ENERGY DELIVERY SYSTEM

SOFTWARE REQUIREMENTS SPECIFICATION- “SRS”

PREPARED BY THE BUSINESS APPLICATIONS TEAM FOR IBEDC

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A. Document Approval

The following IBEDC Energy Delivery System Requirements Specification have been accepted and approved by the following:

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IBEDC

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1. Introduction

An Energy Delivery system refers to the infrastructure and mechanisms that facilitate the transmission and distribution of energy to consumers. It covers various components and processes involved in generating electricity to consumers. This system involves a complex network of interconnected infrastructure, including transmission lines, substations, distribution lines and various control and monitoring systems. It plays a vital role in ensuring a reliable and efficient supply of energy to meet the needs of society.

1.1 Purpose

This document aims to specify the software requirements for the Energy Delivery System that will facilitate a reliable and efficient communication and automation of the technical processes within the different Technical Units (Energy Management, Network Administration, Protection & Control) in IBEDC.

1.2 Objective

The objective of the IBEDC Energy Delivery System is to automate the process flows of all the Technical Units in IBEDC. This system aims to provide a centralized platform where employees in the Technical departments of IBEDC can conveniently send and store information in a central system, thereby eliminating the problem of inaccurate information gathering and circulation.

1.3 Scope

The Scope of the IBEDC Energy Delivery System includes:

1. Energy Management
2. Energy Distribution Infrastructure
3. Network Planning and Design
4. Network Operation
5. Outage Management System
6. GIS Integration
7. Substations and Interconnections
8. Map Assessments
9. Protection and Control
10. Assets Management
11. Reporting
12. Operations
13. Automation

2. REQUIREMENTS

2.1 Functional Requirements

The functional requirements of the IBEDC Energy Delivery System typically includes the following:

1. **Energy Management:** refers to the systematic control, monitoring and optimization of energy resources and consumption within the organization. It involves analyzing energy data, identifying opportunities for efficiency improvements, implementing energy-saving measures and tracking performance to ensure effective energy utilization. Energy Management aims to reduce energy waste, minimize costs, increase sustainability, and improve overall energy efficiency.
2. **Energy Distribution Infrastructure**: refers to the network of transmission and distribution lines, substations, transformers and associated equipment that deliver energy to end-users. It plays a critical role in the efficient and reliable distribution of energy from generation sources to consumers. The Energy Delivery System monitors and optimizes the operation of the distribution infrastructure, ensures proper load balancing, voltage regulation, fault management and coordinates with the generation and demand sides to maintain grid stability and maximize the utilization of the distribution network.
3. **Network Planning and Design:** refers to the process of strategically planning and designing the energy infrastructure, including transmission and distribution networks, to meet current and future energy demands. It involves analyzing load profiles, forecasting energy consumption, identifying optimal routes and locations for infrastructural expansion and selecting appropriate equipment and technologies. This ensures the efficient utilization of resources, cost-effective expansion and reliable operation of the energy network while considering factors like system capacity, load growth, grid reliability and environmental sustainability.
4. **Network Operation:** refers to the day-to-day management, monitoring, and control of the energy infrastructure, including transmission and distribution networks. It involves activities such as real-time monitoring of energy flows, voltage levels, system performance, responding to alarms and incidents, optimizing grid operations, coordinating with energy suppliers and consumers. This ensures the safe, reliable, and efficient operation of the energy network, minimizes downtime, optimizes energy utilization and supports the overall goals of the Energy Delivery System in delivering quality energy services to consumers.
5. **Outage Management System (OMS):** plays a critical role in efficiently identifying, tracking and resolving power outages. It integrates with monitoring devices to detect outages, facilitate outage reporting and communication, assists in outage analysis and restoration prioritization, manages crew dispatch and work order management and integrates with

broader Energy Delivery Systems for overall grid operations. The OMS enhances outage response times, minimizes downtime and improves coordination between utility operators, field crews and customers, thereby optimizing the reliability and performance of the Energy Delivery System.

6. **GIS (Geographic Information System) Integration**: refers to the incorporation of spatial data and geospatial analysis capabilities into the Energy Delivery System. It involves integrating GIS technology with the energy infrastructure data, such as transmission lines, substations and distribution networks, to visualize and analyze the spatial relationships and characteristics of the energy assets. GIS Integration enables efficient asset management, spatial planning, network optimization, outage management, and decision-making processes within the Energy Delivery System, leading to improved system reliability, effective infrastructure maintenance and optimized resource allocation.
7. **Substations and Interconnections:** These play a crucial role in facilitating an efficient transmission and distribution of electricity. Substations act as intermediaries between high-voltage transmission lines and lower-voltage distribution lines, transforming the voltage levels to match the requirements of the different grid sections. They also house equipment for voltage regulation, protection, and monitoring. Interconnections refer to the links between different transmission networks and regions, allowing for the exchange of electricity and enhancing grid reliability. Substations and interconnections ensure seamless energy transfer, enable load balancing, support system stability, and facilitate the integration of renewable energy sources into the grid.
8. **Map assessments:** This involves analyzing geographic data, such as land use, topography and existing infrastructure, to inform decisions related to the placement of power generation facilities, transmission lines, substations, and distribution networks. These assessments help identify suitable locations, determine the most efficient routes for energy transmission and consider factors like accessibility, environmental impact and future expansion. Map Assessments ensures that the system is strategically planned, optimized and aligned with the geographic characteristics of the region, leading to efficient energy distribution and reliable power supply.
9. **Protection and Control:** Protection refers to the mechanisms and devices that detect and respond to abnormal conditions, faults or disturbances in the system to prevent equipment damage and mitigate potential hazards. Control involves the implementation of automated systems and devices to regulate voltage, frequency and power flow, ensuring stability and efficient operation of the Energy Delivery System. Protection and control measures are integrated into substations, transmission lines and distribution networks to safeguard equipment, maintain system reliability and minimize the impact of disruptions on the overall energy supply.

10. **Assets Management:** refers to the strategic planning, operation and maintenance of the infrastructure assets involved in energy generation, transmission and distribution. It involves identifying and classifying assets, establishing asset lifecycle management strategies, monitoring asset performance, conducting inspections and maintenance activities and optimizing asset utilization. Assets Management ensures the reliability, longevity and cost-effectiveness of the infrastructure by prioritizing maintenance, upgrades and replacements based on asset condition, risk assessment and business objectives. It aims to maximize the value and performance of assets, minimize downtime and support the overall goals of the energy delivery system.
11. **Reporting:** Reporting is an essential part of the Energy Delivery System because it provides essential information and data regarding its performance and efficiency. Through comprehensive reporting, engineers can monitor and evaluate various aspects, such as energy consumption, distribution losses, maintenance needs, and renewable energy integration. This data enables informed decision-making, facilitates optimization efforts, supports regulatory compliance and promotes transparency and accountability within the Energy Delivery System.
12. **Operations:** This involves the day-to-day management, maintenance and control of the system's infrastructure and processes. This includes activities like monitoring energy flow, responding to outages or emergencies, managing grid stability, coordinating maintenance schedules and ensuring the safe and reliable delivery of energy to consumers. Effective operations optimize the system's performance, minimizes downtime, maximizes efficiency and contributes to meeting the energy demands of consumers.
13. **Automation:** Enables better monitoring and control of energy units, allowing for real-time data analysis, predictive maintenance, and optimized energy distribution. Additionally, automation enhances safety by minimizing human errors and improving response times to emergencies.

2.2. Non-Functional Requirements

Non-functional Requirements for the IBEDC Energy Delivery System should include the following:

1. **Security:** The system will adhere to high-security standards to protect data, financial information, and transactions. It will also implement encryption, secure authentication, and access control mechanisms to prevent unauthorized access, data breaches, and fraud.
2. **Reliability and Availability:** The system will be highly reliable and available to ensure uninterrupted access for our customers. It will have robust server infrastructure, backup systems, and disaster recovery plans to minimize downtime and maintain service availability.
3. **Performance and Scalability:** The system will be capable of handling a large number of concurrent users and transactions without significant performance degradation. It will be scalable to accommodate increasing user loads and ensure responsiveness during peak usage periods.
4. **User Experience:** The system will have an intuitive and user-friendly interface that is easy to navigate, understand, and use. It will provide clear instructions, error handling, and helpful feedback to enhance the user experience and minimize confusion or frustration.
5. **Compatibility:** The system will be compatible with various web browsers operating systems, and devices to ensure a consistent user experience across different platforms. It will also be responsive and adaptable to different screen sizes and resolutions.
6. **Compliance:** The system will comply with relevant legal and regulatory requirements such as data protection laws and privacy regulations. It will also adhere to industry best practices and undergo regular security audits.
7. **Audit Log:** The system will include mechanisms to monitor system performance, track errors or issues, and log details of all users and database activities for auditing and troubleshooting purposes. This helps in identifying and resolving performance bottlenecks or technical problems promptly.
8. **Integration and Interoperability:** The system will have the capability to integrate with other systems or APIs to exchange data seamlessly. It will support industry-standard protocols and formats to facilitate interoperability with external systems or services.
9. **Scalable Infrastructure:** The system will be built on a scalable infrastructure that can handle increasing user demands and accommodate future growth. It will also have the ability to scale resources such as servers, databases, and network bandwidth as needed.
10. **Disaster Recovery and Backup:** The system will have a robust backup strategy and disaster recovery plan in place to ensure data integrity and minimize downtime in case of unforeseen events. Regular backups, redundant systems, and contingency measures will be implemented.

2.3 Technical/Software Requirements

The Technical/Software Requirements of the Energy Delivery System will include the following:

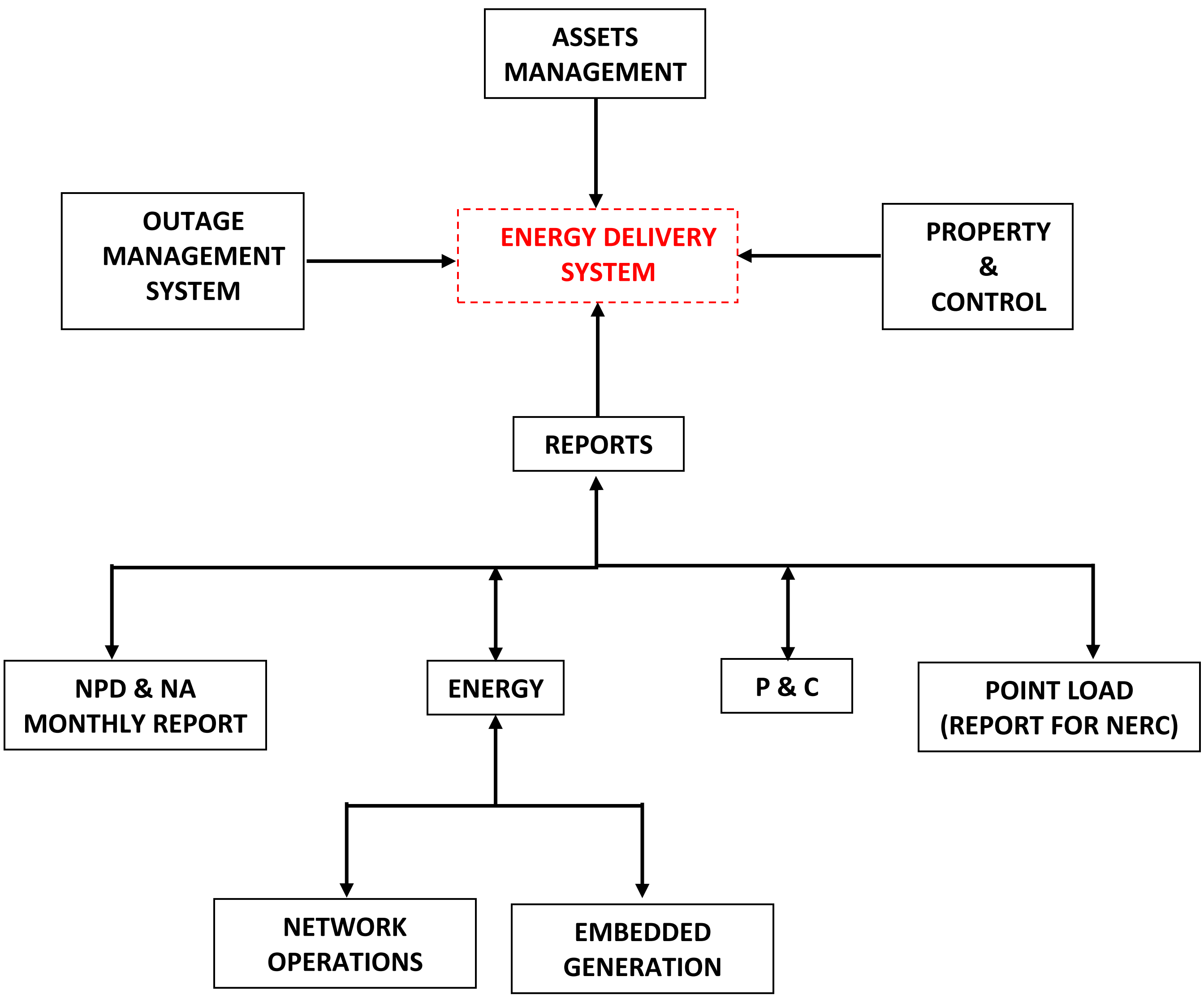
1. **Web Application Framework:** The system will require a web application framework such as React Native and Laravel to build the user interface and handle server-side logic.
2. **Database Management System:** A reliable and scalable database management system like MSSQL will be needed to store data.
3. **Data Warehouse:** A data warehouse is used to integrate, organize, and analyze large volumes of data from various sources to support the business. As a result, a reliable and scalable data warehouse will be needed to store data, and act as a backup in case of unforeseen emergencies.
4. **User Interface Design:** The system will have an appealing and user-friendly interface design using HTML, CSS, and JavaScript. Front-end frameworks like React Native will be employed to enhance user experience and responsiveness.
5. **Security Measures:** The system will incorporate industry-standard security measures, including secure socket layer (SSL) encryption and secure storage of sensitive data. It will also require tools for vulnerability scanning, intrusion detection, and prevention.
6. **Authentication and Authorization:** The system will include authentication mechanisms like username/password authentication, two-factor authentication to ensure secure user access. Role-based access control (RBAC) will be implemented to manage user permissions and authorization levels.
7. **API Development:** The system will provide APIs (Application Programming Interfaces) to allow integration with external systems or services. These APIs enable seamless data exchange and will be developed using Laravel.
8. **Performance Optimization:** The system will be optimized for performance to handle high user traffic and ensure fast response times. Techniques like caching, database indexing, query optimization, and server load balancing will be implemented to improve system performance.
9. **Scalable Infrastructure:** The system will be hosted on a scalable infrastructure, such as a windows server or linux. This allows resources to be dynamically allocated based on demand, ensuring scalability and high availability.
10. **Logging and Monitoring:** The system will incorporate logging mechanisms to record system activities, errors, and user actions for troubleshooting and auditing purposes. Monitoring tools and frameworks will be employed to track system performance, uptime, and user behavior.

2.4 Hardware Requirements

1. **Servers:** The Hardware to be used should be a windows or Linux server, a minimum of 10 Terabyte hard disk and a minimum of 1TB RAM, 3.0GHZ processor speed.
2. **Networking Equipment:** Reliable networking equipment such as routers, switches and firewalls are necessary to establish secure connections between the server infrastructure, user devices and external systems.
3. **Backup Systems:** Implementing backup systems is crucial to ensure data integrity and recovery from potential data loss. This will involve additional storage devices, tape drives, or cloud-based backup solutions.
4. **Security Hardware:** To enhance security, hardware components such as hardware security modules (HSMs) or encryption accelerators will be utilized to handle cryptographic operations securely and efficiently.
5. **Monitoring and Management Tools:** Hardware-based monitoring and management tools such as server monitoring software, network monitoring devices or remote management consoles will be employed to monitor system health, performance, and security.

3. ARCHITECTURE

An Energy Delivery System requires a well-defined architecture to ensure an efficient and reliable operation. The architecture serves as a structured framework that outlines the design, components and connections of the system. It helps optimize the distribution of energy, enables easy scalability, facilitates maintenance and troubleshooting, enhances system resilience and promotes integration with emerging technologies. Overall, a well-designed architecture is essential for maximizing energy delivery, minimizing wastage and adapting to evolving energy needs and challenges.



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4. PROTECTION AND CONTROL (P&C):

A Protection and Control Unit is crucial to any Technical Unit, as this unit safeguards faults and abnormalities on lines, thereby ensuring safe and reliable operations in the organization. By continuously monitoring the grid's health, this unit can detect any potential issue such as overloads, short circuits, or voltage abnormalities. When a fault is identified, the Protection and Control Unit rapidly rectifies the affected area by minimizing disruptions and preventing cascading failures. Additionally, this allows for remote control and automation, enabling efficient grid management, faster fault recovery, and optimized energy distribution.

4.1 POWER TRANSFORMER:

This refers to the process flow that is followed whenever a fault is found on a line and needs to be rectified.

ACTION OWNERS	DESCRIPTION OF TASKS	ACTIVITIES
DSO	Fault found	• The DSO will determine the fault and notify the Business Hub Dispatch
BH Dispatch	Technical Engineer	• The BH Dispatch will pass the information to the Technical Engineer. If the TE solves it, it'll be closed out, if not-
Technical Engineer	Technical Manager	• The TE takes it to the TM
Technical Manager	Chief Technical Officer	• The TM takes it to the CTO
Chief Technical Officer	Protection and Control	• The CTO takes it to the P&C Department
Protection and Control	Managing Director	• If the P&C can't solve it due to financial budget, it then goes to the MD

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4.2 DISTRIBUTION TRANSFORMER:

This refers to the process flow that is followed whenever a fault is found on a transformer and needs to be rectified.

ACTION OWNERS	DESCRIPTION OF TASKS	ACTIVITIES
DSO	Fault found ↓	• The DSO will determine the fault and notify the Technical Supervisor
Technical Supervisor	TS ↓	• The Technical Supervisor will pass the information to the Technical Engineer.
Technical Engineer	TE ↓	• The Technical Engineer takes it to the Regional Head for approval.
Regional Head	RH	• The Regional Head gives final approval.

5. ENERGY MANAGEMENT:

Energy Management and Outage Management System (OMS) are closely related, as they focus on effectively managing and responding to energy outages. The OMS helps in identifying the location and extent of outages, tracking the status of repairs, and facilitating efficient restoration processes. By integrating with the Energy Delivery System's infrastructure and data, the OMS enables rapid identification and isolation of faults, prioritizes restoration efforts and enhances communication with customers and field crews. It plays a vital role in minimizing downtime, improving customer satisfaction, and ensuring the reliable delivery of electricity.

5.1 WORKFLOW:

- **Feeder Fault Reported:** The Distribution System Operator (DSO) of an injection substation reports a feeder fault to the Business Hub Dispatch Office.
- **Dispatch Technical Supervisor and Crew:** The technical supervisor, along with the crew, is dispatched to the DSO location to assess the reported fault.
- **Obtain Permit to Work (PTW):** The technical supervisor and crew go back to the DSO to obtain a Permit to Work (PTW) once they have assessed the fault and determined the necessary actions.
- **Permission Granted:** After the PTW is granted by the DSO, the technical supervisor and crew are authorized to proceed with fixing the fault on the feeder.
- **Check Material Availability:** If materials are required to fix the feeder, the crew checks their own store to see if the necessary materials are available. If they are not available, they proceed to the next step.
- **Inform Technical Engineer:** The crew informs the technical engineer that the required materials to fix the feeder are not available in their store.
- **Material Search:** The technical engineer takes action to acquire the materials. They either retrieve the materials from their own store or contact the regional technical manager to check if the materials are available there.
- **Material Availability Check:** If the regional technical manager has the required materials, they arrange for them to be provided to the crew. If the materials are not available, the process moves to the next step.
- **Contact Business Hub Manager:** The technical engineer contacts the business hub manager to inform them that the necessary materials are not available for the feeder repair.
- **Approval from Hub Auditor:** The business hub manager, in consultation with the hub auditor, assesses the situation and approves the procurement of the required materials.
- **Material Procurement:** The business hub manager obtains the necessary materials either from the store or by arranging an IOU (an 'I Owe You') from the vendor.
- **Material Delivery:** Once the materials are procured, they are delivered to the crew at the DSO location.
- **Feeder Repair:** The crew proceeds with fixing the fault on the feeder using the available materials.

- **Verification and Testing:** After the repair is completed, the crew verifies and tests the feeder to ensure that it is functioning properly.
- **Closure and Reporting:** The crew closes the work order, documenting the actions taken and any additional information related to the repair. The completed work order is reported back to the Business Hub Dispatch Office.
- The DSO then obtains approval from the dispatch office to conduct testing. They perform the necessary tests and provide a report containing the initial load reading and the time at which the power is restored.

Note that in the event a fault cannot be resolved within 24 hours, the Branding and Corporate Officer at the Region/Business Hub is notified. They are responsible for informing the affected areas about the cause of the outage.

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5.2 OUTAGE MANAGEMENT SYSTEM:

ACTION OWNERS	DESCRIPTION OF ACTIVITIES
ISS DSO	Reports a Feeder Fault
BH Dispatch Officer	Business Hub Dispatch Office Receives information about Initial Load and Reading Time of Restoration.
Technical Supervisor	Service Centre
DSO	Grants Permit-To-Work Reports to BH Dispatch Officer with Initial Load and Reading Time of Restoration.
Technical Supervisor	Gather crew to fix Fault States Findings for DSO **Fault Rectified**
	Fault Not Rectified
Technical Engineer	Supply Materials
Technical Manager	Supply Materials

6. NETWORK ADMINISTRATION:

The Network Administration Unit is essential in an Energy Delivery System because this unit manages and monitors the communication network, enables efficient grid operation, fault detection and data exchange to give reliable energy delivery.

This technical unit covers quite a number of processes and flows (update and delete) that guides every activity. The process flows that must be adhered to are;

6.1 UPDATE FLOW:

ACTION OWNERS	DESCRIPTION OF TASKS	ACTIVITIES
NPD of BH	Notification	The NPD of the BH will notify the Regional project manager
Regional project manager	Approve	The Regional project manager will approve and pass the information to the Lead network planning
Lead network planning	Final Approval	The update will be closed at this level.

6.2 DELETE FLOW:

ACTION OWNERS	DESCRIPTION OF TASKS	ACTIVITIES
NPD of BH	Notification	The NPD of the BH will notify the Regional project manager
Regional project manager	Approve	The Regional project manager will approve and pass the information to the Lead network planning
Lead network planning	Approve	The Lead Network Planning will approve and pass it to the Network Administration
Network Administration	Final Approval	The Network Administration will approve and it will be finalized at this level.

7. DOCUMENTATION:

The Documentation for the Energy Delivery System typically includes the following:

1. **User Guide/Manual:** This document will provide instructions and guidelines on how to use the Energy Delivery System from a user's perspective. It will also cover topics such as account login and accessing additional features.
2. **Administrator Guide/Manual:** This document is aimed at system administrators or support personnels who manage and maintain the Energy Delivery System. It covers topics such as system installation, configuration, user management, security settings, monitoring, and troubleshooting.
3. **API Documentation:** API (Application Programming Interfaces) documentation is needed for integration with external systems and services. It includes detailed information about the available endpoints, request and response formats, authentication methods, and usage examples.
4. **Integration Guide:** This document will provide guidance on integrating the Energy Delivery System with other systems. It will also outline the steps and requirements for data synchronization, configuration settings, and handling communication between the system and other integrated systems.
5. **Security and Compliance Documentation:** This documentation covers the security measures implemented in the Energy Delivery System to protect data and comply with relevant industry standards and regulations. It will include information about encryption protocols, data storage practices, access controls and compliance certifications.
6. **Troubleshooting and FAQs:** This document will address common issues or questions that may occur while using the Energy Delivery System. It will also provide troubleshooting steps, solutions to common problems, and frequently asked questions to assist users in resolving issues on their own.
7. **Release Notes/Change Log:** These documents will provide information about new features, enhancements, bug fixes, and other changes made in each version or release of the Energy Delivery System. Furthermore, they will serve as a reference for users and administrators to understand the updates and improvements introduced in the system.
8. **Terms and Conditions/Privacy Policy:** These documents will outline the terms of use, privacy practices, and legal agreements associated with using the Energy Delivery System.

8. TRAINING:

Implementing the Energy Delivery System will require various trainings to ensure that the system is effectively utilized and managed. Here are some key training areas:

1. **User Training:** Users who will be accessing and utilizing the Energy Delivery System will receive training on how to navigate the system and perform tasks.
2. **Administrator Training:** System administrators or support personnel responsible for managing and maintaining the Energy Delivery System will receive comprehensive training. This training will cover tasks such as user management, system configuration, security settings, troubleshooting, and system maintenance. It will also include training on monitoring tools and procedures to ensure system health and performance.
3. **Integration Training:** Training will be provided to developers or technical staff responsible for the integration. This training will cover the integration process, API usage, data synchronization, and troubleshooting.
4. **Security Training:** Security training is essential to educate users and administrators on security best practices, data protection measures, and handling sensitive information within the Energy Delivery System. Training will cover topics such as password security, data encryption, secure authentication, and recognizing and reporting potential security threats.
5. **Compliance Training:** Compliance training ensures that users and administrators are aware of legal and regulatory requirements associated with the Energy Delivery System.
6. **Updates and New Feature Training:** As new updates or features are introduced to the Energy Delivery System; training will be provided to users and administrators to familiarize them with the changes and how to effectively utilize the new functionalities. This helps ensure that all users are up to date and can take advantage of system improvements.

Conducting training sessions, workshops, or providing online training materials can help ensure that individuals have the knowledge and skills to effectively use and manage the Energy Delivery System.

9. CONSTRAINTS:

Constraints for the Energy Delivery System refer to the limitations or restrictions that need to be considered during its design and implementation. Here are some common constraints to consider:

1. **Security Constraints:** Security is a critical aspect of the Energy Delivery System. Constraints may include compliance with industry standards (e.g., PCI DSS), secure storage and transmission of sensitive data, implementation of encryption and authentication mechanisms, and protection against potential threats such as fraud or data breaches.
2. **Performance Constraints:** The Energy Delivery System will be designed to handle high volumes of concurrent user traffic efficiently. Constraints will involve optimizing system performance, minimizing response times, and ensuring scalability to accommodate increased demand.
3. **Timeline:** The Energy Delivery System must be developed within the allocated timeline (12 weeks).
4. **Resources:** The System must be developed within the allocated resources:
    - 1 UI/UX Designer
    - 3 Frontend/Backend Developer
    - 1 Database Administrator
    - 1 Server Administrator
5. **Availability Constraints:** The system will strive for high availability to ensure uninterrupted access for users. Constraints may include redundancy measures such as server failover, load balancing, backup systems and disaster recovery plans to minimize downtime and ensure system availability.
6. **Integration Constraints:** If the Energy Delivery System needs to integrate with other systems or services, constraints may involve adhering to specific integration protocols, API compatibility, data synchronization requirements, and ensuring smooth data exchange between systems.
7. **Compliance Constraints:** The Energy Delivery System will need to comply with various legal and regulatory requirements. Constraints will include data privacy regulations and adherence to specific industry standards or certifications.
8. **User Experience Constraints:** The system will provide a user-friendly and intuitive interface. Constraints may include designing the user interface with ease of use in mind, optimizing responsiveness for different devices, accessibility considerations, and ensuring a seamless and consistent user experience.
9. **Technology Constraints:** Constraints will arise due to technology choices and limitations. These will include compatibility with specific programming languages, frameworks, or

libraries, adherence to hardware or software requirements, and ensuring compatibility with various web browsers.

10. **Time and Budget Constraints:** The development and implementation of the Energy Delivery System will be completed within a specific timeframe and budget. Constraints will include resource allocation, project management considerations and efficient utilization of available resources.
11. **Organizational Constraints:** These could include internal policies, organizational infrastructure, or specific business processes that need to be accommodated within the Energy Delivery System Considering these constraints during the design and implementation of the Energy Delivery System will help ensure that the system meets the necessary security, performance, compliance, and user experience requirements while adhering to budgetary and timeline considerations.

10. ASSUMPTIONS:

Assumptions refer to the underlying beliefs or conditions that are considered true or in place during the design and implementation of the system. Here are some common assumptions for the Energy Delivery System:

1. **User Internet Connectivity:** It is assumed that users accessing the Energy Delivery System have a reliable internet connection to interact with the system.
2. **User Device Compatibility:** The system assumes that users have compatible devices with supported web browsers to access the system.
3. **Data Accuracy:** The system assumes that the data provided by users during the registration process are accurate and valid. It relies on the correctness of user-provided information for proper management.
4. **System Security Measures:** The system assumes the implementation of appropriate security measures to protect data and prevent unauthorized access. This includes encryption of sensitive data, secure authentication methods, and monitoring for potential security threats.
5. **Integration with Backend Systems:** It is assumed that the Energy Delivery System will integrate with relevant backend systems.

11. GLOSSARY:

The following terms are used throughout this document:

- **Data collection:** The process of collecting data from different sources.
- **Data aggregation:** The process of combining data from different sources into a single format.
- **Data storage:** The process of storing collected data in a database.
- **API:** Application Programming Interface.
- **GIS:** Geographic Information System
- **PTW:** Permission to Work
- **NPD:** Network Planning and Design
- **DSO:** Distribution System Operator
- **BH:** Business Hub
- **P&C:** Protection and Control
- **EDS:** Energy Delivery System

12. CONCLUSION:

In conclusion, the essence of the Energy Delivery System is to automate the process flows of the different technical departments in IBEDC. Automation has its own benefits as it improves operational efficiency by reducing manual intervention and streamlining processes, leading to increased productivity and cost-effectiveness.