

OLF ENERGY

Launching new projects

METERING & COMPENSATION

- Metering
- Balance responsible management
- Billing
- Compensation

CUSTOMER RELATIONSHIP & COMMUNICATION

- Notification & communication management
- Emergency & crisis management

CUSTOMER RESPONSE

- Smart Ledgers
- Smart contract

MARKET PLATFORM GATEWAY

- Power Exchange
- Capacity platform
- Balancing market

MARKET SIGNAL

- Cross border capacity calculation
- Adequacy assessment
- Balancing mechanisms

SYSTEM CONTROL

- Remote operation
- State estimation
- Centralized automation (Balancing, Voltage, Congestion)
- Power grid recovery
- Power quality and system stability management

POWER SYSTEM CALCULATION

- Data Model exchanges
- Online security analysis
- Static and dynamic calculation (quality & stability)

FORECASTING

- Demand forecast
- Load forecast
- Generation forecast
- Storage forecast
- International Exchange forecast
- Forecasted grid studies

SHARED

DATA MANAGEMENT

- Long term storage
- Message queuing
- Data validation

SYSTEMS GOVERNANCE

- Self-registering
- Self-healing

IT MANAGEMENT SUPERVISION

- Network administration
- Service administration
- Cybersecurity

COMMON COMMUNICATION MEDIA

- Emergency & Crisis management
- Message queuing – services, directory

UNIFIED OPERATOR'S UX COMPONENTS & FRAMEWORK

- Animated power substation/ network schemes
- Supervision component
- Alerting
- Hypervision component
- Coordination and workflow framework
- Secured Phone

OUTAGE MANAGEMENT

- Ticketing
- Outage Programming
- Outage Planning
- Stakeholder management
- Outage coordination
- Distributed outage management

ASSET INVESTMENT PLANNING

- Renewal policy management
- Investment policy

CRITICAL EQUIPMENTS
Sensor | Protection | Actuator

EDGE NODE CONTROL

- Protocol conversion
- Aggregated / distributed / local automations:
 - Synchronized switching
 - Balance & frequency control
 - Monitoring & control
 - Congestion management

LESS CRITICAL EQUIPMENTS
Sensor | Protection | Actuator

FAULT LOCALIZATION & MANAGEMENT

DIGITAL SUBSTATION

- altering, sensing & actuation
- Configuration
- Equipment communication

AGGREGATION NODE

SUBSTATION NODE

DISTRIBUTED NODE

EQUIPMENT NODE

COMMUNICATION INFRASTRUCTURE

CENTRAL HUB

- Protocol conversion
- Cross-device / vendor & cross-telecom network compatibility
- Data acquisition and treatment
- Short term persistency

INFRASTRUCTURE MANAGEMENT

- Remote equipment and node management
- Remote configuration mgt.

ASSET REPOSITORY

- Power equipment repository
- Digital infrastructure repository
- Configuration tools
- Configurations and settings repository

ASSET SUPERVISION

ASSET MONITORING

ANALYTICS

- Health index computation
- Digital twin
- Predictive analytics
- Deep learning
- Simulation

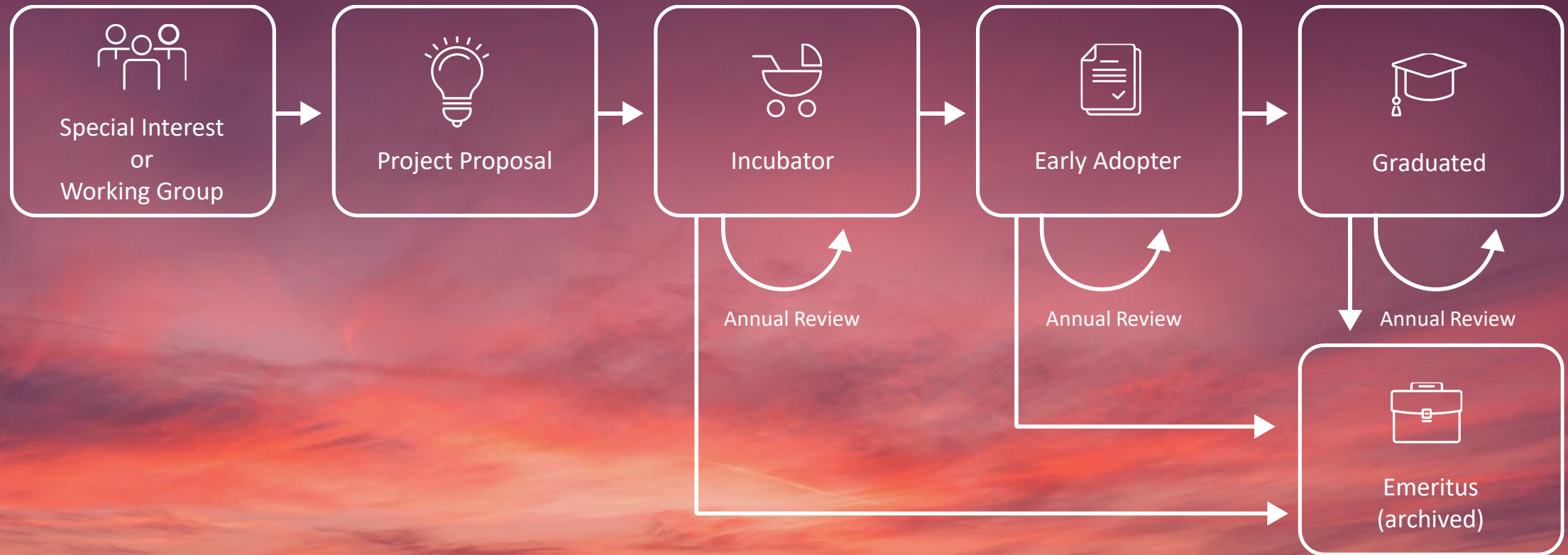
FIELD WORK MANAGEMENT

- Safety rules implementation
- Team planning + scheduling
- Supply chain

LF Energy governance: splitting technical and business decisions

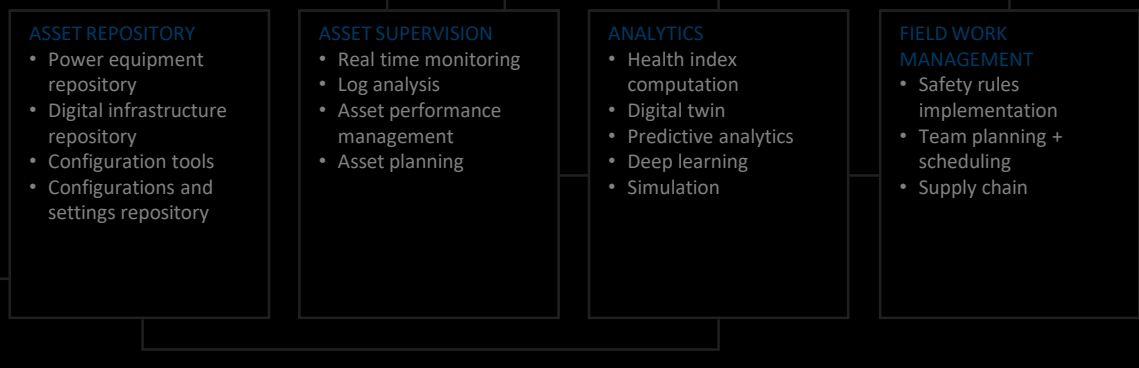
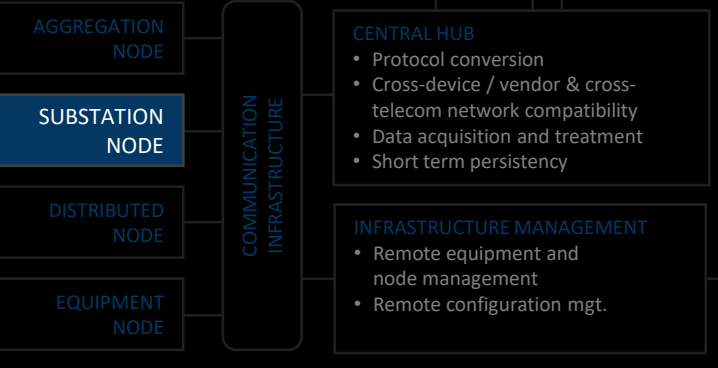
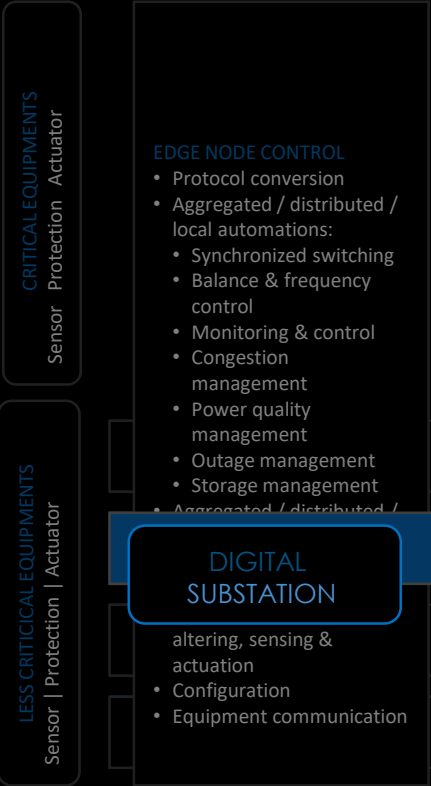
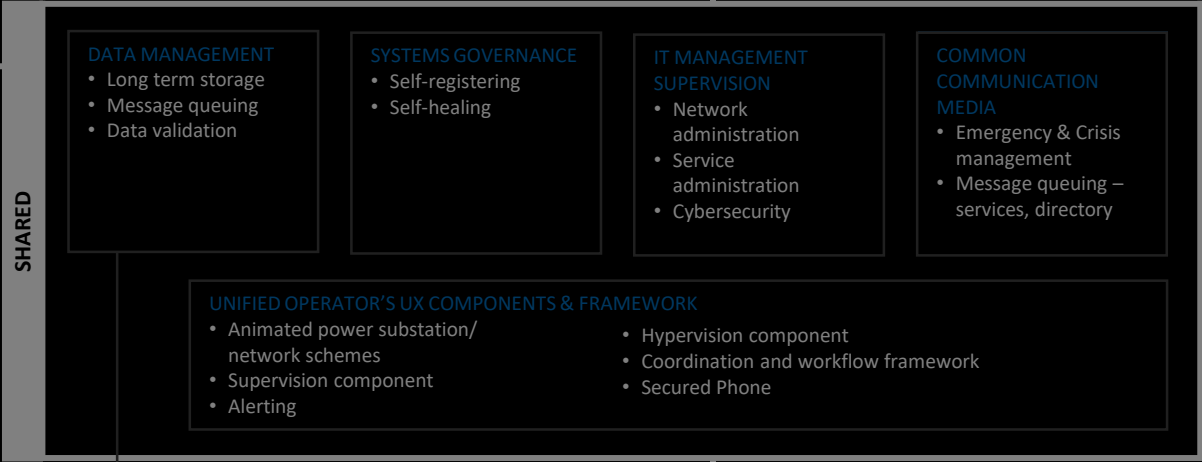
- Established projects are run by their respective Technical Steering Committees (TSCs)
- The inception of new projects is driven by LF Energy's Board and TAC
- Open access & meritocracy
- Requires Membership

LF Energy Project Lifecycle



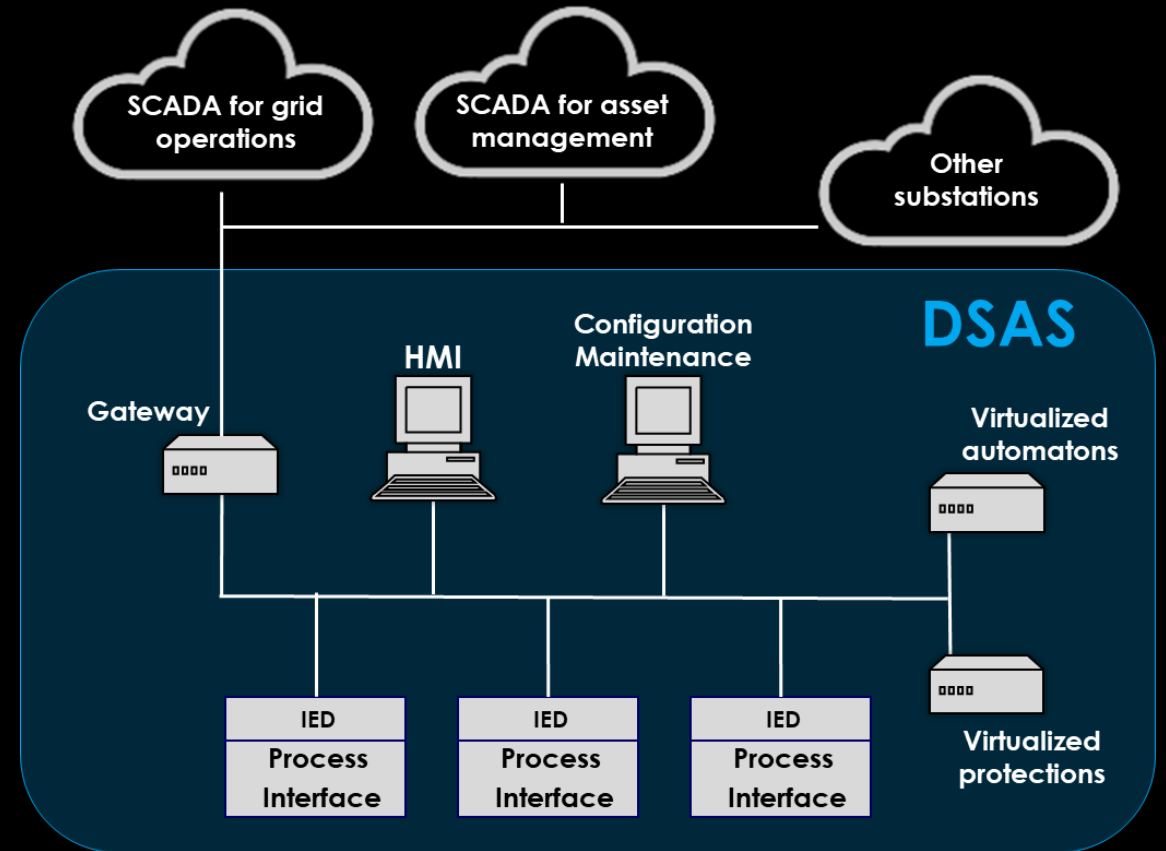


Focus on the Digital Substation



Functions @ Digital Substation

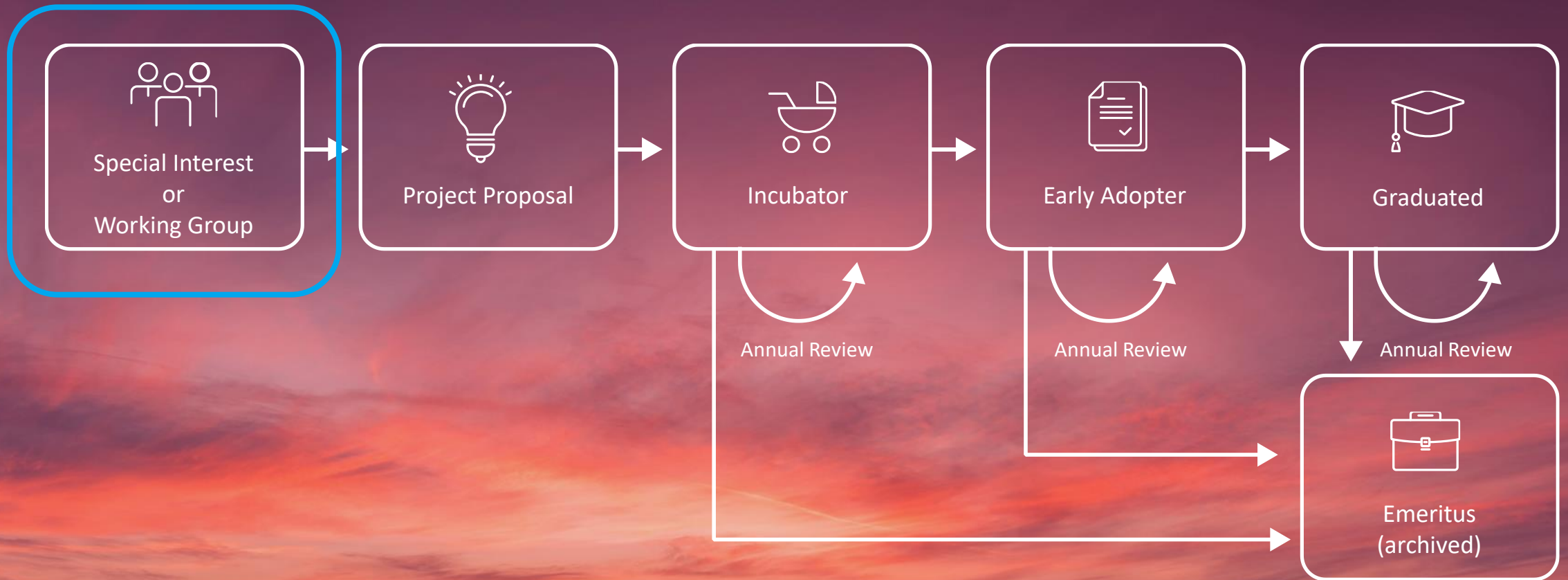
- Measuring, sensing, actuation
 - Including high voltage equipment
- Communication
 - with equipment within the substation
 - with external (central or local) systems
- Automation & protection
- Supervision, configuration, maintenance



Why a call for open source collaboration?

- We believe that open source collaborations are essential to achieve the required level of **modularity**, **interoperability** and **scalability** for the next generation of digital substation systems.
- Open source collaborations are also needed to meet those requirements in a cost-efficient way by sharing the effort through a **leveraged development** approach that involves all stakeholders from equipment manufacturers to end-users.

Pre-inception stage



Design Teams

- The purpose of the Design Teams is to carry out preparatory works for the inception of open source projects under LF Energy umbrella.
- They will aim at building **common roadmaps** and at identifying the individual **contributions** that each party would commit to the projects.
- There is no commitment to participate to the future projects by participating to the Design Teams. Participation to the projects will be decided at the end of the preparatory works based on each party's agreement with the roadmap and contributions.

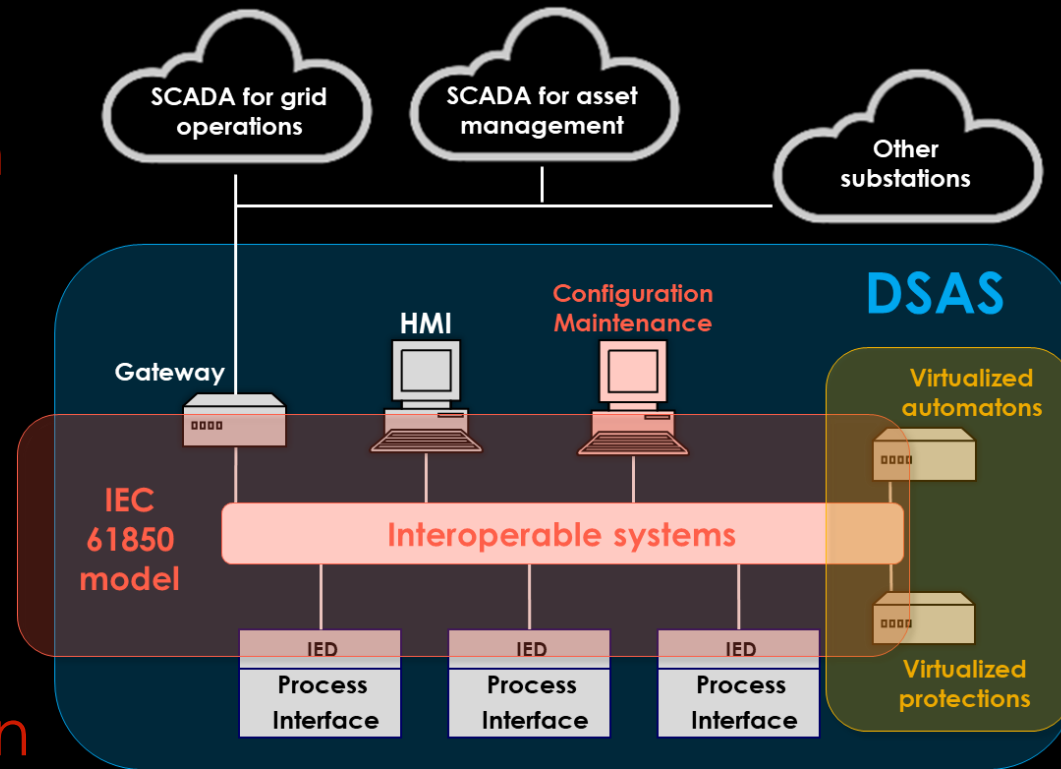
2 Design Teams, aiming at 2 Projects

#1-a) A model specification of the IEC 61850 implementation

at the power grid substation that would constitute the basis of the modular, interoperable and scalable framework

#1-b) A system configuration toolbox

based on the previous IEC 61850 model aiming at multi-vendor interoperability and functional flexibility for end users

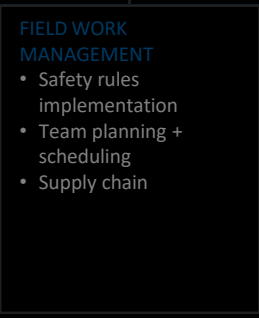
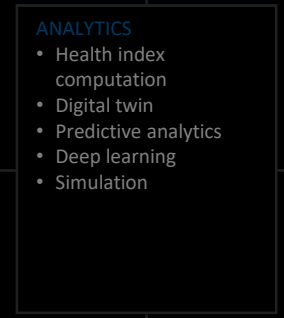
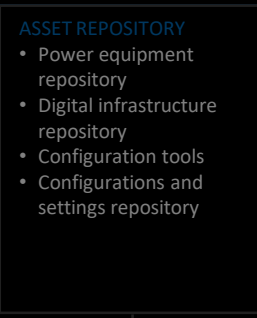
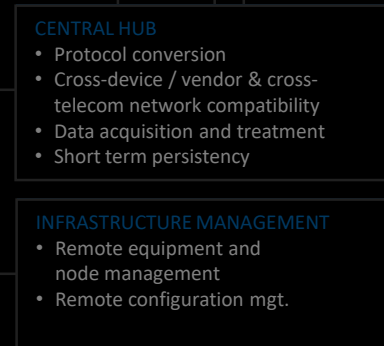
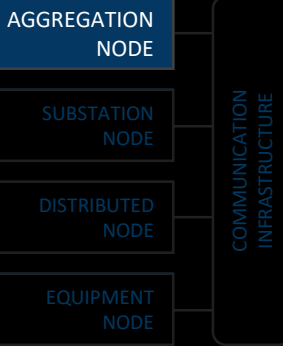
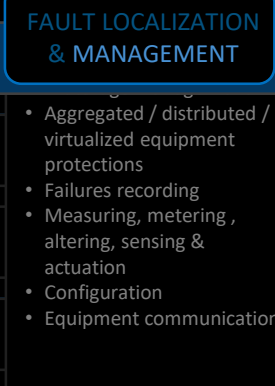
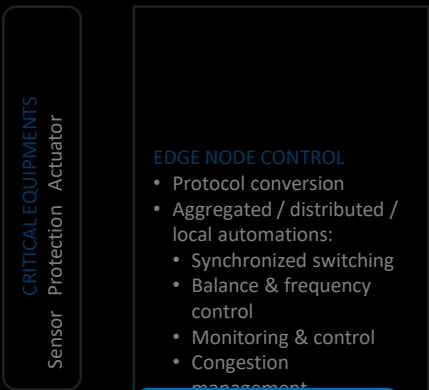
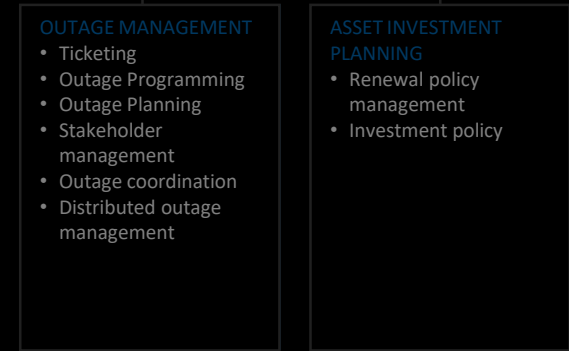
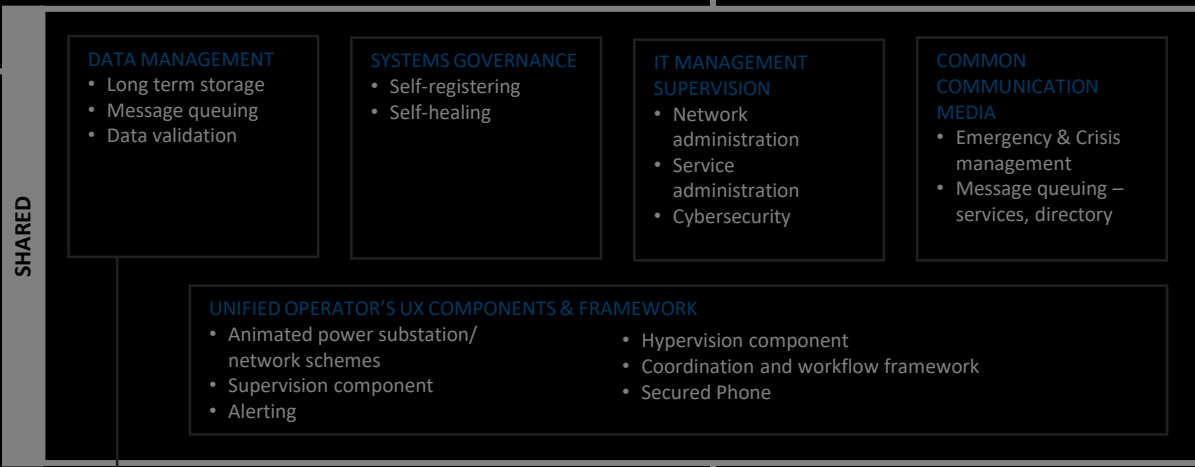


#2) A platform for running real-time virtualized automation and protection applications

providing the following features: isolation, real-time performance, hardware and software supervision, redundancy, time synchronization, application orchestration, configuration and cybersecurity services



Projects coming next?



Your projects?