INDEPENDENT POWER TRANSMISSION OPERATOR S.A. (IPTO OR ADMIE)

IT & Telecommunications Department

Digital TSO Project

11/6/2019

DOCUMENT TRACKING			
VERSION	**Edited By**	**DATE**	**Type of edit**
1	Nikos Raftopoulos	20/02/2019	Author
2	Sotiris Brakatsoulas	16/05/2019	Project Analysis
2	Nikos Raftopoulos	20/05/2019	Review (update specs & budget)

Contents

Digital TSO Project

1. Scope of the Project

Independent Power Transmission Operator (IPTO or ADMIE) needs to develop a digital Strategy that will be used (among others) as a framework for maintaining efficient, robust, secure and up to date information technology infrastructure, applications, tools and services to address the needs of the company. Aging infrastructure, new regulations, distributed energy resources and the convergence of information technology and operations technology (IT/OT) are just a few of the issues that are dramatically changing the utility landscape today. Digital has helped many companies generate greater efficiencies across their operational business units and accelerate innovation. The most important ingredients for such a transformation are:

- Industry 4.0 adoption,
- Exploitation of data analytics,
- modern IT architecture (cloud adoption),
- the value of customer experience for regulated utilities, and
- Blockchain (possibly) — as one of the "next horizon" technologies.

IPTO wishes to hire a specialized consulting firm to develop the digital transformation plan and the relevant roadmap towards the Digital TSO vision. IPTO could approach modern "**Digital TSO"** through disruption and some of the basic pillars that indicatively should be considered by the consultant are described below:

1. **Create a "Digital TSO" vision, milestones and roadmap** that ensures commitment, support and momentum for transformational activities. Digitalization is a core enabler for increased safety, security, productivity and reliability for grid operators. This can be achieved by focusing on the following areas:
    - Adopt Digital ways of working
    - Modernize IT architecture and environment
    - Attract and retain digital talents
2. **Achieve digital Quick Wins**. Achieve early success proposing quick to implement digital pilot cases allowing employees and management to feel and understand digital impact in their day-to-day business. By using agile techniques, the goal is to become faster, reduce the total cost of ownership and establish a new kind of interaction between business and IT. Traditional views on physical assets, "secondary technology", "technical/operational IT" and "business IT" merge into a **"digital world of connected things"**: the grid becomes a "digital reality". Each asset, be it substation, cable or transformer, changes its capability when becoming digital. The same applies to business processes.

3. **IT/OT Operating Model** assessment. Develop and propose the most appropriate operating model for IPTO digital transformation
4. **Aligndigital strategy with the mandate of ADMIE core business departments** (i.e. System Operation, Asset Management, Grid Maintenance, Telecommunications, Construction and New Projects, Market Management)
5. **Handling of huge volumes of data** (e.g. from smart meters) to ensure data mining and prediction. End-to-end business processes need new applications and access to existing data silos.
6. Fuel **utility innovation through analytics**. Develop analytics strategy and align it with predictive maintenance and outage prevention.
7. **Cybersecurity.** Digital solutions are becoming central to keeping the lights on and the grid balanced. But digitalization brings an inherent threat – the more devices are getting digital, smart and connected to the energy and power system, the more do they offer potential access points for cyberattacks to a critical infrastructure. The goal is to build and operate an energy system that is secure and resilient.
8. **Digital disruption on the horizon**. IT is being transformed from an internal service organization to a proactive enabler. Expand the IT delivery model from "run" to "transform" the business by using agile project management and grow IT development capabilities. Innovation examples are:
    - Crowdsourcing of balancing power from batteries in homes mingles transmission with distribution grid level.
    - Widespread roll-out of smart meters would allow activation of millions of decentralized electrical loads, prosumers and storages for grid control.
    - Blockchain-based contracting and settlement enable this kind of mass transaction.

    The long-term trend of decentralizing renewable power generation and storage, load management, aggregation and power-to-X can lead to convergence of the grid-control mechanisms of transmission and distribution grids.
9. **Unlocking the benefits of Digital Grid.** Grid optimization is possible through real-time load balancing, network controls and end-to-end connected markets, enabled by connected assets, machines, devices and advanced monitoring capability. Digital transformation of system operations and energy management may include Digital substation projects, automated security monitoring, balancing energy, forecasting and predictive maintenance.
10. **Asset life cycle management**. Technology solutions can enable real-time, remote-control or predictive maintenance to extend the life cycle or operating efficiency of the generation, transmission or distribution assets and infrastructure. The digital transformation of Asset Management department includes Mobile Workforce Management, Mobile access to maintenance documentation, Autonomous drones for line inspections (air, sea), Sensor data analysis for grid status checks, smart meter data reading etc.

11. **TSO & DSO roles alignment is relevant in principle** but is outside the scope of the project. The role and responsibilities of the transmission and distribution system operators and possible alignments thereof, is a matter to be decided by the authorized institutions. However, the consultant must consider the relevant developments in the European Union countries.
12. **Adopt ENTSO-E digital agenda and comply with IT/ICT digital strategy**. For example, take into consideration Network Codes to facilitate the harmonization, integration and efficiency of the European electricity market.
13. **Unify telecommunication networks towards smart grid establishment.** Obtain and reassure mission critical communication network

2. Project Analysis

1.1. Objectives and Detailed Description

- Interviews with ADMIE's Top Level Management and Key business executives to **develop the vision & mission statements and the objectives of Digital Strategy**.

- **Review the practices of EU TSOs** taking into consideration the IT/ICT requirements of their major departments (i.e. Energy Systems, Asset Management, Maintenance, Construction and Project).

- Review the IT/ICT architecture of **ENTSO-E digital strategy** and ensure that it is consistent with ADMIE's **Digital Strategy Plan**. Take into consideration the current IT/ICT initiatives towards the implementation of Network Codes.

- Formulation of the **Digital Strategy Framework** that will transform ADMIE into a digital TSO including:

    a. Digital Transformation requirements for IT & OT components and digital processes in both Energy and Market.
    b. Description of the proposed solutions for the technical Departments (IT & OT) suggesting appropriate new technologies and ways to utilize them efficiently.
    c. High level requirements of a big data architecture incorporating storage and processing capacity leading to informed decisions (e.g. performance management, predictive maintenance).
    d. Common IT & OT Architecture and Infrastructure plan
    e. Cybersecurity strategy for critical infrastructure.
    f. Requirements to upgrade telecommunications networks and move towards a smart grid.
    g. IT & OT Departments' HR organization and resource plan.
    h. List of future initiatives prioritized (description of dependencies among them).
    i. High level Cost/Impact Analysis of proposed initiatives.

- Presentation of the Digital Strategy Framework to Top-Level Management for comments.
- Review and finalization of the Digital Strategy Framework according to Top Management's comments.

- Formulation of the **Digital Strategy Action Plan** converting the Digital Strategy Framework into specific projects to implement IT, Telecommunications and OT initiatives as proposed by the Digital Strategy Framework.
- The Digital Strategy Action Plan should describe in detail an **integrated implementation approach with a 5 year roadmap horizon** addressing indicatively issues such as:
    a. Defining project requirements after mapping current capabilities of ADMIE considering Technical and Human Resources current state.
    b. Identifying suitable technologies and/or vendors that could provision them under the procurement requirements of the organization.
    c. Selecting the best fit procurement model to meet each project requirements
    d. Governance model to support the implementation and monitoring of the action plan projects providing for periodic progress assessments by ADMIE to identify any required modifications due to changing conditions and requirements.
- Development of a **full project charter** for one (1) priority project with quick turnaround of results (e.g. 6 months) including the following indicative elements :
    1. Project title and Executive Summary
    2. Considerations on the project business case including
        - Any pertinent considerations to the Business Case of the project. Topics such as the impact and urgency of the current situation of the project business case shall be elaborated. Please consider especially any organizational impact (HR, process, department affected, security, policies, etc.).
        - A validation, at project level, of external influences and impacts, such as interfaces, needs, and regulatory requirements that are to be addressed. It shall be checked how urgent it is to address the current situation (how quickly does it need to be addressed). Note that the urgency should not be confused with the impact because it can have a small impact but it can still be an urgent situation to address.
    3. Scope and Objectives of the Project, including
        - A Scope Statement
        - A list of “Includes” ("IN" Scope), i.e., the outputs that the project WILL deliver and which form the solution which addresses the current

situation (problem, need or opportunity). The definition of the scope shall be complemented with the scope of organisational change management activities associated with the implementation of the project and required to achieve the intended benefits.>

- A list of “Excludes” ("OUT" Scope), i.e., what the project will NOT deliver. From the synergies, interrelations and dependencies of the proposed solution, some areas of concern might seem to be part of the scope of the project. It is as important to define what is in scope, as what is out of scope of the project, to better manage the expectations of the project's owner and stakeholders. Examples are deliverables that will be discussed as being part of the scope but given project constraints will be marked as out-of-scope

4. Project Requirements: the IT systems that are required and the relevant infrastructure requirements. Outline of the proposed technology. Outline of the proposed IT systems and relevant infrastructure.
5. Define Business and technical owners (Department) and other participants (Departments)
6. Project Time plan (start and completion date), project, prerequisites, system & application dependencies
7. Budgeted and year-by-year indicative cost estimates (CAPEX, OPEX).

    - Cost. Describe the project’s cost structure. Also provide a summary of previous investments in this area. Provide the Total Cost of Ownership (TCO) of the delivered solution (project output). Calculate the cost for the involvement of the project team and all stakeholders (including costs, if any, for other organizations and/or external stakeholders). Provide the information of the table in “Appendix: Template for describing the Cost Structure of the proposed projects.
    - Timing and Milestones. List the important project points in time of the project lifecycle (i.e. milestones) for events or project deliverables. The list can include an indication regarding the foreseen timing of the major project phases (e.g. Initiating, Planning, Executing, Closing), as well as both project and project management deliverables (e.g. the Project Work Plan and the date it's expected to be finalized).
    - Planned Resources. This is optional, as it presumes a specific method of project implementation. It does not apply to tun key projects, where the resource requirements are defined in the relevant tender.

Please describe project's resources requirements. Summarize here the numbers and type of staff required, including any special skills or experience, scheduled by project phase. Describe how you will approach finding and acquiring resources needed for the project: staff and equipment. Include all resources required to execute the project in all user/stakeholder groups including resources required in other organizations and/or external stakeholders (if any). For non-human resources such as office space, special facilities, computer equipment, office equipment, and support tools, you can also identify

8. Organizational impact (HR, process, department affected, security, policies, etc.)
9. Risks. The list of risks identified shall include the following information
    - Risk Description & Details
    - Current Status
    - Likelihood
    - Impact

The Project must include at least three (3) Key Performance Indicators (KPIs). Those will be used for the ongoing assessment and to manage, coordinate and control every goal and of the overall plan.

- Presentation of the Digital Strategy Action Plan to Top-Level Management for comments.
- Review and finalization of the Digital Strategy Action Plan according to Top Management's comments.

1.2. Deliverables (Documents in hard copies and digital media)

1. The **Digital Strategy Framework (D1)** taking into consideration the EU TSOs' benchmarks and focusing on the "Digital TSO" vision of the management. The digital strategy must support the overall corporate strategy to ensure that digital is fully integrated into core business and highlight the digital transformation of the core energy systems as well as the path leading towards the smart grid. Taking into consideration the IT/ICT and OT systems that are required, prioritizing the implementations needed and the dependencies among the systems. Should address also the following topics:

- **Transmission Grid Asset Performance Management (**Financial performance, Informed asset investment decisions, Risk management, Preventive/predictive maintenance
- **The Digital Infrastructure (Digital Grid, Technical, industrial)** proposal including security of the critical infrastructure and a high-level description of Infrastructure requirements.
- **IT/OT Operating Models.** Propose appropriate operating model and present its core characteristics. Describe the process of adopting such models.
- **Data Analytics Strategy** (handling big and open data, spatial data, public and scientific data, data interoperability)
- The Deliverable should also include a **High-level presentation to the Top-Level Management**.

2. **The Digital Strategy Action Plan (D2)** including the respective IT, OT and telecommunications projects required to implement the framework initiatives. Should address also the following topics:
    - **Integrated Implementation approach** with a 5-year horizon (roadmap)
    - The Deliverable should also include a **High-level presentation to the Top-Level Management**.
3. Fully detailed **Project Charter (D3)** for one high priority quick (up to 6 months) turnaround project including all required information described in the previous chapter.

1.3. Project Duration

The candidate will include in its offer a Gant Chart of the project implementation schedule.

Total Duration: seven (7) months with the following milestones:

- Submission of deliverable **D1 (Digital Strategy Framework)** in **four (4**) **months** from project kick off (**Milestone M1**).
- Submission of deliverable **D2 (Digital Strategy Action Plan)** in **six (6) months** from project kick off (**Milestone M2**).
- Submission of deliverable **D3 (Project Charter for priority project)** in **seven (7) months** from project kick off (**Milestone M3**).

1.4. Meetings

- **Eight (8) workshops and presentations** with the consultant's TSO experts organized throughout the project duration and provided on ADMIE premises.
- **Bi-weekly project progress meetings** with ADMIE's project team and subsequent progress reports to be provided during the project.
- **One (1) Steering Committee meeting** with ADMIE's Top Management for Project Progress every month.

Appendix: List of Core Systems

Enterprise Systems

Oracle E-Business Suite EBS R12 ERP
Corporate WEBSITE
Document Management $ Protocol System

Production & Operations Systems

SCADA/EMS/AGC (Automatic Generation Control)
RES Production & System Load Forecasting
Market Management System (MMS)
Geographical Information System (SMALLWORLD GIS)
Automated Meter Reading (AMR) System
Meter Data Management (MDM) System
Market Settlement System (Imbalances Settlement)
Market Mechanisms Applications
IPTO Auctioning Platform
Energy Data Mart (Metering DWH)
Cross Border Scheduling Platform