CIGRE Study Committee C1

PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP

WG [1] C1.43	**Name of Convener: Yury Tsimberg (Canada)** **E-mail address**: yury.tsimberg@kinectrics.com
Technical Issues[2]: 2, 10	**Strategic Directions[3]: 2, 4**
The WG applies to distribution networks[4]: Yes	
Potential Benefit of WG work[5]: 1	
Title of the Group: Requirements for Asset Analytics data platforms and tools in electric power systems	

Scope, deliverables and proposed time schedule of the WG:

Background:

The asset management environment is changing more rapidly than ever due to external and internal changes: electrification, need for cost reduction, aging assets, etc. In addition to the classical grid investments, a variety of new, innovative and digital solutions are available. This requires the asset managers to be faster and more flexible and agile in decision making, within a complex environment with a large variety of relevant inputs and situational business cases. Smart Grids, Digitalization and Big Data Analytics offer opportunities to the asset managers to bring their decision-making capabilities to the next level from reactive and risk driven towards predictive and even prescriptive supported by the use of currently available Analytics Tools.

Asset Management techniques and methodologies enable electrical utilities to improve their investment planning process by utilizing information about physical assets ("bottom up" approach) and combining it with a strategic decision making framework ("top down" approach). In spite of the well-recognized benefits of Asset Management methodologies, there are several challenges that need to be overcome, in order to establish a mature Asset Management process. The biggest challenges of establishing a mature Asset Management decision making structure within a utility has to do with:

1. Collecting the required inputs of sometimes questionable quality from multitude of data sources,
2. Data quality, availability and non-functional parameters (real-time / near real time availability),
3. Translating these inputs into usable information, and
4. Utilizing this information in generating relevant outputs required to support the decision making efforts.

In addition to "static inputs" (i.e. results of periodic preventative maintenance, such as testing and inspections, corrective maintenance records, peak loading history, etc.), over the last several years "near real time" inputs became available due to advances in technology and, thus, need to be included in the decision making along with the traditional "static inputs". Examples of such near real time inputs are results from on-line monitoring, loading from SCADA, performance data from intelligent electronic devices (IEDs) and changing ambient conditions generated by external data bases. Furthermore, capabilities of big data analytics are evolving rapidly, creating opportunities for identifying trends and developing improved assessment algorithms.

To pursue these opportunities, there is a need for an Asset Analytics platform capable of extracting the data from multitude of data sources, have functionality to process these data and generate the required information, and provide users with required outputs. The objective of this WG is to assist utilities in identifying requirements for such a platform.

It was recognized by CIGRE WG C1.34 that "some utilities have acquired or are in the process of acquiring IT tools that automate data acquisition, provide asset analytics capabilities and assess implications of various investment scenarios. These tools serve multiple purposes, such as business planning, investment prioritization, identification of assets that need attention and automating corrective

and preventive maintenance processes". These tools are also supporting decision making processes in the integral context of asset management: condition management, risk management, policy development, portfolio management, etc.

At the same time it is important for utilities to clearly identify what their business needs and related information needs are, before acquiring such tools, as they represent a significant investment in money, time, internal processes and culture change. This WG will utilize to the extent possible relevant findings and recommendations from WGs C1.1, C1.16, C1.25, C1.34 and C1.38 in order to develop a set of requirements for Asset Analytics platform to be used in supporting both "bottom up" and "top down" Asset Management approaches within electrical utilities. The requirements will include but will not be limited to the following considerations:

- Input data categories and where they are typically stored
- Data requirements – functional (what data) and non-functional (availability, quality, reliability, etc.)
- Methodologies for translating these data into information, e.g. Asset Condition Assessment, investments prioritization, short and long term planning, establishing economic end-of-life, etc.
- Desired outputs and their intended usage
    - generate typical cases derived from core asset management decision making processes: condition management, risk management, policy development, standardisation, portfolio management, vendor management, service provider management, reporting, compliance, PDCA loop monitoring, Life Cycle Costing analysis, etc.
- Asset Analytics platform functionality, e.g. ability to:
    - extract data from various enterprise systems and use them in specified algorithms
    - incorporate both "static" and "near real time" inputs
    - generate desired dashboards, reports and e-mails requesting actions
    - identify relevant trends using machine learning based on collected data and information

The intent of this WG is to recommend a consistent set of requirements for Asset Analytics tool that will assist utilities with streamlining internal data collection, retrieval and storage, provide means for comparing and assessing Asset Analytics tools vendors against a consistent set of requirements, and generate outputs to facilitate benchmarking against historical performance within utilities as well as between different utilities.

Scope:

1. Overview typical data sources of record for both "static" and "near real time" input data
2. Review previously published CIGRE Technical Brochures on Asset Management to extract relevant information for inclusion in the survey
3. Design the survey with specific defined areas, e.g. input data, types of information generation algorithms, typical and desired outputs, etc.
4. Analyze the survey results and establish a recommended set of requirements
5. Prepare Technical Brochure

Deliverables:

☒ Technical Brochure and Executive Summary in Electra

☒ Electra report[6]

☒ Tutorial[6]

☒ Webinar[6]

Time Schedule: Start: June 2019 **Final report**: October 2021 Scope & approach reviewed by C1: December 2018 Approved and issued to National Committee: April 2019 Opening meeting/teleconference: August 2019 Teleconferences/Meetings: Every 3 months Interim report presented to C1 in Paris: August 2020 First draft of report: December 2020 Second draft of report for review by C1: March 2021 Conclusions and final report presented to C1: August 2021
Comments from Chairmen of SCs concerned: Shorten title and make it more relevant to power systems.
Approval by Technical Committee Chairman: **Date**: April 19th, 2019 

Notes: [1] Working Group (WG) or Joint WG (JWG), [2] See attached Table 1, [3] See attached Table 2, [4] Delete as appropriate, [5] See attached Table 3, [6] Presentation of the work done by the WG

Table 1: Technical Issues for creation of a new WG

1	Active Distribution Networks resulting in bidirectional power and data flows within distribution levels up to higher voltage networks
2	Digitalization of the Electric Power Units (EPU): Real-time data acquisition includes advanced metering, processing large data sets (Big Data), emerging technologies such as Internet of Things (IoT), 3D, virtual and augmented reality, secure and efficient telecommunication network
3	The growth of direct current (DC) and power electronics (PE) at all voltage levels and its impact on power quality, system control, system operation, system security, and standardisation
4	The need for the development and significant installation of energy storage systems, and electric transportation, considering the impact they can have on the power system development, operation and performance
5	New concepts for system operation, control and planning to take account of active customer interactions, and different generation types, and new technology solutions for active and reactive power flow control
6	New concepts for protection to respond to the developing grid and different generation characteristics
7	New concepts in all aspects of power systems to take into account increasing environmental constraints and to address relevant sustainable development goals.
8	New tools for system technical performance assessment, because of new Customer, Generator and Network characteristics
9	Increase of right of way capacity through the use of overhead, underground and submarine infrastructure, and its consequence on the technical performance and reliability of the network
10	An increasing need for keeping Stakeholders and Regulators aware of the technical and commercial consequences and keeping them engaged during the development of their future network

Table 2: Strategic directions of the Technical Council

1	The electrical power system of the future: respond to speed of changes in the industry
2	Making the best use of the existing systems
3	Focus on the environment and sustainability
4	Preparation of material readable for non-technical audience

Table 3: Potential benefit of work

1	Commercial, business, social and economic benefits for industry or the community can be identified as a direct result of this work
2	Existing or future high interest in the work from a wide range of stakeholders
3	Work is likely to contribute to new or revised industry standards or with other long term interest for the Electric Power Industry
4	State-of-the-art or innovative solutions or new technical directions
5	Guide or survey related to existing techniques; or an update on past work or previous Technical Brochures
6	Work likely to contribute to improved safety.
7	Work addressing environmental requirements and sustainable development goals.