Power system substation asset monitoring and condition analysis in future power systems

Summary

Objective of this research is to assess the applicability of different measurements to enable reliable and usable asset management approaches considering the actual substation asset condition, and analyse the asset management approaches and develop methodology to include actual asset condition and its ranking to asset management process. Supervisor: professor Jako Kilter (TalTech), Co-supervisor: Mart Landsberg (Elering AS)

Research field:	Electrical power engineering and mechatronics
Supervisor:	Prof. Dr. Jako Kilter
Availability:	This position is available.
Offered by:	School of Engineering
	Department of Electrical Power Engineering and Mechatronics
Application deadline:	Applications are accepted between June 02, 2021 00:00 and July 03, 2021 23:59 (Europe/Zurich)

Description

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Power system asset management in current systems is mostly related to interval-based approach and the actual condition of the asset is not observed nor relevant. This approach in future power system is seen as obsolete as the finances available should be used as much as possible in an appropriate manner.

Therefore, this research has two **main objectives:**

- Understand current and alternative approaches for substation asset condition monitoring and determine the main influencing factors to increase the observability of asset condition. These include collecting, assessing and making decisions on available assets conditions using the available measurement data but also considering applicability of new sensors technology, IoT and cyber security. Various sensitivities and alternatives shall be determined and as much as possible highlighted considering the limitations in actual power systems.
- Implement probabilistic and risk management theory or some other approach to enable condition based asset management approach in power system. There are various type of information available from substations and the descisions made shall be based on these. Usually these include measurments from SCADA, WAMS, environment measurements, etc. In addition, the objective is to develop methodolgy (including substation based asset condition and component/asset ranking) which combines the available information, assesses the level and content of this data and determine the level and extent of data what is necessary to enable the approach of condition based asset management.

All these aspects shall enable secure, reliable and cost-effective asset life monitoring and management in future power systems including recommendations for appropriate system design enabling the most optimal techno-economical solution for substations. One of the objectives is also to develop comprehensive descision making principles and condition indexes that can be applicable in actual substation maintenance planning.

The applicants should fulfill the following requirements:

- Holds a master's degree in Electrical Engineering or Data Analysis/Management (with emphasis on technical assets) or a similar degree with an academic level equivalent to a master's degree
- Have obtained excellent study results and has good knowledge on different mathematical analysis methods (probabilistic and risk assessment theory and methods)
- Have knowledge on power system assets and their operational characteristics
- Have knowledge on power system assets conditon monitoring
- Have experience with programming languages, e.g. MATLAB

- Is able to understand, speak and write texts in English language with high profiency

To get more information or to apply online, visit https://taltech.glowbase.com/positions/286 or scan the the code on the left with your smartphone.