2016 DS3 Wind Security Assessment Tool (WSAT) Workstream Plan

EIRGRID GROUP

Context

EirGrid and SONI are the Transmission System Operators (TSOs) in Ireland and Northern Ireland. It is our job to manage the electricity supply and the flow of power across the island of Ireland. This work is done from the National Control Centre (NCC) in Dublin and the Castlereagh House Control Centre (CHCC) in Belfast.

The All-Island *Wind Security Assessment Tool (WSAT)* has been developed and installed in the Dublin and Belfast Control Centres since November 2012. The tool assists us in maximising the utilisation of wind energy whilst continuing secure, reliable and economic operation of the all island power system.WSAT has been in operation in the Dublin Control Centre since September 2010.The tool was originally developed for the power system of Ireland and was used for guidance in operating the system securely in terms of voltage and transient stability.

In November 2012, WSAT was extended to analyse the all-island power system. This version was launched simultaneously in both the Dublin and Belfast Control Centres on 19 November 2012. The tool provides us with updated operational security assessment every 15 minutes. Frequency security criteria were included in WSAT in December 2014. This followed an extensive period of refining and validating the tool.

This document contains a description of the plan to further develop WSAT as a core Control Centre on-line tool. The aim of the tool is to assess system security in real-time and support off-line analysis that we conduct to maximize wind generation.

Work Completed in 2014 - 2015

- A process for WSAT's dynamic model validation has been concluded and a User Guide has been created.
- Frequency security criterion was included in WSAT.
- A number of models were adjusted and new features added. This process will continue in 2016.

Focus Areas 2016

Main focus in 2016 will be on upgrading the real-time WSAT and implementing Near real-time Study WSAT. This tool aims to assist in increasing the amount of renewable energy in the total energy mix.

This will be achieved by ensuring operational security through a more accurate assessment of day-ahead system operational security conditions.This will involve:

- replacement of 3 servers for Real Time application,
- increase the frequency of Real Time WSAT runs to every 5minutes,
- Developing processes and scripts for operating NT Study WSAT.

Project Objectives

Other ongoing project objectives include:

- further improve the accuracy of the WSAT real-time model,
- extend WSAT functionality,
- Upgrade both hardware and software to increase the updates from every 15 minutes to every 5 minutes in the Control Centres.

High-Level Plan

Task no.	Task	Responsible	Original due date	Due date
Get buy-in to approach for functionality extensions from stakeholders				
WSAT.6.1	Set-up acceptance criteria for extended AI WSAT	TSOs	Q2 2013	Complete
WSAT.6.2	Establish WSAT as a core system operations tool	TSOs	Q4 2013	Complete
Validation and tuning of on-line all-island TSAT dynamic models				
WSAT.7.1	Update TSAT model comparison process and reports to include all-island model	TSOs	Q1 2013	Complete
WSAT.7.2	Complete all-island TSAT model comparison against actual frequency events using PMR data	TSOs	Q2 2013	Complete
WSAT.7.3	Complete all-island TSAT model comparison against actual frequency events using PMU data	TSOs	New Task (Q1 2014)	Complete
WSAT.7.4	Adjust models where possible according to validation process	TSOs	New Task (Q2 2014)	Complete
WSAT.7.5	Develop new models for existing plant where adjustment is impossible	TSOs	New Task (Q3 2014)	Complete
WSAT.7.6	Complete all-island TSAT model comparison against actual events using PMU data for frequency and active power	TSOs	New Task	Complete
WSAT.7.7	Complete all-island TSAT model comparison against actual events using PMU data for voltage and reactive power	TSOs	New Task	Complete
Continuous monitoring and bringing new functionality into WSAT				
WSAT.8.3	Implement frequency criteria in AI WSAT	TSOs	Q4 2013	Complete
Additional Functionality				
WSAT.9.1	Develop and test capability of reverse power transfers	TSOs	Q3 2013	Complete
WSAT.9.2	Develop and test capability of new power transfers, i.e. forecast transfers and 2D-transfers	TSOs	Q3 2013	Complete
WSAT.9.3	Develop a roadmap detailing preferred functionality extensions to WSAT	TSOs	Q4 2013	Complete

WSAT Performance				
WSAT.10	Confirm that AI WSAT is performing as expected and has improved on previous WSAT version	TSOs	Q2 2013	Complete
WSAT Development				
WSAT.11.1	Develop and implement models for new plant	TSOs	(Q1 2014)	Complete
WSAT.11.03	Set up, test and launch 5-min Real-time WSAT Run	TSOs	New Task	Q4 2016
WSAT.11.04	Launch NT Study WSAT	TSOs	New Task	Q4 2017
WSAT.11.05	Install Pre-production/Development server and software for Forward-looking WSAT (FLWSAT)	TSOs	Q3 2015	Q1 2017
WSAT.11.06	Develop processes for scenarios in FLWSAT	TSOs	Q1 2016	Q2 2017
WSAT.11.07	Launch FLWSAT	TSOs	Q2 2016	Q4 2017
WSAT Transfers				
WSAT.12.1	Review of WSAT transfers to cater for potential voltage stability arising from changing power transfers in weak part of the network	TSOs	New Task	Complete