



DS3: Wind Security Assessment Tool (WSAT) Workstream Plan 2015

CONTEXT

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 Grid Controllers in maximising the utilisation of wind energy whilst continuing secure, reliable and economic operation of the power system of Ireland and Northern Ireland.

WSAT has been in operation in the Dublin Control Centre since September 2010 as a **Phase 1** of the system roll-out. The tool was initially developed for the power system of Ireland and was utilised by Grid Controllers for guidance in operating the system securely in terms of voltage and transient stability.

Phase 2 of the project involved developing WSAT for the all-island power system – this version was launched simultaneously in both the Dublin and Belfast Control Centres in November 2012.

Phase 3 of the project involved further developing all-island WSAT as a core on-line tool in the Control Centres through maintaining its reliable and efficient operation, on-going model validation and an enhancement process. As part of this process, frequency security analysis was included in WSAT in December 2014 in the Dublin and Belfast Control Centres.

This document contains a description of the plan to further develop WSAT as a core Control Centre on-line tool that assesses the real-time system security every 15-minutes and supports off-line analysis that EirGrid and SONI conduct to maximize wind generation in Ireland and Northern Ireland.

OBJECTIVES – PHASE 4

The key objective of this phase is to further improve the accuracy of the WSAT real-time model and extend the functionality of on-line WSAT. This will involve the use of newer data sources i.e. PMU records. In addition, a specification of further software enhancements to include frequency response, overload analysis, on-line calculation of the amount of constrained and released wind will be developed. Also new near-real time Forward-looking WSAT will be developed. It will assist in increasing the amount of renewable energy in the total energy mix by ensuring operational security through a more accurate assessment of day-ahead system operational security conditions.

WORK COMPLETED IN 2014

- A process development has been concluded and pilot studies carried out on dynamic models validation and parameter identification
- Roadmap developed detailing preferred functionality extensions to WSAT
- A number of models have been adjusted and new models developed (e.g. for EWIC and Moyle).
- Frequency security analysis has been added in on-line WSAT in December 2014

FOCUS AREAS FOR 2015-2016

Main focus in 2015-2016 will be on implementing Forward-looking WSAT (FWSAT). It will involve installation of two new servers (Pre-production/development and Production servers) and developing processes and scripts for running FWSAT in near-time (day-ahead).

HIGH-LEVEL PLAN

TASK NO.	TASK	RESPON-SIBLE	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	Q2 2015
WSAT.7.7	Complete all-island TSAT model comparison against actual events using PMU data for voltage and reactive power	TSOs	New Task	Q2 2015
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.11.4	Manage and coordinate possible changes in WSAT according to NCC/CHCC requirements	TSOs	On-going	On-going
WSAT.11.5	Install Pre-production/Development server and Software for Forward-looking WSAT (FWSAT)	TSOs	New Task	Q3 2015
WSAT.11.6	Develop processes and scripts for creating Forward-looking scenarios for FWSAT	TSOs	New Task	Q1 2016
WSAT.11.7	Launch WSAT forward looking WSAT	TSOs	New Task	Q2 2016
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	Q1 2015