EirGrid Dynamics Model Register

Note: The format of the Dynamics Model Register has been updated to reflect the current EirGrid practice.

Introduction

At present EirGrid's assessment of dynamic behaviour for wind farm connections consists of three stages:

1. Model assessment simulation,
2. Wind farm pre-connection simulation, and
3. Performance monitoring.

Dynamic models must be provided to EirGrid to allow these assessments to take place. All transmission and distribution connected wind farms greater than 5 MW are required to submit, with their connection application, a wind farm dynamic model in compliance with PC.A4.10.1.2 and should be submitted to EirGrid no later than 240 business days prior to their scheduled date of connection to the power system.

This document lists the current portfolio of wind farm dynamic models that have been assessed or are in the process of being assessed by EirGrid. The assessment is based on measuring compliance with the Planning Code Appendix, PC.A4.10.1.2, of the EirGrid Grid Code (Version 6.0) which can be found on the EirGrid website[1].

It should be noted that the absence of a wind turbine model from this register does not signify that the turbine is unacceptable to EirGrid. Often, this means that the model has yet to be provided to EirGrid.

All dynamic models must be provided for use with PSS®E versions 30.3 CVF up to version 34 and that future versions of PSS®E will also need to be supported.

For dynamics model register queries please contact EirGrid with the following e-mail address: modelregister@eirgrid.com

[1] http://www.eirgridgroup.com/site-files/library/EirGrid/GridCodeVersion6.pdf

Stages in EirGrid Dynamic Assessment

Model Assessment Simulation

The model simulation stage involves a Grid Code compliance assessment of the wind farm performance. This stage can highlight potential issues which are resolved through interaction with the customer and/or manufacturer. This stage also determines if the model is fit for purpose, i.e. error and bug free.

Wind Farm Pre-Connection Simulation

Before a wind farm connects, the customer is required to submit a dynamic study demonstraring that the proposed wind farm is in compliance with the Fault Ride Through requirements (section WFPS 1.4) of the EirGrid Grid Code. This stage can highlight potential issues, specific to the actual connections, which are resolved through interaction with the customer and/or manufacturer.

Performance Monitoring

EirGrid also performs continuous on-site performance monitoring which also has the potential to highlight Grid Code compliance issues that were not evident in the model simulation stage.

Manufacturer	Turbine Model	Size (MW)	PSS®E Dynamic Model and Version
Acciona	AW1500	1.5	A1530x
	AW3000	3.0	A1530x
	Central Voltage Regulator	-	AWTVRG
DeWind	D6	1.25	Version 1.2
	D8	2.0	Version 1.2
Enercon	E40	0.6	ENWEC2r1 Release 2
	E48	0.8	
	E66	1.8, 2.0	
	E70	2.0, 2.2, 2.3	
	E44	0.9	ENWEC2r1 Release 2
	E44, E48, E70, E82	-	ExF12 Version 1
	E44, E48, E53, E70, E82, E101, E126	-	ExF2 Version 2
	E44, E48, E53, E70, E82, E92, E101, E115, E126	-	ExF2v4r5

[2] ExF1 is a component model, ExF2 is a performance model

Manufacturer	Turbine Model	Size (MW)	PSS®E Dynamic Model and Version
Enercon	E-44, E-48, E-53, E-70 E-82, E-92, E-101, E-115, E-126	-	ExF3r1
	E-44, E-48, E-53, E-70, E-82, E-92, E-101, E-101 E2, E-103 EP2, E-115, E-115 EP2, E-126 EP4, E-141 EP4	-	ExF4r1
	E-138 EP3	3.5, 4.2	ExN4v0
	E82	-	ExS3 Version 2b
	Control Unit Model	-	EFCU06 (Mvar)
Gamesa	G5X	0.85	Version 4.2
	G9X	2.0	Version 4.2
	G97	2.0, 2.1	GD0803
GE	3GETW 1.5 MW DFIG	1.5	GEWTG2 Version 2.3.1
	GETW 1.6 MW DFIG	1.6	GEWTG2 Version 2.3.1
	4GEWT FCVT	2.5, 2.75, 4.0	GEWTG2 Version 2.3.1
	GEWT DFIG	2.5, 2.75, 4.0	GEWTG2 Version 2.3.1

[3] DFIG: Doubly-fed induction generator
[4] FCVT: Fully converted turbine

Manufacturer	Turbine Model	Size (MW)	PSS®E Dynamic Model and Version
	GEWT DFIG	1.6, 2.5, 2.75-120, 2.85, 3.2	GEWTG2 Version 600
Lagerwey	L82	2.3	L82_2.3 Version 1.12
	L93	2.6	L93_2.6 Version 1.12
	L100	2.5	L100_2.5 Version 1.12
	L136	4.0	L136_4.0 Version 1.12
	L136	4.5	L136_4.5 Version 1.12
Nordex	N80	2.5	Version 2.2
	N90	2.3 - 2.5	Version 7.0
	N100	2.5 - 3.3	Version 7.0
	N117	2.4 – 3.6	Version 7.0
	N131	3.6 - 3.9	Version 7.0
	N133	4.8	Version 7.1
	Wind Farm Controller	-	NXWFC V2.41
Senvion[5]	34M104 50Hz	3.4	R31002
	3.2M114	3.17	R32B10

[5] Formerly REpower

Manufacturer	Turbine Model	Size (MW)	PSS®E Dynamic Model and Version
Senvion	MM82	2.05	R20B10
	MM92	2.03	R22B10
	Power Management Unit	-	R00012
Sinovel	SL1500	1.5	-
	SL3000	3.0	-
Siemens	1.3 MWBONUS	1.3	Version 9
	2.3 MWBONUS	2.3	Version 9
	3.6 MWBONUS	3.6	Version 1.02a
	(SWT-2.3-82) (SWT-2.3-93) (SWT-2.3-101) (SWT-2.3-113)	2.3	SWT42
	(SWT-3.6-107) (SWT-3.6-120)	3.6	SWT42
Siemens	(SWT-3.0-101) (SWT-3.0-108) (SWT-3.0-113)	3.0	SWT42
	(SWT-3.2-101) (SWT-3.2-108)	3.2, 3.4	SWT42

Manufacturer	Turbine Model	Size (MW)	PSS®E Dynamic Model and Version
	(SWT-3.2-113) (SWT-3.4-101) (SWT-3.4-108)		
Vensys	V70, V77, V82, V87	1.5	Version 1
	V100, V109, V112	2.5	Version 1
	V120	3.0	Version 1
Vestas	V52	0.85	Version 7.3
	V80 VCS6	2.0	Version 7.7
	V90 VCS	1.8	Version 7.7
	V90 VCS	2.0	Version 7.7
	V90 VCS	3.0	Version 7.7
	V90 GridStreamer	1.8	Version 8.1.1
	V90 GridStreamer	2.0	Version 8.1.1
	V105 GridStreamer	3.3	Version 8.1.1
	V112 GridStreamer	3.0	Version 8.1.1
	V112 GridStreamer	3.3	MkIII Version 7.2.13
	V112 GridStreamer	3.6	MkIII Version 7.2.13

[6] Vestas Converter System

Manufacturer	Turbine Model	Size (MW)	PSS®E Dynamic Model and Version
Vestas	V112 GridStreamer	3.45	Version 8.1.1
	V117 GridStreamer	3.3	Version 8.1.1
	V117 GridStreamer	3.45	Version 8.1.1
	V126 GridStreamer	3.3	Version 8.1.1
	V126 GridStreamer	3.45	Version 8.1.1
	Power Park Controller (PCC) PPCSI, VSSTAT, VGMSU	-	PPC_MkIII-2.1.6
	PCC	-	Version A.1.3