# 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. This should be submitted to EirGrid no later than 240 business days prior to the 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 Irish 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/customer-and-industry/general-customer-information/grid-code/

## 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, EirGrid simulates the wind farm in the specific location on the network. 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.

# EirGrid Dynamics Model Register

| 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 | Version 5.3 |
| | E48 | 0.8 | |
| | E66 | 2.0, 2.3 | |
| | E70 | 2.0, 2.3 | |
| | E44 | 0.9 | Version 5.3 |
| | E44, E48, E70, E82 | - | ExF1[2] Version 1 |
| | E44, E48, E53, E70, E82, E101, E126 | - | ExF2 Version 2 |
| | E44, E48, E53, E70, E82, E92, E101, E115, E126 | - | ExF2 Version 4 |
| | E82 | - | ExS3 Version 2b |
| | Control Unit Model | - | EFCU06 (Mvar) |

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

| Manufacturer | Turbine Model | Size (MW) | PSS®E Dynamic Model and Version |
|---|---|---|---|
| **Gamesa** | G5X | - | Version 4.2 |
| | G9X | - | Version 4.2 |
| **GE** | [3]GETW 1.5 MW [DFIG] | 1.5 | GEWTG2 Version 2.3.1 |
| | GETW 1.6 MW [DFIG] | 1.6 | GEWTG2 Version 2.3.1 |
| | [4]GEWT [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 |
| | GEWT [DFIG] | 1.6, 2.5, 2.85, 3.2 | GEWTG2 Version 600 |
| **Nordex** | N80 | 2.5 | Version 2.2 |
| | N90 | 2.3 | Version 1.2 |
| | N90 | 2.5 | Version 1.2 |
| | N100 | 2.4 | Version 2.0 |
| | N117 | 2.4 – 2.5 | Version 1.0 |
| | N100 | 3.3 | Version 1.0 |
| **Senvion[5]** | 3.4M104 50Hz | 3.4 | R31002 |
| | MM82 | 2.05 | R20B10 |
| | Power Management Unit | - | R00012 |

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

| Manufacturer | Turbine Model | Size (MW) | PSS®E Dynamic Model and Version |
|---|---|---|---|
| **Sinovel** | SL1500 | 1.5 | - |
| | SL3000 | 3.0 | - |
| **Siemens** | 1.3 MW$^{BONUS}$ | 1.3 | Version 9 |
| | 2.3 MW$^{BONUS}$ | 2.3 | Version 9 |
| | 3.6 MW$^{BONUS}$ | 3.6 | Version 1.02a |
| | (SWT-2.3-82)<br>(SWT-2.3-93)<br>(SWT-2.3-101)<br>(SWT-2.3-113) | 2.3 | SWTVS4-V1.0 |
| | (SWT-3.6-107)<br>(SWT-3.6-120) | 3.6 | SWTVS4-V1.0 |
| | (SWT-3.0-101)<br>(SWT-3.0-108)<br>(SWT-3.0-113) | 3.0 | SWTVD4-VS-DD<br>V1.0 |
| | (SWT-3.2-101)<br>(SWT-3.2-108)<br>(SWT-3.2-113) | 3.2 | SWTVD41-VS-DD<br>V1.0 |
| | V52 | 0.85 | Version 7.3 |
| | V80 VCS[6] | 2.0 | Version 7.7 |

[6] Vestas Converter System

| Manufacturer | Turbine Model | Size (MW) | PSS®E Dynamic Model and Version |
|---|---|---|---|
| **Vestas** | 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 |
| | V105 GridStreamer | 3.45 | Version 8.1.1 |
| | V112 GridStreamer | 3.0 | Version 8.1.1 |
| | V112 GridStreamer | 3.3 | Version 8.1.1 |
| | 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) | - | VWGO6 (MW)<br>VWEX6 (Mvar) |