

MPID 239 Dynamic Models Grid Code Modification

30th March 2016



Overview

Current data and dynamic model requirements for users are not well defined for the different user technologies that are now connected to the Grid. This modification aims to standardise and to clearly specify the data and dynamic model requirements of users irrespective of technology type.

Accurate models are fundamental to the planning and operation of the power system. As the system is operated with higher levels of non-synchronous generation this requirement becomes ever more important. It is through modelling and studies that operational policies will be informed and updated. In addition to this, on-line security assessment informs control centre operation in real time and is dependent on accurate and credible models. Further to this, the ENTSO-E Network Codes will require standardised data requirements and this modification will bring the Grid Code closer to the Network Code requirements

If this modification is not implemented, the data and dynamic model requirements that currently exist will remain in place. These requirements are not balanced for all technology types currently connected to the power system. Currently there are significant knowledge gaps in some models provided to the TSO. Without the updated data and dynamic model requirements the TSO will be hindered in its ability to accurately assess the security of the system. This will directly impact the ability of the TSO to plan and operate the system efficiently and securely.

Engagement

The TSO has engaged substantially with industry on this modification. Figure 1 below shows a timeline of events from December 2012 to September 2015 with further detail on each given in the following section.

Dec-12	•EirGrid Grid Code Review Panel (GCRP) Discussion Item
Feb-13	•GCRP Proposal Tabled
Apr-13	•Bilateral Meetings (ESBGWM Representatives) •Bilateral Meeting (Grid Connected Renewable Generator (GCRG) Representatives)
May-13	•Joint Grid Code Review Panel (JGCRP) Discussion Item
Jul-13	•Joint Grid Code Working Group (JGCWG)
Sep-13	•JGCRP Update Item & GCRP Proposal
Dec-13	•JGCRP Update Item & GCRP Proposal
Feb-14	•JGCRP Update Item & GCRP Proposal (software review)
Nov-14	•JGCRP Update Item & GCRP Proposal (time constraints)
Feb-15	•GCRP Proposal
Apr-15	•Bilateral meeting (ESBGWM Representative)
Sep-15	•GCRP Proposal & agreement to issue to the CER

Figure 1 Timeline of MPID 239 Consultations

December 2012 – GCRP Discussion Item

A discussion item was included on the GCRP agenda on the dynamic model requirements for generators. The TSO explained the benefits of accurate models when planning and operating the system. The ESBGWM representative highlighted a number of concerns including retrospection given the age of some plant and the cost of developing models in three formats. The TSO noted that an international review showed that several other TSOs require different formats. A model validation process was recommended by the Panel. The provision of non-disclosure agreements (NDA) for the use of models was discussed. Feedback was invited on supporting documents, the proposed modification and the NDA template.

February 2013 –GCRP Modification Proposal

A proposal was tabled at the GCRP. Additionally; a draft 'NDA' template and 'dynamic model specifications for users' were presented to the Panel. The GCRG representatives commented that the OEMs have no issues in providing source code, but have an issue with providing the same model in three formats as it is a costly resource burden. The SONI representative advised that when SONI were consulting on the WFPS settings, there were no comments from the OEMs against providing three model formats. EirGrid advised again that this is not an unprecedented request when looking to requirements from other TSOs. It was queried why it wasn't the TSOs responsibility to take the provided data and transform it into other formats. EirGrid noted that new projects should be able to agree with the OEM in advance that they must provide three formats. The panel agreed that there was a reasonable need for this data and improved modelling but there appeared to be a practical difficulty, in achieving three formats.

April 2013 – Bilateral Meetings

EirGrid held a meeting with interested parties to discuss the proposed modification. EirGrid presented in more detail the motivation for the modification. Revised modelling requirements are required to ensure accurate modelling of the Power System and its behaviour. Better modelling will allow; the efficient planning and operation of the system, the use of online real time system tools for decision making, the increase of SNSP and improved future studies. Without accurate models; SNSP may not be increased to 75%, curtailment may increase and inefficient system planning may occur. The NDA template is being proposed to ensure efficient, consistent agreements are in place with each OEM. A presentation was given by the GCRG representatives. They had concerns in relation to the provision of three model formats and source code, validation of models and NDAs. They recommended that only one model format be required. They stated that OEMs are reluctant to provide any source code for EMT models as it could violate trade secrets, especially if using an EirGrid designed NDA template. They also requested that EirGrid consult with OEMs on the model validation process document. A second presentation was given by the ESBGWM representative. They had concerns in relation to the provision of three model formats, retrospection for existing generation, future format changes by the TSO and the validation process. They noted that the TSO had created models of existing plant using Laplace diagrams and that this process should continue. They also noted that validation of models is a complex issue which requires a collaborative approach between the TSO and user which the TSO agreed with.

May 2013 – JGCRP Discussion Item

A discussion item was included on the JGCRP agenda. The TSO explained that the range of studies carried out had increased resulting in the requirement for additional model formats. It was also noted that commissioning and testing reviews have revealed wide discrepancies between model and actual plant performance. The TSO acknowledged industry feedback that; source code could potentially have commercially sensitive data which OEMs would be reluctant to divulge and that three different formats would have resource implications. The TSO have modified the modification to include one RMS (PSS/E) and one EMT (DIgSILENT) model, with source code not required for the EMT model. Additionally the TSO noted their willingness to engage with existing generation on ways to work through concerns on retrospection. The TSO noted that processing individual OEM NDAs would be a resource burden on the TSO but that they would work with industry to develop a template that would be acceptable to all. The Panel again expressed concerns in relation to; the cost of developing EMT models and retrospection. It was agreed that a JGCWG would be established to discuss the modification in more detail.

July 2013 – JGCWG Meeting

The requirements for an NDA were clarified and is only required if the TSO needs to talk directly to an OEM rather than through the developer. Bilateral meetings held between OEMs and the TSO deemed the revised modification to be more acceptable. The TSO also clarified that if usable, understandable data is provided, then source code is not required. The process for the allocation of model costs was queried by industry at this time and it was clarified that costs are outside of the Grid Code process.

September 2013 – JGCRP Update Item & GCRP Proposal

The TSO presented an update at the JGCRP, highlighting industry concerns noted at the July JGCWG. Panel members queried whether future model developments may require developers to update models. The TSO confirmed that any future changes to model requirements would be subject to the Grid Code governance processes and discussion with users. The TSO confirmed that they were reviewing software packages internally in EirGrid. The TSO presented at the GCRP on the revised Proposal, with material changes as follows; one EMT and one RMS model would be required rather than three model formats, suitable model information would be requested rather than source data in every case. All references to specific software packages were removed and a supplementary clarification document would be provided instead. The Panel agreed in principle with the modification subject to clarification on retrospection, validation and software formats. The TSO agreed to provide supporting documentation on software formats, model usability, EMT model, validation processes and a position paper on retrospection.

December 2013 – JGCRP Update Item & GCRP Proposal

The TSO presented an update to the JGCRP. Similar concerns were raised by the panel. The revised proposal was tabled at the GCRP. It was agreed that the requirement for different model formats would not be revisited but further consultation was required on the validation process. The format of EMT models needed to be agreed with all parties considering the cost implications of retrospection.

February 2014 – JGCRP Update Item & GCRP Proposal & June 2014 JGCRP Update Item

An update was given at both panels, stating that the proposal was currently on hold pending the outcome of an EirGrid software review. Comments were requested from members on the validation process and NDA template. At the June 2014 JGCRP the TSO advised that a consultant would carry out the review.

November 2014 – JGCRP Update Item & EirGrid GCRP Proposal

An update was presented to the JGCRP. It was noted that whilst the software review was ongoing, a business as usual approach would apply. Any costs of updating models submitted between this time and the review completion would be borne by the TSO. The proposal was due to be tabled at the GCRP but due to time limits this did not occur. The Panel agreed that the proposal be circulated to all members where they were invited to vote on the proposal which would then issue to the CER with the proposal.

February 2015 – EirGrid GCRP Proposal

The revised proposal was tabled at the GCRP clarifying software requirements. The ESGW representative highlighted an additional issue stating that existing plant would not be able to obtain models. The RoCoF Generator Studies project would require all existing generation to have a dynamic model and it was suggested that this model be provided to the TSO. The ESGW representative stated that the OEMs would not provide details of the calculations used in those studies. The Chair suggested the proposal be issued to the CER noting all member concerns. Members requested a vote and it was agreed that a bilateral meeting would be held with ESGW and the TSO to finalise the proposal.

April 2015 – Bilateral Meeting

A bilateral meeting was held with the ESGW representative. The TSO noted that the modification would only apply to existing plant where a need was identified. ESGW were concerned that there was no guarantee that the TSO would not require all older plant on the system to submit models immediately the modification took effect. The TSO pointed out that mechanical parameters were essential for performing SSR studies which provide a basis for strategic planning of the transmission network and also to protect existing generation from damage.

August 2015 – Bilateral Meeting

EirGrid met with the ESGW representative again where a resolution was reached. It was agreed that dynamic models would only be required for existing plant if any modification was taking place to that plant or if significant discrepancies existed between plant performance and the model predictions.

September 2015 – EirGrid GCRP Proposal

The revised proposal was tabled at the GCRP. The Chair proposed a round table statement of each member's views on the modification. All members with the exception of 'Conventional' generator representatives were in agreement with the proposal. The TSO invited members with outstanding concerns to submit them to the TSO. The Chairman of the GCRP proposed that the modification be submitted to the CER including the views of the panel.

Final Requirements of MPID 239 Dynamic Modelling Requirements

The final requirements of the modification are shown below. It should be noted that these modelling requirements are in line with the ENTSOE Network Code on Requirements for Generators.

Model Formats and Validation

One RMS model and one EMT model will be required for new generators regardless of technology type. Retrospection will not apply unless the TSO identifies a need for an RMS model to be submitted e.g. refurbishment. IEEE generic models may be submitted where the model adequately represents actual plant behaviour. Model validation will only be required for RMS models. A draft validation process has been published by the TSO for industry comment and will be finalized once the modification has been approved.

Confidentiality Agreement

The requirements for confidentiality in the modification will not be applied where confidentiality agreements are in place for existing plant on or before October 1st 2015. The confidentiality agreements will only be required where the user, or the respective OEM, specify the model as being commercially sensitive. The TSO is willing to engage with the OEM where commercially sensitive models are being submitted.