

GEN-2012-040
Impact Restudy for
Generator Modification
(Turbine Change)

October 2015
Generator Interconnection



Revision History

Date	Author	Change Description
8/26/2015	SPP	GEN-2012-040 Impact Restudy for Generator Modification (Turbine Change) issued.
10/23/2015	SPP	Turbine change from GE 2.3MW (DFIG) to GE 2.4MW (DFIG)

Executive Summary

The GEN-2012-040 Interconnection Customer has requested a modification to its Generator Interconnection Request to change from thirty-one (31) GE 2.3MW wind turbine generators (aggregate power of 71.3MW) to twenty (20) GE 2.4MW wind turbine generators (aggregate power of 48.0MW). Since the GE 2.4MW wind turbine generator has identical electrical characteristics as the GE 2.3MW wind turbine generator, a stability analysis assessment was not performed for this change request. The results of a Definitive Interconnection System Impact Study (DISIS)¹ in which GEN-2012-040 was studied are still valid for this generation interconnection request. As the original request for interconnection is for 76.5MW, the requested change is not considered a Material Modification.

Power factor requirements for GEN-2012-040 that are shown in the DISIS are still valid for this change request. The short circuit analysis that was performed in a previous restudy² for wind turbine change is still valid.

With the assumptions outlined in this report and with all required network upgrades shown in the previous system impact study in place, GEN-2012-040 with the GE 2.4MW wind turbine generators should be able to reliably interconnect to the SPP transmission grid.

Nothing in this study should be construed as a guarantee of transmission service. If the Customer wishes to obtain deliverability to a specific customer, a separate request for transmission service shall be requested on Southwest Power Pool's OASIS.

¹ *Group 8 System Impact Study Report* performed by Mitsubishi Electric Power Products, Inc. (MEPPI) in the Southwest Power Pool (SPP) *Definitive Interconnection System Impact Study DISIS-2012-002* posted 2/8/2013.

² *GEN-2012-040 Impact Restudy for Generator Modification (Turbine Change)* performed by SPP posted 8/26/2015.

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1. Introduction

The GEN-2012-040 Interconnection Customer has requested a modification to its Generator Interconnection Request to change from the GE 2.3MW wind turbine generators to the GE 2.4MW wind turbine generators. In a previous restudy for wind turbine change, GEN-2012-040 was studied with thirty-one (31) GE 2.3MW wind turbine generator (aggregate power of 71.3MW). In the current restudy the requested change is to use twenty (20) GE 2.4MW wind turbine generators (aggregate power of 48.0MW) in place of the GE2.3MW wind turbine generators. Since the GE 2.4MW wind turbine generator has identical electrical characteristics as the GE 2.3MW wind turbine generator, a restudy of the stability analysis was not performed for this change request. The results of the Definitive Interconnection Impact Study (DISIS)³ in which GEN-2012-040 was a part are still valid for this generation interconnection request. As the original request for interconnection is for 76.5MW, the requested change is not considered a Material Modification.

Nothing in this study constitutes a request for transmission service or grants the Interconnection Customer any rights to transmission service.

³ *Group 8 System Impact Study Report* performed by Mitsubishi Electric Power Products, Inc. (MEPPI) in the Southwest Power Pool (SPP) *Definitive Interconnection System Impact Study DISIS-2012-002* posted 2/8/2013.

2. Facilities

Generating Facility

The point of interconnection (POI) for the GEN-2012-040 interconnection request is the Chilocco 138kV 138kV substation.

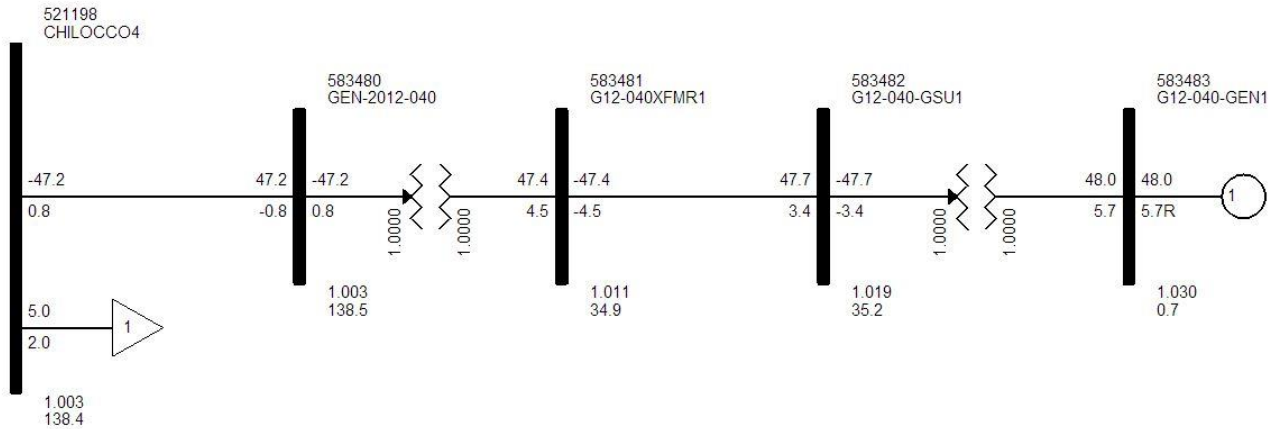


Figure 2-1 depicts the one-line diagram of the POI and the power flow model representing the request.

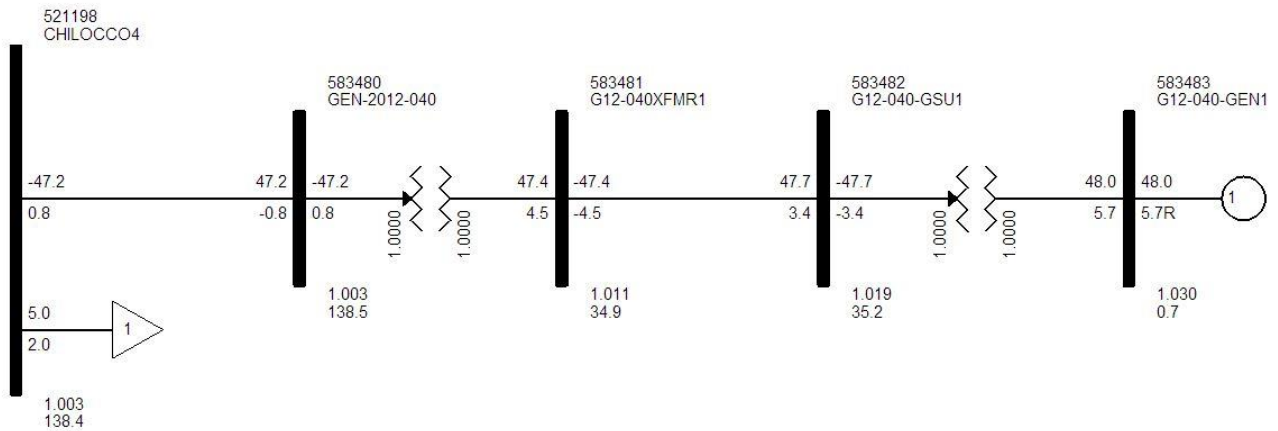


Figure 2-1: Proposed POI and Power Flow Model for GEN-2012-040

3. Stability Analysis

Transient stability analysis is used to determine if the transmission system can maintain angular stability and ensure bus voltages stay within planning criteria bandwidth during and after a disturbance while considering the addition of a generator interconnection request. Since the GE 2.4MW wind turbine generator is electrically identical to the GE 2.3MW wind turbine generator, a stability analysis was not performed. The analysis performed in the DISIS study is still valid.

4. Power Factor Analysis

The power factor analysis was not performed for this change request. The power factor analysis performed in the DISIS study is still valid. The final power factor requirement for GEN-2012-040 will be the pro-forma 95% lagging to 95% leading at the POI.

5. Reduced Generation Analysis

Interconnection requests for wind generation projects that interconnect to a 345kV or 230kV bus on the SPP system are analyzed for the capacitive charging effects during reduced generation conditions (due to unsuitable wind speeds, curtailment, etc.) at the generation site. Typically for a 138kV interconnection the capacitive charging effects are negligible due to the smaller collector system of the wind farm and the shorter length and lower charging of the 138kV transmission lead from the wind farm to the POI. From the data provided by the customer it is estimated that the collector system and generator lead capacitances will inject 1.7MVAR to the POI during reduced generation conditions.

6. Short Circuit Analysis

The short circuit analysis performed in the first generator modification study⁴ is still valid and, therefore, was not performed for this study.

⁴ *GEN-2012-040 Impact Restudy for Generator Modification (Turbine Change)* performed by SPP posted 8/26/2015.

7. Conclusion

The GEN-2012-040 Interconnection Customer has requested a modification to its Generator Interconnection request to change from GE 2.3MW wind turbine generators to the GE 2.4MW wind turbine generator. The GE 2.4MW wind turbine generator is electrically identical to the GE 2.3MW wind turbine generator. Since GEN-2012-040 was studied previously using the GE 1.7MW wind turbine generators, the results of that study are still applicable to GEN-2012-040 using the GE 2.4MW wind turbine generators.

The short circuit analysis performed in the previous turbine restudy is still valid and, therefore, was not performed in this study.

Power factor requirements for GEN-2012-040 from the initial impact study are still valid. The interconnection request will be required to maintain the pro-forma +/- 0.95 power factor at the POI.

Nothing in this study should be construed as a guarantee of delivery or transmission service. If the customer wishes to sell power from the facility, a separate request for transmission service must be requested on Southwest Power Pool's OASIS by the Customer.