GI-2020-10

Interconnection Facilities Study

Phase 4 Report

5/2/2022

Table of Contents

1.0 Summary

This report only includes the Interconnection Customer's Interconnection Facilities and should be read in conjunction with the ***DISIS-2020-001 Cluster Interconnection Facilities Study Phase 4 Report*** located at: Transmission Studies (rmao.com).

GI-2020-10 is a 230 MWac net rated AC-coupled Solar Photovoltaic (PV) and Battery Energy Storage (BES) Generating Facility requesting Network Resource Interconnection Service (NRIS). The Point of Interconnection (POI) is a tap on the Comanche–Midway 230 kV line, at approximately 6 miles from the Comanche Substation.

Since the tap position of the higher-queued request GI-2014-9 is at the same location, the study assumed GI-2020-10 interconnects at the same switching station as GI-2014-9 (GI-2014-9 230 kV Switching Station)

The total estimated cost of the transmission system improvements for GI-2020-10: $5.312 Million.

Network Resource Interconnection Service of GI-2020-10 is: 230 MW (after required transmission system improvements identified in Table 3.5.1 for the Station Network Upgrades and 4.1 for the System Network Upgrades in the *DISIS-2020-001 Cluster Interconnection Facilities Study Phase 4 Report,* and Table 1 below for the Transmission Providers Interconnection Facilities).

The Generation Interconnection Service identified in this report in and of itself does not convey transmission service.

2.0 Introduction

GI-2020-10 is a 230 MWac net rated AC-Coupled Solar PV plus BES hybrid Generating Facility that will be located in Pueblo County, Colorado. The Solar PV Generating Facility will consist of seventy-three (73) HEM FS3350M 3.35 MVA, ±0.90 PF inverters and the BES Generating Facility will consist of seventy (70) HEM FS3350M 3.35 MVA, ±0.985 PF inverters. The inverters are medium voltage inverters with embedded padmount transformers. The 34.5 kV collector system of the Solar PV and BES generating facilities will connect to one (1) 154/206/256 MVA, 34.5/230 kV wye-gnd/delta/wye-gnd, Z=7.5% and X/R=42.4 main step-up transformer which will

connect to the PSCo transmission system via a 0.1-mile 230 kV generation tie-line. The POI is a tap on the PSCo's Comanche+Midway 230 kV line, at approximately 6 miles from the Comanche Substation. Since the tap position of the higher-queued request GI-2014-9 is at the same location, the study assumed GI-2020-10 interconnects at the same switching station as GI-2014-9 (GI-2014-9 230 kV Switching Station).

The BES facility has a charge rate and discharge rate of 230 MW for 4 hours. The output of the hybrid Generating Facility will be limited to 230 MW at the POI using centralized power plant controller. The PV and BES generators will be operated together to meet the FERC 827 reactive power capability requirements. The BES generator is capable of a primary frequency response operating range of +/-0.036 Hz. The BES generator will only charge from the PV.

The output of GI-2020-10 NRIS request is assumed to be serving PSCo native load.

GI-2020-10 requested NRIS[1].

The proposed COD of GI-2020-10 is December 1, 2023. For the study purpose, the back-feed date is assumed to be June 1, 2023, approximately six (6) months before the COD. The GI-2014-9 230 kV Switching Station POI is currently in the early stages of design and therefore PSCo may not be able to achieve completion in order to meet the requested COD.

3.0 Study Scope

The scope of the Interconnection Facilities Study which is Phase 4 of the Definitive Interconnection Study process includes non-binding cost estimates and construction schedule of the Interconnection Facilities and Network Upgrades identified for GI-2020-10 in the **DISIS-2020-001 Phase 2 Report** dated 8/19/2021 and **DISIS-2020-001 Phase 2 Study Report Addendum** dated 9/15/2021.

[1] Network Resource Interconnection Service shall mean an Interconnection Service that allows the Interconnection Customer to integrate its Large Generating Facility with the Transmission Provider's Transmission system (1) in a manner comparable to that in which the Transmission Provider integrates its generating facilities to serve native load customers; or (2) in an RTO or ISO with market based congestion management, in the same manner as all other Network Resources. Network Resource Interconnection Service in and of itself does not convey transmission service.

4.0 Cost Estimates

The cost responsibilities associated with these facilities shall be handled as per current FERC guidelines.

The total cost of the required transmission improvement required for GI-2020-10 to interconnect at the GI-2014-9 230 kV Switching Station is $5.312 Million.

- The cost of Transmission Provider's Interconnection Facilities is $1.720 million (Table 1)
- The cost of Station Network Upgrades is $1.107 million (See Table 3.5.1 of ***DISIS-2020-001 Cluster Interconnection Facilities Study Phase 4 Report***).
- The cost of other System Network Upgrades is $2.485 million (See Table 4.2 of ***DISIS-2020-001 Cluster Interconnection Facilities Study Phase 4 Report***).

Table 1 – GI-2020-10 Transmission Provider's Interconnection Facilities

Element	Description	Cost Est. (million)
PSCo's GI-2014-9 POI expansion	Expand GI-2014-9 POI to interconnect GI-2020-10. The new equipment includes: • (2) 230 kV deadend structures • (3) 230 kV Surge Arresters • (1) 230 kV 3,000 A disconnect switch • (1) set (of three) high side metering units • Fiber communication equipment • Station controls • Associated electrical equipment, bus, wiring and grounding • Associated foundations and structures • Associated transmission line communications, fiber, relaying and testing.	$1.645
PSCo's GI-2014-9 POI expansion	Transmission line tap into substation. Three spans, structures, conductor insulators, hardware and labor.	$0.055
PSCo's GI-2014-9 POI expansion	Siting and Land Rights support for siting studies, land and ROW acquisition and construction	$0.020
Total Cost Estimate for Interconnection Customer-Funded, PSCo-Owned Interconnection Facilities		**$1.720**
Time Frame	**Site, design, procure and construct**	**24 Months***

*Construction of the Interconnection Customer's Interconnection Facilities are reliant on the construction of the GI-2014-9 230 kV Switching Station, which will take approximately 24

months. PSCo will complete the Interconnection Customer's Interconnection Facilities in this same timeframe.