

PSC Annual Report

Diamond State Generation Partners

Executive Summary

Throughout the period of June 2016 to May 2017, Diamond State Generation Partners' (DSGP's) fuel cell projects remained in operation at its 30.0 MW nameplate capacity. The sites continued to generate steady revenue streams. The project experienced an expected decrease in efficiency, as measured by the Heat Rate, throughout the period due to aging fuel cells. The project's average Heat Rate (MMBTU gas used/KWH produced) has steadily improved in recent months, and the project's MMBTU bank remains at a healthy volume. The Project's capacity factor for the period increased to 86.5% compared to last year's 85.9%

Diamond State Generation Partners continues to maximize its revenue from PJM through multiple sources of revenue. The project continues to sell its energy output into the PJM Day Ahead Market, and receives payments for capacity and reactive services. DSGP believes that the project is maximizing PJM revenue through all of the sources for which it is currently eligible in the PJM market.

For the period of June 2016 to May 2017

- Monthly energy payments averaged \$554,271/month
- Capacity payments averaged \$104,358/month
- Reactive Services payments totaled \$10,940/month
- Miscellaneous payments averaged \$752/month

June 2016 through May 2017 Operating Results

This annual report covers the 3rd year of operations from June 2016 to May 2017.

The Annual total QFCP-RC PJM Revenue was \$8,041,760. Table 1 below summarizes the PJM Revenue on a monthly basis. The table shows steady revenue generation throughout the period.

Table 1

Total PJM Revenue	
Month	PJM Revenue
2016/06	\$ 591,087.63
2016/07	\$ 724,305.57
2016/08	\$ 740,520.38
2016/09	\$ 658,130.06
2016/10	\$ 669,006.67
2016/11	\$ 585,516.18
2016/12	\$ 741,845.65
2017/01	\$ 718,620.25
2017/02	\$ 560,842.67
2017/03	\$ 721,165.19
2017/04	\$ 649,586.38
2017/05	\$ 681,132.98
Total	\$ 8,041,759.61

Fuel cell operating data is presented in Table 2 below. The table includes information on the energy produced, natural gas consumed, average output, heat rate, and nameplate capacity installed. The average heat rate for the period was 7598. The average output for the period was 25.9 MW. The QFCP mmBTU Bank position is positive 68,691. Table 2 provides the mmBTU banking activity for the year. The next section of the report provides detailed information on the factors that drove the QFCP heat rate and availability for the period.

Table 2

Fuel Cell Operating Results							
Month	MWH Generated	mmBTU Reformed	mmBTU Banked	Cumulative mmBTU Banked	Heat Rate	Avg Output, MW	Approx. Name Plate MW @ Month End
2016/06	18,530	141,019	(1,117)	76,691	7,610	25.7	30.0
2016/07	19,022	144,922	(1,307)	75,384	7,619	25.6	30.0
2016/08	19,483	146,889	208	75,592	7,539	26.2	30.0
2016/09	18,841	142,404	(155)	75,437	7,558	26.2	30.0
2016/10	19,643	147,740	567	76,004	7,521	26.4	30.0
2016/11	18,386	139,238	(426)	75,578	7,573	25.5	30.0
2016/12	19,625	148,244	(73)	75,505	7,554	26.4	30.0
2017/01	19,460	147,668	(747)	74,758	7,588	26.2	30.0
2017/02	17,380	132,898	(1,680)	73,078	7,647	25.9	30.0
2017/03	19,237	147,381	(2,144)	72,614	7,661	25.9	30.0
2017/04	18,570	142,269	(2,064)	70,550	7,661	25.8	30.0
2017/05	19,123	146,237	(1,859)	68,691	7,647	25.7	30.0
Totals	227,300	1,726,909	(10,797)	68,691	7,598	25.9	30.0

Total QFCP Contract Payments for the period: \$37,929,488.42

Plus Total Gas Cost for the period: \$4,988,039.51

Minus Total PJM Revenues for the period: \$8,041,759.61

Equals Total Disbursements to QFCP for the period: \$34,875,768.32

Fuel Cell Availability: 86.5%

June 2016 through May 2017 Operating Results

1. Routine Maintenance
 - a. DSGP continues to execute its maintenance plans. There were no significant changes during the period.
2. Grid Voltage Quality
 - a. Our systems are sensitive to grid voltage fluctuations and will enter an auto-restart mode if the voltage dips or spikes (even momentarily) beyond predetermined thresholds.
3. Gas Composition
 - a. When there is a substantial amount of ethane in the gas supply, our systems do not get the benefit of a full heating value of the gas. The units run more process air which typically lowers efficiency by 5%.
 - b. NE US shale gas supplies have significantly higher ethane content. This content is not expected to improve in the next few years.

Actions Taken during the Year to Maximize Revenue:

DSGP has the duty to maximize PJM revenues in order to minimize collections from ratepayers, per the Tariff. DSGP has three streams of revenue from PJM for the QFCP project: energy, capacity, and reactive services.

Energy: DSGP has sold 100% of its energy production to date into the PJM Day Ahead Energy Market. Table 2 summarizes the past year's energy output. Note that a higher capacity factor would lead to higher PJM revenues, but also higher collections from ratepayers; therefore, maximizing capacity factor is not seen as a method for meeting the Tariff's goal of minimizing collections from ratepayers.

Capacity: DSGP has successfully bid in all available capacity auctions since March 2012. DSGP is exempt from the MOPR for all Incremental Auctions

DSGP PJM Auction Results:

2018/2019

DSGP successfully bid 25.90 MW at \$225.42/MWD for the Base Residual Auction, and the first Incremental Auction took place September 12, 2016. The Second Incremental Auction takes place July 15, 2017.

2019/2020

DSGP successfully bid 25.30 MW at \$119.77/MWD for the Base Residual Auction, and the first Incremental Auction takes place September 11, 2017.

Table 3
RPM Auction Schedule

Delivery Year	Base Residual Auction	Incremental Auctions		
		First	Second	Third
2013/14	2/3/2010	9/12/2011	7/16/2012	2/25/2013
2014/15	5/2/2011	9/10/2012	7/15/2013	2/24/2014
2015/16	5/7/2012	9/9/2013	7/14/2014	2/23/2015
2016/17	5/13/2013	9/8/2014	7/13/2015	2/29/2016
2017/18	5/12/2014	9/14/2015	7/16/2016	2/28/2017
2018/19	5/10/2015	9/12/2016	7/15/2017	2/28/2018
2019/20	5/11/2016	9/11/2017		
2020/21	5/10/2017			

Table 4
Historical Base Residual Auction Results

Year	EMAAC
2015/16	\$ 167.46
2016/17	\$ 119.13
2017/2018 Base	\$ 120.00
2017/18 CP Transition	\$ 151.50
2018/19	\$ 225.42
2019/20	\$ 119.77
2020/21	\$ 187.87

Table 5
Historical Incremental Auction Results

Year	EMAAC
2013/14 - 1st	\$ 178.85
2013/14 - 2nd	\$ 40.00
2014/15 - 1st	\$ 16.56
2014/15 - 2nd	\$ 56.94
2014/15 - 3rd	\$ 132.20
2015/16 - 1st	\$ 111.00
2015/16 - 2nd	\$ 153.56
2015/16 - 3rd	\$ 184.77
2016/17 - 1st	\$ 119.13
2016/17 - 2nd	\$ 71.00
2016/17 - 3rd	\$ 10.02
2017/18 - 1st	\$ 84.00
2017/18 - 2nd	\$ 26.50
2017/18 - 3rd	\$ 36.49
2018/19 - 1st	\$ 27.15

Reactive Services: As mentioned in previous reports, DSGP investigated the economics of providing reactive power, weighing the revenue stream against the drop in efficiency that the fuel cells experience when operating at less than unity power factor. Consistent with DSGP's analysis from the 2013-2014 period, the fixed monthly payments for reactive power has provided benefits to the ratepayers well in excess of incremental gas cost from lower efficiency. The project earns \$10,939 per month from PJM for reactive services.