Calculating the net emissions associated with the proposed project involves two main components: a calculation of the "baseline" emissions (hereby referred to as the "Current State"), and a calculation of the Proposed Project emissions. The difference between the Proposed Project emissions and the Current State emissions is the net change in emissions.

The methodology of the calculations is intended to capture the most realistic scenarios possible, both from the Current State and the Proposed Project, in order to make the most appropriate comparisons of the project effects on air quality.

Current State: The Current State assumes that Aurora Ridge Farm and Sunnyside Farm continue to operate as they have in recent years with no modifications to equipment. Whenever possible, emission calculations for the Current State are based on information that is on-file with the New York State Department of Environmental Conservation (NYSDEC), either in Air State Facility (ASF) Registration applications or ASF Registrations for Aurora Ridge Farm and Sunnyside Farm. Examples of such information include biogas flows to farm equipment (flares and engines) and emission factors of specific pollutants from the engines. If such information was not available, appropriate engineering judgement and assumptions were made to ensure an appropriate accounting of emissions for a valid comparison of the current state to the proposed project. A key examples of such judgement and assumptions include emission factors from the flaring of biogas, and certain emission factors of pollutants from the engines which were not in cluded in the information on-file with NYSDEC. All bases for the inputs to the emission calculations (whether information from ASF Registration applications, or judgement/assumptions) are referenced in the detailed emission calculation pages of this document.

Proposed Project: The Proposed Project assumes that the equipment owned and operated by Aurora Ridge Farm and Sunnyside Farm will no longer operate, and the farms will send all of their biogas to Blueburd Renewable Energy. Emission calculations for the proposed project are based on the "anticipated actual" emissions evaluations that were previously made for Bluebird Renewable Energy during the ASF Registration application development. Simialr to the Current State, all bases for the inputs to the emission calculations are referenced in the detailed emission calculation pages of this document.

The following page displays a summary of the specific pollutant emissions from each aspect of the Current State and Proposed Project.

For the Current State, there are two main components: emissions from the flares and biogas engine at Aurora Ridge Farm and emissions from the flare and biogas engines at Sunnyside Farm. Emissions from these two components are summed and represent the total annual Current State emissions.

For the Proposed Project, there are also two main components: emissions from the proposed equipment owned and operated by Bluebird Renewable Energy, and emissions associated with the amount of electricity that the regional electrical grid would need to supply with both the absence of on-site generation at each of the farms, and with the electrical consumption from the proposed equipment at Bluebird Renewable Energy's facility. Emissions from these two components (and emissions from truck transport of the RNG to the pipeline interconnection, which are very small comparitively) are summed and represent that total annual Proposed Project emissions.

It is important to note that, while the Proposed Project has an expected useful life of at least 30 years, the equipment at the farms (the biogas engines, in partifular) are aging and are not expected to last nearly as long. If the Proposed Project does not move forward, the farms will need to re-evaluate options to continue utilization of the biogas; however, this analysis is not able to account for such future changes without specific plans, nor does this analysis account for any degradation of the farms existing equipment.

As indicated in the "Current State and Proposed Project Emissions Summary" page, the annual emission reductions of the Proposed Project are significant, both in criteria pollutants (i.e. NOx, SO_2, CO, VOC and PM) and total greenhouse gases. Moreover, the annual emission reductions will be realized every year throughout the life of the project.

Pollutant	Current State: Aurora Ridge Farm Expected Actual Annual Emissions (tons/year)	Current State: Sunnyside Farm Expected Actual Annual Emissions (tons/year)	Current State: Current State Annual Emissions (tons/year)	Proposed Project: Expected Annual Emissions from Electrical Consumption* (tons/year)	Proposed Project: Proposed Project Expected Actual Annual Emissions (tons/year)	Proposed Project: Total Proposed Project Annual Emissions (tons/year)	Net Annual Emissions Change (tons/year)	Percent Change
NOx	17.36	13.10	30.46	1.46	3.45	4.91	**-25.55**	**-84%**
SO_2	14.93	11.74	26.67	0.58	3.05	3.64	**-23.03**	**-86%**
CO	18.79	32.19	50.98	--	2.78	2.78	**-48.20**	**-95%**
VOC	8.43	8.36	16.79	--	0.21	0.21	**-16.58**	**-99%**
$PM/PM_{10}/PM_{2.5}$	1.40	1.99	3.39	--	0.28	0.28	**-3.11**	**-92%**
CO_2	8,957.53	12,788.52	21,746.04	3,080.02	11,671.21	14,751.23	**-6,994.81**	**-32%**
CH_4	20.85	46.33	67.18	0.23	78.71	78.93	**11.75**	**17%**
N_2O	0.077	0.089	0.17	0.027	0.080	0.11	**-0.06**	**-36%**
CO_2e**	10,729.73	16,703.65	27,433.38	3,105.95	18,303.58	21,409.53	**-6,023.84**	**-22%**
H_2S	0.16	0.13	0.29	--	0.020	0.020	**-0.27**	**-93%**

Notes:
*Emission factors for electrical consumption obtained from EPA's eGRID Power Profiler Summary Tables for Upstate New York subregion. Emission factors not available for CO, VOC, PM, or H_2S.

Note: CO_2e is calculated by summing the product of each individual greenhouse gas (CO_2, CH_4, and N_2O) and their respective 20-year Global Warming Potential (GWP), which are 1 for CO_2, 84 for CH_4, and 264 for N_2O.

Natural gas-fired boilers to supply additional heat to the Aurora Ridge Farm and Sunnyside Farm digesters.

Number of Boilers:	2	
Fuel Type:	Natural Gas	
Fuel High Heating Value:	1,012	Btu/scf
Maximum Heat Input Capacity:	5.0	MMBtu/hr, each
	4,940.71	scf/hr, each
Expected Annual Fuel Use:	22,792	MMBtu, Aurora Ridge Farm
	35,454	MMBtu, Sunnyside Farm
	58,246	MMBtu, combined
	57.56	MMscf, combined

Pollutant	Emission Factor	Units	Expected Actual Emissions - Combined (tons/year)	Emission Factor Reference
NOx	100	lb/MMscf	2.88	AP-42 Chapter 1.4, Table 1.4-1
SO_2	0.60	lb/MMscf	0.017	AP-42 Chapter 1.4, Table 1.4-2
CO	84	lb/MMscf	2.42	AP-42 Chapter 1.4, Table 1.4-1
VOC	5.5	lb/MMscf	0.16	AP-42 Chapter 1.4, Table 1.4-2
$PM/PM_{10}/PM_{2.5}$	7.6	lb/MMscf	0.22	AP-42 Chapter 1.4, Table 1.4-2
CO_2	120,000	lb/MMscf	3,453.32	AP-42 Chapter 1.4, Table 1.4-2
CH_4	2.3	lb/MMscf	0.066	AP-42 Chapter 1.4, Table 1.4-2
N_2O	2.2	lb/MMscf	0.063	AP-42 Chapter 1.4, Table 1.4-2
CO_2e	--	--	3,475.59	See note below

Note: CO_2e is calculated by summing the product of each individual greenhouse gas (CO_2, CH_4, and N_2O) and their respective 20-year Global Warming Potential (GWP), which are 1 for CO_2, 84 for CH_4, and 264 for N_2O.

Raw biogas (pre-treated for H_2S only) from the digesters is routed to the flare instead of processing (i.e. processing is down).

Expected Gas Flow:	635	scfm raw biogas
	1	scfm natural gas (pilot)
Expected CH_4 Content of Gas:	54.98%	
Expected H_2S Content of Gas:	500	ppm
Expected CO_2 Content of Gas:	44.98%	
Expected Heat Input:	21.26	MMBtu/hr (based on expected CH_4 content)
Maximum Operating Hours:	350.4	(4% of year)
Expected Annual Heat Input:	7,449	MMBtu

Pollutant	Emission Factor	Units	Expected Actual Emission Rate (lb/hr)	Expected Actual Emissions (tons/year)	Emission Factor Reference
NOx	0.068	lb/MMBtu	1.45	0.25	AP-42 Chapter 13.5, Table 13.5-1
SO_2	89.48	lb/MMscf	17.05	2.99	Assumes total conversion of H_2S to SO_2, and negligible emissions from pilot gas
CO	46	lb/MMscf CH4	0.97	0.17	AP-42 Chapter 2.4 (DRAFT), Table 2.4-4
VOC	5.5	lb/MMscf	0.21	0.037	AP-42 Chapter 1.4, Table 1.4-2
$PM/PM_{10}/PM_{2.5}$	15	lb/MMscf CH4	0.32	0.055	AP-42 Chapter 2.4 (DRAFT), Table 2.4-4
Lead	0.0005	lb/MMscf	1.9E-05	3.3E-06	AP-42 Chapter 1.4, Table 1.4-2
CO_2 - combustion	120,000	lb/MMscf	4,579.20	802.28	AP-42 Chapter 1.4, Table 1.4-2
CO_2 - gas	55,185.73	lb/MMscf	2,102.58	368.37	Assumes all CO_2 in digester gas released
CH_4	2.3	lb/MMscf	0.088	0.015	AP-42 Chapter 1.4, Table 1.4-2
N_2O	2.2	lb/MMscf	0.084	0.015	AP-42 Chapter 1.4, Table 1.4-2
CO_2e	--	--	6,711.31	1,175.82	See note below
H_2S	0.95	lb/MMscf	0.036	0.0063	Based on minimum 98% DRE

Note: CO_2e is calculated by summing the product of each individual greenhouse gas (CO_2, CH_4, and N_2O) and their respective 20-year Global Warming Potential (GWP), which are 1 for CO_2, 84 for CH_4, and 264 for N_2O.

Waste gas from upgrade plant is vented, while off-spec biogas sent to flare during SSM events

Expected Gas Flow:	420	scfm off-spec biogas
	1	scfm natural gas (pilot)
Expected CH_4 Content of Gas:	97%	
Expected H_2S Content of Gas:	0.0004%	
Expected CO_2 Content of Gas:	3%	
Expected Heat Input:	24.80	MMBtu/hr (based on expected CH_4 content)
Maximum Operating Hours:	43.8	(0.5% of year)
Expected Annual Heat Input:	1,086	MMBtu

Pollutant	Emission Factor	Units	Expected Actual Emission Rate (lb/hr)	Expected Actual Emissions (tons/year)	Emission Factor Reference
NOx	0.068	lb/MMBtu	1.69	0.037	AP-42 Chapter 13.5, Table 13.5-1
SO_2	0.72	lb/MMscf	2.25	0.04938	Assumes total conversion of H_2S to SO_2, and negligible emissions from pilot gas
CO	46	lb/MMscf CH4	1.13	0.025	AP-42 Chapter 2.4 (DRAFT), Table 2.4-4
VOC	5.5	lb/MMscf	0.14	0.0030	AP-42 Chapter 1.4, Table 1.4-2
$PM/PM_{10}/PM_{2.5}$	15	lb/MMscf CH4	0.37	0.0080	AP-42 Chapter 2.4 (DRAFT), Table 2.4-4
Lead	0.0005	lb/MMscf	1.3E-05	2.8E-07	AP-42 Chapter 1.4, Table 1.4-2
CO_2 - combustion	120,000	lb/MMscf	3,031.20	66.38	AP-42 Chapter 1.4, Table 1.4-2
CO_2 - gas	3,680.85	lb/MMscf	92.76	2.03	Assumes all CO_2 in gas released
CH_4	2.3	lb/MMscf	0.058	0.0013	AP-42 Chapter 1.4, Table 1.4-2
N_2O	2.2	lb/MMscf	0.056	0.0012	AP-42 Chapter 1.4, Table 1.4-2
CO_2e	--	--	3,143.51	68.84	See note below
H_2S	0.0076	lb/MMscf	1.9E-04	4.2E-06	Based on minimum 98% DRE

Note: CO_2e is calculated by summing the product of each individual greenhouse gas (CO_2, CH_4, and N_2O) and their respective 20-year Global Warming Potential (GWP), which are 1 for CO_2, 84 for CH_4, and 264 for N_2O.

Expected Actual Emissions Scenario

Expected Tail Gas Flow: 226.5 scfm (average flow of 113 to 340 scfm)

Expected Operating Hours per Year: 8,322 95% uptime for process

Constituent	Content in Tail Gas (ppm)	Content in Tail Gas (mole fraction)	Molecular Weight (lb/lb-mol)	Content in Tail Gas (percent weight)	Gas Density* (lb/scf)	Vent Emission Rate (lb/hr)	Expected Vent Emissions (tons/year)
CO_2	969,998	0.97	44.01	98.89%	0.1234	1,626.58	6,768.21
CH_4	30,000	0.030	16.04	1.11%	0.0447	18.33	76.29
N_2	0	0	28.0134	0%	0.078072	0	0
O_2	0	0	31.999	0%	0.08921	0	0
H_2S	2	0.000002	34.1	0.00016%	0.0895	0.0026	0.011
Totals	1,000,000	1.00	43.17	100%	0.1210	--	--

*Densities obtained from Engineering Toolbox.

Expected Volume of Gas Released from Each Transfer:	100	scf
Expected Number of Transfers per Year per Year:	730	Two trucks per day, 365 days per year (conservative)

Constituent	Content in RNG (ppm)	Content in RNG (mole fraction)	Molecular Weight (lb/lb-mol)	Content in RNG (percent weight)	Gas Density* (lb/scf)	Expected Leak Emissions (lb/year)	Expected Leak Emissions (tons/year)
CO_2	19,000	0.019	44.01	5.05%	0.1234	170.16	0.085
CH_4	981,000	0.981	16.04	94.95%	0.0447	3,202.09	1.60
CO_2e	--	--	--	--	--	269,146.03	134.57
H_2S	H_2S content of processed gas < 0.25 grains/ccf (0.00000036 lb/scf)					0.026	0.000013

*Densities obtained from Engineering Toolbox.

Note: CO_2e is calculated by summing the product of each individual greenhouse gas (CO_2, CH_4, and N_2O) and their respective 20-year Global Warming Potential (GWP), which are 1 for CO_2, 84 for CH_4, and 264 for N_2O.

Expected Emissions Scenario

Flow from Aurora Ridge: 247.05 scfm

Equipment Type	Service	Emission Factor (kg/hr/source)	Number of Components	Total Emissions (lb/hr)	Total Emissions (tons/year)
Valves	Gas	0.0045	24	0.2381	1.04
Pump Seals	Gas	0.0024	0	0.0000	0.00
Others	Gas	0.0088	3	0.0582	0.25
Connectors	Gas	0.00020	14	0.0062	0.027
Flanges	Gas	0.00039	0	0.0000	0.00
Open-ended lines	Gas	0.0020	0	0.0000	0.00
TOTAL	Gas	--	41	0.302	1.32

Constituent	Content in Raw Gas (ppm)	Content in Tail Gas (mole fraction)	Molecular Weight (lb/lb-mol)	Content in Tail Gas (percent weight)	Gas Density* (lb/scf)	Emission Rate (lb/hr)	Annual Emissions (tons/year)
CO_2	447,500	0.45	44.01	68.86%	0.1234	0.14	0.59
CH_4	550,000	0.550	16.04	30.84%	0.0447	0.17	0.73
H_2S	2,500	0.002500	34.1	0.29806%	0.0895	0.00076	0.0033
Totals	1,000,000	1.00	28.60	100%	0.0800	0.30	1.32

*Densities obtained from Engineering Toolbox.

Raw biogas from the digester is routed to the Aurora Ridge Farm flare instead of engine (both when engine is down, and when gas flow is more than engine can accommodate).

Gas Flow with Engine Operating:	64.95	scfm
Gas Flow without Engine Operating:	247.05	scfm
Engine Operating Hours:	8,410	(95% of year - based on engineering judgement)
Total Expected Gas Flow:	37.97	MMscf per year
Expected CH_4 Content of Gas:	54.80%	(based on ARF Air Facility Registration application from 2016)
Expected H_2S Content of Gas:	4,000	ppm (based on ARF Air Facility Registration application from 2016)
Expected CO_2 Content of Gas:	44.80%	(based on ARF Air Facility Registration application from 2016)
Heat Content of Gas:	554.6	Btu/scf (based on methane content)
Total Expected Heat Input:	21,055	MMBtu per year
Maximum Operating Hours:	350.4	(4% of year - based on ARF Air Facility Registration application from 2016)

Pollutant	Emission Factor	Units	Annual Average Expected Actual Emission Rate (lb/hr)	Expected Actual Emissions (tons/year)	Emission Factor Reference
NOx	0.068	lb/MMBtu	0.16	0.72	AP-42 Chapter 13.5, Table 13.5-1
SO_2	701.53	lb/MMscf	3.04	13.32	Assumes 98% conversion of H_2S to SO_2
CO	46	lb/MMscf CH4	0.11	0.48	AP-42 Chapter 2.4 (DRAFT), Table 2.4-4
VOC	5.5	lb/MMscf	0.024	0.10	AP-42 Chapter 1.4, Table 1.4-2
$PM/PM_{10}/PM_{2.5}$	15	lb/MMscf CH4	0.036	0.16	AP-42 Chapter 2.4 (DRAFT), Table 2.4-4
CO_2 - combustion	120,000	lb/MMscf	520.07	2,277.92	AP-42 Chapter 1.4, Table 1.4-2
CO_2 - gas	54,971.00	lb/MMscf	238.24	1,043.50	Assumes all CO_2 in digester gas released
CH_4	2.3	lb/MMscf	0.010	0.044	AP-42 Chapter 1.4, Table 1.4-2
N_2O	2.2	lb/MMscf	0.010	0.042	AP-42 Chapter 1.4, Table 1.4-2
CO_2e	--	--	761.67	3,336.11	See note below
H_2S	7.61	lb/MMscf	0.033	0.14	Based on minimum 98% DRE

Note: CO_2e is calculated by summing the product of each individual greenhouse gas (CO_2, CH_4, and N_2O) and their respective 20-year Global Warming Potential (GWP), which are 1 for CO_2, 84 for CH_4, and 264 for N_2O.

Existing Engine Emission Calculations - Aurora Ridge Farm

Treated biogas (H_2S removal) from the digester routed to engine at Aurora Ridge Farm to generate electricity.

Engine Power:	898	bhp (based on ARF Air State Facility Registration application from 2016)
Engine Fuel Consumption:	6,771	Btu/bhp-hr (based on ARF Air State Facility Registration application from 2016)
	6.08	MMBtu/hr (based on engine power and fuel consumption rate)
Expected Total Gas Flow to ARF:	247.05	scfm raw biogas (based on ARF Air State Facility Registration application from 2016)
Expected CH_4 Content of Gas:	54.99%	
Expected H_2S Content of Gas:	200	ppm
Expected CO_2 Content of Gas:	44.99%	
Expected Heat Content of Gas:	556	Btu/scf (based on methane content)
Expected Gas Flow to Engine:	182.10	scfm treated biogas (based on engine fuel consumption and heat content of gas)
Remaining Gas Flow to Flare:	64.95	scfm
Maximum Operating Hours:	8,410	(96% of year - based on engineering judgement)
Total Gas Burned in Engine:	91,884,077	scf/year
Total Engine Heat Input:	51,133	MMBtu/year
Generator Output:	649	kW
Total Generation:	5,457,830	kW-hrs per year

Pollutant	Emission Factor	Units	Expected Actual Emission Rate (lb/hr)	Expected Actual Emissions (tons/year)	Emission Factor Reference
NOx	2.0	g/bhp-hr	3.96	16.65	Engine vendor data
SO_2	35.08	lb/MMscf	0.38	1.61	Assumes 98% conversion of H_2S to SO_2
CO	2.2	g/bhp-hr	4.36	18.31	Engine vendor data
VOC	1.0	g/bhp-hr	1.98	8.32	Engine vendor data (NMHC)
$PM/PM_{10}/PM_{2.5}$	0.15	g/bhp-hr	0.30	1.25	Engine vendor data
CO_2 - combustion	67,474	lb/MMscf	737.23	3,099.91	Based on oxidation of methane-based carbon during combustion
CO_2 - gas	55,204.13	lb/MMscf	603.17	2,536.19	Assumes all CO_2 in fuel gas released
CH_4	2.5	g/bhp-hr	4.95	20.81	Engine vendor data (THC - NMHC)
N_2O	0.00063	kg/MMBtu	0.0084	0.036	40 CFR 98, Table C-2
CO_2e	--	--	1,758.37	7,393.61	See note below
H_2S	0.38	lb/MMscf	0.0042	0.017	Based on minimum 98% DRE

Note: Engine vendor data included in ARF Air Facility Registration application from 2016.

Note: CO_2e is calculated by summing the product of each individual greenhouse gas (CO_2, CH_4, and N_2O) and their respective 20-year Global Warming Potential (GWP), which are 1 for CO_2, 84 for CH_4, and 264 for N_2O.

Raw biogas from the digester is routed to the Sunnyside Farm flare instead of engine.

Expected Gas Flow:	384	scfm raw biogas (based on SSF Air Facility Registration application from 2008)
Expected CH_4 Content of Gas:	54.88%	(based on SSF Air Facility Registration application from 2008)
Expected H_2S Content of Gas:	2,500	ppm (based on SSF Air Facility Registration application from 2008)
Expected CO_2 Content of Gas:	44.88%	(based on SSF Air Facility Registration application from 2008)
Expected Heat Input:	12.78	MMBtu/hr (based on expected CH_4 content)
Maximum Operating Hours:	700.8	(8% of year - based on SSF Air Facility Registration application from 2008)

Pollutant	Emission Factor	Units	Expected Actual Emission Rate (lb/hr)	Expected Actual Emissions (tons/year)	Emission Factor Reference
NOx	0.068	lb/MMBtu	0.87	0.30	AP-42 Chapter 13.5, Table 13.5-1
SO_2	438.46	lb/MMscf	10.30	3.61	Assumes 98% conversion of H_2S to SO_2
CO	46	lb/MMscf CH4	0.58	0.20	AP-42 Chapter 2.4 (DRAFT), Table 2.4-4
VOC	5.5	lb/MMscf	0.127	0.044	AP-42 Chapter 1.4, Table 1.4-2
$PM/PM_{10}/PM_{2.5}$	15	lb/MMscf CH4	0.189	0.066	AP-42 Chapter 2.4 (DRAFT), Table 2.4-4
CO_2 - combustion	120,000	lb/MMscf	2,762.40	967.94	AP-42 Chapter 1.4, Table 1.4-2
CO_2 - gas	55,063.02	lb/MMscf	1,267.55	444.15	Assumes all CO_2 in digester gas released
CH_4	2.3	lb/MMscf	0.053	0.0186	AP-42 Chapter 1.4, Table 1.4-2
N_2O	2.2	lb/MMscf	0.051	0.0177	AP-42 Chapter 1.4, Table 1.4-2
CO_2e	--	--	4,047.77	1,418.34	See note below
H_2S	4.75	lb/MMscf	0.109	0.038	Based on minimum 98% DRE

Note: CO_2e is calculated by summing the product of each individual greenhouse gas (CO_2, CH_4, and N_2O) and their respective 20-year Global Warming Potential (GWP), which are 1 for CO_2, 84 for CH_4, and 264 for N_2O.

Treated biogas (H_2S removal) from the digester routed to two engines at Sunnyside Farm to generate electricity.

Expected Gas Flow:	192	scfm raw biogas per engine (annual average - based on SSF Air Facility Registration application from 2008)
	384	scfm raw biogas both engines combined
Expected CH_4 Content of Gas:	54.98%	(based on SSF Air State Facility Registration application from 2008)
Expected H_2S Content of Gas:	500	ppm (based on SSF Air State Facility Registration application from 2008)
Expected CO_2 Content of Gas:	44.98%	(based on SSF Air State Facility Registration application from 2008)
Expected Heat Input:	6.40	MMBtu/hr per engine (based on expected CH_4 content)
	12.81	MMBtu/hr both engines combined
Maximum Operating Hours:	8,059	per engine (92% of year - based on SSF Air State Facility Registration application from 2008)
Expected Annual Heat Input:	103,215	MMBtu (both engines combined)
Engine Power:	720	bhp per engine (based on SSF Air State Facility Registration)
	1,440	bhp (both engines combined)
Expected Generator Output:	500	kW per engine (based on SSF Air State Facility Registration)
	1,000	kW (both engines combined)
Total Generation:	8,059,200	kW-hrs per year

Pollutant	Emission Factor	Units	Expected Actual Emission Rate (lb/hr)	Expected Actual Emissions (tons/year)	Emission Factor Reference
NOx	1.0	g/bhp-hr	3.17	12.79	Engine vendor data
SO_2	87.69	lb/MMscf	2.02	8.13	Assumes 98% conversion of H_2S to SO_2
CO	2.5	g/bhp-hr	7.94	31.98	Engine vendor data
VOC	0.65	g/bhp-hr	2.06	8.32	Engine vendor data (NMHC)
$PM/PM_{10}/PM_{2.5}$	0.15	g/bhp-hr	0.48	1.919	Engine vendor data
CO_2 - combustion	67,456	lb/MMscf	1,552.84	6,257.32	Based on oxidation of methane-based carbon during combustion
CO_2 - gas	55,185.73	lb/MMscf	1,270.38	5,119.10	Assumes all CO_2 in fuel gas released
CH_4	3.62	g/bhp-hr	11.49	46.31	Engine vendor data (THC - NMHC)
N_2O	0.00063	kg/MMBtu	0.018	0.072	40 CFR 98, Table C-2
CO_2e	--	--	3,793.26	15,285.31	See note below
H_2S	0.95	lb/MMscf	0.022	0.088	Based on minimum 98% DRE

Note: Engine vendor data included in SSF Air Facility Registration application from 2008, except for PM. PM emission factor from ARF used as surrogate.

Note: CO_2e is calculated by summing the product of each individual greenhouse gas (CO_2, CH_4, and N_2O) and their respective 20-year Global Warming Potential (GWP), which are 1 for CO_2, 84 for CH_4, and 264 for N_2O.

Facility: Pollutant Information	Aurora Ridge Farm	Sunnyside Farm	Bluebird Renewable Energy	TOTAL
Annual Net Electricity Offset/Use (kW-hr)	5,457,830	8,059,200	13,000,000	26,517,030
CO2 Emission Factor (lb/MW-hr)	232.31	232.31	232.31	--
Total CO2 Emissions (tons)	633.94	936.10	1,509.98	3,080.02
CH4 Emission Factor (lb/MW-hr)	0.017	0.017	0.017	--
Total CH4 Emissions (tons)	0.046	0.069	0.1105	0.23
N2O Emission Factor (lb/MW-hr)	0.0020	0.0020	0.0020	--
Total N2O Emissions (tons)	0.0055	0.0081	0.0130	0.027
CO2e Emission Factor (lb/MW-hr)	234.26	234.26	234.26	--
Total CO2e Emissions (tons)	639.28	943.98	1,522.70	3,105.95
NOx Emission Factor (lb/MW-hr)	0.11	0.11	0.11	--
Total NOx Emissions (tons)	0.30	0.44	0.715	1.46
SO2 Emission Factor (lb/MW-hr)	0.044	0.044	0.044	--
Total SO2 Emissions (tons)	0.12	0.18	0.286	0.58

*Note: Emission factors for electrical consumption obtained from EPA's eGRID Power Profiler Summary Tables for Upstate New York subregion. Emission factors not available for CO, VOC, PM, or H2S.

Note: CO_2e is calculated by summing the product of each individual greenhouse gas (CO_2, CH_4, and N_2O) and their respective 20-year Global Warming Potential (GWP), which are 1 for CO_2, 84 for CH_4, and 264 for N_2O.

Emissions from Tranportation of RNG Using Trucks

Emission factors developed using EPA's Motor Vehicle Emission Simulator (MOVES) software.

Key Assumptions in MOVES:

Time Period:	All months, days, hours per year
Vehicle Type:	Short-haul commercial trucks, diesel fueled, model year 2023
Location:	Cayuga, Chemung, Schuyler, and Tompkins Counties, New York
Road Types:	Rural

Emission factors for each pollutant were averaged across the entire domain of time periods and locations.

Key operational assumptions:

Number of truckloads per day:	2	
Distance per truckload	280	miles (one-way from BRE to pipeline interconnection is 70 miles, and including an additional 140 miles to account for where the trailer is left- either at BRE or the
Total distance per day:	560	miles (two trucks per day)
Total distance per year:	204,400	miles (365 days per year)

Pollutant	Emission Factor	Units	Expected Actual Emissions - Combined (tons/year)
NOx	1.27	g/mile	0.29
SO_2	0.0031	g/mile	0.00070
CO	0.75	g/mile	0.17
VOC	0.062	g/mile	0.014
$PM/PM_{10}/PM_{2.5}$	0.013	g/mile	0.0029
CO_2	931.8	g/mile	209.95
CH_4	0.011	g/mile	0.0026
N_2O	0.0014	g/mile	0.00031
CO_2e	--	--	210.24

Note: CO_2e is calculated by summing the product of each individual greenhouse gas (CO_2, CH_4, and N_2O) and their respective 20-year Global Warming Potential (GWP), which are 1 for CO_2, 84 for CH_4, and 264 for N_2O.