

***Gadsby Emissions Curtailment Program
Sustainable Transportation and Energy Plan***

Innovative Utility Programs

1 Executive Summary

Air quality is one of the most challenging and important public policy issues facing the state of Utah. The Utah Sustainable Transportation and Energy Plan or “STEP” legislation allows for the Commission to authorize innovative utility programs that curtail emissions from thermal generation plants along the Wasatch Front. This program would establish a process where the Gadsby Power Plant would curtail its emissions during winter inversion air quality events as defined by the Utah Division of Air Quality (“UDAQ”). Funds collected under 54-20-105-1 will be used to cover costs of the curtailment during the 5 year pilot program period. The curtailment program is budgeted for a total \$500,000. Once the funds are exhausted the program will cease to operate.

2 Purpose and Necessity

The Wasatch Front is currently in non-attainment of National Ambient Air Quality Standards for Particulate Matter 2.5 microns known as PM 2.5. According to the UDAQ¹, “the majority of Utah’s PM2.5 is called secondary aerosol, meaning that it is not emitted directly as a particle, but is produced when gasses such as SO₂, NO_x, and volatile organic compounds (VOC) react with other gasses in the atmosphere, such as ammonia, to become tiny particles. Wintertime temperature inversions not only provide ideal conditions for the creation of secondary aerosols, they also act to trap air in valleys long enough for concentrations of PM2.5 to build up to levels that can be unhealthy.

Rocky Mountain Power (RMP) has designed a program where the company will voluntarily reduce the operation of the Gadsby Power Plant during winter inversions, which is located in the Salt Lake non-attainment area. The Gadsby Plant is 100%-owned and operated by RMP, and was originally designed to burn oil derivatives, natural gas, or coal. Two physical sections with vastly different electricity generation vintage and technologies make up the Gadsby Plant. The first group of units are conventional natural gas fired boilers, consisting of Units 1-3. These units represent the oldest operating units in RMP’s thermal fleet, and were originally built in the 1950’s. The units were then converted from a coal-fueled plant to a natural gas-fueled plant in the 1990’s. Pipeline quality natural gas is now fired in the original boilers to generate steam, which generates electricity. The second group of units are aeroderivative gas turbines consisting of Units 4-6. Units

¹ See Utah Division of Air Quality 2014 Annual Report, Page 18

4-6 are peaking units and are not being considered for this program.

Units 1, 2, and 3, which are being considered for the curtailment program, have a net capacity rating of 64 MW, 69 MW, and 104.5 MW, respectively for a total of 237.5 MW. The Gadsby Plant is typically used for two purposes: reserves and peak load. Reserves held at the Gadsby Plant allows other, lower heat rate (i.e. more efficient) units to be run at or near full capacity. The grid has a certain amount of generation that must be “held back” to meet reserve requirements, as determined by the grid reliability coordinator, Western Electric Coordinating Council (WECC).

The program would work in collaboration with the UDAQ so that the state would issue air quality alerts to RMP when the ambient air quality along the Wasatch Front is at or near unhealthy levels and then RMP would curtail the operation of the Gadsby Units, if operating, until the air quality alerts are lifted by the UDAQ. According to the Utah State Implementation Plan² for PM 2.5 developed by the UDAQ, Gadsby is a major emitting source of NO_x (a PM 2.5 precursor) on a typical winter inversion weekday.

However, if RMP curtails operation at the Gadsby Power Plant there will be economic loss from both not operating the resource and purchasing replacement generation and capacity to meet system needs. Since Gadsby is a system resource, the economic loss would impact all the states in the PacifiCorp service territory that pay for the costs of Gadsby (5 of the 6 states served by the company). To ensure that no state is unfairly impacted from the voluntary air quality program, STEP funds would be used to compensate the system for the economic loss.

3 Program Description

The UDAQ issues action alerts when pollution is approaching unhealthy levels. These alerts proactively notify residents and businesses before pollution build-up so they can begin to reduce their emissions. When pollution levels reach 15 µg/m³ for PM_{2.5}, DAQ issues a ‘yellow’ or voluntary action day, urging Utah residents to drive less and take other pollution reduction measures. At 25 µg/m³, 10 µg/m³ below the EPA health standard, DAQ issues a “red” or mandatory advisory prohibiting burning of wood and coal stoves or fireplaces. It is at the 25 µg/m³ level when RMP will take action to curtail the Gadsby Steam units.

² Utah State Implementation Plan Control Measures for Area and Point Sources, Fine Particulate Matter, PM_{2.5} SIP for the Salt Lake City, UT Nonattainment Area Section IX. Part A.21 December 3, 2014

DAQ will provide 5 days-notice to RMP when air quality actions will be issued. RMP will evaluate the system to determine if there are reliability or emergency issues that could be impacted by curtailing Gadsby. At 2 days out, DAQ will issue a second notice of an upcoming air quality action alert. Assuming no issues, RMP will curtail Gadsby's steam operations. RMP needs at least 2 days or 48 hours to effectively reposition its fuel supply. The steam units will stay curtailed until DAQ releases its air quality action alert.

In the event that the plant was scheduled to operate and was curtailed, the economic loss must be calculated. RMP will perform dispatch modeling analyses with the resource in the model and with the resource absent to evaluate the Net Power Cost impact of curtailment. The Gadsby curtailment program is budgeted for a total of \$500,000 for the entire 5 year pilot program period. Once the \$500,000 is spent the program would end. If Gadsby is not scheduled to operate during an air quality event, then no action is taken and there is no economic loss.

4 Customer Interest Justification

Many of RMP's customers live in communities that are located within the non-attainment areas, including Salt Lake City which is where the Gadsby Power Plant is located. The primary benefit of curtailing Gadsby is the potential reduction of NOx emissions which contribute to the formation of PM 2.5. According to DAQ (see Appendix 1), the Gadsby's Power Plant may emit 0.437 tons of NOx per day during a typical winter inversion day, which makes Gadsby the 10th largest emitter of NOx in the Salt Lake non-attainment area. This program would ensure that those emissions would not occur during periods of unhealthy air quality and not contribute pollutants to air sheds of non-attainment areas.

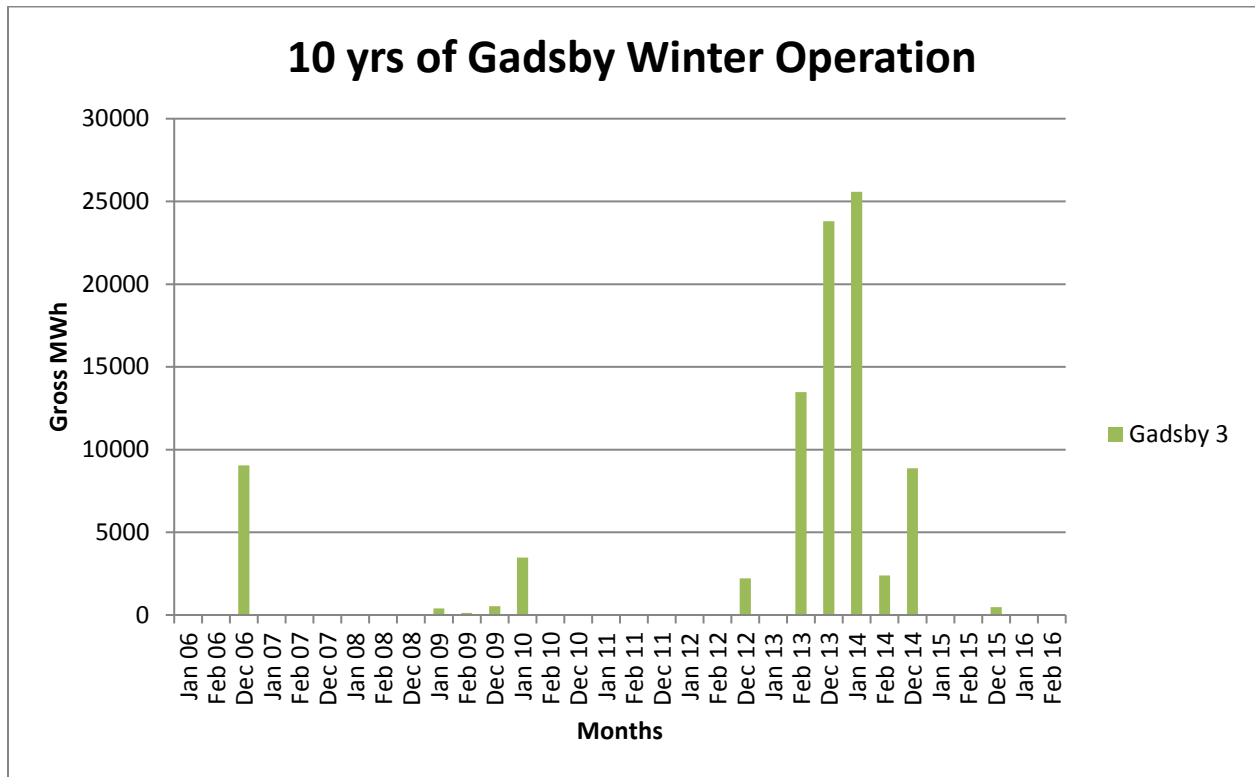
5 Compliance with SB115

The Gadsby curtailment program meets the legislative language of SB115 54-20-105-1(e) that pertains to "a program to curtail emissions from thermal generation plant in the Salt Lake non-attainment area during a non-attainment event as defined by the Division of Air Quality". This project falls under the STEP's innovative utility programs.

6 Program Costs

To evaluate the potential impact of curtailing, the historical operation of Gadsby was evaluated. Since Unit 3 is the largest and most dispatched Unit it was used as the proxy. The following chart (the data was taken from the Environmental Protection Agency's Clean Air Markets Data Base)

illustrates Gadsby Unit 3 winter operation (December, January, February) for the last ten years:



Although the Gadsby plant primarily operates in the summer months, Gadsby was dispatched in the winter of 2013 and 2014.

The typical inversions along the Wasatch Front last on average 3 weeks a year. To determine the projected scale of the economic loss, RMP performed a preliminary analysis using an economic dispatch model under three different scenarios involving Gadsby’s curtailment during winter inversions. The initial analysis assumed Unit 3 was operating for 1,462 hours during the winter months (which corresponds with the winter of 2014). The three scenarios are as follows:

- 1) Gadsby does not run at all during Dec, Jan and Feb.
- 2) Gadsby does not run for 6 weeks (1 week in the end of Dec, all of Jan and 1 week in Feb).
- 3) Gadsby does not run for 3 weeks starting in the beginning of January.

Scenario 1 (3 months)			
	Scenario 0	Scenario 1	Gain/Loss
Fuel cost	(\$245,180,621)	(\$242,442,269)	\$2,738,352
Implied sale/purchase	\$45,674,281	\$41,490,919	(\$4,183,362)
Start-up Cost	(\$1,096,140)	(\$985,910)	\$110,230
		Net Gain/Loss	(\$1,334,780)

Scenario 2 (6 weeks)			
	Scenario 0	Scenario 2	Gain/Loss
Fuel cost	(\$245,180,621)	(\$243,932,024)	\$1,248,596
Implied sale/purchase	\$45,674,281	\$43,816,871	(\$1,857,410)
Start-up Cost	(\$1,096,140)	(\$1,076,110)	\$20,030
		Net Gain/Loss	(\$588,783)

Scenario 3 (3 weeks)			
	Scenario 0	Scenario 3	Gain/Loss
Fuel cost	(\$245,180,621)	(\$243,552,170)	\$1,628,450
Implied sale/purchase	\$45,674,281	\$43,768,192	(\$1,906,088)
Start-up Cost	(\$1,096,140)	(\$1,049,040)	\$47,100
		Net Gain/Loss	(\$230,538)

It is estimated that the economic loss from curtailing Gadsby’s winter operation, when it is scheduled to operate, is roughly \$100,000 a week. This amount can be used as a potential upper limit. Since typical inversions last 3 weeks \$300,000 would most likely cover the costs if Gadsby 3 operated like it did during the winter of 2014 and air quality events occur. Since this amount is an upper limit and Gadsby usually does not operate during most winter months a budget of \$500,000 should cover most of the expense during the 5 year pilot program.

7 Accounting Issues or Regulatory Recovery Issues

UDAQ will provide 5 days-notice to RMP when air quality actions will be issued. Energy Supply Management (“ESM”) will then determine whether Gadsby should be curtailed. If curtailment is elected, ESM will use models to determine the incremental Net Power Cost (“NPC”) impact of the curtailment. ESM will then enter the curtailment volume and cost in the Endur system, and provide notification to NPC and Load Forecast group, NPC Finance and ESM Finance groups that a Gadsby curtailment has occurred. If a month-end accrual is required, NPC Finance will book the

accrual. ESM Finance will book the actual curtailment costs. The entry is a debit to the corresponding STEP WBS (STEP balancing account) and a credit to NPC (since the decision to curtail Gadsby increases NPC, the credit from STEP funds makes NPC costs neutral for ratepayers). Since these STEP funds are recognized as a reduction to NPC, the corresponding STEP expenditures should not be included in the balancing account amortization expense or revenue.

Appendix 1
List of Point Sources in the Salt Lake Non-Attainment Area

Typical Winter Inversion Weekday			2010_(R2)					2015_(R9)				
Emissions (tpd)			Baseline					Growth & Control				
Source Category	NA-Area	Site	PM2.5	NOX	VOC	NH3	SO2	PM2.5	NOX	VOC	NH3	SO2
Point Sources	Salt Lake City, UT											
		ATK Thiokol Promontory	0.135	0.360	0.141	0.002	0.042	0.144	0.354	0.150	0.003	0.045
		Bountiful City Power	0.174	0.697	1.284	0.311	1.065	0.087	0.624	1.264	0.311	0.392
		Central Valley Water	0.000	0.005	0.001		0.000	0.082	0.209	0.049		0.002
		CER Generation II LLC - WVC	0.004	0.034	0.137	0.000	0.003	0.004	0.043	0.033	0.000	0.003
		Chemical Lime Company	0.015	0.039	0.005		0.002	0.015	0.039	0.005		0.002
		Chevron Refinery	0.036	0.043	0.001	0.000	0.034	0.008	0.058	0.002	0.000	0.044
		Flying J Refinery	0.501	2.991	0.663	0.026	1.774	0.105	1.950	1.234	0.022	1.092
		Geneva Rock Point of Mountain	0.069	0.269	0.050		0.037	0.084	0.323	0.060		0.026
		Great Salt Lake Minerals - Production Plant	0.132	0.249	0.023	0.002	0.018	0.107	0.304	0.061	0.003	0.026
		Hexcel Corporation Salt Lake Operations	0.048	0.217	0.180	0.079	0.024	0.103	0.102	0.111	0.129	0.009
		Hill Air Force Base Main	0.037	0.525	0.826	0.006	0.008	0.035	0.373	0.800	0.006	0.008
		Holly Refining Marketing	0.147	0.851	0.663	0.057	1.318	0.134	0.933	0.700	0.654	0.309
		Interstate Brick Brick	0.175	0.114	0.010		0.036					
		Kennecott Mine Concentrator	0.647	8.492	0.504	0.003	0.008	0.854	12.130	0.651	0.004	0.014
		Kennecott NC-UPP-Lab-Tailings	0.014	0.016	0.005	0.001	0.000	0.300	0.197	0.069	0.001	0.034
		Kennecott Smelter & Refinery	0.610	0.470	0.027	0.016	3.023	0.837	0.767	0.068	0.025	3.827
		Murray City Power	0.000	0.001	0.000		0.000					
		Nucor Steel	0.158	0.502	0.202	0.006	0.118	0.351	0.978	0.353	0.004	0.833
		Olympia Sales Co.	0.014	0.001	0.072	0.000	0.000	0.000	0.001	0.091	0.000	0.000
		Pacificorp Gadsby	0.067	0.443	0.031	0.065	0.006	0.067	0.437	0.031	0.065	0.006
		Pacificorp Little Mountain	0.021	1.014	0.007		0.011					
		Proctor & Gamble Paper Products Co.	0.099	0.043	0.067		0.003	0.575	0.674	0.654		0.007
		Silver Eagle Refining	0.011	0.246	0.359	0.012	0.003					
		Tesoro Refinery	0.710	1.162	0.806	0.011	2.808	0.272	1.297	1.005	0.010	0.819
		University of Utah	0.024	0.313	0.023	0.009	0.003	0.030	0.159	0.022	0.008	0.003
		Utility Trailer	0.002	0.117	0.215		0.001					
		Vulcraft	0.017	0.020	0.147	0.000	0.001	0.044	0.030	1.134	0.000	0.002
		Wasatch Integrated IE	0.019	0.903	0.033	0.039	0.292	0.024	0.832	0.042	0.049	0.371
		Salt Lake City, UT Total	3.885	20.138	6.482	0.645	10.638	4.261	22.811	8.590	1.294	7.874

Table 6.3, Point Source Emissions; Baseline and Projections with Growth and Control (taken from Control Measures for Area and Point Sources, Fine Particulate Matter, PM2.5 SIP for the Salt Lake City, UT Nonattainment Area Section IX. Part A.21)