

**State of Colorado Coal Units**
**2016 Simulation**
**Active Coal Units**

	Nameplate Capacity (MW)	Full Load Cost \$/MWh		Full Load Heat Rate btu/kWh	Estimated 2016 Fuel Cost \$/mmbtu
Cherokee (CO)	381	\$	31.05	10320	2.80
Comanche (CO)	383	\$	22.52	9798	2.05
Comanche (CO)	396	\$	24.65	10832	2.05
Comanche (CO)	857	\$	22.67	9870	2.05
Craig (CO)	446	\$	26.85	10413	2.39
Craig (CO)	446	\$	27.06	10502	2.39
Craig (CO)	463	\$	25.93	10030	2.39
Hayden	190	\$	31.19	12109	2.42
Hayden	275	\$	27.88	10744	2.42
Lamar Plant	25	\$	34.51	12465	2.64
Lamar Plant	19	\$	40.61	18475	2.11
Martin Drake	50	\$	25.05	12025	1.77
Martin Drake	75	\$	26.04	12582	1.77
Martin Drake	132	\$	23.07	10909	1.77
Nucla	12	\$	25.61	11727	2.04
Nucla	12	\$	25.61	11727	2.04
Nucla	12	\$	25.61	11727	2.04
Nucla	79	\$	26.93	12371	2.04
Pawnee	552	\$	20.17	10777	1.73
Rawhide	294	\$	18.37	9767	1.71
Ray D Nixon	207	\$	22.50	10748	1.96
Trigen Colorado	8	\$	31.00	12000	2.46
Trigen Colorado	8	\$	31.00	12000	2.46
Trigen Colorado	20	\$	28.54	11000	2.46
Valmont	192	\$	39.32	11317	3.22

**Estimated Retired Coal Units**

	Nameplate Capacity (MW)	Full Load Heat Rate btu/kWh	Year Retired
Arapahoe	46	16349	2013
Arapahoe	112	13311	2014
Cherokee (CO)	125	11605	2012
Cherokee (CO)	171	10984	2015
Trigen Colorado	0	10000	2012
W N Clark	19	13100	2013
W N Clark	25	12690	2013
Trinidad (CO)	4	12000	2015

**EIA-923 2012**

	Net Generation (Megawatthours)	Total Fuel		CO2 Rate
		Consumption MMBtu	Est CO2 lb	
W N Clark	223647	2922969	599208645	2679
Arapahoe	745548.66	9265938	1899517290	2548
Cherokee	2962284.5	31848771	6528998055	2204
Cherokee	0	0	0	
Comanche	8988890.3	91496062	18756692710	2087
Valmont	1005559.1	9915566	2032691030	2021
Valmont	0	0	0	
Martin Drake	63438.169	719329	147462445	2325
Martin Drake	1334162.2	15179964	3111892620	2332
Lamar Plant	0	0	0	
Lamar Plant	0	0	0	
Hayden	2473640.7	26970597	5528972385	2235
Hayden	0	0	0	
Nucla	550914.57	6928573	1420357465	2578
Craig	9164975	92716898	19006964090	2074
Pawnee	3256481.8	34129935	6996636675	2149
Rawhide	2116057.4	20920533	4288709265	2027
Ray D Nixon	0	0	0	
Ray D Nixon	1485507	15729244	3224495020	2171
Colorado Energy Nations Company	141588.02	4844674	993158170	7014
Western Sugar Coop- Ft Morgan	8325.51	1149073	235559965	28294
<b>Total</b>	<b>34,521,020</b>	<b>364,738,126</b>	<b>74,771,315,830</b>	<b>2166</b>



State of Colorado 2012 Generation		
Row Labels	Sum of GENERATION (Megawatthours)	Percentage of Generation
Coal	34512695	66%
Hydroelectric Conventional	1497209	3%
Natural Gas	10504950	20%
Other	10699	0%
Other Biomass	57722	0%
Petroleum	11038	0%
Pumped Storage	-244468	0%
Solar Thermal and Photovoltaic	149832	0%
Wind	5959825	11%
Wood and Wood Derived Fuels	267	0%
<b>Grand Total</b>	<b>52459770</b>	<b>100%</b>
<hr/>		
EPA Renewable (Solar & Wind)	6109657	12%

Source: EIA

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**Colorado State CO2 Rate Calculation**

	2030 Rate lb/MWh	Notes
Colorado Overall Target with all BSER Goals	1108	From EPA spreadsheet for option 1
Colorado 2012 Existing Fossil Fuel Plant Emission Rate	1937	From EPA spreadsheet for option 1
Colorado Existing 2012 Renewable Generation	6109657	Source EIA
Colorado 2012 Existing Fossil Fuel Plant Emission Rate w/ Existing Renewable Credit	1701	Calc. From EPA Spreadsheet
-How this will be allocated to existing units unknown but will have to be since rule is based on existing plants - How to credit out of state PPA if any - State will have to decide		
Colorado State Reduction Needed from Renewable Credited Existing Fleet to Target	35%	2012 reduction requirement to 2030

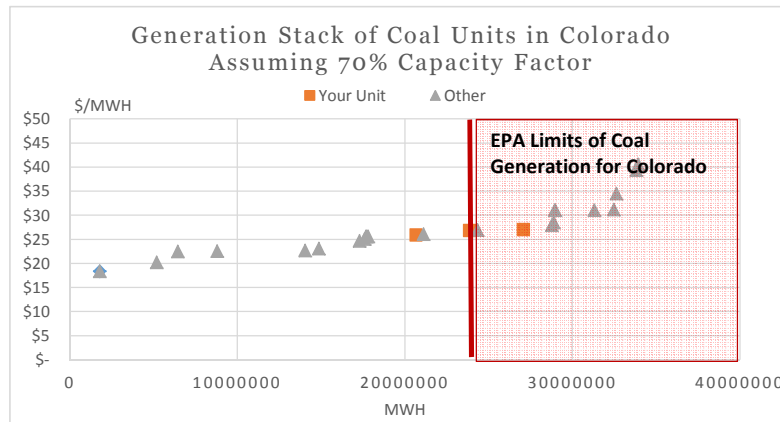
**EPA Effective Fossil Fuel Rate Required to Achieve Target With BSER 3 & 4 (Renewable & DSM/EE Targets)**

	2030 Rate lb/MWh	Notes
EPA Existing Fleet Emission Rates Required Assuming BSER 3&4 Achieve 100% Target	1521	Calc. From EPA Spreadsheet
-If BSER 3 & 4 undershoot the existing fleet emission will have to make up for the impact - Alternatively overshooting BSER 3 & 4 enables existing fleet to emit more		
EPA Estimated Reduction of Existing Fossil Fuel Fleet if 100% of BSER 3 & 4 Occur	11%	2012 reduction requirement to 2030
EPA 2030 Renewable Generation Target	10839820	From EPA spreadsheet for option 1
Colorado Percentage Increase from 2012 Levels	177%	Increase from 2012 - Annualized = 3%
Renewable Generation Target as a Percentage of Total Generation From 2012	21%	
Increase In Renewable Generation	4730163	2030-2012 MWH
Wind Capacity Needed By 2030	1800	Assuming all wind @ 30% capacity factor
EPA Estimated Required DSM/EE by 2030	5658360	From EPA spreadsheet for option 1
DSM/EE 2030 Target as Percentage of Current Generation	11%	
EPA Existing Fleet Emission Rates Required Assuming BSER 3&4 Achieved 60% Target	1385	Calc. From EPA Spreadsheet
EPA Estimated Reduction of Existing Fossil Fuel Fleet if 60% of BSER 3 & 4 Occur	19%	2012 reduction requirement to 2030

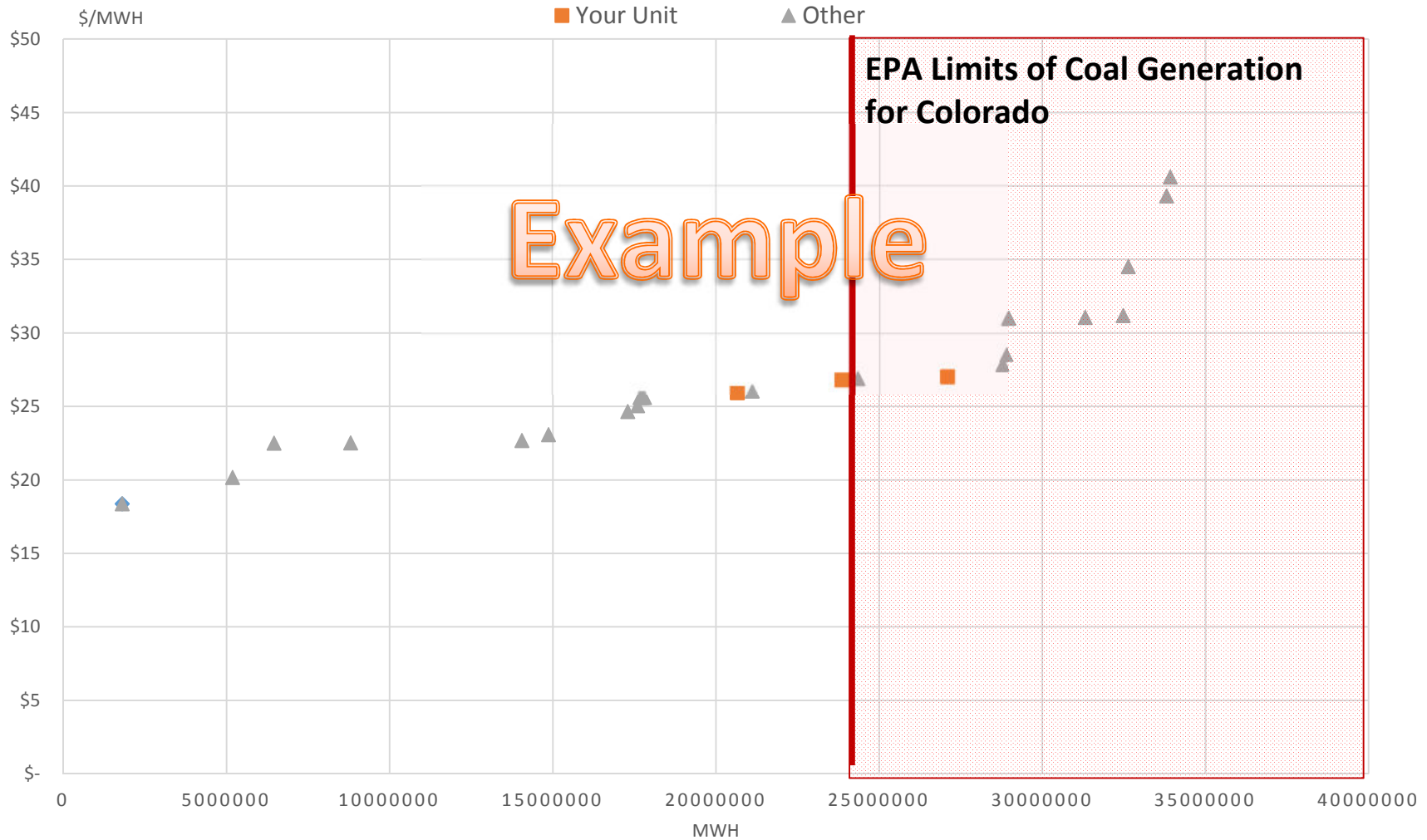
Your Unit Assumptions			
Unit	2012 CO2 Tons		2012 MWH
Unit 1	100000		500000
Unit 2	100000		200000
Unit 3	100000		10000
Unit 4	100000		10000
Unit 5	100000		10000
Unit 6	100000		10000
Unit 7	100000		10000
Unit 8	100000		10000
Unit 9			10000
Unit 10			10000
Unit 11			10000
Unit 12			10000
<b>Total</b>	<b>800000</b>		<b>800000</b>

Example

Your Fleet Rate Calculation	
MWh	
ExHydro	780000
	- Assumes credit for out of state wind PPA (minimal nonetheless)
Your Fleet 2030 Fleet Target Reduction to EPA Fleet Goals With Colorado System	
Your Fleet Rate Reduction Requirement to 1521 lb/MWh	26%
	- Assumes rest of system achieves BSER Goals Set By EPA 100% Achieved
Amount of Your Fleet Renewables/DSM/EE Needed with Current MWh	271,939
Amount of Effective Wind Capacity @ 30% Capacity Factor MW	103
Your Fleet 2030 Fleet Target Reduction to EPA Fleet Goals Without Colorado System	
Your Fleet Rate Reduction Requirement to 1108 lb/MWh	46%
	- Your Fleet left to target system goals individually
Amount of Your Fleet Renewables/DSM/EE Needed to Sustain Current MWh	664,044
Amount of Effective Wind Capacity @ 30% Capacity Factor MW	253
Your Fleet 2030 Fleet Target Depending On Other Coal Fleet Reduction	
EPA Coal Generation Target For Colorado MWh	22,548,824



# Generation Stack of Coal Units in Colorado Assuming 70% Capacity Factor



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