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Cost Effectiveness for Rule 1109 Boilers and Heaters

10 year equipment Life

1109 Boilers requiring SCR with emission limit fo 5 ppm operated using refinery gas

Equipment Size mmBtu/hr	Equipment Cost[1]	Instrumentation[2] (0.10 x EC)	Equipment Cost + Instrumentation	Emission Limit [1]	Sales Tax [3] (.0825 x EC)	Freight [4] (.05 x EC)	Total Equipment Cost (TEC)	Retrofit [5] (.50 x TEC)	Total Capital investment (TCI)
100 - 170	$1,673,836	$167,384	$1,841,220	5 ppmv	$151,901	$92,061	$2,085,181	$1,042,591	$3,127,772
427	$2,288,649	$228,865	$2,517,514	5 ppmv	$207,695	$125,876	$2,851,084	$1,425,542	$4,276,627

Equipment Size mmBtu/hr	Maintenance Labor[6] (0.015 X TCI)	Maintenance Material[6] (0.015 X TCI)	Total Labor (TL)	Overhead Administrative Property Tax Insurance[7] (.6 X TL + .04 X TCI)	Total Annual Costs
100 - 170	$46,917	$46,917	$93,833	$181,411	$275,244
427	$64,149	$64,149	$128,299	$248,044	$376,343

Cost effectiveness for Rule 1109 Equipment Peak activity, and lower of new BARCT and 2000 Emission Factor

Equipment Size mmBtu/hr	% of equipment in size range	Number of equipment	Present Value Factor (10 yr life, 4% real interest rate)	Present value of annual cost per boiler	Total present value of the Capital investment per boiler	Cost of control for all equipment
100 - 170	79%	59	8.11	$2,232,228	$5,360,000	$316,239,998
427	21%	16	8.11	$3,052,143	$7,328,770	$117,260,315

Total number of boilers[1]	75		$433,500,314
Total NOx reduction (ton/10yr)[2]	13775	Average cost of control/ton emission reduced	$31,500

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Cost Effectiveness for Rule 1109 Boilers and Heaters

15 year Equipment Life

1109 Boilers requiring SCR with emission limit fo 5 ppm operated using refinery gas

Equipment Size mmBtu/hr	Equipment Cost[1]	Instrumentation[2] (0.10 x EC)	Equipment Cost + Instrumentation	Emission Limit [1]	Sales Tax [3] (.0825 x EC)	Freight [4] (.05 x EC)	Total Equipment Cost (TEC)	Retrofit [5] (.50 x TEC)	Total Capital investment (TCI)
100 - 170	$1,673,836	$167,384	$1,841,220	5 ppmv	$151,901	$92,061	$2,085,181	$1,042,591	$3,127,772
427	$2,288,649	$228,865	$2,517,514	5 ppmv	$207,695	$125,876	$2,851,084	$1,425,542	$4,276,627

Equipment Size mmBtu/hr	Maintenance Labor[6] (0.015 X TCI)	Maintenance Material[6] (0.015 X TCI)	Total Labor (TL)	Overhead Administrative Property Tax Insurance[7] (.6 X TL + .04 X TCI)	Total Annual Costs
100 - 170	$46,917	$46,917	$93,833	$181,411	$275,244
427	$64,149	$64,149	$128,299	$248,044	$376,343

Cost effectiveness for Rule 1109 Equipment Peak activity, and lower of new BARCT and 2000 Emission Factor

Equipment Size mmBtu/hr	% of equipment in size range	Number of equipment	Present Value Factor (15 yr life, 4% real interest rate)	Present value of annual cost per boiler	Total present value of the Capital investment per boiler	Cost of control for all equipment
100 - 170	79%	59	11.11	$3,057,960	$6,185,732	$364,958,172
427	21%	16	11.11	$4,181,172	$8,457,799	$135,324,787

Total number of boilers[1]	75		$500,282,958
Total NOx reduction (ton/15yr)[2]	20662	Average cost of control/ton emission reduced	$24,000

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Cost Effectiveness for Rule 1109 Boilers and Heaters

25 year equipment life

1109 Boilers requiring SCR with emission limit fo 5 ppm operated using refinery gas

Equipment Size mmBtu/hr	Equipment Cost[1]	Instrumentation[2] (0.10 x EC)	Equipment Cost + Instrumentation	Emission Limit [1]	Sales Tax [3] (.0825 x EC)	Freight [4] (.05 x EC)	Total Equipment Cost (TEC)	Retrofit [5] (.50 x TEC)	Total Capital investment (TCI)
100 - 170	$1,673,836	$167,384	$1,841,220	5 ppmv	$151,901	$92,061	$2,085,181	$1,042,591	$3,127,772
427	$2,288,649	$228,865	$2,517,514	5 ppmv	$207,695	$125,876	$2,851,084	$1,425,542	$4,276,627

Equipment Size mmBtu/hr	Maintenance Labor[6] (0.015 X TCI)	Maintenance Material[6] (0.015 X TCI)	Total Labor (TL)	Overhead Administrative Property Tax Insurance[7] (.6 X TL + .04 X TCI)	Total Annual Costs
100 - 170	$46,916.58	$46,916.58	$93,833.15	$181,410.76	$275,243.92
427	$64,149.40	$64,149.40	$128,298.80	$248,044.35	$376,343.15

Cost effectiveness for Rule 1109 Equipment Peak activity, and lower of new BARCT and 2000 Emission Factor

Equipment Size mmBtu/hr	% of equipment in size range	Number of equipment	Present Value Factor (25 yr life, 4% real interest rate)	Present value of annual cost per boiler	Total present value of the Capital investment per boiler	Cost of control for all equipment
100 - 170	79%	59	15.6	$4,293,805	$7,421,577	$437,873,038
427	21%	16	15.6	$5,870,953	$10,147,580	$162,361,279

Total number of boilers[1]	75		$600,234,317
Total NOx reduction (ton/25yr)[2]	34436	Average cost of control/ton emission reduced	$17,430