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Cost Effectiveness for Rules 1146 and 1146.1 Boilers and Heaters
Manufacturer A

Boilers	Low NOx Burner	Equipment Cost[1]	Instrumentation[2] (0.10 x EC)	Equipment Cost + Instrumentation	Fuel [1]	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)
≤ 5 MM BTU/Hr	5 MM	$25,000	$2,500	$27,500	Nat Gas	12 ppmv	$2,269	$1,375	$31,144	$15,572	$46,700
>5 - 20 MM BTU/Hr	14.7 MM	$37,750	$3,775	$41,525	Nat Gas	12 ppmv	$3,426	$2,076	$47,027	$23,514	$70,500
>20 - 50 MM BTU/Hr	21 MM	$70,600	$7,060	$77,660	Nat Gas	9 ppmv	$6,407	$3,883	$87,950	$43,975	$131,900
	33.6 MM	$94,700	$9,470	$104,170	Nat Gas	9 ppmv	$8,594	$5,209	$117,973	$58,986	$177,000
> 50 MM BTU/Hr	63 MM	$127,200	$12,720	$139,920	Nat Gas	9 ppmv	$11,543	$6,996	$158,459	$79,230	$237,700

Low NOx Burner	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
5 MM	$701	$701	$1,401	$2,709	$4,100
14.7 MM	$1,058	$1,058	$2,115	$4,089	$6,200
21 MM	$1,979	$1,979	$3,957	$7,650	$11,600
33.6 MM	$2,655	$2,655	$5,310	$10,266	$15,600
63 MM	$3,566	$3,566	$7,131	$13,787	$20,900

1. Equipment cost, fuel, and emission limit info provided by Manufacturer
2. Instrumentation = 10% of Equipment Cost (OAQPS Section 1, Chapter 2, page 2-27, table 2.4)
3. Sales Tax = 8.25% for Los Angeles
4. Freight = 5% of Equipment cost (OAQPS Section 1, Chapter 2, page 2-27, table 2.4)
5. Retrofit = 50% of Equipment Cost (OAQPS Section 1, Chapter 2, page 2-28, paragraph 2.5.4.2)
6. Maintenance and Material: Maintenance material costs are 100% of the Maintenance Labor costs (OAQPS Section 1, Chapter 2, page 2-32, paragraph 2.5.5.3)
7. Overhead = 60% of all labor and maintenance materials; Property taxes, Insurance ans Administative = 4% of TCI
(OAQPS Section 1, Chapter 2, Page 2-34, paragraphs 2.5.5.7 and 2.5.5.8)

10 year life

Boiler size range	Low NOx burner	% of boilers in size range	Number of boilers	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
≤ 5 MM BTU/Hr	5 MM	17%	117	8.11	$33,251	$79,951	$9,354,300
>5 - 20 MM BTU/Hr	14.7 MM	53%	362	8.11	$50,282	$120,782	$43,723,100
>20 - 50 MM BTU/Hr	33.6 MM	26%	177	8.11	$126,516	$303,516	$53,722,300
>50 MM	63 MM	5%	31	8.11	$169,499	$407,199	$12,623,200
Total number of boilers	687					Cost of contr	$119,422,900

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Total NOx Reduction (ton/10yr)[2]	9048	Average cost of control/ton emission reduced	**$13,200**

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15 year life

Boiler size range	Low NOx burner	% of boilers in size range	Number of boilers	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
≤ 5 MM BTU/Hr	5 MM	17%	117	11.11	$45,551	$92,251	$10,793,400
>5 - 20 MM BTU/Hr	14.7 MM	53%	362	11.11	$68,882	$139,382	$50,456,300
>20 - 50 MM BTU/Hr	33.6 MM	26%	177	11.11	$173,316	$350,316	$62,005,900
>50 MM	63 MM	5%	31	11.11	$232,199	$469,899	$14,566,900
Total number of boilers	687					Cost of contr	$137,822,500
Total NOx Reduction (ton/15yr)[2]	13572					Average cost of control/ton emission reduced	**$10,200**