BARCT – Boilers and Heaters (other than refinery or utility)

SCAQMD Rules	Applies To	Emission Factors	Exceptions/Exemptions	Notes
Rule 1146	Boilers/heaters ≥ 5 mmBtu/hr	30 ppm 0.036 lb/mmBtu	Electric utility boilers, Boilers > 40 mmBtu/hr used at refineries, Sulfur plant reaction boilers, Limited exemption for low fuel usage	
Rule 1146.1	Boilers/heaters > 2 and < 5 mmBtu/hr	30 ppm 0.037 lb/mmBtu	Limited exemption for low fuel usage	
Rule 1146.2	Boilers/heaters ≤ 2 mmBtu/hr	30 ppm 0.037 lb/mmBtu	Units at RECLAIM facilities	
Other District's Rules	**Applies To**	**Emission Factors**	**Exceptions/Exemptions**	**Notes**
Bay Area Air Quality Management District (BAAQMD) 9-7	Boilers/heaters > 1 mmBtu/hr	30 ppm .037 lb/mmBtu	Natural gas/LPG-fired ≤ 10,000 mmBtu/hr, Electric utility boilers, Refinery boilers/heaters, Waste heat recovery boilers, Kilns, ovens, furnaces, Limited exemption for low fuel usage	Non-gaseous fuel 40 ppm
Kern County APCD 425.2	Boilers/heaters ≥ 5 mmBtu/hr			Less stringent than SCAQMD
Sacramento Metropolitan AQMD (SMAQMD) 411	Boilers/heaters ≥ 5 mmBtu/hr	30 ppm		Similar to SCAQMD
San Diego Co APCD 69-2	≥ 5 mmBtu/hr	30 ppm		Similar to SCAQMD
San Joaquin Valley Unified APCD (SJVUAPCD) 4305	≥ 5 mmBtu/hr	30 ppm gaseous fueled 40 ppm liquid fueled		Similar to SCAQMD
SJVUAPCD 4306	≤ 20 mmBtu/hr > 20 mmBtu Refinery boilers/heaters	15 ppm gaseous fuel 40 ppm liquid fuel 9 ppm gaseous fuel 40 ppm liquid fuel see next category	Solid fuel units, Dryers & glass melting furnaces, Kilns & smelters, Waste heat recovery boilers	More stringent than SCAQMD
Ventura Co APCD 74-15	≥ 5 mmBtu/hr	40 ppm		Less stringent than SCAQMD
Ventura Co APCD 74-15-1	≥ 1 and < 5 mmBtu/hr	30 ppm		Similar to SCAQMD

Control Technologies

Technology	Emission Limit Achievable	Retrofit Feasibility	Cost Issues	Notes
Ultra-low NOx Burner	12 ppm for < 20 mmBtu/hr for BACT 9 ppm for > 20 mmBtu/hr for BACT	Achieved in practice	Cost effective	Manufacturer guarantee

Recommended New BARCT

15 ppm (0.018 lb/mmBtu)

Basis

Other District's rule (weighted average based SJVUAPCD rule)
Achieved in practice (SCAQMD units at or below proposed BARCT)
Manufacturer guarantee
Existing technology for retrofits (ultra low NOx burners)
Cost effective

BARCT – Refinery Boilers/Heaters

SCAQMD Rule	Applies To	Emission Factors	Exceptions/Exemptions	Notes
R1109	Boilers and process heaters at petroleum refineries > 40 mmBtu/hr	0.030 lb/mmBtu (25 ppm)	≤ 40 mmBtu/hr, Sulfur plant reaction boilers, Units operated < 10% capacity for 12 months	12/31/92 compliance date
Other Districts' Rules	**Applies To**	**Emission Factors**	**Exceptions/Exemptions**	**Notes**
BAAQMD 9-10		.20 lb/mmBtu input NOx facility-wide or 300 ppm NOx daily avg	CO Boilers, Various other exemptions	Less stringent
Kern Co. APCD				No separate rule
SMAQMD				No separate rule
San Diego Co. APCD				No separate rule
SJVUAPCD 4306	5 – 65 mmBtu/hr > 65 – 110 mmBtu/hr >110 mmBtu/hr	30 ppm gaseous fuel 40 ppm liquid fuel 25 ppm gaseous fuel 40 pm liquid fuel 5 ppm gaseous fuel 40 pm liquid fuel	Solid fuel units, Dryers and glass melting furnaces, Kilns an smelters where products of combustion directly contact material being heated, Waste heat recovery boilers on turbines or internal combustion engines	Less stringent for 5 – 110 mmBtu/hr More stringent for > 110 mmBtu/h
Ventura Co APCD				No separate rule

Control Technologies

Technology	Emission Limit Achievable	Retrofit Feasibility	Cost Issues	Notes
SCR	5 ppm	Achieved in practice	Cost effective	
Ultra-low NOx Burner	25 ppm	Achieved in practice	Cost effective	Manufacturer guarantee

Recommended New BARCT

5 ppm (0.006 lb/mmBtu) for > 110 mmBtu/hr
(no new BARCT for 40 – 110 mmBtu/hr units because current allocations are based on Rule 1109 limit of 25 ppm which is the limit achievable with ultra low NOx burners and SCR is not cost effective)

Basis

Other District's rule (SJVUAPCD)
Achieved in practice
Existing technology for retrofits (SCR)
Cost effective

BARCT – Utility Boilers

SCAQMD Rules	Applies To	Emission Factors	Exceptions/Exemptions	Notes
1135	Electric power generating systems (SCE, LADWP, City of Burbank, City of Glendale, City of Pasadena, or any of their successors)	Annual limits per facility (based on limits ~ 24 ppm)	Smaller utilities	
2009	Same as above	5 – 30 ppm boilers		
Other Districts' Rules	**Applies To**	**Emission Factors**	**Exceptions/Exemptions**	**Notes**
BAAQMD 9-11	New power plants only			Not a BARCT rule
Kern Co APCD				No rule
SMAQMD				No rule
San Diego APCD 68 & 69	All units 3 specific utilities Other utility boilers	125 ppm Aggregate annual emissions cap: 1/1/97: 2100 tons 1/1/01: 800 tons 1/1/05: 650 tons 0.15 lbs NOx/MW-Hr	Units < 100 mmBtu/hr, Units used for heat and not electric generation	 Less stringent More stringent
SJVUAPCD 4306 Phase 3	≤ 20 mmBtu/hr > 20 mmBtu/hr PO limit of 9 to 30 billion Btu/yr annual heat input	15 ppm or 0.018 lb/mmBtu 9 ppm or 0.011 lb/mmBtu 30 ppm or 0.036 lb/mmBtu		Compliance by 100% of units by June 1, 2007 Equivalent to Rule 2009 limits for > 20 mmBtu/hr, less stringent for smaller units

Other Districts' Rules	Applies To	Emission Factors	Exceptions/Exemptions	Notes
SJVUAPCD 4306 Phase 3 (continued)	Units with multiple burners ≤ 5 mmBtu/hr, but total rated heat input is > 5 mmBtu/hr	30 ppm or 0.036 lb/mmBtu		
Ventura Co APCD				No rule

Control Technologies

Technology	Emission Limit Achievable	Retrofit Feasibility	Cost Issues	Notes
SCR	5 ppm or less for retrofit	Achieved in practice	Cost effective	Retrofits already completed

Recommended New BARCT for Utility Boilers and Turbines

9 ppm or less

Basis

Existing technology for retrofits (SCR)
Cost effective for retrofits and peak year usage

BARCT – Gas Turbines

SCAQMD Rules	Applies To	Emission Factors	Exceptions/Exemptions	Notes
1134	> 0.3 MW	Reference limits: 0.3 - < 2.9 MW 25 ppm 2.9 - < 10 MW 9 ppm 2.9 - < 10 MW with no SCR 15 ppm ≥ 10 MW 9 ppm ≥ 10 MW with no SCR 12 ppm ≥ 60 MW, combined cycle, no SCR 15 ppm ≥ 60 MW, combined cycle, no SCR 15 ppm ≥ 60 MW, combined cycle 15 ppm Sewage digester gas units 25 ppm	Laboratory units, Fire fighting and flood control units, Chemical processing gas turbines, Pipeline gas turbines located in Southeast Desert Air Basin (SEDAB), Emergency standby and peaking units operating < 200 hours per year, Existing gas turbines rated < 4 MW, operated < 877 hours per year and located in SEDAB or San Clemente Island	
2009	Electric power generating systems (SCE, LADWP, City of Burbank, City of Glendale, City of Pasadena, or any of their successors)	5 – 17 ppm		
Other Districts' Rules	**Applies To**	**Emission Factors**	**Exceptions/Exemptions**	**Notes**
BAAQMD 9-9	> 0.3 MW	Reference limits: 0.3 – 10 MW gaseous fueled 42 ppm refinery gas fueled 55 ppm non-gaseous fueled 65 ppm ≥ 10 MW gaseous fueled w/o SCR 15 ppm non-gaseous fueled w/o SCR 42 ppm gaseous fueled with SCR 9 ppm non-gaseous fueled with SCR 25 ppm	Testing of aircraft turbine engines for certification, Flood & fire control, Emergency standby	Less stringent for most categories, equivalent to SCAQMD for ≥ 10 MW with SCR
Kern Co APCD 425	Cogeneration turbines ≥ 10 MW	Reference limits: Gas-fired with SCR 9 ppm Oil-fired with SCR 25 ppm Gas-fired w/low-NOx combustors 20 ppm Oil-fired with low-NOx combustors 42 ppm		Equivalent to SCAQMD for units with SCR

Other Districts' Rules	Applies To	Emission Factors	Exceptions/Exemptions	Notes
SMAQMD 413	≥0.3 MW output or 3 mmBtu/hr input	RACT (reference limits) gaseous fuels 42 ppm liquid fuels 65 ppm BARCT (reference limits) ≥ 0.3 MW to < 2.9 MW or ≥ 2.9 MW operating < 877 hr/yr gaseous fuels 42 ppm liquid fuels 65 ppm ≥ 2.9 MW and <10 MW operating ≥877 hr/yr gaseous fuels 25 ppm liquid fuels 65 ppm ≥ 10 MW w/o SCR operating ≥ 877 hrs/yr gaseous fuels 15 ppm liquid fuels 42 ppm ≥ 10 MW w/ SCR operating ≥ 877 hrs/yr gaseous fuels 9 ppm liquid fuels 25 ppm	Emergency stand-by units, laboratory units, startup/shutdown	Less stringent or equivalent to SCAQMD
San Diego APCD 69-3	≥ 0.3 MW Applies to any unit	Reference limits gaseous fuels 42 ppm liquid fuels 65 ppm	Research, portable engines, engines rated ≤ 0.4 MW used in conjunction w/ military tactical equipment provided ≤ 1000 hours/year, emergencies, startup/shutdown	RACT Rule Less stringent than SCAQMD
San Diego APCD 69-3-1	Existing unit ≥ 1.0 MW and New units ≥ 0.3	Reference limits new units ≥ 0.3 and < 2.9 and existing units ≥ 1.0 and < 2.9 MW gaseous fuels 42 ppm liquid fuels 65 ppm ≥ 2.9 and < 10 MW gaseous fuels 25 ppm liquid fuels 65 ppm ≥ 10 MW w/o controls gaseous fuels 15 ppm liquid fuels 42 ppm	Research, portable engines, engines rated ≤ 0.4 MW used in conjunction w/ military tactical equipment provided ≤ 1000 hours/year, emergencies, startup/shutdown	BARCT Rule
San Diego APCD 69-3-1		≥ 10 MW w/ controls gaseous fuels 9 ppm liquid fuels 25 ppm		

Other Districts' Rules	Applies To	Emission Factors	Exceptions/Exemptions	Notes
San Diego APCD 69-3-1 (continued)		Peaking Units ≥ 4 MW operating < 877 hr/yr and < 4 MW operating < 877 hr/yr gaseous fuels 42 ppm liquid fuels 65 ppm		
SJVUAPCD 4703	≥0.3 MW output and/or 3 mmBtu/hr input	Tier I Reference limits: ≥ 4 MW operating < 877 hr/yr and > 0.3 MW, but < 10 MW operating ≥ 877 hr/yr gaseous fuels 42 ppm oil 65 ppm ≥ 10 MW w/o SCR operating ≥ 877 hr/yr gaseous fuels 15 ppm oil 42 ppm ≥ 10 MW w/ SCR operating ≥ 877 hr/yr gaseous fuels 9 ppm oil 25 ppm General Electric Frame 7 with Quiet Combustors gaseous fuels 18 ppm oil 42 ppm Solar Saturn 1100 horsepower gas turbine powering centrifugal compressor gaseous fuels or oil 50 ppm Tier II Solar Saturn < 2 MW driving a centrifugal compressor gaseous and liquid fuels 50 ppm ≤ 10 MW if dry low-NOx (DLN) system is commercially available gaseous fuel 25 ppm liquid fuel 65 ppm	Research and testing, Firefighting or flood control, Emergency standby operating < 200 hours per year, 4 MW units operating < 877 hours/year	Tier 1 requirements less stringent or equivalent to SCAQMD. Tier II Less stringent for most, but more stringent for specific categories
SJVUAPCD 4703		> 10 MW combined cycle or >10 MW simple cycle operating > 877 hr/yr gaseous fuels 5 ppm (standard) 3 ppm (enhanced) liquid fuel 25 ppm		

Other Districts' Rules	Applies To	Emission Factors	Exceptions/Exemptions	Notes
SJVUAPCD 4703 (continued)		> 10 MW simple cycle operating ≤ 877 hr/yr gaseous fuels 25 ppm (standard) 5 ppm (enhanced) liquid fuels 42 ppm (standard) 25 ppm (enhanced)		
Ventura Co APCD 74-23	≥ 0.3 MW	Reference limits: ≥ 0.3 and < 2. gaseous fuels 42 ppm liquid fuels 65 ppm ≥ 2.9 and < 10 MW gaseous fuels 25 ppm liquid fuels 65 ppm ≥ 10 MW without controls gaseous fuels 15 ppm liquid fuels 42 ppm ≥ 10 MW w/ control gaseous fuels 9 ppm liquid fuels 25 ppm Units ≥ 4 MW operating < 877 hours/year gaseous fuels 42 ppm liquid fuels 65 ppm	Research and testing, Firefighting or flood control, Emergency standby units, Units operating < 200 hours per year, Start-up, planned shut-down, or unplanned load changes	Emission factor at ppmv on a dry basis, corrected to 15% O_2 when firing on gaseous fuels

Control Technologies

Technology	Emission Limit Achievable	Retrofit Feasibility	Cost Issues	Notes
SCR	5 ppm or less for retrofit	Achieved in practice	Not Cost Effective	

Recommended New BARCT

None proposed

Basis

Further control beyond Rule 1134 not cost effective based on peak year usage factors

BARCT – Petroleum Refinery Fluid Catalytic Cracking Units (FCCU)

SCAQMD Rules

No Rule for FCCU NOx
Control Measure 90P-B-2 (70% reduction) subsumed for year 2000 allocation calculations

Other Districts' Rules

None for FCCU NOx

Control Technologies

Technology	Emission Limit Achievable	Retrofit Feasibility	Cost Issues	Notes
SCR	1.439lb/1000 bbl fresh feed	Achieved in practice at 2 refineries	Cost Effective	

Recommended New BARCT

1.439lb/1000 bbl fresh feed with SCR

Basis

Achieved in practice
Retrofit technology available (SCR)
Cost effective

BARCT – Cement Kilns

SCAQMD Rules	Applies To	Emission Factors	Exceptions/Exemptions	Notes
1112	Gray cement kilns	11.6 lbs/ton of clinker (24 hr avg) and 6.4 lb/ton of clinker (30 consecutive day avg)		CEMS required
Other Districts' Rules	**Applies To**	**Emission Factors**	**Exceptions/Exemptions**	**Notes**
BAAQMD				**No rule**
Kern Co APCD 425-3	Portland cement kilns	11.6 lbs/ton of clinker (24 hr avg) and 6.4 lbs/ton of clinker (30 consecutive day avg)	Startup and shutdown, Breakdowns	CEMs required Equivalent to SCAQMD
Mojave Desert AQMD	Portland cement kilns	Preheater-precalciner kilns & long dry kilns 6.4 lb/ton (30 consecutive day avg) Short dry kilns 7.2 lb/ton of clinker (30 consecutive day avg)		Startup and shutdown requirements and emission limits
SCMAQMD				No rule
San Diego APCD				No rule
SJVUAPCD				No rule

Recommended New BARCT

None proposed

Basis

SCAQMD is most stringent
Rule 2002 end factor based on SCAQMD Rule 1112
Further reductions not technically or economically feasible

BARCT – Internal Combustion Engines

SCAQMD Rules	Applies To	Emission Factors	Exceptions/Exemptions	Notes
1110.2	Stationary and portable engines > 50 bhp	Portable compression ignition 50 and < 117 bhp 10.0 g/bhp-hr 117 - < 400 bhp 7.2 g/bhp-hr ≥ 400 bhp 7.0 g/bhp-hr Stationary engines 0.15 g/bhp-hr	Emergency engines (< 200 hr/yr) Auxiliary engines used to power other engines or gas turbines during startup Test cells Ski lift & snow mfg Nov 1 – Apr 15 Portable engines under state registration Non-road engines Engines on san Clemente Island	Some categories with higher limits
Other Districts' Rules	**Applies To**	**Emission Factors**	**Exceptions/Exemptions**	**Notes**
BAAQMD 9-8	Stationary engines > 50 bhp	Gaseous fueled: Rich burn 56 ppm @ 15% O_2 Lean burn 140 ppm @ 15% O_2 Waste gas fueled: Lean burn 140 ppm 15% O_2 Rich burn 210 ppm 15% O_2	No emission limits: < 250 bhp liquid fueled engines agricultural emergency standby (< 100 hr/yr) ≤ 1000 bhp & operate < 200 hr/yr > 1000 bhp & operate < 100 hr/yr	Less stringent
Kern Co APCD 427	Stationary engines > 50 bhp	> 50 bhp maintenance ≥ 250 bhp rich burn 50 ppm ≥ 250 bhp lean burn 125 ppm diesel 600 ppm	Agricultural engines Emergency (< 200 hr/yr) Portable (< 1 yr at same site) Test cells	Less stringent
SCMAQMD 412	Stationary engines > 50 bhp at major source	Spark ignited Rich burn 25 ppm Lean burn 65 ppm Compression ignited 80 ppm	Emergency, Agricultural, Nonroad, Flight line support engines, Test cells Less stringent limits for lower usage engines	Less stringent
San Diego APCD 69-4	Stationary engines > 50 bhp at major source	Rich burn fossil fuel 0.9 g/bhp-hr (50 ppm) Lean burn 2.3 g/bhp-hr (125 ppm) Waste gas fueled 2.3 g/bhp-hr (125 ppm) Diesel or kerosene 9.0 g/bhp-hr (700 ppm)	Agricultural, Test cells, Emergency (< 200 hr/yr), Military tactical support	Less stringent
San Diego APCD 69-4-1	Stationary engines > 50 bhp	Rich burn 25 ppm Waste gas 50 ppm Lean burn 65 ppm	Agricultural, Test cells, Emergency (< 200 hr/yr), Military tactical support	Less stringent

Other Districts' Rules	Applies To	Emission Factors	Exceptions/Exemptions	Notes
San Diego APCD 69-4-1 (continued)		Diesel or kerosene Low use 9.0 g/bhp-hr (700 ppm) High use 6.9 g/bhp-hr (535 ppm) New 6.9 g/bhp-hr (535 ppm)		
SJVUAPCD 4701	Stationary engines > 50 bhp	Waste gas 125 ppm Water districts Rich burn 90 ppm Lean burn 150 ppm Diesel or dual fuel 600 ppm Other Rich burn 50 ppm Lean burn 75 ppm Diesel or dual fuel 600 ppm	Standby, Emergency, Test cells. Portable engine under Statewide Registration, Use of other fuels during natural gas curtailment, Military tactical equipment, Transportable engines (< 1 yr at same site)	Less stringent
SJVUAPCD 4702	Spark ignited > 50 bhp	Rich burn Waste gas 50 ppm Cyclic, filed gas 50 ppm Other 25 ppm Lean burn 2-stroke, gaseous fuel and < 100 bhp 75 ppm Other 65 ppm	Emergency standby, Low usage, Statewide Registration, Military tactical equipment, Transportable engines (< 1y at same site)	Less stringent
Other Districts				Several other Districts have NOx BARCT rules for ICEs but all are Less stringent than SCAQMD

Recommended New BARCT

None proposed

Basis

SCAQMD is most stringent
Further reductions not economically or technically feasible

BARCT – Glass Melting Furnaces

SCAQMD Rules	Applies To	Emission Factors	Exceptions/Exemptions	Notes
1117	Glass melting furnaces	4.0 lb NOx per ton of glass pulled	Furnaces limited to ≤ 15 lbs NOx/hr by permit, Glass remelt facilities using exclusively glass cullet, marbles, chips or similar feedstock, Furnaces producing glass tableware exclusively, Flat glass melting furnaces, Furnaces melting glass for production of fiberglass exclusively, Idling furnaces	
Other Districts' Rules	**Applies To**	**Emission Factors**	**Exceptions/Exemptions**	**Notes**
BAAQMD 9-12	Glass melting furnaces	2.75 grams of NO_x per kilogram (5.5 lbs of NO_x per short ton) of glass pulled (3 consecutive hour avg excluding start-up, shutdown, and idling)	Uses electricity except when furnace contains no molten glass, Capacity < 5 short tons/day	Less stringent than SCAQMD
Kern County APCD				No rule
SMAQMD				No rule
San Diego Co APCD				No rule
SJVUAPCD 4354	Glass melting furnaces at major NOx sources	Container Glass or Fiberglass 4.0 lb NOx per ton of glass pulled (24 hr avg) Flat Glass 9.2 lb NOx per ton of glass pulled (block 24 hr avg) and 7.0 lb NOx per ton of glass pulled (rolling 30 day avg) Oxygen-assisted combustion 9.2 lb NOx per ton of glass pulled (block 24 hr avg) and 7.0 lb NOx per ton of glass pulled (rolling 30 day avg)	Uses electricity except when furnace contains no molten glass, Startup, shutdown, and idling	Equivalent to SCAQMD for container glass, also contains requirements for processes exempt under SCAQMD Rule 1117
Ventura Co APCD				No rule

Recommended New BARCT

None proposed

Basis

SCAQMD Rule 1117 and Rule 2002 end factors for NOx RECLAIM sources are most stringent limits
Rule 2002 end factors for glass melting furnaces

Glass Fiber Furnace and Flat Glass Melting Furnace	4 lb NOx per ton of product (Rule 1117 Rule 2002)
Tableware Glass	5.68 lb NOx per ton of product (Rule 2002)
Container Glass	1.2 lb NOx per ton of product (Rule 2002)

BARCT – Curing and drying ovens

SCAQMD Rules

No SCAQMD for NOx BARCT for this category

Other Districts' Rules

No rules

Recommended New BARCT

None proposed

Basis

No BARCT rules
Rule 2002 end factor (0.31 lb/mmBtu) is more stringent than new BARCT recommended for other miscellaneous combustion equipment
Further reductions not technically feasible

BARCT – Metal Melting Furnaces and Heat Treating Furnaces

SCAQMD Rules	Applies To	Emission Factors	Exceptions/Exemptions	Notes
				No NOx rules for these sources
Other District's Rules	**Applies To**	**Emission Factors**	**Exceptions/Exemptions**	**Notes**
BAAQMD				No rule
Kern County APCD				No rule
SMAQMD				No rule
San Diego Co APCD				No rule
SJVUAPCD				No rule
Ventura Co APCD				No rule

Control Technologies

Technology	Emission Limit Achievable	Retrofit Feasibility	Cost Issues	Notes
Low NOx & Ultra Low NOx Burners	Varies depending on equipment	Achieved in practice	Cost effective	

Recommended New BARCT

45 ppm (0.055 lb/mmBtu)

Basis

Achieved in practice
Retrofit technology available (ultra low NOx burners)
Cost effective

BARCT – Miscellaneous Combustion (ovens, kilns, claimers, dryers, furnaces)

SCAQMD Rules	Applies To	Emission Factors	Exceptions/Exemptions	Notes
				No NOx rules for these sources
Other District's Rules	**Applies To**	**Emission Factors**	**Exceptions/Exemptions**	**Notes**
BAAQMD				No rule
Kern County APCD				No rule
SMAQMD				No rule
San Diego Co APCD				No rule
SJVUAPCD				No rule
Ventura Co APCD				No rule

Control Technologies

Technology	Emission Limit Achievable	Retrofit Feasibility	Cost Issues	Notes
Low NOx & Ultra Low NOx Burners	30 ppm for retrofit	Achieved in practice	Cost effective	

Recommended New BARCT

30 ppm (0.036 lb/mmBtu)

Basis

Achieved in practice
Retrofit technology available (ultra low NOx burners)
Cost effective