A.6 INDUSTRIAL, COMMERCIAL, AND RESIDENTIAL FUEL COMBUSTION

Industrial, commercial and residential fuel combustion accounts for approximately 14 percent of combined U.S.-Canada SO_2 emissions and approximately 20 percent of their combined NO_x emissions. This sector is characterized by a wide diversity in boiler sizes (i.e., from 10^5 Btu/hr to greater than 250 x 10^6 Btu/hr), combustion systems, and fuel characteristics. In addition, the technical expertise of the owner/operator varies from the homeowner to the skilled technician. Industrial boilers are the major emitters in this sector.

There are various control options that can be considered to reduce sulfur dioxide emissions from this sector. These are:

(1) replace sulfur containing fuels such as coal and petroleum with natural gas or electrical energy, or substitute lower sulfur fuel of the same type;

(2) desulfurize fuels such as heating oils and heavy fuel oils;

(3) use flue-gas desulfurization techniques to remove sulfur dioxide from combustion flue gases.

FGD can lower sulfur oxide emissions by up to 90 percent. Fluid-bed combustion can achieve a 70-85 percent SO_2 reduction at costs which are estimated to be competitive with FGD. The dual-alkali FGD process is the dominant sulfur oxide control technology for industrial boilers. Sodium-based once-through systems are used in industries which produce a sodium-containing waste stream such as pulp and paper and textile mills (from de-ionizer recharging). There are two installations of the lime-spray-dryer SO_2 control process on commercial boilers in the United Sates.

As in utility boilers, combustion modification is the principal method of controlling NO_x emissions. In California, several thermal-NO_x (non-catalytic NO_x control) installations have been purchased; however, none is in commercial operation at this time. The NO_x emission limits that are achievable using combustion modification are dependent upon the fuel type (oil, coal, gas) and firing method (for coal, pulverized coal, chain-grate stoker, vibrating-grate stoker, and spreader stoker).

The cost of SO_2 control technology varies as a function of boiler size, load factor, and fuel sulfur content. Thus the uncertainty in capital and annual costs can be large. The capital costs and operating costs shown in Figures A.6.1 and A.6.2 can be in error by as much as $\pm$40 percent. The cost of retrofitting industrial boilers is highly uncertain since space limitations and other restrictions can cause significant variations.