

A.3 FOSSIL-FUEL-FIRED ELECTRICITY GENERATION - CONTROL TECHNOLOGY SUMMARY

In this sector the focus is placed on fossil-fuel-fired electricity generation, the attendant SO_x and NO_x emissions and their control and reduction. The principal reason for this is that these facilities are important contributors to total emissions of these pollutants. While hydroelectric and nuclear facilities are commercially available forms of power production, in the past these options have been selected on the basis of the availability of natural resources, technical, social and economic considerations and not as an alternative control strategy for SO_x and NO_x emissions. Power generation processes such as magnetohydrodynamics, tidal, wind and solar power have also been excluded from consideration in this report as alternative means for SO_x and NO_x control because currently they are only emerging technologies.

SO_x Reduction

Sulfur oxide emissions can be reduced by several methods. These can be grouped generically as follows:

- (1) use of naturally occurring low-sulfur fuel;
- (2) removal of the sulfur before combustion;
- (3) reaction of sulfur with an absorbent during combustion; and
- (4) removal of the sulfur oxides after combustion.

Some processes for SO₂ control are capable of a very high removal efficiency with attendant expense; others cost much less but are limited to a relatively low level of removal efficiency.

For coal combustion, the following rankings are made for process choice at different levels of emission reduction. They are judgmental in nature, being based on a subjective evaluation of factors such as cost, commercial viability, absorption efficiency, and process reliability and may well change when site-specific considerations are taken into account. It is not considered feasible to undertake a more quantitative approach to ranking in this report.

Removal Efficiency level, %

Process Listing

Higher than 90%

1. Limestone scrubbing with additives
2. Lime scrubbing
3. Dual alkali scrubbing
4. Regenerable FGD processes

50-90% (high-sulfur coal)

1. Limestone scrubbing, (with physical coal cleaning where upper limit on SO₂ emissions applies)
2. Chemical coal cleaning^a