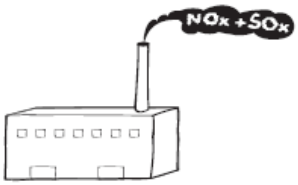

TRADE-OFFS AND CO-BENEFITS ACCOMPANYING SOx CONTROL

SOx Control Trade-offs and Co-benefits Beyond the Source

Emissions of greenhouse gases and other atmospheric pollutants occur at stages of the life cycle other than power generation. These stages include raw material extraction, component manufacture, fuel and material transportation, and facility construction and dismantling. To the extent that greenhouse gas emissions are representative, information compiled by The World Energy Council (2004) would suggest that direct stack emissions are far more dominant than the other indirect stages of the life cycle. See Figure S11.

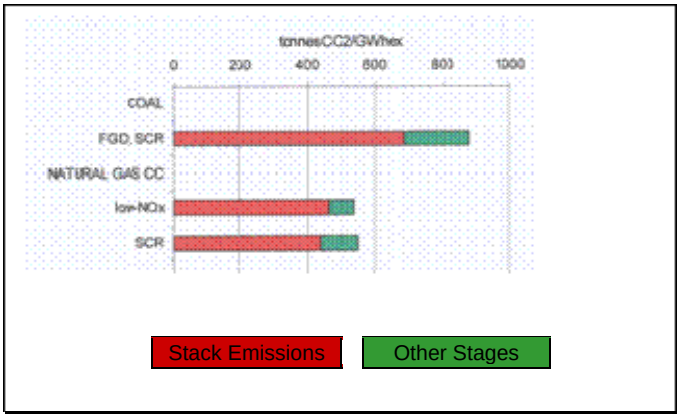

Figure S11. Greenhouse Gas Emissions from Combined Heat and Power Systems (Source: World Energy Council 2004)

The National Renewable Energy Laboratory (NREL) has performed a life cycle assessment (LCA) that examined coal-fired power systems. Included was the scenario of a coal-fired power plant equipped with flue gas treatment technology for SOx control and combustion modifications for NOx reduction. Findings related to flue gas treatment for SOx reduction are noted below.

- Apart from the CO_2 produced during coal combustion, operations related to flue gas clean-up produce more CO_2 than any other upstream process.
- Process steps involved in manufacturing and transporting limestone and lime along with limestone use, account for 62% of the system CO_2 emissions not associated with coal combustion, twice the CO_2 emissions related to transportation of the coal.
- Limestone production accounts for 28% of the non-coal system energy consumption.
- The majority of overall particulate emissions originate with limestone production.

References

World Energy Council. 2004. *Comparison of energy systems using life cycle assessment*. London: World Energy Council. http://www.worldenergy.org/documents/lca2.pdf