

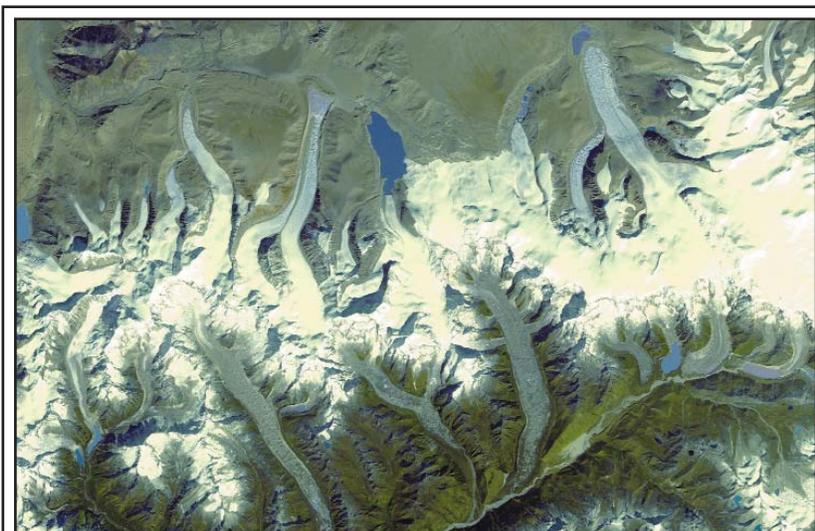
Q-PAC® Scrubbing and MLM® Heat Recovery Media Reduce Greenhouse Gas Emissions - Fight Global Warming

Introduction

The burning of fossil fuels produces carbon dioxide and water. In simple terms, oxidation of hydrocarbon fuels is described by the chemical reaction:



The fact that human activities are adding CO₂ gas to the atmosphere is beyond dispute. Even organizations that dispute the consequence of rising carbon dioxide concentration in the atmosphere [1] state that such concentration has been rising steadily in the past century. The US EPA has reported that in the United States approximately 6.6 tons of carbon equivalent greenhouse gases are emitted per person per year [2]. Reports detailing such events as glacial lake formation [3] where previously in recorded history no such lake was ever reported, continue to proliferate.



Finger Lakes forming in Bhutan from glacial melting. Photo provided courtesy of NASA's Earth Observatory <http://earthobservatory.nasa.gov> image #2001324

Example - Pulp Mill ClO₂ Scrubber is packed with Q-PAC®

A bleached kraft mill used Q-PAC® supplied by Lantec Products to repack their chlorine dioxide scrubber [4]. As the result of dramatically lower pressure drop the mill eliminated 270 horse power. Scrubbing efficiency of ClO₂ also improved. The environmental consequence of the power reduction is explained below.

1 hp = 0.746 kW [5]

Operation of Pulp Mill ~ assume mill operates 340 days per year
Therefore, the savings in kWh per year is:

270 hp (0.746 kW/hp) (24 hours/day) (340 operating days/year)
or:
1,643,587 kWh per year

A joint DOE/EPA study reports [6] that one kWh equates to 1.341 pounds of CO₂ emitted to the atmosphere. Therefore the pounds of carbon dioxide emission the pulp mill eliminated is:

1.644 x 10⁶ kWh/year (1.341 pounds CO₂/kWh) or:
2.205 million pounds of carbon dioxide per year in carbon emission reduction
with: **an \$80,000+ per year reduction in power costs for the mill!**

Example - Chemical Plant Regenerative Thermal Oxidizer Retrofitted with MLM®

A Chicago area chemical plant retrofitted their RTO (regenerative thermal oxidizer, also known as afterburner as the process unit destroys volatile organic compounds, or VOCs) from saddles to MLM® [7]. This is a ceramic heat recovery media that both reduced pressure drop and also possibly improves thermal efficiency in a RTO. The RTO at this plant was designed to operate in "autothermal" or self supported combustion but had never been able to do so with ceramic saddles. As a consequence of the retrofit to MLM®, the pressure drop in the RTO fell by 10" W.C. (25 mbar). As a result, the power consumption of the RTO fell by ~ 100 hp (75 kW). Therefore, as explained above, the CO₂ emission reduction was 800,000 pounds/yr (360,000 kg/yr).

Additionally, the RTO returned to autothermal operation due to improved thermal efficiency of MLM® vs. saddles. As a result, 84 therms of natural gas consumption was eliminated in the RTO. This is based upon a reported fuel gas savings of \$50,000 per year and a cost of \$0.60 per therm. The resultant reduction in CO₂ emissions was 9.7 x 10¹² lbs (4.4 x 10¹² kg) CO₂ per year.

Fuel and power savings combined equaled over \$100,000 per year!



References

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6. US Department of Energy and the US Environmental Protection Agency, "Carbon Dioxide Emissions from the Generation of Electric Power in the United States", July 2000
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