



Emission Resource Group, LLC

CO₂

Recovery

To

Methanol



Recent Revisions to the EPA's Emissions Standards

- On December 21, 2012, EPA finalized rule tightening the maximum achievable control standards (“MACT”) on air emissions from electric generating units;
- The final rule provides for a 90% reduction from uncontrolled power plant emissions of Cadmium, Carbon Monoxide, Dioxins/Furans, Hydrogen Chloride, Lead, Mercury, Oxides of Nitrogen, three forms of acid gases, Sulfur Dioxide, and fine particulates;
- It has been conservatively projected that this rule will affect approximately 1,100 coal-fired units and 300 oil-fired units nationwide.



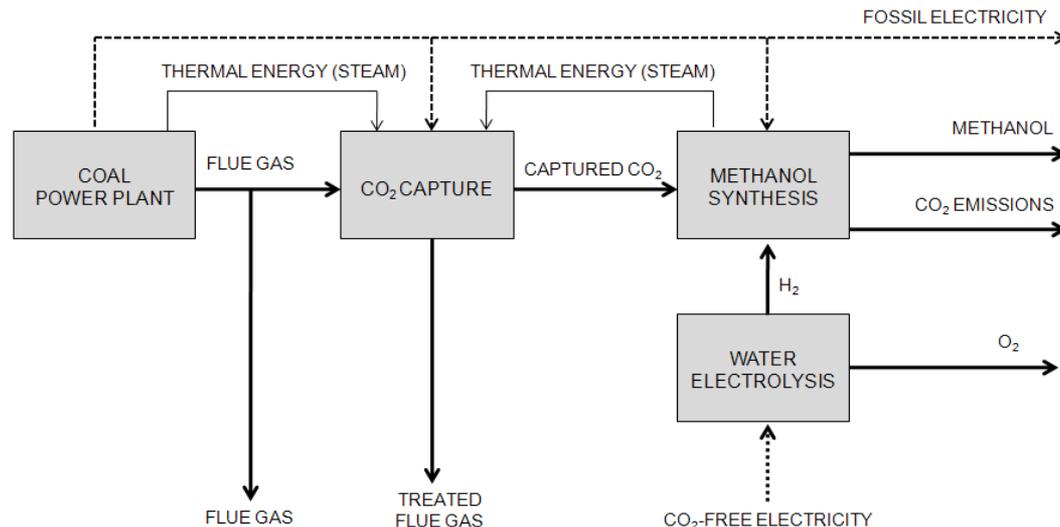
Economic Impacts: Recent Revisions to the EPA's Emissions Standards

- Large Power Providers: Most large producers in Washington will see little adverse impacts from the new rule, as most operations are by hydro-electric plant. However, the new emissions rule will have a significant adverse economic impact on the coal-fired power plants which account for approximately forty-percent of electricity produced in the US and the gas-fired power plants which account for twenty-five percent of the electricity produced in the US. These plants will be required to make significant capital investments in new plant and equipment to become compliant with the new MACT standards. The EPA estimates the cost of this rule to be approximately \$10.9 billion per year – Industry officials have projected these annualized costs much higher:
- ;
- Small Power Producers and “District Energy” Companies: Because these producers generally burn “fossil fuels” in their operations, they will be required to make significant capital investments in existing plant and equipment to become compliant with the new MACT standards. Unfortunately, these producers do not have customer base to warrant such investment from an economic perspective
- Rate-Payers: Both the EPA and industry officials have projected that this rule will result in significant rate increases nationwide for two key reasons: (1) the nationwide supply of electricity will likely decrease due to plant closures caused by operations of the new MACT rule, and (2) the cost of producing electricity will likely increase due to long-term debt associated with the capital raise necessitated by the new rule. While the EPA estimates the increase in retail electricity prices to be an average of 3.7% with consumer natural gas prices increasing by 0.6% to 1.3%, industry officials are not nearly so optimistic.



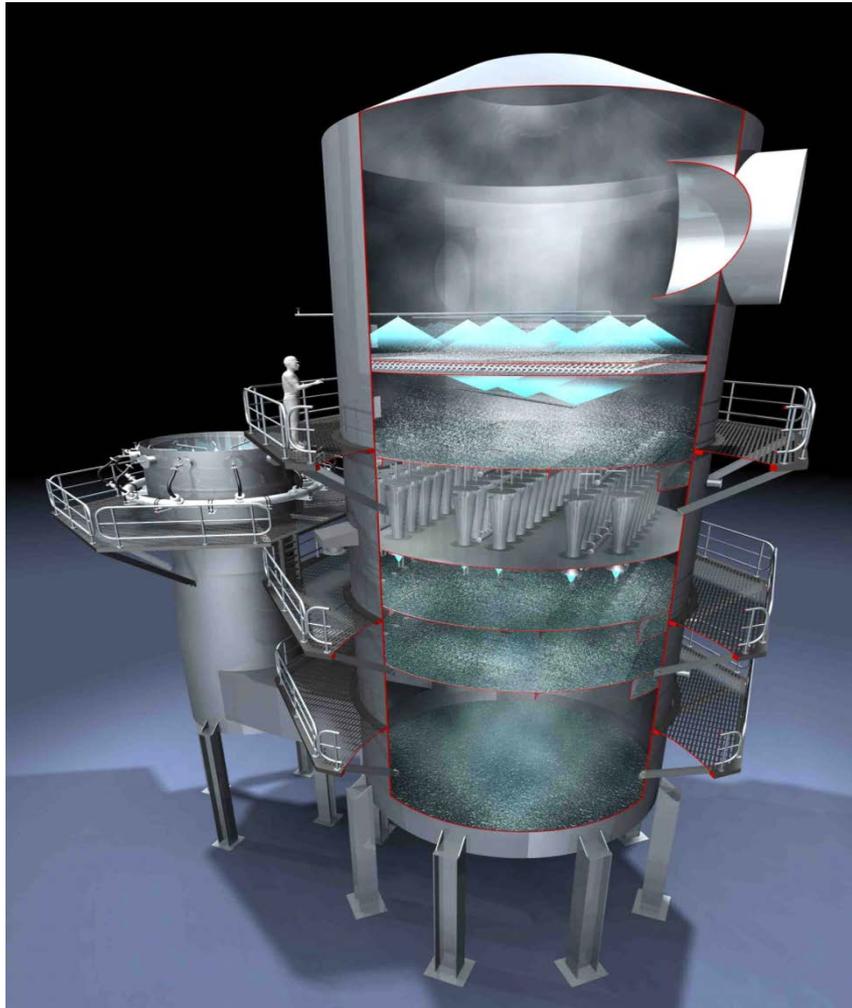
Emission Resource Group's “Interim Solution”

- Emission Resource Group has developed a technological answer to the dilemma presently facing the coal and power industries with respect to increased regulations imposed upon coal-fired power plants.
- Through utilization of patented technologies in a two-Phase system, Emission Resource Group can offer coal-fired facilities the freedom to continue to utilize coal as its feedstock at emissions levels compliant with the new MACT rule.
- This system will not only allow coal-fired power plants to continue existing operations without cost-prohibitive capital investment or significant downtime, it will also enable these facilities to continue to rely upon proven coal products delivered by existing transport infrastructure – essentially, the system will enable these facilities to continue to operate with existing plant and feedstock and meet the existing and promulgated air emissions standards.





Emission Resource Group's "Interim Solution" Phase 1



Micromist SO₂ W/Plume Abatement

Proven Performance Data:

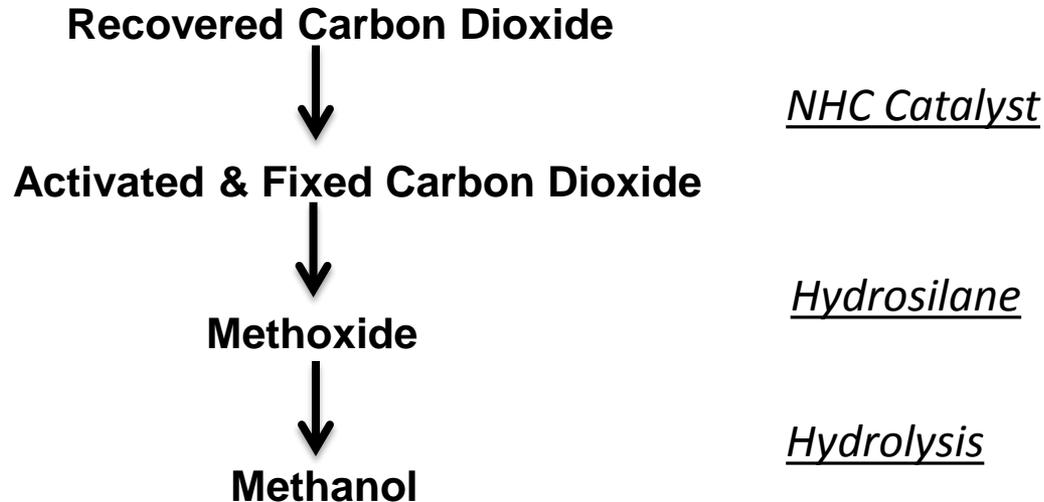
- **Consumables-Removes 99.7%**
- **Flue Acid Gases-Removes 99%**
- **Heavy Metals-Removes 99%**
- **Particulate-Removes 95.5%**
- **Our Wet Scrubber removes H₂SO₄ which no other device provides. No more (yellow toxic) haze**
- **Our Scrubber captures over 90% of all Sulphur Dioxide Nitrogen Dioxide, Mercury, and other compounds**



Emission Resource Group's "Interim Solution"

Phase 2: The CO₂ to Methanol Process

Flow Chart



The carbon dioxide reduction is efficiently catalyzed by NHC's even at room temperature. Then hydrosilane provides the hydrogen which bonds with carbon dioxide in a reduction reaction.



Emission Resource Group's “Interim Solution”

Phase 2: The CO₂ to Methanol Process

- Stage 1: At the conclusion of the MicroMist Scrubber's operations, clean Carbon Dioxide is run through an initial chamber where it is exposed to and reacts with N-heterocyclic carbenes (NHCs);
- Stage 2: The compounds generated in Stage 1 are combined with silica and hydrogen (in a process referred to as “hydrosilane”) here these compounds bond;
- Stage 3: The compounds generated in Stage 2 are then combined water (in a process referred to as “hydrolysis”) where methanol becomes the end product;

The end result of this process is a reduction of between fifty to sixty percent of carbon dioxide emissions from fossil fuel burn operations with an associated production of methanol which can be used as a fuel additive.



Long-term Benefits Derived from Introduction of Emission Resource Group's "Interim Solution" to Power Production Operations

- provide a consistent and meaningful reduction (in excess of 50%) in greenhouse gasses generated in power production operations utilizing all fossil fuels (coal, oil, natural gas, biomass, etc.);
- generate methanol (a fuel additive) from waste gases, in so doing, lessening both the state and federal reliance upon foreign produced oil; and
- create a niche market in the "Renewable Energy" sector which will result in increased jobs and revenues both at the state and federal level.



Conclusion

- We look forward in serving as an information resource for this Committee as it develops energy policies which will incent environmentally friendly and economically feasible solutions to problems presently facing power providers and rate payers both here in Washington and across the nation;
- Thank you for allowing us to appear today to discuss these important issues and opportunities.



Emission Resource Group, LLC

Assuring Our Nation's Energy Security as We Transition to a New Energy Future

www.emissionresourcegroup.com