Testimony of James Yann

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Subcommittees on Clean air and Jobs

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Good morning. My name is James Yann, and I am Managing Director for the North American Environmental Control Systems business of Alstom Power. I would like to thank Chairman Carper, Chairman Sanders, Ranking Member Barrasso, and Ranking Member Boozman for this opportunity to address the potential for job creation under the current and proposed regulatory regime set forth by the U.S. Environmental Protection Agency under the Clean Air Act.

Alstom is a global leader in the power generation, rail transportation infrastructure and power transmission and distribution industries. Our company sets the bench mark for innovative and environmentally friendly technologies. Today, Alstom equipment can be found in more than 50% of U.S. power plants, while globally it generates more than 25% of the world's electricity. Alstom also is the world's largest air pollution control company.

Alstom employs more than 93,000 people in 70 countries and had sales of approximately $30 billion in 2009-2010. In the U.S., Alstom employs about 6,000 full time permanent employees in 47 states and the District of Columbia. This number can nearly double when accounting for workers hired for specific projects. Alstom continues to grow and invest in the U.S. Last year, we inaugurated a $350 million new steam turbine facility in Chattanooga, Tennessee, and this summer we are opening a new wind turbine manufacturing facility in Amarillo, Texas.

Alston's Environmental Control Systems business (ECS) traces its roots as far back as 1920, when the business made mechanical collectors and fans for removing soot and ash from early power plants and industrial facilities. Today, ECS is a highly innovative environmental company continuing to specialize in air pollution control. We offer a full line of both wet and dry flue gas desulfurization equipment for sulfur oxide control, both combustion and post combustion control of nitrogen oxides, electrostatic precipitators and fabric filters for particulate control, and mercury control through both combustion and post combustion techniques. Our experience includes more than 100 GW of flue gas

desulfurization, more than 350 GW of particulate control, more than 80 GW of nitrogen oxide control and approximately 15 GW of mercury control.

Additionally, Alstom is a leader in developing carbon capture technologies to lower CO2 emissions. Alstom is commercializing three CCS technologies: oxy-firing combustion, Chilled Ammonia and Advanced Amine for post-combustion control. Currently, Alstom has 12 CCS projects in the operation, construction, or engineering stages around the world. These range from small pilot plants up to 250 MW commercial size plants.

We are here today to specifically address the subject of potential job creation in the air pollution control industry, and its supply chain, under the current rules affecting the industry – most notably the Clean Air Transport Rule and other rules referred to as the HAPs MACTs. The actual amount of equipment to be installed is a complex question which depends on the timing of each of the rules, including possible Greenhouse gas regulation, as well as fuel availability and pricing, and many other factors. We leave it to others to explore and finalize the application of those factors.

However, leveraging our knowledge of typical air pollution control projects applying a range of technologies, and estimates provided by industry experts, we can offer insight into the typical employment requirements for a nominal 500-600 MW unit.

Let us start with wet flue gas desulfurization, or scrubbers as they are commonly called. These projects typically have a duration of 28-40 months and begin with engineering and design work. A standard scrubber project will require in excess of 50,000 engineering, procurement, project management and support hours, which may increase as much as 50% including hours for the owner and the owner's engineer. The typical scrubber is field erected and requires more than 2,000 tons of fabricated steel delivered to the site. This steel represents more than 40,000 man-hours of production. The largest single source of man power is the actual erection of the scrubber, which requires a wide variety of trade crafts. Typically this lasts over about thirty months and employs some 700 craft people on average during that period. Scrubbers consist of a large number of components including pumps, demisters, spray nozzles, electrical equipment and wiring, controls, emission monitors, crushers/ball mills, conveyors, weighing devices and so on. As we tie these complex projects back to potential job creation, it should be noted that almost all of this equipment can be procured from sources in the United States.

In total, a wet flue gas desulfurization project will provide the equivalent of about 775 full time jobs over the three plus years of the project, not including jobs provided for all the equipment suppliers and delivery services involved in delivering materials and equipment to the site. Estimates such as those provided by ICF to the public of some 60 GW of new FGD projects required under the aforementioned rules, could translate into approximately 100 projects over a five to six year period, thus representing approximately 77,000 direct job-years .

Based on studies by ICF and others, it is anticipated that the nitrogen oxide control market will be less than half the size of the sulfur oxide market. These projects, while less complex from a process point of view, can be far more complex from a construction perspective because the selective catalytic reduction equipment must be installed between the boiler and the existing particulate collection equipment. Sulfur oxide scrubbers on the other hand are installed at the end of the process train. Following similar logic to that above, and again drawing from ICF estimates, it is anticipated that work on nitrogen oxide control projects would result in about 35-40,000 job-years over the same time period.

Since the HAPs MACT has not yet been released, it difficult to anticipate the actual requirements. It is our general belief that some number of fabric filters will be required on those plants that do not have oversized electrostatic precipitators, can not install a hybrid ESP/FF, or do not already have fabric filters (where a fabric media change may prove to be adequate). Similarly, given the diverse offerings for collection of mercury and other metals, the number of fabric filters required may be in the range 70 GW. Applying the same job creation logic, this could spur the creation of approximately 50,000 jobs years over the same 5-6 year period.

Additional considerations also offer paths to job creation.. Operators and maintenance personnel will be hired in the plants that may range form as few 10 to as many as 30 per plant depending on operation and maintenance philosophy at each installation. Assuming this affects approximately 100 plants (many plants already have some of the equipment described), this represents an additional 1,000-3,000 full time jobs.

The last area which will create jobs is the supply of reagents to these systems. These include ammonia, lime, limestone and activated carbon (ACI), among others. It is estimated by the Institute of Clean Air Companies that this market will increase by about $400,000,000 annually to support the operation of the equipment installed as a result of the regulations listed above.

We wish to make it clear that while we are confident in the estimates of effort required for each project, any projections on total job creation is dependent on the number of units installed. For purposes of this recitation, we have leaned heavily on others to interpret the impact of the regulations.

In summary, it is expected that these regulations will create the opportunity to create more than 150,000 job-years over the span of 5-6 years for implementation alone. This does not including jobs created by sub-suppliers of components, transportation, commodity suppliers, and the indirect multiplier that normally is associated with supporting direct jobs. Estimates of industry associations put this total market in the range of $4 billion dollars annually until compliance (not including operations and commodities).

While Alstom is working to develop innovative technologies for meeting the potential requirements of any Greenhouse Gas regulations that may be proposed, we have chosen not to address them at this time except to say that such control systems will be much larger and more complex than the processes discussed above. Therefore, they also will have the potential to create far more jobs than the regulations we have addressed today.

We would like to thank the two sub-committees for the opportunity to provide this information.