

Name: Ray Kenard
Email Address: rkenard@windpowerandhydrogen.com
Organization: American Wind Power & Hydrogen
County: New York

Comments on the NYSERDA Concept Paper and Operating Plan Development Process for Programs that Reduce Greenhouse Gas Emissions and Consumption of Petroleum-Derived Fuel Subject: All-Electric School Buses In the Introduction to NYSERDA's concept paper reference is made to NYSERDA's rule (Part 507.4(d)) which states that proceeds from the sale of allowances be used to: ".promote and implement programs for energy efficiency, renewable or non-carbon emitting technologies, and innovative carbon emissions abatement technologies with significant carbon reduction potential." Under Section 2 Background, reference is made to "building a portfolio of programs". The Operating Plan (and the Concept Paper) identifies the major sources of CO2 emissions i.e. transportation, commercial, residential and industrial but does not identify specific programs that can be implemented that would have a major impact on emissions. Transportation is identified as the largest source of CO2 emissions in New York State. This memorandum covers a specific transportation program. New York State's Fleet of 50,000 Diesel School Buses: New York State has a fleet of 50,000 diesel, or gasoline, fueled school buses. For two to four hours a day, 2.3 million school children are exposed to 40 pollutants, 15 of which are carcinogenic. These vehicles also emit over two million tons per year of carbon dioxide. An all-electric school bus would protect our children from toxic contaminants as well as eliminate greenhouse gas emissions and eliminate petroleum consumption. Background for the All-electric School Bus Under the US Federal Transit Administration's \$49 million R& D hydrogen-fueled fuel cell bus program, Proterra Inc. developed a battery dominant hydrogen-fueled fuel cell bus that can operate for 60 minutes on the battery system and use the fuel cell to recharge the batteries for 20 minutes of the hour. Proterra recognized that the battery system developed could drive a school bus for 50 to 60 miles before recharging. Recharging could be done at mid-day and at night when off-peak electricity could be used as fuel.. Proposal for NYS Application American Wind Power & Hydrogen (AWP&H) introduced this concept to the Suffolk Transportation Service Inc. that serves 12 school districts in Suffolk County and Pioneer Transportation that serves the school districts in south Bronx. Both transportation companies were enthusiastic about the concept and both agreed to contribute the cost of one diesel bus (\$100,000) toward the cost of a standard school bus fitted with the battery system and drive train if AWP&H obtained funding for the alternate fuel vehicle incremental costs. AWP&H is preparing to submit a proposal to NYSERDA for the incremental cost for two school buses and associated engineering expense under PON 1223. Overwhelming and eager support should be rendered to the effort to protect the health of the State's children as a matter of principle. In addition the use of grid electricity to fuel the buses would reduce the fuel cost of operation to a matter of pennies per mile compared

to about a dollar a mile for diesel fuel. There also is the potential of building a bus assembly facility in New York State which would provide jobs and investment opportunities. Potential for Federal Support AWP&H has scheduled meetings with Congressman Israel from Long Island and Congressman Serrano from the Bronx to solicit their support for Federal funding for all-electric school buses. Clearly, the all-electric school bus is an energy efficient, non-carbonaceous technology that results in (1) the elimination of greenhouse gas emissions and toxic pollutants, and (2) the elimination of the use of a petroleum derived fuel. The all-electric school bus qualifies for funding under the parameters set by NYSERDA for the funds from the RGGI program. The NAPA Valley School District, in California, has placed a deposit of \$100,000 with Proterra for an all-electric school bus, and the city of San Jose has obtain \$575,000 of Federal funds to build an all-electric school bus assembly plant that will employ between 200 and 400 people. The State should recognize that funds from the RGGI program can leverage federal funds and achieving greater results than can be achieved with State funds alone. Ray Kenard American wind Power & Hydrogen
rkenard@windpowerandhydrogen.com .

Name: Ray Kenard
Email Address: rkenard@windpowerandhydrogen.com
Organization: American Wind Power & Hydrogen
County: New York

Comments on the NYSERDA Concept Paper and Operating Plan Development Process for Programs that Reduce Greenhouse Gas Emissions and Consumption of Petroleum-Derived Fuels Subject: Hydrogen-fueled Fuel Cell Transit Buses In the Introduction to NYSERDA's concept paper reference is made to NYSERDA's rule (Part 507.4(d)) which states that proceeds from the sale of allowances be used to: ".promote and implement programs for energy efficiency, renewable or non-carbon emitting technologies, and innovative carbon emissions abatement technologies with significant carbon reduction potential." Under Section 2 Background, reference is made to "building a portfolio of programs". The Operating Plan (and the Concept Paper) identifies the major sources of CO2 emissions i.e. transportation, commercial, residential and industrial, but does not identify specific programs that can be implemented that would have a major impact on the emissions. Elsewhere in the world, aggressive programs are in place already to deal with greenhouse gas emissions. These programs are examples of what can be done and can be implemented in NYS in a relatively short period of time. For instance: California's ZBUS Program A/C Transit in California raised \$16 million and purchased three hydrogen-fuel fuel cell buses and a fueling station. This program has been so successful that A/C Transit has now raised another \$45 million, and is acquiring a total of 12 hydrogen-fueled transit buses and the capacity to produce 450 kilograms per day of hydrogen. This effort has completely eliminated greenhouse gas emissions from these buses, eliminated the use of a petroleum derived fuel, and reduced fueling costs by 70%. The California Air Resources Board has a ZBUS (zero emission bus) program. The California Fuel Cell Partnership estimates that by 2010 there will be 15 hydrogen-fueled zero emission fuel cell buses, and by 2012-2014 there will be 220 hydrogen-fueled zero emission buses operating in various cities in California. Department of Transportations Funding The US Federal Transit Administration has had a \$49 million R&D program for hydrogen-fueled fuel cell vehicles. Hartford., Connecticut, already has one fuel cell bus and under the FTA program will add three more. Boston is getting one fuel cell bus and fueling station. GE has an award for the development of a new concept hybrid fuel cell drive train. About half of the FTA money is being used for California projects. The House of Representatives will undertake a reauthorization of the Department of Transportation's highway program. Funding is anticipated for hydrogen-fueled fuel cell transit buses. Appropriation requests by schools for transit projects will be accepted Opportunity for New York State. The New York Power Authority had the opportunity to obtain a \$6 million grant from the USFTA for two hydrogen-fueled fuel cell buses but cancelled the project. AWP&H has the opportunity to obtain these funds for the Capital District Transportation Authority but needs a

State commitment of about \$3 million to match the \$6 million in FTA funds. The State commitment would result in receiving \$6 million of federal funds. Europe's Zero-Emission Bus Program Nine cities in Europe have been driving 30 hydrogen-fueled Daimler fuel cell buses since 2003. As of December 2007, over 7 million passengers have ridden in these buses, and 220 tons of hydrogen have replaced 750,000 litres of diesel fuel. Currently Berlin has 14 hydrogen fueled transit buses, London 10 buses, five cities in the European Hydrogen Alliance have agreed to buy five buses each, Shanghai has 3 buses, and Beijing has 3 buses. Vancouver is acquiring a fleet of 20 such transit vehicles and five fueling station to service its fleet. These 74 buses plus the original 30 buses represents a combined investment of about \$400 million to \$500 million plus a comparable amount for the infrastructure to support and fuel the buses. Recently, the European Union identified a five year \$2 billion commitment for sustainable energy projects. Fuel cells and hydrogen systems are the primary focus of this investment. Federal and State Action Required to Remain Competitive in the Vehicle Industry Clearly, the World recognizes that fuel cells, hydrogen, and the applications to transit systems are one of the few near-term opportunities to make a major impact on greenhouse gas emissions and reduce petroleum fuel consumption. If US Federal and State governments, with the cooperation of industry, do not aggressively pursue the demonstration, development, and application of such technology, the United States will cease to be competitive in the automotive and transit vehicle field and will continue to export billions of dollars of capital to unfriendly nations. The Regional Greenhouse Gas Emissions Funding Opportunity Regional Greenhouse Gas Initiative funds should be focused on projects where they will do the most good in the shortest period of time. It is doubtful that any program can match the benefits of a federally supported hydrogen-fueled fuel cell transit bus program that (1) eliminates tail pipe emissions resulting in zero emission buses, (2) eliminates the consumption of petroleum products (3) creates an opportunity for a new industry to form and for job creation (4) can be leveraged by Federal funding. NYSERDA's rule (Part 507.4(d)) identifies what the proceeds from the sale of allowances will be used for. Hydrogen-fueled transit vehicles are high efficiency non-carbon emitting technologies, and are innovative abatement technologies that outstandingly meet the parameters set to qualify for funding. Ray Kenard American Wind Power & Hydrogen
rkenard@windpowerandhydrogen.com 212-836-4705

Name: Ray Kenard

Email Address: rkenard@windpowerandhydrogen.com

Organization: American Wind Power & Hydrogen

County: New York

www.windpowerandhydrogen.com 445 Park Avenue, New York, New York 10022 P 212-836-4705, F 212-836-4795 December 14, 2008 Energy Plan Comments NYSERDA 17 Columbia Circle Albany, NY 12203-6399 RGGI Programs Attn: Dave Coup NYSERDA 17 Columbia Circle Albany, NY 12203-6399 American Wind Power & Hydrogen (AWP&H), as a New York State stakeholder, responded to the Energy Plan Committee's earlier draft energy master plan. Recently, NYSERDA has issued an Operating Plan for the allocation of the RGGI funds and sought comments. AWP&H is submitting two comments, copies of which will be submitted separately. These comments deal with all-electric school buses and hydrogen-fueled fuel cell transit buses. Material presented in these comments supplements what was submitted previously to the Energy Plan Committee and provides the background for the possibility of obtaining substantial Federal funding for projects that are consistent with the State's objectives of reducing petroleum fuel consumption, reducing greenhouse gas emissions and using renewable energy. California's ZBUS Initiatives While New York State is expanding the use of hybrid transit and individual-use vehicles, California and Europe are focused on the next generation of vehicles - zero-emission vehicles. It is anticipated that California will have 220 zero-emission transit buses by 2012-2014. The US Department of Transportation believes that the zero-emission bus is one of the few near-term opportunities to achieve a major reduction in petroleum fuel use and greenhouse emissions. The National Hydrogen Association has made an extensive study that shows that the only solution to the increasing use of petroleum fuels and the emissions of greenhouse gases is a transportation system based on either electricity or hydrogen. The National Science Foundation has recently reached the same conclusion. Federal Funding Support Federal programs provide substantial funding for zero emission projects. An example is the Federal Transit Administration (FTA) \$49 million R&D hydrogen fuel cell bus program. About half the funds have been committed to California, the other half supports a three hydrogen fuel cell bus project in Hartford, Connecticut, a project in Boston, and a development project by GE in Schenectady. AWP&H has submitted a proposal to the FTA on behalf of the Capital District Transportation Authority for a \$6 million grant. The FTA grant requires a 50%

match. In-kind services for \$3 million were identified, \$1 million from NYSERDA was potentially available, but AWP&H has been unable to find a source of the balance of \$2 million necessary to obtain a \$6 million grant. Reauthorization of the Highway Act In 2005 Congress reauthorized the highway act and funded appropriations for \$602 million of transit projects identified by 126 colleges and universities. A few of the projects, even at that early date, covered hydrogen fuel cell vehicles. Eight of the schools were New York State schools. The appropriations for these eight schools totaled \$33 million. Only one school was a SUNY school. The highway act will shortly be reauthorized for expenditures of \$545 billion. Appropriation earmarks will be allowed to the extent of 5% of the funding available. Congressman Bishop (Long Island), one of six New York State Congressmen on the House Transportation Committee has suggested that the SUNY colleges on Long Island submit appropriation requests. Congressman Israel (Long Island), one of four New York State Congressmen on the House Appropriation Committee, will support the applications. Senator Schumer's Long Island representative has indicated the Senator would also support the effort to obtain funding. The Farmingdale Initiative Farmingdale State College has an active hydrogen technology development program undertaken in its chemical engineering laboratories. It has requested AWP&H to suggest a project for an appropriation request submission. AWP&H has suggested a project similar to the one proposed to the FTA for CDTA, but with a larger fueling station so that hydrogen-fueled sedans from GM, Honda, Toyota and Mercedes can also be fueled in addition to two hydrogen fueled fuel cell buses. The hydrogen used will be liquid hydrogen produced from hydroelectric power and is therefore hydrogen from a renewable resource. The project cost would be about \$10 million and the match requirement would be only 20%. The buses would be placed in service with the Long Island Bus Company, a subsidiary of the Metropolitan Transit Authority. The All-electric School Bus AWP&H has proposed the demonstration of an all-electric school bus in Suffolk County and in south Bronx, and is filing a proposal with NYSERDA for funding under PON 1223. This bus program will cover a one year test demonstration and include the participation by Farmingdale for the Long Island project, and the Bronx Community College for the Bronx project. Proposals are being made to the Long Island Power Authority and the New York Power Authority for the funding to support the year long testing program. These buses include advanced battery technologies based on nanoparticles of lithium titanate. SUNY Stony Brook has an advanced battery program and uses diesel-fueled buses on the campus to move students to classes. AWP&H will suggest that

Stony Brook submit a appropriation request. I A Public-Private Partnership with SUNY AWP&H is prepared to work with any SUNY campus that chooses to submit a transit appropriation request that involves a zero-emission bus concept involving either all-electric transit vehicles or hydrogen fueled fuel cell vehicles. The opportunity exist to undertake a multi-campus zero-emission bus program that will initiate a hydrogen fuel cell or all-electric school bus program in the major population areas of the State at little or no cost to the State. Ray Kenard American Wind Power & Hydrogen rkenard@windpowerandhydrogen.com 212-836-4705