

August 11, 2008

California Air Resources Board
Attention: Chuck Shulock
Via Email

Subject: **AB 32 Draft Scoping Plan – Comments on CCS**

On behalf of Hydrogen Energy International LLC, please accept the attached comments on the Climate Change Draft Scoping Plan, June 2008 Discussion Draft. These comments will focus specifically on the role of carbon capture and storage (CCS) in enabling California to achieve the greenhouse gas emission reductions required by AB 32.

Please feel free to contact me should you wish to discuss these recommendations in more detail.

Sincerely,



Tiffany Rau
Policy & Communications Manager
Hydrogen Energy, Americas



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Background

Hydrogen Energy is a joint venture between BP and Rio Tinto and is developing alternative energy solutions in the form of low carbon energy projects. Hydrogen Energy's initial projects will combine a number of existing technologies in a unique way to reduce carbon dioxide emissions from fossil fuel power generation by up to 90 per cent when compared with existing plants. The carbon dioxide will be extracted from fossil fuels such as coal, oil and natural gas, and then stored permanently and securely deep underground, leaving hydrogen to be used as the fuel to generate low-carbon energy.

Today, much of the world's economy runs on fossil fuels. And, in developing countries like China and India, fossil fuel usage is expanding significantly. This needs to change, and we need to reduce our reliance on these fuels. However, while policymakers, scientists and consumers begin our transition to new, renewable sources of energy, as well as adopt conservation and efficiency measures to reduce the use of traditional energy sources, we also must take action to reduce CO₂ emissions from these conventional sources of energy, too.

Carbon capture and sequestration is a critical tool in the effort to reduce the concentration of global warming gases in the atmosphere. Most experts agree that pursuing this viable, safe and proven means of addressing global warming is essential to the development of a comprehensive strategy to successfully confront the most serious environmental issue of our time. According to the United Nations Intergovernmental Panel on Climate Change (IPCC) Special Report on Carbon Dioxide Capture and Storage (www.ipcc.ch), CCS can play a vital role to help reduce CO₂ emissions globally, contributing around 25% of the emissions reduction required to control global warming.

CCS and the Scoping Plan

California faces even greater challenges than many other jurisdictions in reducing emissions from the power sector because in some respects it has more limited options. Current policy requires that long-term disposal issues are resolved prior to siting any new nuclear power plants in California. In addition, California already has a large proportion of generation from gas, reducing the potential for GHG emissions reduction from fuel switching that is available on systems with a high proportion of coal-based generation (although there is some potential for reducing emissions by improving the efficiency of the current inventory of gas plants). This leaves plants with CCS as the **only available** source of secure baseload power able to complement renewables and increased efficiency as a means of securing target reductions in GHG emissions from California's power sector.



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Furthermore, low carbon electricity or low carbon hydrogen is likely to be essential in securing the necessary reductions in transportation sector emissions. These account for 40% of total California emissions, a higher proportion than in most other jurisdictions. Although increasing the efficiency of the vehicle fleet will allow some emissions reductions, deep cuts in emissions are likely to require either fuel cell vehicles, which will require hydrogen from low-carbon sources, or plug-in hybrid or electric vehicles, which require low carbon power.

Power generation with CCS is thus likely to play a central role in reducing California's emissions.

It is critical that CARB more directly recognize and discuss the potential of CCS to deliver large-scale reduction in greenhouse gas emissions, as well as the state policy mechanisms that need to be put in place in order to encourage investment in CCS projects. A one-sentence mention in Section V, "A Vision for the Future", does not adequately recognize the near-term potential for millions of tons of reductions prior to 2020. Development of a commercial-scale project is a lengthy, capital intensive process and it is important that California's Climate Change policy sends an immediate signal that this type of investment is needed, valued and will be rewarded. Additionally, the absence of recognition of the pre-2020 potential for emission reductions from CCS creates a situation where those reductions will not be valued or accounted for in the state's goals for achieving 1990 levels.

Hydrogen Energy recommends that CARB explore two areas in the revised version of the Scoping Plan. First, CARB should discuss how tons of CO₂ captured and stored in geological formation prior to 2020 would be accounted for, valued, treated, rewarded, allocated, etc. Secondly, CARB should recognize that policies put forward today are the policies that will drive the investments needed to achieve the reductions required. The California Energy Commission is currently evaluating what regulatory mechanisms – monitoring, liability, assurance, etc – the state needs to put in place to deal with CCS once it is operational in specific applications. CARB should focus in the draft scoping plan on what policy mechanisms, from a greenhouse gas emissions reduction perspective, the state should explore in order to get these projects built and to reward this investment. As one of the primary applications of carbon capture and storage initially will be for power generation, we recommend that CARB look at creating a Low-Carbon Portfolio Standard to complement the Renewable Portfolio Standard for power generation. As AB 32 is focused on reducing GHG emissions, it may be more appropriate for CARB to recommend that the power procurement above 20% and up to 33% be filled with low-carbon power, including renewable power generation.

Why Now?

On July 31, Hydrogen Energy filed an Application for Certification (AFC) for a proposed hydrogen fuel production facility and power plant in Kern County. The



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filing initiates a comprehensive regulatory review process and, upon approval, grants permission for the construction of the nation's first industrial-scale low-carbon power plant with carbon capture and sequestration. The proposed facility will use Integrated Gasification Combined Cycle (IGCC) technology to manufacture hydrogen from petroleum coke (a by-product of the refining process) or blends of petroleum coke and coal, as needed. The hydrogen will be used to generate nearly 400 gross megawatts of base-load low-carbon electricity -- enough to power 150,000 homes in the region. Over 2 million tons of carbon dioxide (CO₂) is expected to be captured and stored in deep underground geological formations annually, giving the facility minimal CO₂.

Hydrogen Energy is siting this new facility in California because of the State's leadership role in requiring greenhouse gas emission reductions in policy initiatives supported by the Governor, Legislature, and energy regulatory agencies, including the California Public Utilities Commission and the California Air Resources Board. In order to account for and recognize the benefits of a bold project like the Hydrogen Energy project in California, and to send the policy signals that will lead to further investments in low-carbon power with CCS, CARB should provide for a more in-depth policy for carbon capture and storage.

HECA could be the first integrated IGCC with CCS (and cleanest fossil fuel in terms of GHG emissions) power plant in the world, and provide the technology and commercial demonstration to help stimulate wider international CCS deployment. Early deployment of CCS has the potential to lead to substantial reductions in cumulative worldwide emissions totaling many billions of tons. It has been estimated that a delay of as little as seven years in deploying CCS technology could increase atmospheric concentration of CO₂ by 10 ppm over the next 50 years.

One of the main reasons for the large effect from delaying deployment of CCS is the long life of power plants. American Electric Power (AEP), America's largest coal generator, noted in recent testimony to Congress that "we are still operating plants that were built during the Eisenhower, Kennedy and Johnson administrations and plants built today will be operating during the term of the President who sits in the Oval Office in the 2050's." This phenomenon is sometimes referred to as emissions lock-in. The sooner CCS is available, the smaller the quantity of emissions that will be locked-in.

The need for early deployment of CCS is particularly pressing because of the long lead times in the power generation industry. Several years are required to design, permit and build a power plant, with HECA expected on line in California in 2014 or 2015 and other plants on line around this time at the earliest. More time is then needed to gain operating experience.



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These long timescales mean that the time required to get the technology down its cost curve is correspondingly long. If the first CCS projects are not begun *now* there will be reduced time for such cost reduction to occur. This will in turn lead to technology being *less* advanced with *higher* costs when very large scale deployment is required in the future. Costs are thus likely to be higher for widespread deployment if the first deployment of CCS is delayed.

Thank you for the opportunity to provide these comments on behalf of Hydrogen Energy International LLC. Please contact Tiffany Rau, Policy and Communications Manager for Hydrogen Energy Americas, at tiffany.rau@hydrogenenergy.com or (562) 276-1510, if you need further information or discussion.