



December 1, 2008

Sequestration News

Significant events are occurring that will contribute to shaping climate legislation

Major recent events include the displacement of Rep. Dingell as head of the House Energy & Commerce Committee, the House committee with jurisdiction over climate change. His replacement, Rep. Waxman, is perceived as being both more liberal and more aggressive regarding climate change. In March 2008, Rep. Waxman and Markey introduced HR5575, a bill that would ban the permitting of new coal-fired power plants without CCS, and in the event a new unit was already permitted, would deny allowance allocations to units commencing construction after enactment of the bill. Less noticed was the removal of Sen. Lieberman as Chairman of the Private Sector and Consumer Solutions to Global Warming and Wildlife Protection Subcommittee (E&PW Committee), and his membership on the larger E&PW Committee. This action suggests that Sen. Boxer may react to the rejection of her climate bill last summer with a much simpler bill than the Lieberman-Warner model, and relegate divisive details to EPA's implementation regulations. If so, this could sidestep having to resolve such controversial issues as allowance distributions and auctions in an open political arena. This alternative legislative strategy could fare well in the emerging climate regulatory environment. The recent EPA/EAB decision on the Deseret power station construction permit (discussed below) could result in such a regulatory quagmire (under the current Clean Air Act's authority) that even the regulated industries will seek an alternative legislative solution.

EPA and CCS

On November 13, EPA's Environmental Appeals Board, an in-house appeal process for construction permits, issued a ruling on a long pending petition regarding the Deseret Power Electric Cooperative's PSD permit for a new waste coal-fired generating unit at the existing Bonanza Power Plant, in Utah. The permit had been issued by EPA in 2007, and immediately challenged by Sierra Club. EPA Region 8 had determined that CO₂ was not a pollutant "subject to regulation under this Act" [the Clean Air Act], and therefore the Region could not regulate CO₂ in a new source permit. The EAB disagreed that the Region lacked the discretion to consider CO₂ as subject to regulation under the CAA. The EAB remanded the permit to the Region for reconsideration of how the phrase "subject to regulation..." should be interpreted, and strongly implied that a national rulemaking on the issue was the best way to resolve this issue. While the decision did not technically resolve anything (except that the proposed unit cannot

commence construction), it effectively means that new coal-based power plants will very likely need to conduct a “best technology” analysis to avoid near-certain litigation over this procedural issue. And if they do conduct the analysis, and the permitting authority decides that “best technology” is less than advocacy groups desire, then the permit will be challenged on the grounds that the permitting authority reached the wrong conclusion. Either way, construction of a new coal-fired power plant without CCS is very likely to be delayed significantly. It is unclear whether this decision will also impact other major sources of CO₂ emissions, such as natural gas-fired power plants, but that would seem to be logical.

On October 30, EPA published a final rule revising the definition of “solid waste” under the hazardous waste section of RCRA. The definition excluded certain recycling activities. However, relief was not provided for “speculative accumulation,” which could have implications for stored GHG streams.

Prominent Commentary on Climate Issues and CCS

President Elect Obama spoke by video to a California climate conference on November 18. He stated that he continues to support a target of reducing CO₂ emissions to 1990 levels by 2020, by 80% by 2050, and that he plans to invest \$150 billion in green technologies.

http://www.nytimes.com/2008/11/19/us/politics/19climate.html?_r=1&ref=us

Former Vice President Al Gore was interviewed on CNN last week. In his interview he had dire warnings on climate change but also commented on coal and CCS. He stated that he was opposed to the construction of coal power plants because the coal industry was not serious about CCS and climate issues. He compared the coal industry to the Detroit automotive industry in this regard. He commented that Detroit keeps saying they are working on new cleaner technology (and show future cars equipped with cleaner technology at car shows) but that the new cleaner technology is always beyond the horizon for use in actual manufactured cars and is used as an excuse to avoid or delay environmental regulation. He referred to the major CCS demonstration projects in the North Sea, in Algeria, and in Canada, but emphasized that there has not been one such project in the U.S. -- for which he blamed the coal industry. He also observed CCS technology has a long ways to go before it can be broadly applied (with the implication that the world can't wait for its development). He said he would be OK with the construction of coal power plants if they were actually equipped with CCS systems (with the implication that they would be CCS systems capturing and storing at least 90% of the CO₂). The questioner then asked what about China and India -- that the coal industry always rebuts with the point that this is a global problem and that China and India will continue using coal and will never employ costly technology for curbing CO₂ emissions. He stated that he just returned from China and is on his way now to India. He said the Chinese leadership basically told him that they would consider using CCS and low/no carbon technology if the U.S. was first to do it -- and that he, believes they will if the U.S. does. In this context, he indicated that the U.S. must immediately take steps to limit CO₂ and other GHG emissions and not wait for CCS or any other technology.

EI Financial Conference & CCS

Press coverage of the November EII Financial Conference highlighted views that, absent successful development of CCS, GHG limits are likely to lead to much higher electricity prices. As were concerns of another “rush to natural gas” as utilities abandon new coal projects due to permitting obstacles and concern about future regulation. NERC is projecting an additional 20,000 MW of natural gas capacity over the next 8 years, compared to forecasts from last year.

<http://www.businessweek.com/ap/financialnews/D94CAJMO0.htm>

Strategy for Green Recovery

The Center for American Progress (CAP) Action Fund issued a 14 page paper on November 10 outlining a "Strategy for Green Recovery." The Center's papers have achieved greater notice since CAP's John Podesta was named Transition Lead for the Obama Administration. The Paper cites the earlier CAP product: Green Recovery: A program to Create Good Jobs and Start Building a Low-Carbon Economy which advocated a \$100 billion 2-year stimulus program built around conservation and renewable energy. The November 10 paper claimed that green investments provide twice the jobs per dollar as fossil fuel investments. The report also advocated a \$1.1 billion CCS demonstration unit, and spoke favorably of Future Gen.

http://www.americanprogressaction.org/issues/2008/green_recovery_memo.html

Concern over Possible Blackouts

The *Washington Post* reported November 11 that the Maryland PUC had directed state electric utilities to prepare, by December 1, proposals to avoid rolling blackouts in 2011. The utilities were urged to focus on conservation programs and a system to have customer backup generators available to supplement utility power on peak demand days. <http://www.washingtonpost.com/wp-dyn/content/article/2008/11/10/AR2008111002741.html>

Canada & GHGs

A new study released in late October on the economy and the environment recommends that the Canadian government combat climate change with a "silver buckshot" of policies rather than a single silver bullet. No one policy is adequate to reduce greenhouse-gas emissions, concludes a report by the Pembina Institute. The report, commissioned by the TD Bank, says governments should instead consider a range of options when crafting environmental policy. The report does not recommend emissions targets. It says further study of specific policies and price levels is needed. "I don't think there is a credible body of research that nails down 'this is the way to approach it, and this is the way to hit various different targets'," said Don Drummond, chief economist at TD Bank. He says industry suffers in the absence of detailed environmental policies because businesses cannot plan for the future. A copy of the report can be found at: <http://climate.pembina.org/pub/1720>.

CCS field tests will begin in Canada. Three test wells will soon be drilled as the start of a long-term, large-volume CO₂ sequestration project in Alberta. The Government of Alberta, through the Alberta Energy Research Institute (AERI), is providing \$6.6 million in funding for the three-year \$20-million project near Shell Canada's Scotford facility.

<http://www.alberta.ca/home/NewsFrame.cfm?ReleaseID=/acn/200810/24549060A11EE-A487-6EAB-0BA6A4955D18D734.html>

Canadian oil sands companies revealed some details of plans for CCS technology in third quarter earnings reports as part of their compliance with the Canadian federal government's draft climate change regulations. The government encourages new oil sands facilities coming on-stream between 2004 and 2011 to capture CO₂ emissions. Capture and storage of emissions is required for all oil sands projects coming on-stream after 2012. The Canadian Oil Sands Trust, the largest owner of the Syncrude project, reported that it is considering developing a large carbon dioxide capture, transportation and storage network through its participation in the Integrated CO₂ Network. Suncor Energy is investigating

CCS technology as well as investing in wind energy, biofuels and installing new emissions abatement equipment. Canadian energy company Transalta has applied to the Alberta government's \$2 billion CCS development fund to support a previously announced CCS pilot project with Alstom Canada. (*Point Carbon*, October 31)

Australia & CCS

The Australian taskforce set up to identify suitable sites to store carbon has held its first meeting. The group is charged with producing a carbon mapping and infrastructure plan by June of 2009. The plan will prioritize the development of geological storage sites for carbon capture and storage and plan necessary pipeline infrastructure.

<http://www.nasdaq.com/aspxcontent/NewsStory.aspx?cpath=20081021/ACQDJON200810212204DOWJONESDJONLINE000774.htm&&mypage=newsheadlines&title=Australian%20Taskforce%20Begins%20Hunt%20For%20Sites%20To%20Store%20Carbon>

The Netherlands & CCS

The Netherlands Environmental Assessment Agency (NEAA) has released a report titled, *Effects of Climate Policies on Emissions of Air Pollutants in the Netherlands* (available at:

http://www.planbureauvoordeleefomgeving.nl/pdf_bestanden/500146002.pdf). The report looks at the impacts of the Dutch climate plan on other emissions as well as the role that biofuels and CCS will play. According to the report, "Some CO₂ abatement measures will not necessarily reduce other air polluting emissions, for instance, the application of biofuels and biomass, and carbon capture and storage (CCS)." At this time, CCS technology could lead to an increase in certain emissions while decreasing the levels of others, as stated by the study. The report also believes that better efficiency and emissions reductions would take place using "emerging" pre-combustion CCS and oxy-fuel techniques but they may not be commercially viable until 2025.

<http://climate.alston.com/blog.aspx?entry=973>

The EU & CCS

Global economic recession will affect the EU carbon market by nearly halving an expected shortfall in CO₂ allowances according to a report by the research firm IDEACarbon (<http://www.ideacarbon.com/>). The onset of recession has prompted the UK-based research group to cut its projected shortfall of EU allowances by 44% to 115 million per year between 2008 and 2012. In December 2007, IDEACarbon forecast the shortfall in EUAs would be 206 million tons per year of CO₂ equivalent. Indeed, the price of EU allowances for December delivery has fallen to a low of €17.40 on 28 October from nearly €30 in July. (*Point Carbon*, November 3)

Bloomberg reports that Credit Suisse Group says that CCS technologies need another \$15 billion in capital investment and 10 years to reach commercial status.

<http://www.bloomberg.com/apps/news?pid=20601072&sid=al3dbrRfHMu4&refer=energy>

Italy's main electricity provider, Enel, and its biggest oil and gas company, Eni, signed a deal in mid-October to create the country's first carbon sequestration project aimed at reducing greenhouse gases from a coal-fired power station. The chief executives of Enel and Eni signed an agreement with Environment Minister Stefania Prestigiacomo. Under the plan, Enel will capture CO₂ from the coal-fuelled power station at Brindisi in southern Italy. The gas will be transported to the site of a former Eni

natural gas field near Piacenza, in the north, and injected into the rock.

<http://www.fxstreet.com/news/futures-news/article.aspx?StoryId=cc0a6bbf-34ea-4dae-a714-0228cd0284b7>

Technology Advances

MIT's Technology Review reports a carbon storage approach being funded by the US Academies of Science. The technique drills two wells into a natural formation of peridotite rock (found in massive deposits at a few locations globally), pumps CO₂ and water into the formation (creating an exothermic reaction that fractures the formation and converts the CO₂ to carbonate), and then enjoys an increasing convection flow of additional water and CO₂ into the process. The implication is very cheap, yet totally permanent, storage of CO₂, with minimal energy input. A cubic kilometer of rock could store one billion tons of CO₂ per year. A system fed by seawater with natural CO₂ concentrations (rather than concentrated industrial CO₂) would also work, but storage rates would be reduced to 1 million TPY for a cubic kilometer of rock – but the system is freed from an industrial source. This approach is a research concept and has not been demonstrated at large scale. The MIT article is free at

<http://www.technologyreview.com/energy/21629/?nlid=1483&a=f>. The NAS paper can be purchased and downloaded at <http://www.pnas.org/content/early/2008/10/31/0805794105.full.pdf+html>.

Climate Wire reports serendipitous discovery of a fungus feeding on cellulose and secreting compounds similar to diesel fuel. Gary Strobel, a plant pathologist at Montana State University, discovered the fungus in a rainforest. Additional research will attempt to decipher the enzymes and processes that enable the conversion of cellulosic carbon to complex hydrocarbons. The discovery is described in a paper in *Microbiology* (subscription download at:

<http://mic.sgmjournals.org/cgi/content/abstract/154/11/3319>). (*Climate Wire*, November 6).

Recent GHGT-9 Presentations & Other Reports

- Allyson Anderson, from the Senate Energy and Natural Resources Committee spoke before the GHGT-9 Conference in Washington last week and sought input on legislation that she is drafting to address CCS long-term liability issues, and “leakage” provisions. She expects to have a bill drafted by January.
- The IEA has issued a report recommending (globally) 20 commercial scale CCS demonstration projects. The report, *CO₂ Capture and Storage: A Key Carbon Abatement Option*, identifies potential government financial incentives, and proposed a CCS Roadmap. http://www.iea.org/Textbase/press/pressdetail.asp?PRESS_REL_ID=272
- Jim Dooley (PNNL) presented a paper at GHGT-9 projecting that a CO₂ pipeline network might look much different from the existing natural gas pipeline system. Specifically, he believes that only 11,000 – 23,000 additional miles of pipeline might be needed (we already have about 4,000 miles) prior to 2050, given the expected pace of CCS deployment.
- Howard Herzog (MIT) presented a paper at GHGT-9 suggesting a staged introduction of CCS technologies, with less than 90% capture on initial power plant systems.
- Dozens of additional technical papers can be downloaded from the GHGT-9 website at: <http://web.mit.edu/ghgt9/program/index.html>

- DOE and DOI have published a final Programmatic EIS on the Designation of Energy Corridors on western federal lands. The report is a procedural requirement for implementing Section 368 of EPACT-2005, which required the establishment of such energy transport corridors on federal lands by August 2007. Section 368 explicitly cited oil, gas, and hydrogen pipelines, and electricity transmission lines, but was silent regarding CO₂ pipelines.
- NERC issued a 10 year reliability outlook report on October 23. Environmental initiatives and transmission infrastructure needs pose the greatest risks to grid reliability. “Faster siting, permitting, and construction of transmission resources will be vital to keeping the lights on in the coming years.” <http://www.nerc.com/>
- The World Resources Institute has published a 144 page report, *Guidelines for CO₂ Capture, Transport, and Storage*. <http://www.wri.org/publication/ccs-guidelines>
- UNESCO, in an extension of earlier work, has mapped the major groundwater resources of the planet, and summarized its work in multicolor maps, available for download at: <http://www.whymap.org/>
- An environmental advocacy group known as “Clean Air – Cool Planet” has issued a report containing recommendations for how the next Administration should address climate change.
- Synapse Energy Economics, Inc. has published brief reports (largely anecdotal) on escalating costs in the coal and nuclear sectors. <http://www.synapse-energy.com>
- Greenpeace released a report on October 27, arguing that coal use cost the Chinese a hidden \$248 billion last year through damage to the environment, strain on the health care system and manipulation of the commodity's price. The report is available at: <http://act.greenpeace.org.cn/coal/report/TCOC-Final-EN.pdf>
- Interesting factoids -- From the June 2008 BP Statistical Review of World Energy – “Coal was the fastest growing fuel in the world for the fifth consecutive year. Global consumption rose by 4.5%. Chinese coal consumption grew by 7.9%, the weakest growth since 2002, but still sufficient to account for more than two-thirds of global growth.” “Nuclear power output fell by 2%, the steepest decline on record.” [all data for 2007]

