



March 16, 2010

## *Sequestration News*

The large, integrated cap and trade legislation in the Senate (S. 1733) appears stalled. However, there has been congressional activity on “short versions” of climate legislation. Senators Kerry, Graham, and Lieberman have been working on a scaled down climate bill that would include a power plant emissions cap and a liquid fuel tax. The Kerry/Graham/Lieberman package would likely grant a 10 year hold on industrial GHG regulation, and focus on electric utilities. The prospects for a separate path, based on a Clean Energy Standard (CES), have increased but remain uncertain. Senator Graham has suggested a draft clean energy standard that would operate like a renewable electricity standard, but include more options (nuclear, coal-CCS). The relevance to coal-CCS is that a CES could provide a non-tax financial resource for building commercial CCS units, without the complexity of a full cap and trade (C&T) package. There appears to be some congressional opposition to EPA moving forward with climate regulations based on current legislative authority. Some are advocating shale gas as the new painless way to achieve climate goals. The new CERA report is a mix of celebration and caution, as it recognizes that gas would eventually need CCS to meet GHG targets. The UK is reportedly pursuing a CCS strategy that includes what one could call “trunkline” CO<sub>2</sub> pipelines. Some in the U.S. have suggested a concept of one or more trunklines, with perhaps a government -owned/contractor- operated saline storage facility, as a way to accommodate a few CCS-saline projects while the legal framework issues are worked out. Also, NRDC / ARI has published another report citing the virtues of CCS-EOR

### *Administration's Approach for Valuing GHG Reductions*

The Administration has developed an approach for Federal agencies to use in valuing the benefit of GHG reductions in new regulations. The report is cited as “Appendix 15A: Social Cost of Carbon for Regulatory Impact Analysis under Executive Order 12866”, and is posted on a DOE EERE website: [http://www2.eere.energy.gov/buildings/appliance\\_standards/commercial/pdfs/sem\\_finalrule\\_appendix\\_15a.pdf](http://www2.eere.energy.gov/buildings/appliance_standards/commercial/pdfs/sem_finalrule_appendix_15a.pdf). The report uses discount factors ranging from 2.5 to 5% to evaluate the present value of future benefits that would flow from reducing GHG emissions at different points in time. The “social cost” calculated varied by model, discount rate, probability and point in time. Mean projections for 2030 ranged from \$10 to \$50 per ton of CO<sub>2</sub> for 5% to 2.5% discount rates. The 2006 British “Stern Report” generated controversy by calculating large present value “damages” from future climate change effects

using an unusually low 1.4% discount rate. This document states that the values developed by the interagency working group have been “presented in several proposed and final rules and were offered for public comment.” The document further appears to say that no additional public review will be undertaken until the assessment is updated in 2 years.

### ***Senators Kerry, Graham, and Lieberman Climate Legislation***

Senators Kerry (D-MA), Graham (R-SC), and Lieberman (I-CT) are reportedly working on a scaled down climate bill, which would cap utilities and tax transportation fuels now, and address other groups later. As with earlier legislation, there may be some utility industry support for this approach if utilities are provided a substantial amount of “free” allowances in the program’s early years. (E&E Daily, March 3) <http://www.eenews.net/EEDaily/2010/03/03/2/>. Some have suggested that a delay in regulation of non-utility industrial emission sources may present an easy way to be responsive to complaints from key senators that immediate imposition of limits on industry may be harmful to economic recovery. The legislative drafters are likely aware of EPA and EIA analyses of H.R. 2454 which show that in the early years of the program, almost all GHG reductions derive either from the power sector, or from offsets by entities not covered under the bill (forestry and agricultural measures). Hence, a 10 year hiatus on industrial regulation would carry little environmental impact, and in fact, little impact of any kind.

Perhaps as a preview, Sen. Graham circulated a draft bill that expanded the Renewable Electricity Standard concept into a Clean Energy concept – allowing credit for new nuclear power and fossil with CCS. The bill also provided a financial incentive for low efficiency coal units to shut down.

The National Commission on Energy Policy, which has been very influential regarding climate legislation, has published a report describing useful enhancements to domestic energy production, consistent with climate protection. This report (see Reports below) may be used to support the upcoming Kerry-Graham-Lieberman legislation.

### ***Secretary Lugar and CCS***

Senator Lugar announced on March 9 that he is drafting a “practical energy plan” that would be responsive to multiple national goals, including climate protection. Part of the plan outline includes a broad “Clean Energy Standard” (including coal-CCS) and an “early retirement program for the dirtiest coal plants.” <http://lugar.senate.gov/press/record.cfm?id=322910&&>

### ***Senate and Coal Plant Restrictions***

On March 2, thirteen senators wrote Majority Leader Reid (D-NV) to ensure that upcoming climate legislation “does not weaken the CAA’s application to existing coal-fired power plants ... so that they meet up-to-date technology standards for carbon dioxide.” In other words, these senators wish to expand the bills offered in both the Senate and House that mandate new coal-based power plants (and no other source category) meet strict emission standards, to also mandate performance standards for existing coal units.

### ***EPA and CCS***

On January 21, Senator Murkowski (R-AK) and 40 cosponsors introduced a joint resolution (SJRes 26) which would disapprove EPA’s endangerment finding, effectively blocking ongoing climate regulatory

activity at EPA (including the motor vehicle rule). For this to take effect, it would have to be passed by simple majority in both Houses, and signed by the President. On March 10, twenty Governors wrote the House and Senate leadership stating that they are “gravely concerned about such [EPA] regulation” due to its impact on their states’ fragile economies. The group expressed support of a legislative approach to addressing climate security. The Murkowski resolution received support from a group of 98 trade associations and companies in a letter addressed to each member of Congress.

On March 11, five western congressmen (Baca, Costa, Green, Rodriguez, and Teague -- all Democrats) wrote the President to “halt its [EPA’s] current plan to regulate GHGs at stationary sources and leave it to Congress to develop national climate change policy.” Their letter stated concern that EPA regulation “could significantly jeopardize the nation’s energy policy and economic recovery agenda.”

Senator Rockefeller (D-WV) introduced S. 3072, which would suspend any EPA permitting or NSPS regulatory action on climate change (other than motor vehicles) for 2 years, providing time for Congressional action. Similar legislation (H.R. 4753) has been introduced in the House by Representatives Rahall (D-WV), Mollohan (D-WV), and Boucher (D-VA). The UMW wrote Senator Rockefeller on February 25 in support of his bill.

<http://rockefeller.senate.gov/press/record.cfm?id=322764&>

OMB reported that it is now reviewing EPA’s draft rule for “Prevention of Significant Deterioration (PSD): Reconsideration of Interpretation of Regulations that Determine Pollutants Covered by the Federal PSD Permit.” This is longhand for reconsidering the policy set forth in the “Johnson Memo” (December 18, 2008) that declared CO<sub>2</sub> was not a regulated pollutant under the CAA, and therefore not subject to permitting requirements.

<http://www.reginfo.gov/public/do/eoReviewSearch;jsessionid=9f8e890430d7912755b286734baa8466e05219794a33.e340bxiKbN0Sci0TbN0Nch4Rahb0n6jAmljGr5XDqQLvpAe>

EPA held a workshop on March 3-4 on black carbon and ozone as “short-lived climate forcers.” EPA does not refer to these gases as “global warming gases” because it has defined those otherwise in regulations like the endangerment finding. Nevertheless, EPA does recognize that these gases heat the environment and controlling them causes an almost immediate beneficial effect.

<http://www.cleanairinfo.com/slcf/> Early report was that the conference was so popular EPA had to reject late registrants due to lack of seating.

### *CCS Related Reports*

CERA has released the Executive Summary of Fueling North America’s Energy Future: The Unconventional Natural Gas Revolution and the Carbon Agenda, 2010. The report is part of a growing chorus promoting unconventional natural gas resources, particularly gas from shale deposits, as a major element of the solution to climate change, based on the fact that gas-based electricity has about half the CO<sub>2</sub> emissions as coal-based electricity (assuming neither has CCS). The importance of shale gas is that it is being cited as significantly expanding natural gas resources, thereby making gas a viable replacement for coal. The CERA report concludes that “The new natural gas resource is a game changer” which can expand gas use “without significant increases in prices.” However, the report, unlike most others advocating replacement of coal with natural gas, observes that if current goals for GHG reductions are adopted, the switch to gas will not be a final solution: “If the goals include cutting carbon emissions substantially over the long term, such as the often-cited 80 percent reduction by midcentury, aggressive development and deployment of zero-carbon technologies, including nuclear and CCS, will need to take place today. But a gas-based solution, on its own, does not provide a long-term path to a low-carbon future. To get there will require a portfolio of options including not only natural gas but also some mix of

nuclear power, renewables, and breakthroughs in CCS.”  
<http://www.cera.com/asp/cda/public1/home/home.aspx>

The National Commission on Energy Policy has published a report advocating greater domestic energy production via: OCS production of oil, “safe” development of shale gas, tax incentives and loan guarantees for next generation nuclear power, RD&D funding for CCS for “non-IGCC plants” and legal framework progress on CCS, and a “clean energy” portfolio standard (expanding the renewable electricity standard to include nuclear and fossil-CCS). This report is a highly recommended read, as it could form the intellectual underpinning of a climate “deal” that would manifest in the pending Kerry-Graham-Lieberman legislation. <http://bipartisanpolicy.org/news/press-releases/2010/03/ncep-releases-detailed-recommendations-expanding-us-domestic-energy-reso>

ARI, Inc., prepared a report for NRDC on the merits of EOR coupled with CCS. US Oil Production Potential from Accelerated Deployment of Carbon Capture and Storage, ARI, Inc., 10Mar2010, uses the platform of HR 2454 to estimate that CCS-EOR could increase domestic oil production by 3.0-3.6 million BPD by 2030 (assuming all the CCS projects under HR 2454 in that timeframe are used for EOR). The cumulative impact (through 2030) on the nation’s trade balance is calculated as \$700 billion, with increased state and federal revenues of about \$200 billion. The report identifies a possible future network of CO<sub>2</sub> pipelines that could connect current CO<sub>2</sub> sources with EOR fields.

*ClimateWire* (March 5) reported that up to 10 million tpy of methane is “bubbling up from the East Siberian Arctic Shelf (seabed) because warming ocean water is thawing permafrost....” The permafrost had been effectively sealing the methane from release. An article describing the multi-national study is in the current edition of *Science*. <http://www.sciencemag.org/cgi/content/short/327/5970/1211>

## Canada and CCS

The Government of Alberta has announced the signing of letters of intent with owners of 4 CCS projects in Alberta, from the \$2 billion CCS Fund. The projects are:

- Swan Hills Synfuels. The province will invest \$285 million in this in-situ coal gasification (ISCG) project which will access deep coal seams. Wells will access the seams and be used to convert the coal underground into syngas. The syngas will be used to fuel new high-efficiency power generation and the CO<sub>2</sub> created during this process will be captured and used for enhanced oil recovery (EOR).
- \$495 million will go to Enhance Energy Inc. and North West Upgrading for the Alberta Carbon Trunk Line (ACTL), a 240 kilometer pipeline that will transport CO<sub>2</sub>. The initial supplies of CO<sub>2</sub> will come from the Agrium Redwater Complex and once built, the North West Upgrader. North West Upgrading will upgrade bitumen from Alberta’s oil sands and the captured CO<sub>2</sub> will be transported to depleting conventional oilfields and used in EOR.
- \$745 million will go to Shell and its partners for the Shell Quest project. Quest will capture and store 1.2 million tons of carbon dioxide annually beginning in 2015 from Shell’s Scotford upgrader and expansion, near Fort Saskatchewan.
- A Letter of Intent (LOI) was also signed with TransAlta Corporation and its partners for *Project Pioneer* at the Keephills 3 plant west of Edmonton. The project will utilize leading-edge technology to capture CO<sub>2</sub> which will be used for EOR in nearby conventional oil fields, or stored almost three kilometers underground. The project is

expected to capture one million tons of carbon dioxide annually beginning in 2015. The Government of Alberta's investment in this project is \$436 million.

SaskPower and Hitachi are combining forces to work on carbon capture technology. During a recent Government of Saskatchewan mission to Japan, the two companies signed an agreement to collaborate on low carbon energy projects - an agreement that will help SaskPower advance plans for a Saskatchewan demonstration facility (also known as a reference plant) for carbon capture systems. The non exclusive collaboration agreement will see SaskPower and Hitachi cooperate on shortening the path from demonstration project to commercially viable CCS technologies. The Saskatchewan Reference Plant, which has a targeted 2012 in-service date, would allow for the full-scale demonstration of one or more carbon dioxide capture technologies. Not only could this facility accelerate development and deployment of capture technologies at a commercial scale, it could also deliver potential cost savings to vendors, governments and prospective buyers. SaskPower has agreed to provide a host site for the Reference Plant and is working actively on plans to integrate the facility with one of its operating power plants. <http://www.newswire.ca/en/releases/archive/February2010/16/c2266.html>

### *EU and CCS*

Carbon dioxide pipeline could serve up to five power plants. The initial plans submitted by E.ON UK for the Kingsnorth clean coal power station indicate that the pipeline would be able to take emissions from other sources in addition to those from the Kingsnorth plant. Crossing the Hoo Peninsula in southeast England, the pipeline would be big enough to transport the carbon emissions of two 1,600 MW Kingsnorth type power plants and three smaller 500 MW combined heat and power (CHP) plants. The pipeline is expected to be able to shift 24 million tons of trapped carbon dioxide a year be stored in depleted North Sea gas fields, allowing a cluster of CCS projects to be developed in the same area. The Kingsnorth CCS power plant is E.ON's entry in the British government's CCS competition. The other two groups also in the competition are a consortium led by Scottish Power, a unit of Spain's Iberdrola, including Shell UK Limited and National Grid, and another, led by RWE power.

<http://uk.reuters.com/article/idUKLDE6201IQ20100301?sp=true>

In the U.K., Ed Miliband, the energy secretary, is ready to give tens of millions of pounds to Eon and Scottish Power, the utility groups, to finish designs for CCS equipment that would be fitted to coal-fired power stations. The government sees it as a key element of its plans to slash Britain's greenhouse gas emissions. Last year, it introduced a carbon levy to raise £9.5 billion to fund up to four of the experimental plants. Miliband will also supply fresh details of the government's vision to build "carbon clusters" in regions where heavy industry and power plants are located. Moving millions of tons of carbon from plants to spent oil and gas fields in the North Sea will require a large new pipeline network. Eon and Scottish Power are expected to finish their designs in a year. Scottish Power, which wants to fit the pollution-cutting equipment to its plant at Longannet in Scotland, is seen as the frontrunner.

[http://business.timesonline.co.uk/tol/business/industry\\_sectors/natural\\_resources/article7052568.ece](http://business.timesonline.co.uk/tol/business/industry_sectors/natural_resources/article7052568.ece)

The EU executive approved a German government grant to install emissions-reduction technology on a steel plant owned by ArcelorMittal. The German grant is aimed at helping steel firm ArcelorMittal Eisenhuettenstadt GmbH to develop a so-called Top Gas Recycling (TGR) steelworks, whose emissions would be some 16% less than the cleanest steel-plants open today. TGR technology is designed to capture the carbon dioxide from the plant emissions while smelting steel and to recycle the other emissions back into the smelter, but the technology has not yet been put into practice on an industrial scale. [http://www.earthtimes.org/articles/show/313231\\_eu-approves-german-aid-to-cut-emissions-from-arcelormittal-plant.html](http://www.earthtimes.org/articles/show/313231_eu-approves-german-aid-to-cut-emissions-from-arcelormittal-plant.html)

Britain will fail to meet its 2010 target for cutting carbon dioxide emissions. The target of a 20% cut in 1990 levels of CO<sub>2</sub> by the end of this year is likely to be missed by a wide margin. By the end of 2008, CO<sub>2</sub> emissions had fallen by only 10%. The figure is 13% if it includes carbon credits bought from emission reduction programs overseas. A spokeswoman for the Department of Energy and Climate Change said, "We are not going to meet the 20 percent target this year. The 2010 target was always designed to be stretching and has helped to drive the progress that has already been made." She said that the Government would be focusing on achieving other targets with much longer timescales. It has committed to cutting greenhouse gases by 34% by 2020 and 80% by 2050. Overall emissions in Britain of six greenhouse gases fell by 1.9% in 2008, according to figures published by the department. The decline was partly due to the recession reducing demand for energy and partly a result of the continuing trend of manufacturing moving overseas to China and elsewhere

<http://www.timesonline.co.uk/tol/news/environment/article7013460.ece>

And elsewhere in the EU, Spain sees emissions to 2012 breaching Kyoto limit. Spain also announced that its greenhouse gas emissions in the 2008-12 period will be almost 20% above the upper limit it was set in 1990 under the Kyoto Protocol. The Environment Ministry said emissions would be, on average, 34.45% above 1990 levels, the benchmark year set by Kyoto, under which Spain was allowed to emit 15% more in 2008-12 because it was not considered fully industrialized. It will now exceed that limit by 19.45%. However, Spain has long planned to bridge a gap of 22% above Kyoto limits by offsetting 20 percentage points by purchasing emissions rights from less industrialized countries, and another two points by investing in carbon-capturing forests. <http://uk.reuters.com/article/idUKTRE6123I520100203>

Norway is the latest to announce carbon fraud crackdown. The Norwegian government recently charged three people with alleged VAT fraud, while at least two firms are also under investigation over suspected fraudulent trading of EU emission allowances. The government also announced it will emulate a number of other European governments by changing the rules governing VAT to tackle so-called carousel fraud. Norway is not part of the EU, but operates its own carbon market that integrates with the EU's wider emissions trading scheme (ETS). <http://www.businessgreen.com/business-green/news/2258755/norway-latest-announce-carbon>

### **Saudi Arabia and CCS**

Saudi Aramco announced plans to inject carbon dioxide into the world's biggest oilfield by 2012, a year ahead of previous plans, a government official said. The giant field Ghawar pumped 5 million barrels per day (bpd) in 2008, more than half of top oil exporter Saudi Arabia's output. The kingdom announced plans last year for a pilot project to pump the climate-warming gas into the field to both improve production and reduce emissions. The project would be entirely financed by Aramco, he added. The kingdom plans to inject 40 million standard cubic feet per day (cfd) of CO<sub>2</sub> into the field, and has said this is part of the global push to trap emissions rather than because it needs to enhance oil recovery from the field.

<http://in.reuters.com/article/oilRpt/idINLDE61E0TW20100215?sp=true>



*The U.S. Carbon Sequestration Council ([www.uscsc.org](http://www.uscsc.org)) is a not-for-profit, 501(c)(3), organization established as an authoritative source of information to inform and to educate on all matters pertaining to carbon sequestration.*

