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Carbon Sequestration Council

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Sequestration News

The immediate future for the passage of a climate bill remains uncertain and has been judged by many to be unlikely in the current Congressional session. However, Congressional initiatives continue to be pursued and perhaps could gain some traction. Senators Kerry, Graham and Lieberman have developed a new draft climate bill, which is anticipated to be publicly released on April 26. However, Senator Reid and Representative Pelosi have lowered climate legislation to 3rd priority, behind Financial Reform legislation and Immigration legislation.

Senator Voinovich has drafted legislation that would prohibit regulation of stationary source green house gas (GHG) emissions by EPA. However, EPA is continuing to move forward.There are some rule makings that merit attention – one on mandatory reporting of emissions (essentially permitting for the CCS Storage activity), the other on NEPA climate provisions and "Categorical Exclusions". These could all impact CCS projects.

The President's Interagency Task Force on Carbon Capture and Storage will hold a public meeting on May 6, 2010, in Washington, D.C. The meeting is advertised to be a general information meeting. The meeting is open to the public and will also be broadcast live.

On April 14th, the House Select Energy Independence and Global Warming Committee held a full committee hearing on the Role of Coal in a New Energy Age. A press release issued by the Committee in advance of the hearing stated that the purpose of the hearing was to determine the coal industry's position on climate change and related issues, which the Committee received in the form of both written and verbal testimony (the testimony was previously distributed to USCSC members).

The UN Development Program published an excellent report on China, which is essentially a climate roadmap and a detailed reporting of energy and emission data for China – with projections thru 2050. The report focuses on efficiency and renewables, but shows a very strong role for CCS (about 4 billion TPY of CO_2 reduction in 2050).

Reuters used European freedom of information laws to obtain a copy of an EU report concluding that biofuels have a greater carbon footprint than traditional petroleum fuels (based on land use effects). Reuters also reports that Cornell University ecologist Robert Howarth is asserting that natural gas produced via hydraulic fracturing from unconventional

resources can result in GHG emissions comparable to coal, when the production-based emissions are included.

Senators Kerry, Graham, and Lieberman (KGL) Climate Bill

The last issue of *Sequestration News* reported on the ongoing efforts of Senators Kerry, Graham and Lieberman to draft a new climate bill. They have now completed their work. The draft KGL bill reportedly will be released the week after Earth Day to avoid the perception that it might be viewed as just a climate bill, and not a jobs / energy independence bill. Moreover, it may not be formally introduced as legislation, but released for public discussion and moved to Majority Leader Reid to avoid Senate Committees. Major issues are reported by trade publications to orbit around money issues: allowance allocations (including rebates to consumers to reduce near-term cost impacts on individuals), limitations on domestic and international offsets, the timing of the package's more aggressive emission caps, and a delay for application to the industrial sector. This suggests that in the initial decade, the bill would focus on power plants and offsets. EEDaily (April 16) reports that Rahm Emanuel (the President's Chief of Staff) and his deputy Jim Messina met with environmentalists to assure them that the Administration has not taken climate change off the agenda for this year, and would support a summer push for enacting a bill. Doubts have been raised regarding the feasibility of enacting climate legislation during the current congressional session, given time needs to address financial market reform, and to confirm a new Supreme Court nominee.

Other Senate Activities Affecting Climate Issues and CCS

A group of Senate Democrats is reported to be calling for import tariffs in prospective climate legislation to create "a level playing field for domestic [U.S.] manufacturers." http://www.businessweek.com/news/2010-04-15/senate-democrats-say-tariffs-needed-in-climate-law-update1-.html Similar calls for a carbon tax by the EU on imports from countries outside a global carbon accord [which currently includes the U.S.] were registered by France and Italy last week. http://www.google.com/hostednews/afp/article/ALeqM5hYboqmCeV04LAKylhfnjdtf7oMLQ

A Washington Post blog reports that House Speaker Pelosi and Senate Majority Leader Reid have agreed to follow financial reform with immigration, demoting climate legislation again. This decision makes it less likely that climate legislation will be enacted this year, given the limited amount of time before adjournment.
http://voices.washingtonpost.com/postpartisan/2010/04/immigration_vs_climate_reid_pe.html

EPA and CCS

Ohio Senator Voinovich has released a draft legislative amendment (to be incorporated into other legislation) which would generally preclude EPA and state regulation of stationary source emissions of GHGs, except under Title VI (Stratospheric Ozone Protection) of the Clean Air Act. The amendment would also prohibit legal actions based on greenhouse gases (GHGs).

On March 22, EPA complemented its earlier notice of proposed rulemaking on GHG reporting with a proposed rule specific to Injection and Geologic Sequestration of CO_2. The proposed rule (Subpart RR), background documents, and briefing summaries can be found at:
http://www.epa.gov/climatechange/emissions/subpart/rr.html

On February 23, the White House Council on Environmental Quality (CEQ) proposed changes in NEPA regulations governing Categorical Exclusions (from NEPA), and for "Consideration of the Effects of Climate Change and GHG Emissions" when preparing assessments under NEPA. These rules could impact both R&D and demonstration projects related to coal technology and CCS. The comment period closes May 24.

OMB reports receipt of EPA's rulemaking on the Greenhouse Gas Tailoring Rule, on April 20. http://www.reginfo.gov/public/do/eoReviewSearch;jsessionid=10de48536eb97bca8900710f121440dacf11d0513e8881e9eae66648eea11563.e38Nch4NbhuNa40NahiSahuRb3v0n6jAmljGr5XDqQLvpAe

An RFF paper, Greenhouse Gas Regulation under the Clean Air Act, examines various pathways to regulate GHGs under current statutory authority. The paper found the NSPS provisions to be the most predictable and most likely choice by EPA regulators. It concluded that rules could encourage modest GHG reductions from power plants via efficiency improvements and biomass cofiring. The paper's authors have extensive experience working with regulations under the CAA, and offer a useful guide to policy makers. The paper cites a Feb 24, 2010 draft NETL report on efficiency improvements possible at existing coal-fired power plants. http://www.netl.doe.gov/energy-analyses/pubs/ImpCFPPGHGRdctns_0410.pdf and http://www.rff.org/News/Features/Pages/Greenhouse-Gas-Regulation-under-the-Clean-Air-Act-Structure-Effects-and-Implications-of-a-Knowable-Pathway.aspx

Kyoto Protocol in the News

The reputation of a Kyoto Protocol carbon finance scheme was dealt another blow after a UN climate panel suspended the third company that offered emission reduction verification services and partially suspended a fourth. The executive board suspended emissions auditors TUEV SUED and partially suspended Korea Energy Management Corporation (KEMCO) after spot checks at the companies' offices revealed procedural breaches. This board is an arm of the United Nation's climate change secretariat and pledged that it will work with TUEV SUED and KEMCO to ensure timely resolution of the issues. Under Kyoto's Clean Development Mechanism (CDM), companies can invest in greenhouse gas cuts in developing countries and in return receive carbon offsets which they can sell for profit. In the tightly regulated $33 billion market, clean energy projects need to be validated by private sector certification firms called designated operational entities (DOE's). The CDM's executive board said it suspended TUEV SUED for not following procedures and for giving "a positive validation opinion to some projects even though it had concerns about additionality. The board rejected KEMCO's re-accreditation application due to issues also including employee qualifications.
http://uk.reuters.com/article/idUKTRE62P5E420100326?sp=true

But one of the suspended firms is arguing that clarification of the rules is needed. KEMCO called for clarification of the rules of a Kyoto Protocol carbon finance scheme under which they operate. An official at KEMCO said "The company officials are now discussing internally how they will dispute." "In our view, this increase in the number of temporary suspensions also indicates that the provisions for (firms) are not clear enough", said Sven Kolmetz, head of carbon management services at TUEV SUED, the company that was fully suspended.
http://in.reuters.com/article/fundsNews/idINLDE62T1G520100330

And further tarnishing the image of carbon trading, a Norwegian police investigation into alleged carbon tax evasion is widening its scope into money laundering, with five men being charged. The Norwegian authorities' investigation is part of a wider probe into tax fraud relating to carbon emissions trading that European police agency Europol said cost treasuries up to 5 billion euros ($6.72 billion) in lost revenues.

The investigation is looking into what is known as carousel fraud related to the EU's Emissions Trading Scheme. Carousel fraud occurs when goods, in this case greenhouse gas emissions credits, are bought and imported tax-free from other EU countries, then sold to domestic buyers, charging them VAT. The sellers then disappear without paying the tax to governments.
http://www.forexyard.com/en/news/Norway-widens-CO2-probe-into-money-laundering-2010-03-29T165427Z

China and CCS

The UN Development Program published *China and a Sustainable Future: Towards a Low Carbon Economy and Society* in April 2010. This 197 page report is rich in regional and sectoral data, and prescribes BAU and mitigation-based scenarios for China through 2050. It quantifies China's extraordinary growth since 1979 (nominal per capita income up 50 fold) and notes that another 350 million Chinese are expected to migrate to urban areas by 2030, with significant GHG emission implications. For example, under the BAU scenario, China's energy-based CO_2 emissions grow from 5.6 Btpy in 2005 to 16.2 Btpy in 2050. Under an aggressive mitigation program, the 2050 total drops to 9.5 Btpy (still a 70% increase), and in an all-out scenario, emissions are capped at 2030 levels, 8.7 Btpy. According to a graphic on p.59, CCS has the potential to reduce 2050 emissions by about 4 Btpy CO2, with most CCS penetration coming after 2040. The report emphasizes the role of renewable energy, but much of the potential for GHG reductions comes from improved efficiency, and as noted above, CCS. Download at: www.undp.org.cn/pubs/nhdr/nhdr2010e.pdf.

In the first round of climate talks since Copenhagen, China promised to develop a cleaner economy by using energy more efficiently and by investing in research and development to cut carbon emissions. The Chinese president's special envoy Xie Zhenhua wrote in the *China Economic Herald* that climate change represents a threat to Chinese economic development, and laws should be strengthened to meet climate targets. Chinese delegates stayed neutral at climate change talks in Bonn as U.S. negotiator Jonathan Pershing fended off efforts by developing countries to sink the climate pact negotiated during two weeks of talks in Copenhagen last year. Officials from more than 190 countries tussled in Germany over whether the Copenhagen Accord, backed by almost two-thirds of the parties, can serve as a foundation for a worldwide agreement to limit climate change. China has announced plans to cut output of CO_2 per unit of GDP by 40-45% from 2005 levels by 2020, a target that it has asserted is voluntary and not bound by international treaties. Xie also said the industrialized countries must shoulder the blame for 80% of the greenhouse gas emissions since 1750, while China's "reasonable increase" in greenhouse gases will allow the country to develop.
http://www.businessweek.com/news/2010-04-15/china-to-fight-world-war-scale-climate-destruction-update1-.html

Earlier in the meeting, the talks nearly ended before they began. Talks about talks appeared at times on the verge of breakdown over seemingly minor procedural issues, but that reflected a deep divide on how to treat the hastily crafted political deal struck at the Copenhagen summit last December. (*Associated Press*, April 10)

Australia and CCS

The Delta Project, which is being jointly funded by Federal and State Governments in Australia as well as the Australian Coal Association, will demonstrate integrated post combustion capture, transport and geological storage of carbon dioxide at a medium scale. The Delta Project is designed to store up to

100,000 tons of CO_2 annually, building on the existing pilot scale post combustion capture plant at Delta's Munmorah Power Station. The Australian Government is supporting CCS through several programs, including: the Global Carbon Capture and Storage Institute (GCCSI); the National Low Emissions Coal Initiative which funds the Delta Project (as well as other small projects), research and development, and a national initiative to map carbon emission and storage hubs; and the $2 billion Carbon Capture and Storage Flagships program, which funds larger commercial scale demonstration projects. The completion of the first stage of the project will allow a more accurate assessment of the total cost and merit of the project before second stage funding is approved. The funding partners have an in-principle total commitment of $150 million to both stages of the Delta project. http://cowracommunitynews.com/viewnews.php?newsid=4474&id=137

Commercial trials of an algae consuming carbon dioxide and providing bio-fuel and cattle feed as by-products will take place in Queensland this year. Scientists claim that the diesel fuel from this process could be brought to commercial readiness within three years. These field tests, on 1.8 hectares of land next to the Tarong Power Station, north-west of Brisbane, will be the first step in getting the technology to market. When the project was first announced by the State Government, it was thought the algae could "consume" 50% of the carbon dioxide produced by power stations. The pilot phase of the project will be scaled to capture 700 tons of carbon dioxide each year. Late last year, MBD Energy Limited chairman Jerry Ellis predicted the technology would emerge as a viable CO_2 abatement technology option for coal and gas-fired power stations, smelters and refineries around the world. The CSIRO said the technology was still in its infancy, but a trial near a power plant would be the best way of testing its commercial success. http://www.brisbanetimes.com.au/queensland/carbon-eating-algae-to-power-cars-feed-cattle-20100330-rbb3.html

Climate Change Minister Penny Wong said that Australia will continue to rely on coal as a major source of power. During a lecture at the Queensland University of Technology, Senator Wong rejected nuclear power in favor of renewable energy and CCS. "If you look at the International Energy Agency's projections out to 2050, coal is still going to be a significant part of the world's energy profile - that's a fact. So if you want to do something about climate change you're going to have to find some technologies to address emissions from coal, otherwise you don't have a solution to climate change." In other remarks, she rejected the nuclear option. She also outlined the cost of inaction on Queensland's primary industries and the Great Barrier Reef. Senator Wong said the opportunity to avoid climate change had passed and the world faced a small window to avoid catastrophic climate change. http://www.brisbanetimes.com.au/environment/climate-change/no-climate-solution-without-coal-fix-20100412-s2vm.html

EU and CCS

The Scottish Government's carbon capture plans have been hampered by a paper reporting that the technology was "not feasible at any cost." This new research paper questioning the technology was published in the Journal of Petroleum Science and Engineering by Christine Ehlig-Economides of Texas A&M University and Michael Economides of the University of Houston. It was released as Members of the Scottish Parliament (MSP's) voted in favor of an amendment opposing coal-fired power stations such as one proposed at Hunterston by Ayrshire Power. The paper included the statement that "Our very sobering conclusion is that underground carbon dioxide sequestration via bulk injection is not feasible at any cost." Green MSP Patrick Harvie said, "...This research concludes that burying the CO_2 from a full-size commercial power station would require underground storage roughly the size of a small U.S. state – a luxury we simply do not have." Professor Stuart Haszeldine, a chartered geologist at Edinburgh University, said that other studies into CCS are being carried in Ohio, Algeria and the North

Sea and would be more relevant to Scotland than the Texas research paper. "The opinion of several experts is that there are a number of technical flaws in the article," he said.
http://news.scotsman.com/politics/Scientists-say-SNP39s-plans-for.6165252.jp

An article by Bellona (a European environmental group) cites the key role of CCS in meeting climate change mitigation goals, and calls for long term incentives to increase public funding from current efforts to construct from 10-12 units to 100 units.
http://www.publicservice.co.uk/feature_story.asp?id=13972

The European Climate Foundation (funded by private philanthropic foundations) recently released *Roadmap 2050: A practical guide to a prosperous, low-carbon Europe.* The series of reports presents the results of analyses of the technical and economic feasibility of different pathways towards reducing EU GHG emissions at least 80% (below 1990 levels) by 2050. The study analyzes the implications for the European energy system over the next five to 10 years. One of the key conclusions of the study is that across different scenarios defined by different energy mixes – ranging from a baseline business as usual scenario through a scenario with 40% renewable energy to one with 80% renewables – the electricity prices do not vary significantly in the long run. In the short run, given the comparatively greater investment need for renewables in comparison to other technologies, the scenarios with higher shares of renewables show a greater increase in costs. This disparity would level off over time as most renewable energy has very low operating expenditure. The study also finds that CCS is an essential component of all pathways, regardless of the percentage of energy production made up by renewables, as it is assumed to be applied on half of all heavy industry. The report also highlights the additional CO_2 emission abatement potential of combining biomass combustion with CCS. The project's work products currently include a 99 page technical report, a 32 page policy report, and a brief report on macro-economics, along with extensive presentation materials explaining the overall Roadmap. Access the full ECF study at: http://www.roadmap2050.eu/downloads.html.

Canada and CCS

A Canadian government- and industry-funded study – the Wabamun Area CO_2 Sequestration Project (WASP) – has recently been released. The study reports that the storage potential for CO_2 in geological formations in central Alberta, Canada could exceed 500 million tons of CO_2. A copy of the report is available from the University of Calgary at http://www.ucalgary.ca/wasp/WASP-FinalReport_(Full).pdf.

Abu Dhabi and CCS

Abu Dhabi Company for Onshore Oil Operations (ADCO) has initiated an enhanced oil recovery project that will inject CO_2 into a carbonate reservoir in the MENA region of Abu Dhabi. The pilot began operations in the fourth quarter of 2009. A continuous supply of 60 tons per day (1.2 million standard cubic feet per day) of CO_2 is being provided to ADCO and is being injected into one of the pilot wells. Praxair in involved in supplying the required carbon dioxide and injection operations. The MASDAR Initiative is supplying the funding.
http://www.ntm.nickles.com/issues/story.aspx?aid=1000367043&ref=rss

Mozambique and CCS

Mozambique is exploring CCS technology developed by the Energy Research Centre (ECN) of Holland. The same technology may also be used in other countries of the region, such as Botswana and Namibia.

Deputy Energy Minister Jaime Himed spoke at a recent seminar on CCS organized by the Ministry of Energy and stated that the technologies adopted by the country should ensure that the CO_2 produced by industries, and in the generation of electricity, is not released into the atmosphere. Currently, Mozambique's carbon dioxide emissions are estimated at 9,266 kilotons a year. However, with the major energy investments in energy projects including a gas pipeline and the inauguration of planning two large coal fired power stations are likely to be built in the western province of Tete in the next few years, the emissions could substantially increase. (*Energy Central*, April 13)

Other Climate and CCS Related News Items

Reuters used European freedom of information laws to obtain a copy of an EU report concluding that biofuels have a greater carbon footprint than traditional petroleum fuels (based on land use effects). The study's results had been withheld by the EU in an assessment of biofuels. http://www.calgaryherald.com/technology/Biofuels+could+produce+more+greenhouse+emissions+than+standard+fuels/2933368/story.html

Reuters reports that Cornell University ecologist Robert Howarth is asserting that natural gas produced via hydraulic fracturing from unconventional resources can result in GHG emissions comparable to coal, when the production-based emissions are included. [The objective of the comparison appears to be to advocate renewables, not coal.] A spokesman for the gas industry characterized the claims as preliminary and speculative. http://www.reuters.com/article/idUSTRE62U2UY20100331

The Brattle Group has published a report that shows the competing economics of natural gas versus coal generation (both without CCS) under a range of potential CO_2 allowance prices. http://www.brattle.com/NewsEvents/NewsDetail.asp?RecordID=767

Tenaska and EDF issued a press release on April 19 reporting an agreement under which EDF will cease opposition to the Tenaska's proposed Trailblazer Energy Center (600 MW, SCPC Plant with 85% CCS for EOR) in Texas. In addition to the CO_2 control, an important element in EDF's decision was the use of dry cooling at the power plant.

The National Center for Atmospheric Research (NCAR) reports that they cannot account for about half the earth's incoming energy (according to satellite data) since 2005. Their analysis is reported directly, and in more detail in Science (April 16). The implication of their work is that we cannot reliably predict the impacts of mitigation measures if we are unable to perform a basic energy balance at large scale. http://www2.ucar.edu/news/missing-heat-may-affect-future-climate-change

Underground coal gasification has been receiving renewed attention recently. Greenwire reports (April 16) that German scientists at Aachen University are about to propose a new process for converting inaccessible coal seams to synthesis gas, burning it, and reinjecting captured CO_2. Both China and Australia are operating underground coal gasification pilot projects, and a 100 MW project has been proposed for Alaska (CIRI project). Concerns remain regarding groundwater contamination, but the depths being considered may reduce such concerns. The driver is cost: some estimates have projected costs with CO_2 control to be lower than conventional coal-fired power plants without CO_2 control. Costs are low due the absence of mining and a surface gasification facility, and the potential for low-cost on-site CO_2 storage. BP is reportedly working with LLNL on the technology. See also, Prospects for underground coal gasification in carbon-constrained world, J. Friedmann (LLNL), GHGT-9 Conference, per DOE contract DE-AC52-07NA27344.

Climate and CCS Related Reports

On April 15, FERC released its "State of the Markets" report on key energy markets' behavior over the past year. Included are some unusual graphics which are not found elsewhere, including the influence of the Recession. Tidbits: increased demand for natural gas for electricity generation generally offset loss in demand in other sectors; gas prices were down roughly 50% in 2009 versus 2008; electricity demand was down 4.2%; wholesale electricity prices were down about 50%, and ranged from $27/MWh in ERCOT to $56/MWh in NYPP; on a seasonal basis, some gas-fired power plants became cheaper to dispatch than coal units [although the FERC chart may be mislabeled]; gas and wind dominated new power capacity, but coal added about 3GW. http://www.ferc.gov/market-oversight/st-mkt-ovr/som-rpt-2009.pdf

KEMA (www.kema.com) has made available a new whitepaper as part of its service to assist utilities tackle generation portfolio operational- and cost-based risks associated with the uncertain carbon future. KEMA is applying a new portfolio approach to carbon planning for a number of U.S. utilities that integrates the utility's own generation asset data with KEMA's substantial insight into the costs of generation and direction in carbon policy development. The KEMA model enables utilities to perform comprehensive scenario analysis of variable policy decisions and generation options—securing a clear understanding of the costs and options in defining a carbon strategy and laying the foundation for developing a cleaner, sustainable generation investment plan. The whitepaper, *Strategies for Compliance under Federal Climate Legislation*, demonstrates how the insight gained from the new analytic dashboard helps utilities develop climate portfolio strategies based on rigorous asset and scenario analysis. The paper can be requested at: www.kema.com/ClimatePortfolio.

Det Norske Veritas' (DNV) has recently issued its guidelines document *CO2Qualstore*, which is one of four planned for release by DNV. The second, on transport, is due later in April of 2010. DNV is preparing to set up a process to update and maintain the guidelines as established regulations are amended and new regimes are brought into effect. *CO2Qualstore* also includes a workflow to help operators, regulators, verifiers and the general public ensure that storage sites are qualified following a transparent, consistent and cost-effective process. See the report at: http://www.dnv.com/binaries/CO2QUALSTORE_guideline_tcm4-412142.pdf