

THE CARBON SEQUESTRATION NEWSLETTER

<http://www.netl.doe.gov/coalpower/sequestration/>

June 2004

- Sequestration in the News
- Events and Announcements
- Recent Publications
- Legislative Activity

Sequestration in the News

NETL Hosting Public Meetings on the Environmental Impacts of Carbon Sequestration. Three upcoming meetings are set for June 3 in Atlanta, Georgia; June 8 in Bozeman, Montana; and June 10 in Grand Forks, North Dakota. If you live near any of these locations and are interested in carbon sequestration, please consider attending. The forums are a great opportunity to hear about the research efforts first-hand from DOE management and also to have your opinions heard. For coordinates on the meetings go to: <http://www.netl.doe.gov/coalpower/sequestration/eis/index.html> If you cannot attend, but have comments or recommendations about either the environmental impacts of carbon sequestration or methods for estimating those impacts, please send an email message to Dr. Heino Beckert at Heino.Beckert@netl.doe.gov

"U.S. Energy Secretary Abraham Signs Department's First-Ever Bilateral Agreement with Norway." U.S. Secretary of Energy Spencer Abraham signed a non-binding Memorandum of Understanding (MOU) with Norway, a first for the two countries with respect to energy research. Under this agreement, the US and Norway will conduct joint research in areas that include carbon sequestration, hydrogen, and clean fuels. "This MOU marks a significant advancement in our efforts to improve energy security in the United States and Norway, as well as the entire world," Secretary Abraham said. May 22, 2004 <http://releases.usnewswire.com/GetRelease.asp?id=101-05222004>

Third National Conference on Carbon Sequestration. In his keynote address, U.S. Energy Secretary Abraham set the tone for the conference, "Together, we can and will perfect the technology of carbon sequestration. We can and will transform our economies from carbon-based to hydrogen-based. And we can and will restrain the emission of greenhouse gases so we bestow a healthy planet on future generations." The conference was a great success with groundbreaking technical sessions and robust dialogue among professionals working in the area. For information about the conference or for proceedings go to: <http://www.carbonsq.com/>

The New York Times, Climate Change Gets a Hollywood Makeover. In what might be the first "carbon neutral" movie production, director Roland Emmerich reportedly paid \$200,000 for a reforestation project in the Himalayas and energy saving projects for poor families in the United States to offset the carbon energy used during filming of "The Day After Tomorrow." May 12, 2004 <http://www.nytimes.com/reuters/arts/entertainment-environment-film.html>

Miami Herald, Economic and political stability depend on finding alternative fuels. "The world's largest energy-user nations need to agree on actions to develop new technologies for carbon capture and storage, and for utilizing alternative energy supplies," says famed Columbia University Economist Jeffery D. Sachs in this op-ed piece. Sachs cautions against making a "mad dash" for renewable energy sources that may not prove affordable or widely available, and instead encourages improvements to the use of existing, non-oil fuels, like coal and gas. May 4, 2004 <http://www.miami.com/mld/miamiherald/news/opinion/8583434.htm>. Sachs' opinions are also covered in "Experts urge thinking ahead on climate and not waiting for 'certainty' to act," *Electric Utility Week*, April 26, 2004, Vol., No.; Pg. 17

Canada.com, AIR Liquide Canada to develop liquid carbon dioxide plant for oil recovery. The company said the new plant will recover, purify and liquefy raw carbon dioxide from Solex Gas Processing Corp.'s Harmattan gas processing operations in southwestern Alberta. "The plant will be a new source of liquid carbon dioxide for the oil and gas industry, for use in enhanced recovery drilling and other drilling needs, said Air Liquide." <http://www.canada.com/businesscentre/story.html?id=E4D0A86B-4B84-4DC2-9824-CBCD3082AC0C>

Oil and Gas Journal, "EOR and climate change." A report from the UK Department of Trade and Industry, (DTI) embraces the idea of moderating emissions of carbon dioxide with projects that raise oil production. However producers surveyed by DTI don't think dual-purpose CO₂ injection makes economic sense in the North Sea under current conditions. They also don't think credits available at expected values under the European Union's Emission Trading Scheme would make the technique commercial. "If EOR is to be deployed broadly in the UK North Sea," the study observes, "additional market changes will be needed." No Link Available, April 26, Pg. 17.

The Times (London), "A global threat buried" reports on the Frio Pilot Test CO₂ sequestration project east of Houston, Texas, in an abandoned oilfield. "According to Susan Hovorka, a geologist with the Texas Bureau of Economic Geology, which is leading the Frio Pilot Test, the Frio Formation alone can hold between 200 and 350 billion tonnes of carbon dioxide, or at least 28 years' worth." The article also mentions the Sleipner experiment and the CO₂ Capture Project. May 20, 2004, Features, <http://www.timesonline.co.uk/>. Also, "A 'Burial' for air pollutants," Global News Wire, Business Line, April 28.

Announcements

Secretary Abraham Invites Poland to Join Carbon Sequestration Leadership Forum. "I believe the Carbon Sequestration Leadership Forum is a vital part of the world's energy security because coal will be an inescapable part of our energy mix for years to come," said Secretary Abraham in his remarks as he invited Poland to become the 17th member of the CSLF. May 28, 2004 http://www.doe.gov/engine/content.do?PUB-LIC_ID=15961&BT_CODE=PR_PRESSRELEASES&TT_CODE=PR_ESSRELEASE

New DOE Solicitation for Funding State Energy Efficiency Projects. The State Technologies Advancement Collaborative is soliciting proposals for energy efficiency and clean energy projects (including improvements in technology to mitigate emissions from power production) from state and territory energy offices, state-chartered institutions, or institutions of higher learning partnered with one or more of the above state- or territory designations. At least \$4.3 million is available. Mandatory pre-application due May 24, 2004. For more information, visit <http://www.naseo.org/stac> and click on 04-STAC-01 Solicitation.

Australian Energy Package. Australian Prime Minister John Howard is expected to unveil a \$500 million energy program next month. The package is expected to include a \$300 million low-emission technology fund, in addition to incentives for energy producers worth \$1 for every \$2 they invest in new technologies, such as coal sequestration. <http://www.theage.com.au/articles/2004/05/27/1085461890812.html>

Science

"Global dimming" may stop the Earth overheating. Since the late 1950s, scientists have observed a 2-4% reduction in the amount of solar radiation reaching the Earth's surface, thought to be caused by particles and clouds in the atmosphere scattering the light. Some scientists see global dimming as part of a possible negative feedback loop working against global warming. According to Michael Roderick, from the Australian National University in Canberra, "burning fossil fuels not only increases carbon dioxide levels in the atmosphere; it also pumps tiny particles into the air. Meanwhile higher temperatures increase the amount of cloud cover. The clouds and particles help to block the Sun's rays, and the scattered light they allow through actually boosts plants' absorption of carbon dioxide, the principle greenhouse gas. This would help to keep carbon dioxide levels stable, protecting the planet from runaway global warming." *Nature*, news section, May 19, 2004 <http://www.nature.com/nsu/>

Global warming pioneer says only nuclear power can now halt global warming. James Lovelock, one of the first scientists to warn of the threat from the greenhouse effect, says "global warming is now advancing so swiftly that only a massive expansion of nuclear power as the world's main energy source can prevent it overwhelming civilization." Citing melting of the Greenland ice sheet and last summer's heat wave in central Europe, Lovelock says there is not enough time for renewables to replace the use of carbon dioxide producing fossil fuels. *The Independent*, May 24, 2004, <http://news.independent.co.uk/uk/environment/story.jsp?story=524313>

Now available "Abrupt Climate Change." The U.S. National Research Council report originally published in 2002 is now available for download in PDF at <http://www.nap.edu/html/climatechange-brief/abruptclimatechange-brief.pdf>

Importance of ocean temperature to global biogeochemistry. Analyses conducted by researchers from the University of Chicago and the Potsdam Institute for Climate Impact Research (Germany) show that changes in the temperature of the ocean could have drastic long-term effects on atmospheric concentrations of CO₂ and O₂. <http://www.sciencedirect.com/science/article/B6V61-4C7VXHK-1/1/631db7e24ee774647ce18572fca3372f>

Geology

Alberta producers rewarded for use of CO₂ in enhanced oil recovery. Four companies using carbon dioxide in enhanced oil recovery projects will share a C\$14 million bonus from the Alberta Government in Canada. The four companies qualify for royalty credits under the province's plan to reduce greenhouse gas emissions by encouraging the sequestration of CO₂ as part of oil and gas production. The companies plan to inject about 110 metric tons of CO₂ per day for the duration of a project in Swan Hills, central Alberta. *Petroleum News*, May 25, 2004 <http://www.pointcarbon.com/article.php?articleID=3774&categoryID=147>

Technology

Calixarene crystals as new absorption agents for the purification of hydrogen. A pair of Scientists from Missouri and South Africa have discovered that the supposedly impregnable cavities formed by calixarene crystals actually absorb and store molecules from the air. They absorb CO₂ particularly well, but they do not absorb hydrogen at all. This could mean that calixarene crystals might be used both to capture carbon and to isolate hydrogen for fuel cells. *Chemie Germany*, <http://www.chemie.de/news/e/37747/>

Presentations from Stanford Hydrogen Workshop Now Available Online. The Global Climate and Energy Project (GCEP) held a series of energy workshops to identify the technical barriers and research opportunities for developing technologies that may lead to reduced greenhouse gas emissions. Selected presentations from the workshop held April 26-27, 2004 are available on the internet. Topics include Carbon-Free Production of Hydrogen from Fossil Fuels and Carbon Capture and Separation. See also "GCEP: Keep up the good work," *Stanford Daily*, http://daily.stanford.edu/tempo?page=content&id=14264&repository=0001_article

IECM Sequestration Model. The sequestration edition of Ed Rubin's Integrated Environmental Control Model (IECMs) is available for download on the web. IECMs allows the user to determine the cost and performance of different plant types (pulverized coal, natural gas combined cycle, or integrated gasification combined cycle) with a variety of pollutant control technologies including NO_x, SO_x, particulate matter, mercury, and CO₂. Carnegie Mellon, May 2004 <http://www.iecm-online.com/>

Ocean

The Role of Coastal Seas in the Ocean Carbon Cycle. Researchers evaluated the contribution of coastal and marginal seas to global ocean carbon uptake, especially the North Sea. High biological activity acts to pump carbon into the sub-surface seas. Once CO₂ uptake has occurred it is transported to the deep ocean via currents. Although coastal and marginal seas represent only 7% of the total ocean surface, they account for about 20% of the carbon inputs, according to the extrapolated calculations in this paper. "Enhanced Open Ocean Storage of CO₂ from Shelf Sea Pumping," *Science*, Helmuth Thomas, et al, p. 1005, <http://www.sciencemag.org/cgi/content/abstract/304/5673/1005?etoc>

Terrestrial

Study Measures Mountain Trees' Carbon Uptake. Scientists seek to find the rate at which forests in the mountains pull carbon from the atmosphere through the Airborne Carbon in the Mountains Experiment (ACME) project. They will measure changes in carbon dioxide concentration as small as five to 20 parts per million. "Study to eye trees at altitude," *The Denver Post*, May 13, 2004; Pg. B-03.

Draft Forest Protocol Recommendations Available for Public Comment. The California Climate Registry's Forest Workgroup has developed reporting and certification protocol recommendations for the forest sector. The draft protocol recommendations have already been reviewed by a diverse group of industry and GHG policy experts, and the Registry now seeks comments from the public. The draft protocol recommendations were formally vetted through a public workshop hosted by the California Energy Commission on May 27 in Sacramento, CA. <http://www.climateregistry.org/PROTOCOLS/>

Climate Change Policy Rewards Permanent Reforestation. The owners of permanent forests in New Zealand will be able to get Kyoto Protocol carbon credits under a new Government climate change policy. <http://www.pointcarbon.com/article.php?articleID=3743&categoryID=147>

Trading

As Emissions Trading Moves Closer to Reality, Firms Brace for Change. As European countries prepare to move forward in 2005 with the Emissions Trading Scheme - a cap-and-trade system E.U. nations will use to meet greenhouse gas (GHG) reduction targets under the Kyoto Protocol - hundreds of major corporations are beginning to factor climate change issues into their business decisions, according to a major industry survey released by an investors' group last week. May 26, 2004 <http://www.greenwire.com/> [subscription required]

Australian Emissions Trading Scheme Expensive. A report by Allen Consulting concluded that an Australian emissions trading system equivalent to a tax of \$5 per ton of CO₂ emitted would cut 15,000 jobs, severely affect the national economy until 2050 and increase power prices by 5.5 percent. <http://www.pointcarbon.com/article.php?articleID=3742&categoryID=147>

First Carbon Sequestration Trade by US Utility. Entergy conducted the first geologic carbon sequestration trade, by a utility in the US, through the newly formed trade registry of the Emissions Marketing Association (EMA). Entergy purchased geologic carbon sequestration credits to meet a voluntary CO₂ stabilization commitment. The project captures CO₂ vent gases for use in enhanced oil recovery. The total amount of carbon credits will equal 100,000 metric tons. May 26, 2004 http://biz.yahoo.com/prnews/040526/daw013_1.html

Policy

Australia Still Won't Ratify Kyoto. Australian Prime Minister John Howard repeated his decision to not ratify the Kyoto Protocol. A potential Russian ratification, which would see the Protocol enter into force, would not change his mind. May 26, 2004 <http://www.pointcarbon.com/article.php?articleID=3785&categoryID=147>

Japan is Struggling to Meet Kyoto Target. Japan's emissions are rising, according to reports from the Ministry of Environment of Japan. A recently released progress report showing emissions of greenhouse gases up 8.2 percent in 2001 from 1990 levels. Emissions from mobile sources and coal-fired power plants are Japan's largest source of greenhouse gas emissions. Japan plans to use credits from forest management activities to meet the Kyoto targets. <http://www.pointcarbon.com/article.php?articleID=3731&categoryID=147>

Russia may back Kyoto to get on path to join WTO. Russia signaled that it would ratify the Kyoto climate change treaty in exchange for European support for its bid to join the World Trade Organization, a breakthrough that could revive the long-stalled pact designed to curb global warming. "We are for the Kyoto process," Putin said during a news conference after a summit with European leaders. "We support it, although we do have some concerns over the obligations that we will have to assume. The European Union has met us halfway in negotiations on the WTO, and it could not help but have a positive effect on our attitude toward ratification of the Kyoto protocol." Upon Russia's formal ratification, their 17 percent share of the world's greenhouse gas emissions would bring the total endorsement by developed nations to 55 percent, which is the threshold level for the Kyoto Protocol to officially enter into force. *The Washington Post*, May 22, 2004 <http://www.washingtonpost.com/wp-dyn/articles/A46416-2004May21.html> See also, "A change in the climate: will Russia help the Kyoto Protocol come into force?" in *Financial Times* provides more details and chronicles a shift in corporate attitudes, including Johnson & Johnson and Swiss Re, the reinsurer, which is investing in World Bank carbon sequestration projects. *Financial Times* (London), May 20, 2004, Features; Pg. 17

How Can the Transatlantic Partners Help in Addressing Developing Country Emissions? This note briefly describes the current situation with respect to greenhouse gas emissions in developing countries, summarizes the current political context for future actions, and describes specific actions that Europe and the US, despite their differences of views, can take to help address developing country emissions <http://www.OxfordClimatePolicy.org>

Sequestration News Contn'd

G8 to collaborate on clean energy R&D. A strategy drafted by the White House aims to coordinate G8 development of an international Earth Observation System and clean energy technologies. The agreement will apply to hydrogen fuel cells, carbon sequestration and renewable R&D, as well as energy efficiency and clean fossil energy technologies. *Inside Energy / with Federal Lands*, April 26, 2004; Vol., No.; Pg. 16, <http://www.platts.com>

Massachusetts to consider the GHG impact when state regulators evaluate public construction plans. Governor Mitt Romney unveiled a comprehensive agenda on climate change, which makes Massachusetts the first state to consider the impact of greenhouse gases when state regulators evaluate highway projects and other public construction plans. "Massachusetts launches climate change strategy," May 6, 2004, <http://www.pointcarbon.com/article.php?articleID=3654&categoryID=147>

Securing Our Future: The Economics and Ecology of Coal. "Regulatory uncertainty puts a premium on flexibility when electric utilities make decisions on fuels and technologies," said James Rogers, Chairman and CEO of Cinergy, at the RFF Policy Leadership Forum on May 18. A Video of the presentation is available online. <http://www.rff.org/>

Events

June 7-8, 2004, **Climate protection as development opportunity**, the Hamburg Institute of International Economics, Hamburg, Germany. Focus on the Clean Development Mechanism to reach development targets. Email a-michaelowa@hwwa.de with expressions of interest. <http://www.hwwa.de/climate.htm>

June 9-11, 2004, **World's First Carbon Expo**, Cologne, Germany. Trade fair and conference on emissions trading and the emerging carbon market co-sponsored by the World Bank. "A watershed event in the emerging carbon market, it is the first opportunity for buyers and sellers of greenhouse gas emission reductions to meet face to face." <http://www.carbonexpo.com/> The Conference Program for CARBON EXPO - Global Carbon Market Fair & Conference can be downloaded from http://www.ieta.org/CARBON_EXPO_program.pdf

June 10-11, 2004, **Energy & Agricultural Carbon Utilization Symposium**: Sustainable Alternatives to Sequestration, the campus of The University of Georgia in Athens, Georgia. Sessions focused on the use of charcoal and carbon black in terrestrial ecosystems. <http://www.georgiaitp.org/carbon>

August 20-28, 2004, **32nd International Geological Congress**, Italy. Including Topical Symposium T09 - Future of Energy and Resources, Florence, Italy. Contacts: Scientific Secretariat, Chiara Manetti, Borgo Albizi, 28 - 50121 Firenze, Italy. Tel/Fax: +39 055 2382146 casaitalia@geo.unifi.it Organising Secretariat, Newtowns, Via Augusto Righi, 8 50019 Sesto F.no - Firenze, Italy Tel: +39 055 33611 Fax: +39 055 3361250/350 secretariat@32igc.org or www.32igc.org

Events

September 5-9, 2004, **7th International Conference on Greenhouse Gas Control Technologies**, Vancouver BC, Canada. GHGT-7 is being organized by University of Regina, Natural Resources Canada, and the IEA GHG R&D Programme. www.ghgt7.ca. Contact: GHGT-7 Conference Secretariat, Ted Morris, Suite 150, 10 Research Drive, Regina, SK. S4S 7J7, Canada. Tel: +1 306 337 2290 Fax: +1 306 337 2301 secretariat@ghgt7.ca

September 13-17, 2004, **The International Pittsburgh Coal Conference**, Osaka Japan. Industrial Ecology topics include: life cycle studies of coal conversion plants; Industrial ecology of emission trading; and planning future energy plants. <http://www.engr.pitt.edu/pcc> Topics: <http://www.engr.pitt.edu/pcc/04AbstractTopics.htm>

November 2004, **Climate Change and Business**, Auckland, New Zealand. Seven partner organizations are putting together a conference on the business opportunities arising from climate change. For further information, see: <http://www.climateandbusiness.com/>

November 7-12, 2003, **American Institute of Chemical Engineers (AIChE) Annual Meeting**, Austin, TX, Session 09005, Greenhouse Gas Sequestration Technology. Proposals covering technologies for (1) separation and capture, (2) transport, and/or (3) long-term sequestration (geologic, terrestrial, etc.) of greenhouse gases are especially desired. CO₂ is the focus, but technologies specific to other greenhouse gases (CH₄, N₂O, etc.) are also welcomed. <http://www.aiche.org/annualapp>

Recent Publications

Economics of Sequestering Carbon in the U.S. Agricultural Sector. The Economic Research Service (ERS) of the U.S. Department of Agriculture has recently published a report that analyzes the performance of alternative incentive designs and payment levels if farmers were paid to adopt land uses and management practices that raise soil carbon levels. At payment levels below \$10 per metric ton for permanently sequestered carbon, the model predicts landowners would find it cost-effective to adopt changes in rotations and tillage practices. At higher payment levels, afforestation dominates sequestration activities, mostly through conversion of pastureland. A 50-percent cost-share for cropland conversion to forestry or grasslands would increase sequestration at low carbon payment levels. Technical Bulletin 1909 (TB1909), 68 pp, March 2004, by Jan Lewandrowski, Mark Peters, Carol Jones, Robert House, Mark Sperow, Marlen Eve, and Keith Paustian. The full report can be downloaded from the ERS website at <http://www.ers.usda.gov/publications/tb1909/>

"Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2002" was submitted to the United Nations Framework Convention on Climate Change (UNFCCC) by the U.S. Department of State. The full Inventory document can be downloaded, as well as individual chapters and annexes, from EPA's web site at <http://www.epa.gov/globalwarming/publications/emissions>.

Recent Publication Cont'd

Transportation systems for CO₂-application to carbon capture and storage. Commercialization of carbon capture and storage from fossil fueled power plants requires an infrastructure for transportation of the captured CO₂ from the sources of emission to the storage sites. This paper identifies and analyzes different transportation scenarios with respect to costs, capacity, distance, means of transportation and type of storage. The scenario analysis shows that feasible transportation alternatives are pipelines (on and off shore), water carriers (off shore) and combinations of these. *Energy Policy*, Volume 32 Issue 17. <http://www.sciencedirect.com/science/article/B6V2P-4BJ1XCD-2/1/ead6509577cca1df8732fec59030dbbc>

California, Permitting and Terrestrial Sequestration. This paper advocates carbon sequestration programs in California and addresses their possible regulatory and economic dimensions. It makes the case that California provides a rich landscape for terrestrial and geologic sequestration activities, and promises that the state would garner substantial co-benefits from these programs. "Regulatory constraints to carbon sequestration in terrestrial ecosystems and geologic formations: a California perspective," *Mitigation and Adaptation Strategies for Global Change*, Edward Vine, 9 (1, 2004): 77-95

New Greenhouse Gas Calculator Available. The Global Environment and Technology Foundation (GETF) has added a new greenhouse gas equivalencies calculator to the U.S. Climate Technology Cooperation Gateway Web site. The calculator enables organizations and individuals to quickly translate greenhouse gas reductions into terms that are easier to conceptualize, such as gallons of gasoline, barrels of oil, the number of cars not driven for one year, or the number of acres of forest preserved from deforestation. The online tool also allows users to calculate greenhouse gas emissions from a known quantity of kilowatt-hours or gallons of gasoline, or a given number of cars and trucks not driven for one year. The U.S. Climate Technology Cooperation Gateway was developed by GETF in partnership with the U.S. Agency for International Development and EPA <http://www.usctcgateway.net/tool/>

Step changes for decarbonising the energy system: research needs for renewables, energy efficiency and nuclear power. Research is needed in a number of areas if large, long-term reductions in carbon emissions from energy use are to be achieved. Decomposition analysis is used to illustrate the various parts of the energy system, the differential carbon emissions associated with each part, and the different kinds of policy measures which will be required to reduce them. Common themes where research is needed include: human behavior, social acceptability, economic costs, network and infrastructure issues, how to stimulate innovation, security and reliability, and markets and governance. Progress will need to be made in developing a better understanding of most if not all of these issues if radical reductions of carbon emissions are to be achieved. <http://www.sciencedirect.com/science/article/B6V2W-4CBVSHB-1/1/f10a526a46986bae397d0d1b288d5784>

Legislative Activity

Congressional Hearing: Impacts of Climate Change and States' Actions. "Climate change is real and presents a clear danger on public health," said Senator John McCain (R-AZ) in the opening Remarks to a May 6 hearing before the Senate Committee on Commerce, Science and Transportation. Witnesses included Dr. William Curry, Department of Geology and Geophysics, Woods Hole Oceanographic Institution, Dr. Paul Epstein, Harvard Medical School, Dr. William Fraser, President, Polar Oceans Research Group, Dr. Philip Mote, Research Scientist, University of Washington and Mr. Ken Colburn, Executive Director, Northeast States for Coordinated Air Use Management. <http://commerce.senate.gov/hearings/witnesslist.cfm?id=1176>

House Climate Bill Vote Delayed. Republican lawmakers in the Connecticut House of Representatives succeeded in postponing a vote on legislation designed to help reduce greenhouse gases, saying it would be a burden on businesses and may force some companies to leave the state. "Vote on US climate change bill delayed," May 4, 2004, <http://www.pointcarbon.com/article.php?articleID=3637&categoryID=147>

One Step Further for East Coast GHG Framework. The Connecticut General Assembly has approved a bill creating a framework for New England states and eastern Canadian provinces to reduce GHG emissions together. The bill also sets a state goal of reducing ghg emissions to 1990 levels by 2010, to 10 percent below 1990 levels by 2020, and eventually to a level 75 to 80 percent below current levels over the long term. May 6, 2004 "Connecticut approves emissions trading bill," <http://www.pointcarbon.com/article.php?articleID=3652&categoryID=147>