



Advanced Resources
International, Inc.

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Advanced Resources International QUARTERLY UPDATE

Unconventional Resources • Enhanced Recovery • Carbon Sequestration

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Advanced Resources International (ARI) is a professional services firm that provides geological, reservoir engineering, business and policy analysis and advice on a global basis related to unconventional gas resources, enhanced oil recovery and geologic carbon sequestration. Our quarterly update highlights current industry trends, ongoing and completed projects, recent publications, upcoming workshops and events, and company news. We encourage you to visit our website at www.adv-res.com to learn more about our company history, research and technology activities, industry news and much more. You may also contact our offices listed at the bottom of this page for additional information.



WEBEX MEETING OF THE PETROLEUM TECHNOLOGY TRANSFER COUNCIL

On **December 16, 2010**, Vello Kuuskraa, President, and Michael Godec, Vice President of Advances Resources International, Inc., gave a presentation to the first WebEx Meeting of the Petroleum Technology Transfer Council entitled "The Promise and Performance of Next Generation CO₂-EOR." This presentation examines how alternative technology designs and operating strategies may enable industry to significantly improve CO₂-EOR oil recovery efficiencies, while also potentially providing the opportunity for the sequestration of CO₂. The presentation draws on laboratory work, reservoir simulation and in depth assessments of significant CO₂-EOR field tests that show promise for high oil recovery. The insights gained from these sources are combined to show how injecting larger volumes of CO₂, integrating horizontal wells with close vertical well spacing, rigorously managing the CO₂-EOR operation, and controlling the conformance of the CO₂ flood could lead to increased oil recovery efficiencies from CO₂-EOR.

http://www.pttc.org/pttc_webinars.htm

8TH ANNUAL EOR CARBON MANAGEMENT WORKSHOP IN HOUSTON



On **December 6, 2010**, Michael Godec, Vice President of Advances Resources International, Inc., presented a paper entitled, "CO₂-EOR & Sequestration: What it is Worth to the American Economy and Energy Security?" at the 8th Annual EOR Carbon Management Workshop in Houston, Texas. Mr. Godec discussed the potential of U.S. Oil resources from CO₂-EOR, possible forecasts of U.S. CCS deployment assuming climate legislation, the potential U.S. oil production that could result for the forecast CCS deployed where the captured CO₂ is used for CO₂-EOR, and the economic and environmental benefits associated with this increased production. Mr. Godec concluded that oil production could reach 4 MMBbld by 2030 with contribution from natural CO₂ sources. The sale and use of captured CO₂ could provide revenues to the capture of CO₂ emissions and other stakeholders. The use of oil fields for storing CO₂ confines the areal extent of the CO₂ plume, reducing risks of CO₂ leakage and helping overcome public opposition, and the use of CO₂-EOR as CO₂ storage option could enable major CCS projects to be implemented in the near-term while the "thorny issues" surrounding climate legislation and using saline formations for storing CO₂ (e.g., pore space rights, regulatory approval, public acceptance) are resolved.



WORLD BANK TECHNICAL ASSISTANCE MISSION

Vello Kuuskraa, President of Advanced Resources International, Inc., has been engaged by the World Bank in Washington, D.C., to participate in a World Bank Technical Assistance Mission to assess the carbon capture and storage potential in Jordan. During early December 2010, the mission met with officials of the Ministries of Energy and Mineral Resources, Environment, Planning and International Cooperation, and Water and Irrigation. The mission also held meetings with the Natural Resources Authority, the Water Resources Authority, the University of Jordan, the Royal Geographic Center, and the National Petroleum Company.



OPTIMIZATION OF CO2 STORAGE IN CO2 ENHANCED OIL RECOVERY PROJECTS

On **November 30, 2010**, Advanced Resources International, Inc. and Melzer Consulting prepared a final report for the Department of Energy & Climate Change (DECC), entitled "Optimization of CO2 Storage in CO2 Enhanced Oil Recovery Project", which examines current understanding around the issue of the "carbon footprint" of incremental oil produced by CO2 injection EOR.

The key finding is that the carbon footprint is usually significantly lower than that for conventional oil (typically between 25-50% less), due to the impact of the CO2 that remains stored in the reservoir after the EOR project ceases. In some circumstances more CO2 can be stored than the incremental oil contains. Thus CO2 EOR can have an environmental benefit compared to conventional oil production, which can be viewed or downloaded from the links below.

[PDF COPY OF FINAL REPORT](#)

[UK DEPARTMENT OF ENERGY AND CLIMATE CHANGE WEBSITE](#)



PARTNERSHIP TO SECURE ENERGY FOR AMERICA (RPSEA) MEETING ON NATURAL GAS: THE PATH TO CLEAN ENERGY FORUM

On **November 18, 2010**, Mr. Vello Kuuskraa, President of Advanced Resources International, Inc., was invited to speak at the Research Partnership to Secure Energy for America (RPSEA) meeting on Natural Gas: The Path to Clean Energy Forum, held in College Station, Texas. Mr. Kuuskraa's presentation about North American gas supply was entitled "Abundant North American Unconventional Natural Gas Supplies Offer Multiple Clean Energy Options".



SHALE GAS ENVIRONMENTAL SUMMIT: LINKING ENVIRONMENTAL COMPLIANCE AND THE BOTTOM LINE

On **November 16, 2010**, Michael Godec, Vice President of Advanced Resources International, Inc., gave a presentation entitled, "Impact of Proposed Tax Structure Changes to Pay for Environmental Work" at the Shale Gas Environmental Summit: Linking Environmental Compliance and the Bottom Line, in Houston, Texas. The presentation provided Mr. Godec's perspectives on U.S. shale gas potential, current tax proposals impacting shale gas development, the pros and cons of potential tax changes, the impact of proposed tax changes on the economics of shale gas development, and possible prospects for the future. The presentation concluded that gas shales represent a significant new resource development opportunity in the United States, and that severance taxes represent one method to help address the impacts of rapid increases in shale gas development activities. However, Mr. Godec noted that the imposition of such taxes could impact the extent and rate of this development, and that the structure of an ultimate tax proposal is key to

managing the impacts both to government revenues and to gas production economics.



SPE INTERNATIONAL CONFERENCE ON CO2 CAPTURE, STORAGE, AND UTILIZATION

On **November 10, 2010**, Karine Schepers, Senior Reservoir Engineer of Advanced Resources International, Inc. gave a presentation entitled, "Enhanced Gas Recovery and CO2 Storage in Coal Bed Methane Reservoirs: Optimized Injected Gas Composition for Mature Basins of Various Coal Rank", at the SPE CCS Conference in New Orleans. The presentation described how to optimize injected gas composition in Coal Bed Methane reservoirs, in order to improve CO2 sequestration while preserving injectivity. Key parameters driving enhanced coal-bed methane recovery and CO2 sequestration were identified for common mature coal basins in the US and reservoir simulation tools were used to optimize their development. This innovative methodology could help turning non-economic coal bed and gas shale into profitable plays.

[PDF COPY OF PRESENTATION](#)



SPE INTERNATIONAL CONFERENCE ON CO2 CAPTURE, STORAGE, AND UTILIZATION

On **November 10, 2010**, George Koperna, Vice President of Advanced Resources International Inc., gave a presentation entitled, "CO2 Storage Engineering: Real Solution to Real Problems", at the SPE CCS Conference in New Orleans. This presentation discusses practical CO2 storage options that have been proposed for significantly increasing CO2 storage performance at three challenging saline reservoir settings. Deep saline aquifers offer the potential for storing large volumes of CO2. With conventional CO2 storage well design and operating practices, only a small fraction of this large CO2 storage potential can be productively used. Numerous alternative designs and practices, which utilize the reservoir's internal architecture and draw on CO2 storage engineering expertise, could enable CO2 storage operators to more efficiently and fully utilize a saline formation's storage capacity. This would help reduce the areal extent of the CO2 plume and its risk footprint. It would also help reduce the number of CO2 injection wells and patterns that would need to be developed.

[PDF COPY OF PRESENTATION](#)



29TH UNITED STATES ASSOCIATION FOR ENERGY ECONOMICS (USAEE)/INTERNATIONAL ASSOCIATION OF ENERGY ECONOMICS (IAEE) NORTH AMERICAN CONFERENCE: "ENERGY AND THE ENVIRONMENT CONVENTIONAL AND UNCONVENTIONAL SOLUTIONS"

In **October 2010**, Vello Kuuskraa, President of Advanced Resources International, Inc., traveled to Calgary, Alberta, Canada to attend the 29th United States Association for Energy Economics (USAEE)/International Association of Energy Economics (IAEE) North American Conference "Energy and the Environment Conventional and Unconventional Solutions". His presentation was entitled "From Fears of Shortages to Expectations of Plenty: The Paradigm Shift in Natural Gas Supplies". The three day conference was well attended by energy professionals.



CARBON CAPTURE AND SEQUESTRATION SUMMIT

On **September 30, 2010**, George Koperna, Vice President of Advanced Resources International, Inc., presented a paper entitled, "Leveraging Captured CO₂ to Improve the Economics of Enhanced Oil Recovery" at the Carbon Capture and Sequestration Summit in Washington, D.C. The presentation discussed the status and potential of CO₂-EOR both in the U.S. and worldwide, described the impact of CO₂-EOR on CCS and the impact of CCS on CO₂-EOR, discussed the current shortfalls in EOR-related infrastructure that need to be addressed in order to achieve this potential, and described the regulatory framework in the U.S. that is evolving related to CO₂-EOR and CCS. Mr. Koperna concluded that CO₂-EOR have been demonstrated profitable in commercial applications for over 30 years; additional growth in oil production from CO₂-EOR is limited by the availability of reliable supplies of CO₂ at affordable costs; CCS needs CO₂-EOR to help ensure economic viability for CCS but also, CO₂-EOR needs CCS to ensure adequate CO₂ supplies to facilitate growth in production from CO₂-EOR projects; and that government actions could help or hinder achieving the potential for CO₂-EOR in conjunction with CCS.



COAL-SEQ FORUM VII COMING SOON

On **March 7–8, 2011**, the Coal-Seq Forum VII will take place in Houston, TX at the Hilton Houston Westchase located at 9999 Westheimer Road, Houston, TX 77042. The forum is a great opportunity to learn about international and domestic activities as well as more technical laboratory and theoretical studies.

<http://www.coal-seq.com/upcomingevents.asp>

If you are interested in participating, please contact Susan Pershall at spershall@adv-res-hou.com or call 281-558-9200 Ext 4.



COMET3 RESERVOIR SIMULATOR

Advanced Resources' COMET3 reservoir simulator for coalbed methane (CBM) and gas shale reservoirs was the first of its' kind in the marketplace, the initial version having been developed in the early 1980's when both resources combined contributed less than 1% to U.S. gas supply. Since then it has remained the industry-standard reservoir simulator for these reservoir types. Advanced technical features include: • A triple-porosity/dual-permeability option for certain gas shale and coalbed methane (CBM) reservoirs • Multi-component sorption for enhanced coalbed methane (ECBM) recovery and carbon sequestration (CO₂ sequestration) applications • A robust permeability model A COMET3 brochure, as well as technical papers describing the model theories, and model testing and benchmarking studies, can be downloaded via the links below.

[Download COMET3 Brochure](#)



UPCOMING EVENTS

Coal-Seq Forum VII

March 7–8, 2011

Hilton Houston Westchase

9999 Westheimer Road

Houston, TX 77042

<http://www.coal-seq.com/upcomingevents.asp>

Southeast Regional Carbon Sequestration Partnership

(SECARB)**6th Annual Stakeholders' Briefing**

March 9-10, 2011

Hilton Atlanta Airport Hotel

1031 Virginia Avenue

Atlanta, GA

<https://s07.123signup.com/servlet>[/SignUp?PG=1531834182300&P=153183400](https://s07.123signup.com/servlet/SignUp?PG=1531834182300&P=153183400)**2011 AIChE Spring Meeting & 7th Global Congress on Process Safety**

March 13-17, 2011

Hyatt Regency Chicago

Chicago, IL

<http://www.aiche.org/Conferences/SpringMeeting/index.aspx>**AAPG 2011 Annual Convention & Exhibition**

April 10-13, 2011

George R. Brown Convention Center

Houston, TX

<http://www.aapg.org/houston2011/>**OTC 2011**

May 2 -5, 2011

Reliant Park

One Reliant Park

Houston, TX 77054

http://www.otcnet.org/2011/pages/schedule/tech_program/index.php**SPE Unconventional Gas Conference**

June 14-16, 2011

The Woodlands Waterway Marriott Hotel and Convention Center

The Woodlands, Texas USA

<http://www.spe.org/events/ugc/>

For a complete list of industry news, recent white papers and case studies please visit our website www.adv-res.com or contact one of our offices:

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