



CONGRESSIONAL BUDGET OFFICE COST ESTIMATE

July 7, 2011

S. 699 **Department of Energy Carbon Capture and Sequestration Program Amendments of 2011**

*As ordered reported by the Senate Committee on Energy and Natural Resources
on May 26, 2011*

SUMMARY

S. 699 would authorize the creation of a new program at the Department of Energy (DOE) to demonstrate systems for storing carbon dioxide produced by industrial sources, including measures that would indemnify recipients for certain liabilities and allow DOE to take title to the sites for long-term stewardship. The bill also would create and repeal authorizations of appropriations for certain grants related to carbon sequestration projects.

CBO estimates that implementing this bill would increase net discretionary spending by \$68 million over the 2012-2016 period, assuming appropriation of the necessary amounts. Pay-as-you-go procedures apply because enacting the legislation would affect net direct spending. However, CBO estimates that such spending would be negligible over the 2012-2021 period. Enacting this bill would not affect revenues.

S. 699 contains no intergovernmental or private-sector mandates as defined in the Unfunded Mandates Reform Act (UMRA).

ESTIMATED COST TO THE FEDERAL GOVERNMENT

The estimated budgetary impact of S. 699 is shown in the following table. The costs of this legislation fall within budget function 270 (energy).

| | By Fiscal Year, in Millions of Dollars | | | | | | | | | | | |
|---|--|------|------|--------|--------|--------|--------|--------|--------|--------|-----------|-----------|
| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2012-2016 | 2012-2021 |
| CHANGES IN SPENDING SUBJECT TO APPROPRIATION | | | | | | | | | | | | |
| Estimated Authorization Level | 10 | 10 | 10 | 10 | 50 | 51 | 52 | 54 | 55 | 56 | 90 | 358 |
| Estimated Outlays | 8 | 12 | 12 | 8 | 28 | 46 | 52 | 53 | 54 | 56 | 68 | 329 |
| CHANGES IN DIRECT SPENDING | | | | | | | | | | | | |
| Estimated Budget Authority ^a | 0 | 0 | 0 | 10,700 | 10,900 | 11,200 | 11,400 | 11,700 | 12,000 | 12,200 | 21,600 | 80,100 |
| Estimated Outlays | 0 | 0 | * | * | * | * | * | * | * | * | * | * |

Note: * = net outlays between -\$500,000 and \$500,000.

a. The budget authority for the indemnifications authorized by the bill would be recorded in the year that DOE enters into a cooperative agreement. The estimated budget authority shown in this table represents the maximum amount authorized by the bill for each project, including adjustments for inflation. The actual amount of such potential liabilities could be much smaller than the authorized levels.

BASIS OF ESTIMATE

For this estimate, CBO assumes that S. 699 will be enacted near the end of fiscal year 2011, that the necessary amounts for implementing the bill will be appropriated for each fiscal year, and that outlays will occur at the historical rates for similar activities.

Spending Subject to Appropriation

CBO estimates that implementing S. 699 would increase net discretionary spending by \$68 million over the 2012-2016 period and \$329 million over the 2012-2021 period. That estimate includes the net effects of provisions that would increase spending for carbon sequestration projects, authorize grants to state and tribal governments involved in regulating such projects, and repeal an existing authorization for grants to universities to perform research related to carbon capture and storage.

Increased Spending for Carbon Sequestration Projects. The cooperative agreements authorized by S. 699 would supplement other forms of federal assistance for carbon sequestration projects. For example, section 963 of the Energy Policy Act of 2005 authorized appropriations for a research, development, and demonstration program on carbon sequestration through 2015. CBO anticipates that projects that have received funding under DOE's existing programs would be eligible for the types of assistance authorized by this bill, assuming they meet the eligibility criteria in the bill. Therefore, S. 699 would effectively extend the existing authorization of appropriations to support carbon sequestration projects beyond the scheduled expiration in 2015.

By authorizing DOE to continue a carbon sequestration program beyond 2015, S. 699 would effectively authorize appropriations for those activities in 2016 and later years. Based on information from DOE about recent levels of funding for carbon sequestration projects and related administrative activities, CBO estimates that fully funding those activities in 2016 would require appropriations totaling \$40 million. That estimate assumes that funding for carbon sequestration projects, including monitoring and other administrative costs, remains in line with funding provided in recent years.

In addition, CBO expects that implementing S. 699 would expand DOE's administrative workload to manage existing carbon sequestration projects whose sponsors would choose to enter into cooperative agreements for indemnification under the bill. Based on the status of such projects, CBO anticipates that DOE would approve seven indemnification agreements by 2021, some of which would occur during the 2012-2016 period covered by this estimate. We also expect that those projects would qualify for additional technical and financial assistance under the bill. Thus, we estimate that fully funding S. 699 would require additional appropriations of about \$10 million annually over the 2012-2016 period. That estimate is based on historical trends in spending for reviewing other technically complex applications and assumes that some of the sponsors of DOE's existing carbon sequestration projects would enter into cooperative agreements under S. 699 and receive modest increases in technical and financial assistance under the bill.

In total, assuming appropriation of the necessary amounts, CBO estimates that implementing S. 699 would increase discretionary spending related to carbon sequestration by \$68 million over the 2012-2016 period. That estimate is based on historical spending patterns for existing activities.

Grants to State, Local, and Tribal Governments. S. 699 would authorize the appropriation of \$10 million for grants to local governments to establish programs to train workers involved with regulating carbon sequestration projects and other related projects, such as transportation systems. Based on historical spending patterns for similar activities, CBO estimates that fully funding the proposed grant program would cost \$10 million over the 2012-2016 period.

Repeal Authorization for Grants to Universities. S. 699 would repeal a provision of law that authorizes the appropriation of \$10 million for grants to universities to carry out research related to carbon capture and storage. According to DOE, that program, which was originally authorized under the Energy Independence and Security Act of 2007, has received no funding to date. CBO estimates that the proposed repeal would reduce authorized spending by \$10 million over the 2012-2016 period, assuming appropriations are reduced consistent with S. 699.

Direct Spending

Injecting carbon dioxide into geologic formations is being studied as a way of removing greenhouse gas from the atmosphere. DOE, the Environmental Protection Agency (EPA), and other agencies are in the process of examining the use of such technologies on a commercial scale. S. 699 would authorize DOE to enter into as many as 10 cooperative agreements to provide financial and technical assistance to large-scale demonstration projects that would provide for the long-term geologic storage of carbon dioxide produced by industrial sources.

Under the proposed cooperative agreements, DOE would be authorized to indemnify the recipients for damages resulting from the demonstration projects, subject to certain conditions. Project sponsors would be required to comply with certain performance standards and provide financial assurances at levels specified by EPA and other federal agencies. Except in cases of gross negligence, the government would indemnify the recipients for liabilities that exceed the value of those financial assurances, subject to a limit of \$10 billion per project, or a total of \$100 billion (plus adjustments for inflation). The bill also would require project developers to pay a fee equal to the estimated net present value of indemnification payments. Once DOE certifies that a project meets all of the closure requirements, the department also could take ownership of the site.

Enacting the federal indemnification and stewardship provisions in S. 699 would affect direct spending. S. 699 would waive the Anti-Deficiency Act to allow DOE to sign indemnification agreements in advance of appropriation acts and would provide a permanent, indefinite appropriation for any costs incurred by DOE to indemnify sponsors and remediate sites that come under government ownership. The proceeds from indemnification fees would be deposited in the Treasury as miscellaneous receipts, which are a credit against direct spending.

Indemnification Costs. Unintended releases of carbon dioxide from geologic storage systems could pose risks to human health, property, and natural resources, including drinking water. Because the demonstration projects would be designed to store carbon dioxide permanently, the liability for such events would span several decades. Project sponsors would be required by the bill and existing EPA regulations to demonstrate their ability to cover costs that may arise in developing, operating, and plugging wells as well as closing sites, responding to emergencies, and performing remedial actions. Thus, CBO estimates that the indemnification authority would be used primarily to cover costs resulting from events that may occur after a site has been closed, which probably would occur well after 2021.

While most outlays for indemnification costs probably would occur after 2021, the government's obligation to make such payments would be incurred at the time the cooperative agreement is signed. As a result, CBO's estimate includes the amount of

budget authority authorized by the bill for indemnification payments. The amounts ultimately paid under such agreements may be much smaller than the amounts authorized by S. 699, however. DOE and other analysts expect that the risks posed by the 10 projects would be relatively small because they would be located in geologic formations that are well understood, and, as demonstration projects, would be subject to extensive monitoring and oversight. The 2006 report of the International Panel on Climate Change, for example, said that well-engineered, well-managed projects might effectively sequester 99 percent of the carbon dioxide over periods of 100 years or more.

Income from Indemnification Fees. For this estimate, CBO assumes that DOE would require firms to pay indemnification fees over the operating life of the facility, based on the volume of carbon dioxide injected each year. Setting a price for such fees would be difficult because agencies and industry lack experience with large-scale geologic storage systems. EPA's regulations, for example, rely on pilot projects, modeling efforts, and experience with other underground injection activities such as enhanced oil and gas recovery. According to some analysts, the value of the financial risks through the operational and post-injection period may be equivalent to less than 20 cents per ton of carbon dioxide.¹ CBO estimates that DOE initially would set rates below that level because most of those estimated risks are associated with operational activities, not long-term storage. Similarly, firms might not seek federal indemnification if they considered the fee to be disproportionate to the projected risks.

Net Effect on Direct Spending. Based on DOE's 2010 plan for carbon storage and sequestration projects, CBO anticipates that DOE would finalize seven indemnification agreements by 2021, that most of those facilities would begin injections after 2015, and that the initial injections would involve relatively low volumes of carbon dioxide. Under those volume, price, and cost assumptions, CBO estimates that implementing the indemnification provisions in S. 699 would have no significant net effect on outlays over the 2012-2021 period. The net budgetary impact of the indemnification regime in subsequent years would depend on the balance between the amounts spent and the amounts collected from fees: it could reduce net direct spending if income from the fees exceeds the nominal value of any payments but would increase net outlays if the costs exceed the amounts paid by recipients of this assistance.

Finally, CBO estimates that enacting this bill would increase future direct spending for DOE's stewardship and regulatory activities. Such costs probably would be incurred well beyond the 2012-2021 period and would depend on the characteristics of the sites acquired by DOE. While routine monitoring and management expenses probably would average less than \$5 million a year per site (in 2011 dollars), the cost of any remediation activities is unknown.

1. Michael Donlan and Chiara Trabucchi, "Valuation of Consequences Arising from CO₂ Mitigation at Candidate CCS Sites in the U.S." *Energy Procedia*, 4(2011), p. 2228.

PAY-AS-YOU-GO CONSIDERATIONS

The Statutory Pay-As-You-Go Act of 2010 establishes budget-reporting and enforcement procedures for legislation affecting direct spending or revenues. Enacting S. 699 would affect net direct spending but CBO estimates that those effects would be negligible in each of the fiscal years 2012 through 2021.

INTERGOVERNMENTAL AND PRIVATE-SECTOR IMPACT

S. 699 contains no intergovernmental or private-sector mandates as defined in UMRA. The bill would authorize grants to state and tribal agencies for training employees involved in carbon capture, transportation, and storage projects. Any costs those entities incur to meet grant requirements would result from complying with conditions of federal assistance.

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