

Revenues	- 0 -	- 0 -	- 0 -
Expenditures	- 0 -	Increase up to \$538,000	Increase up to \$528,000
Carbon Dioxide Storage Facility Trust Fund (new)			
Revenues	- 0 -	Gain from CO ₂ storage fees	Gain from CO ₂ storage fees
Expenditures	- 0 -	Increase in administrative and monitoring costs	Increase in administrative and monitoring costs; Increase for maintaining closed sites under state ownership
Advanced Energy Fund (Fund 5M50) and related funds			
Revenues	- 0 -	- 0 -	- 0 -
Expenditures	- 0 -	Potential increase for implementation of energy efficiency programs	Potential increase for energy efficiency programs

Note: The state fiscal year is July 1 through June 30. For example, FY 2008 is July 1, 2007 – June 30, 2008.

- The bill would establish the Ohio Renewable Energy Authority. The 11-member Authority would provide financial assistance to promote job opportunities in Ohio working for renewable energy businesses. The Authority would cease to exist on June 30, 2018 unless extended by an act of the General Assembly.
- The bill requires the state treasurer to transfer \$2.5 million from the GRF to the Renewable Energy Development and Investment Fund, which the bill establishes in the custody of the Treasurer of State but not in the state treasury, to be administered by the Ohio Renewable Energy Authority. The transfer must be made immediately after the initial appointments to the Authority. The bill requires the Treasurer of State to transfer an additional \$10 million during calendar year 2009; thereafter, the Treasurer of State is required to transfer at least \$10 million (possibly more, depending on growth in income taxes paid by individuals employed by renewable energy businesses) annually from the GRF to the fund, until the Authority ceases to exist.
- The bill requires the Department of Transportation (DOT) to implement a lease or permit program allowing CO₂ storage facility operators to locate transmission pipelines along state highway system property. DOT would likely be able to handle this program with existing personnel, although there may be some additional administrative burden to review the plans and specifications for these pipelines. Since the bill does not specify where any lease payment revenue would be deposited, it is assumed the revenue will be deposited into the GRF.
- The bill would establish the Carbon Dioxide Storage Facility Trust Fund in the state treasury, to be administered by the Division of Mineral Resources Management within the Ohio Department of Natural Resources. The fund will receive revenue from fees that accompany applications to establish a CO₂ storage facility, storage fees paid per ton of carbon dioxide stored by operators of such facilities, and potentially civil penalties. These funds will be used to support a long-term monitoring program for carbon storage sites and may be needed to support state ownership of these sites when the facilities reach capacity in the future.
- The Public Utilities Commission of Ohio (PUCO) would need to add staff to perform various new duties required by the bill. The preliminary analysis by PUCO officials indicates that costs would be comparable to those reported for S.B. 221, for which costs were indicated to be approximately \$528,000 per year, plus one-time start-up costs of \$10,000. Funding for these expenditures would come from Fund 5F60.

- The Department of Development may experience increased expenditures from the Advanced Energy Fund (Fund 5M50) and related funds in order to implement energy efficiency programs that meet energy consumption reduction requirements specified in the bill.
- The bill would require electric utilities subject to PUCO regulation to meet a renewable energy portfolio requirement. This may increase prices the state pays for electricity. The increase is expected to be minimal in the first few years, while the requirement is being phased in, but is expected to be significant by 2024, when the phase-in is complete.

Local Fiscal Highlights

LOCAL GOVERNMENT	FY 2008	FY 2009	FUTURE YEAR
Counties			
Revenues	Increase in recordation fees for carbon storage facilities	Increase in recordation fees for carbon storage facilities	Increase in recordation fees for carbon storage facilities
Expenditures	- 0 -	- 0 -	- 0 -
Counties, municipalities, townships, school districts			
Revenues	- 0 -	- 0 -	- 0 -
Expenditures	- 0 -	- 0 -	Potential increase \$42.3 million or more in expenditures for electric utility service

Note: For most local governments, the fiscal year is the calendar year. The school district fiscal year is July 1 through June 30.

- Counties may experience an increase in recordation fees from permits and statements of property rights filed for parcels of property to be used for underground carbon dioxide storage facilities.
- The bill would require electric utilities subject to PUCO regulation to meet a renewable energy portfolio requirement. This may increase prices local governments pay for electricity. The increase is expected to be minimal in the first few years, while the requirement is being phased in, but is expected to be significant by 2024, when the phase-in is complete.

Detailed Fiscal Analysis

The bill would establish the Ohio Renewable Energy Authority. The Authority would provide financial assistance directed toward promoting employment in renewable energy businesses in Ohio. It would be required to meet at least six times per year and to submit annual reports on its activities to the General Assembly, the Governor, and the Director of Development. It would administer the newly established Renewable Energy Development and Investment Fund, the funding for which would come from transfers from the GRF. The Renewable Energy Development and Investment Fund would not be in the state treasury, but it would be in the custody of the Treasurer of State. The Authority would have 11 members selected according to criteria contained in section 3706.32 of the bill. The Authority would cease to exist after June 30, 2018 unless extended by an act of the General Assembly.

The bill would grant the Division of Mineral Resources Management within the Department of Natural Resources (DNR) the exclusive authority to regulate the storage of anthropogenic (human-produced) carbon dioxide (CO₂) in subterranean reservoirs formed out of geologic formations. Such "carbon sequestration" techniques are used to reduce the concentrations of the greenhouse gas CO₂ that are being released into the atmosphere.

The bill allows the Chief of the Division of Mineral Resources Management to issue permits to qualified entities seeking to operate CO₂ storage facilities if they meet certain requirements. Applicants must demonstrate that the facility is suitable and feasible for the purpose of storing carbon dioxide, that they have made a good faith effort to obtain the consent of a majority of property interests affected by the facility, that the facility will not contaminate existing resources, and that the facility will not endanger human health and the environment, along with any other terms and conditions the Chief deems appropriate.

Permits for carbon storage facilities issued under the bill are subject to rules adopted by the Chief for establishing application procedures, appropriating property interests, establishing financial assurance requirements for the maintenance and proper disposal of a storage site, penalties and procedures, and fees to be charged to storage operators. The Chief must also adopt rules regarding closure requirements for facilities that have reached their storage capacity, requiring such sites to fall under state control after a period of ten years has passed since CO₂ was last injected into a facility, and requiring rules for the creation and administration of a long-term monitoring program and for allowing enhanced oil or natural gas recovery operations to be converted into a carbon storage facility. The bill also allows the Director of Natural Resources to enter into cooperative agreements with the federal government and other states if the Division of Mineral Resources Management believes such agreements to be necessary.

The bill would impose requirements on electric distribution utilities and on electric services companies regarding the use of renewable and other advanced energy sources^[1] in generating electricity sold in Ohio. This provision would be monitored and enforced by the Public Utilities Commission of Ohio (PUCO). Companies that fail to meet the required standards may be required to make compliance payments to PUCO based on the degree to which the sources for their electric generation fall short of the required level. The compliance payments are to be deposited into the Renewable Energy Development and Investment Fund. PUCO would be required to issue a report annually to the General Assembly describing compliance with the renewable energy requirements of the

bill on the part of electric utilities. Companies would be permitted to meet the requirements, in whole or in part, by purchasing renewable energy credits. PUCO would be required to adopt rules governing the renewable energy credit program.

The bill would impose certain other new duties on PUCO. PUCO would be required to produce an annual report on the achievements of energy efficiency programs that electric distribution utilities would be required to implement. PUCO would monitor and enforce compliance with the energy efficiency requirements, and would be required to assess forfeitures on utilities that fail to comply. Any forfeitures received would be deposited into the Renewable Energy Development and Investment Fund. PUCO is also required to adopt rules regarding greenhouse gas emission reporting requirements.

The Governor, in consultation with the Commission Chairman, is required to appoint an Alternative Energy Advisory Committee. The bill does not specify the number of members that must be appointed, nor does it specify whether members would be compensated.

Background

Reputable studies find that renewable portfolio standard (RPS) requirements would increase the price of electricity to consumers (including governments). For example, the U.S. Energy Information Administration (EIA) published a study in August 2007 titled *Energy and Economic Impacts of Implementing Both a 25-Percent Renewable Portfolio Standard and a 25-Percent Renewable Fuel Standard by 2025*.^[2] As implied by the title, the specific policy proposal that that study examined differed from the current bill: it required a 25% renewable portfolio standard rather than a 12.5% RPS, and it required a 25% renewable fuel standard in addition to the RPS requirement. The study projected that average retail electricity prices would increase by about 3.3% due to the proposal by 2025, and by 6.2% by 2030. It also projected that about one-half of the renewable generation required by the proposal would be met by biomass electricity generation, and that wind generation would account for slightly over one-third. For purposes of comparison, another EIA study, released in June,^[3] analyzed the effect of a 15% RPS proposal, finding that that proposal would increase electricity prices by about 2.0% by 2030.

The more recent study included many caveats, which are appropriate given the long-term nature of the projections. It was based on federal laws and regulations as they were on September 1, 2006; in particular any tax incentives that were scheduled to expire under the law on that date were assumed to expire. It made projections about the cost, performance, and commercial feasibility of types of generation, such as advanced biomass generation, for which no commercial generation currently exists. Any of those assumptions may prove to be overly optimistic (in which case the price increases could be greater than projected) or overly pessimistic (in which case they could be smaller than projected). And, of course, it projected the prices of commodities like oil, coal, natural gas, and uranium that are very hard to predict. Given the differences between the proposal analyzed in this study and the RPS requirement of H.B. 487, as well as the uncertainties highlighted in the study itself, the projected effects on electricity prices would differ from the effects that H.B. 487 is likely to have. Nevertheless, the RPS requirement of H.B. 487 is likely to affect electricity prices. This point is elaborated below.

Both the state and local governments are consumers of electricity. The Office of Budget and Management (OBM) reports that state agencies spent slightly over \$52.1 million on electricity in FY 2007. The agencies that spent the largest amounts were the Department of Rehabilitation and Correction (DRC, \$14.2 million), the Department of Transportation (DOT, \$11.4 million), the Adjutant General (ADJ, \$3.6 million), the Department of Mental Health (DMH, \$3.5 million), the Department of Administrative Services (DAS, \$3.4 million), and the Department of Natural Resources (DNR, \$3.3

million). No other agency spent more than \$3 million that year, though one spent over \$2 million and four spent over \$1 million. In addition to direct spending on electricity, some agencies pay for electricity indirectly, as part of the amount they pay for leased office space. The U.S. Census Bureau estimates that local governments in Ohio collectively spent approximately \$682.7 million on electricity during the fiscal year that ended between July 1, 2004, and June 30, 2005. The definition of local governments appears to include counties, municipalities, townships, special districts, and school districts.

Fiscal effects

Ohio Renewable Energy Authority

Funding for the activities of the Authority would come from transfers from the GRF. The bill would require the Treasurer of State to transfer \$2.5 million to the Renewable Energy Development and Investment Fund immediately after the initial appointments of members of the Authority, and another \$10 million during calendar year 2009. Starting in calendar year 2010, the amount of the annual transfer is to be either (1) the increase (compared with 2009) in the amount of revenue received under the income tax from taxpayers employed by a renewable energy business, or (2) \$10 million per year, whichever amount is greater. The amount of income tax revenue attributable to relevant taxpayers is to be determined by the Tax Commissioner, in consultation with the Authority and the Director of Development.

Up to 6% of the funds received by the Renewable Energy Development and Investment Fund could be used for administration of the Authority. The remainder is to be used to provide grants, loans, loan guarantees, awards, and other forms of financial assistance to promote employment in renewable energy businesses.

The Renewable Energy Development and Investment Fund would not be in the state treasury, but it would be in the custody of the Treasurer of State. Because it would not be in the state treasury, expenditures from the fund would not need to be appropriated by the General Assembly.

As explained above, beginning in calendar year 2010, the amount of the transfer from the GRF would depend on whether income taxes paid by employees of renewable energy businesses increased by more than \$10 million from the amount such employees paid in 2009. The bill leaves to the Tax Commissioner's judgment certain questions about how to estimate the amount of revenue involved (for example, whether to use North American Industry Classification System, or NAICS, industry codes). These questions may involve considerable administrative difficulty. For example, new jobs could be generated in NAICS code 332312 (fabricated structural metal) to construct the tower for a wind turbine, but, though the job may be directly related to supplying a renewable energy component, the NAICS code would not definitively demonstrate that, since other structures could be manufactured within this industry class.

Because the bill leaves these criteria to the determination of the Commissioner (and due to the time that would be needed to produce a reliable estimate), LSC staff have not been able to determine the likelihood of the transfer exceeding \$10 million in any year before the Authority ceases to exist. However, LSC staff attempted to estimate the number of jobs that would have to be generated in renewable energy businesses in order for the transfer to exceed \$10 million. The number of jobs created would depend on the average pay in the industry (or industries), which we do not know. If the jobs paid an average of \$25,000 per year, the transfer would exceed \$10 million per year if 26,184 new jobs were created, based on estimates of the FY 2011 effective income tax rate for taxpayers with federal adjusted gross income of \$25,000. If the jobs paid an average of \$65,000 per year, it would exceed \$10 million

per year if 6,797 new jobs were created. Based on these estimates, LSC staff believe that it is likely that somewhere between 6,797 and 26,184 new jobs would need to be created in renewable energy businesses before the transfer would exceed \$10 million. It should be noted that new jobs would count toward increasing the transfer amount simply because they are new—it would not need to be the case that the jobs were created as a result of the activities of the Authority.

Department of Transportation

The bill requires DOT to implement a lease or permit program allowing CO₂ storage facilities operators to obtain rights of way along the state highway system to locate pipelines needed for transporting CO₂ to storage facilities. DOT would likely be able to handle this additional responsibility with existing personnel, although there may be some additional administrative burden to review the plans and specifications of CO₂ storage facility pipelines and carry out any other necessary administrative functions. Any increased expenses that result would likely be paid from the Highway Operating Fund (Fund 7002). The bill does not specify where any lease payment revenue received by the Department would be deposited, meaning that it would be placed in the GRF. The magnitude of any revenue gain is uncertain.

Division of Mineral Resources Management (DNR)

The bill would create the Carbon Dioxide Storage Facility Trust Fund in the state treasury, funded by the storage permit fees paid by CO₂ storage operators. The bill specifies that a fee may be required by rule to accompany applications to open a storage facility, and that a second fee is to be set by rules and calculated as an amount paid per ton of carbon dioxide stored by a facility. The bill also provides for civil penalties for violations of the law governing carbon sequestration and requires that those penalties be paid into the Carbon Dioxide Storage Facility Trust Fund. The fund is to be used to administer all aspects of the carbon sequestration program, including funding for long-term monitoring.

The fund would pay the administrative costs of the carbon sequestration program outlined above, including issuing permits, adopting rules, and performing other work associated with operating the program. The largest portion of the costs is likely to be for the:

- long-term monitoring program for overseeing the operation of CO₂ storage facilities;
- remediation of mechanical problems at storage facilities and surface infrastructure;
- repairing mechanical leaks at storage facilities; and
 - plugging and abandoning wells associated with storage facilities.

The long-term monitoring program will likely require DNR to hire a number of additional staff to carry out the tasks just mentioned.

In addition, the bill requires ownership of a storage facility to pass to the state no later than ten years, or another time frame to be specified in rules, after the last injection of CO₂. The transfer of ownership is contingent upon a site's operator proving that the facility is reasonably expected to maintain its mechanical integrity and remain emplaced, and previous certification by the Division of Mineral Resource Management that the site is no longer accepting injected carbon dioxide. Presumably, the costs of maintaining these closed sites would be incurred by DNR and paid out of the Carbon Dioxide Storage Facility Trust Fund once ownership has been transferred. Depending on the time frame

for state takeover of facilities established in rules, it could be less than ten years after the completion of carbon injections when DNR assumes ownership of a closed facility.

The bill requires the Chief of the Division of Mineral Resources Management to file a copy of the permit issued by the Division for carbon sequestration with the recorder's office of the county in which the facility is located. In addition, prior to the injection of any CO₂ into a storage facility, facility operators must file statements with the county recorder that they are legally entitled to all property rights with respect to the storage facility. These provisions would result in an increase in fees collected by county recorders for processing and filing these documents.

Energy efficiency programs

The bill would require electric distribution utilities and the Department of Development (DOD) to implement energy efficiency programs designed to achieve energy use reductions of 0.3% in 2009, followed by an additional 0.5% in 2010, 0.7% in 2011, 0.8% in 2012, 0.9% in 2013, 1.0% from 2014 to 2018, and 2.0% each year thereafter, for a cumulative energy reduction in excess of 22% by 2025. The bill does not specify further guidelines for DOD to use in implementing such programs, nor does it specify whether the department must develop new programs or continue using current resources. DOD already operates several programs to encourage reduced energy consumption among businesses and administers Ohio's low-income energy assistance programs, which include measures to promote energy efficiency among low-income households. Any costs to DOD would depend on the extent to which these existing programs would need to be modified, or the extent to which new programs would need to be developed in order to meet the goals the bill prescribes. Such programs would likely be funded out of the Advanced Energy Fund (Fund 5M50) or related funds.

Renewable energy requirements and electricity prices

The bill would require generation suppliers to derive a percentage of the electricity that they sell from renewable sources beginning in calendar year 2009. The required percentage is 0.25% by the end of 2009, and increases in increments until it reaches 12.5% by the end of calendar year 2024. Included within these amounts must be specified portions derived from solar energy resources. Of the total electricity sold, 0.005% must be from solar energy by the end of 2009, and the increment increases to 1% in 2024. In addition to this requirement, by the end of 2025 at least 12.5% of electricity sold must be generated from advanced energy sources, including cogeneration, clean coal technology, nuclear technology, and energy efficiency. The renewable energy requirement may be fulfilled (in whole or in part) by using renewable energy credits. PUCO is required to adopt rules specifying that one unit of credit is equal to one megawatt hour of electricity derived from renewable energy resources. PUCO is required to specify a system for registering credits using some existing system (and is prohibited from creating its own registry).

Based on EIA studies of similar renewable portfolio standards being imposed nationwide, it seems likely that this requirement would increase electric generation rates. While EIA studies cited above projected increases in electricity prices of 2.0% to 6.2% by 2030 from somewhat similar provisions, there are a number of differences between the proposals that were analyzed in generating those projections and the requirement in H.B. 487. The principal differences are that H.B. 487:

- (1) would effectively impose a 12.5% RPS, with another 12.5% of generation subject to a requirement to employ advanced energy technologies; and
- (2) would apply only to Ohio, as compared with nationwide application.

While LSC staff are unable to determine the magnitude of the impacts of these differences on EIA projections, economic theory does suggest the direction of the impacts. The second difference would make the H.B. 487 provision more expensive than the programs EIA analyzed, in the sense that electricity prices would be expected to increase more. EIA has found in past studies that reduced prices for fossil fuels roughly offset the fact that renewable energy sources are generally costlier than fossil fuels, so that offsetting savings prevented the average cost of producing electricity from rising much. Since the markets for fossil fuels are generally national (if not international), meaning Ohio generators are a small part of the overall market, then the offsetting savings would be smaller—on average electricity prices would rise more.

The first difference is less straightforward. On one hand, a 25% portfolio standard that allows for advanced energy technologies as well as renewable technologies allows greater flexibility (in theory) than a simple 25% RPS, which implies that the increase in electricity prices in Ohio would be less than the magnitudes projected by EIA for the national projects. In particular, the advanced energy options include energy efficiency, which is widely considered the cheapest form of obtaining a kWh of electricity. On the other hand, during a conversation with an EIA official involved in producing these studies he indicated that certain of the advanced energy technologies given in the bill are currently more expensive than renewable energy technologies. On balance, it seems likely that the first difference would provide greater flexibility, thus lessening any increase in electricity prices estimated by EIA.

There are substantial uncertainties involved in long-range forecasting, especially when technological change may change some of the cost variables significantly at some point during the next 17 years. Many of those uncertainties are highlighted in the EIA study cited above, making their projections themselves subject to significant uncertainty. And given the differences between the advanced and renewable energy requirement of H.B. 487 and the national proposals examined by EIA, it would appear to be possible that EIA's projections that electricity prices could increase by 2.0% or even 6.2% by 2030 may overstate Ohio's experience under the requirement, due to the first difference between the proposals. It seems just as likely, though, that EIA's projections would understate Ohio's experience due to the second difference, suggesting a reasonable likelihood that electricity prices would increase by up to 6% or more.

The state pays for electricity from a variety of different funds in the budget. The GRF is certainly the largest single source of funding, providing the source of funding for purchases by DRC (\$14.2 million in FY 2007), DAS (\$3.4 million), and at least a portion of the funding for two other large users (ADJ and DMH). The second largest user, DOT (\$11.4 million in FY 2007), pays for electricity out of the Highway Operating Fund (Fund 7002).

The Commission is required to assess compliance payments (i.e., penalties) on any generation supplier that fails to meet the minimum requirements for renewable energy generation. In the case of failure to comply with the renewable standard, the amount of the compliance payment is to be \$45 for each renewable energy credit the company would have needed to comply with the standard. In the case of failure to comply with the solar energy standard, the amount of the compliance payment is to be \$450 per megawatt hour that the company falls short of the solar requirement in 2009, \$400 (per megawatt hour) of shortfall in 2010 and 2011, followed by payment amounts that are similarly reduced by \$50 per mWh every two years thereafter (through 2024). Receipts from compliance payments are to be deposited into the Renewable Energy Development and Investment Fund. The amount of any resulting receipts for the fund would depend on compliance of electric distribution utilities and electric services companies with the new standards.

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[1] The bill defines "renewable energy resources" to be solar energy (photovoltaic or thermal), wind energy, hydropower, geothermal energy, biomass energy, fuel derived from municipal solid waste through a process other than combustion, biologically derived methane gas, and energy derived from certain wood and paper byproducts. It also includes fuel cells powered by any such energy source, and facilities that store energy derived from other renewable sources.

[2] The study can be found at the EIA web site, www.eia.doe.gov/fuelrenewable.html. Click on "more renewable reports" to find it.

[3] This study is titled *Impacts of a 15-Percent Renewable Portfolio Standard*.