

**Department of Legislative Services**  
Maryland General Assembly  
2022 Session

**FISCAL AND POLICY NOTE**  
**First Reader**

Senate Bill 471 (Senator Rosapepe)  
Education, Health, and Environmental Affairs

---

**Facilitating University Transformations by Unifying Reductions in Emissions  
(FUTURE) Act**

---

This bill requires each public four-year institution to be carbon neutral for “Scope 1 direct emissions” and “Scope 2 indirect emissions” by January 1, 2025, and for “Scope 3 indirect emissions” by January 1, 2035. Carbon neutrality can be met through reduced carbon emissions or carbon offset projects, subject to specified requirements and restrictions. For carbon offsets used to meet the bill’s requirements, a public four-year institution must invest in the Environmental Justice Scholarship Program (to be administered by the Maryland Higher Education Commission (MHEC)) an amount equal to the “social cost of carbon” minus the cost of the carbon offset. Each institution must have specified staff to implement the bill and dedicated to sustainability by specified dates. The bill establishes reporting requirements for institutions and MHEC. **The bill takes effect July 1, 2022.**

---

**Fiscal Summary**

**State Effect:** Overall costs cannot be reliably estimated but are significant. As early as FY 2023, public four-year higher education expenditures increase to begin efforts to reduce carbon emissions. Expenditures increase significantly further beginning in FY 2025 – and again beginning in FY 2035 – due to additional requirements. MHEC revenues and expenditures, including general fund administrative expenditures, increase beginning in FY 2025 for the scholarship program. Other State revenues are not directly affected, although institutions may increase or establish student sustainability fees to cover a portion of their costs.

**Local Effect:** Local government operations and finances are not directly affected.

**Small Business Effect:** Minimal, as discussed below.

---

## Analysis

**Bill Summary:** The bill applies to public senior (four-year) institutions, *i.e.*, constituent institutions of the University System of Maryland (USM) and the University of Maryland Center for Environmental Science, Morgan State University (MSU), and St. Mary's College of Maryland (SMCM).

“Scope 1 direct emissions” means emissions physically produced at a public four-year institution campus, including specified emissions. “Scope 2 indirect emissions” means indirect emissions that are produced by an energy generating system that is not owned, operated, subcontracted, or maintained by a public four-year higher education institution that burns fossil fuels to generate energy to power the institution’s facilities, including those specified. “Scope 3 indirect emissions” means indirect emissions resulting from upstream and downstream activities a public four-year institution relies on to conduct its operations, including those specified.

If, before January 1, 2035, technology is developed to address emissions from solid waste and wastewater that is reasonable for a public four-year higher education institution to purchase and utilize, a public four-year higher education institution is *encouraged* to purchase and utilize the technology to achieve carbon neutrality for the institution’s solid waste and wastewater emissions.

Methods for achieving carbon neutrality include increasing an institution’s energy efficiency, transitioning the institution’s vehicles to electric vehicles, a commitment to net-zero building emissions from the institution, transitioning the institution to renewable energy, and carbon offsets, subject to specified requirements. Specifically, a public four-year institution that uses carbon offsets to meet the bill’s requirements must:

- for each ton of carbon dioxide (CO<sub>2</sub>) for which carbon offsets are used, determine an environmental justice investment amount for the Environmental Justice Scholarship Program; the amount must be calculated by subtracting the cost of the carbon offset from the social cost of carbon, as determined by the federal [Interagency Working Group on Social Cost of Greenhouse Gases](#);
- ensure that each project generating carbon offsets that are used to meet the bill’s requirements is located in the United States; and
- verify each carbon offset used to meet the bill’s requirements with one of several specified methods.

Beginning January 1, 2055, carbon offsets may not be used to offset Scope 1 or 2 emissions.

By August 1, 2022, each institution must designate an existing faculty or staff member to implement and monitor the institution's implementation of the bill, as specified. By January 1, 2023, each institution must have at least one position dedicated to sustainability, as specified.

Institutions must share relevant resources, best practices, and methodologies with one another. Each institution's sustainability staff members, or, if applicable, sustainability director or sustainability office, must meet twice a year, either in person or virtually, to share best practices and report on the progress made toward meeting the bill's requirements.

By December 1 annually, each public four-year institution must report to specified legislative committees on the progress the institution has made toward meeting the bill's requirements, as specified.

#### *Environmental Justice Scholarship Program*

There is an Environmental Justice Scholarship Program to support students who are from an environmental justice community or a community that has been displaced by climate change. The Office of Student Financial Assistance (OSFA) must administer the program.

An individual may apply to OSFA for a scholarship if the individual is from a community that (1) receives a score equal to or greater than 0.51 on the [Maryland Environmental Justice Screen Tool](#); (2) is designated as an environmental justice community by an alternative method approved by the Department of Natural Resources or the University of Maryland School of Public Health; or (3) has been displaced by climate change.

OSFA must give priority to applications from State residents. A scholarship award may be used at any eligible public four-year higher education institution.

Funds for the program include (1) environmental justice investments paid by public four-year institutions under the bill; (2) money appropriated in the State budget; and (3) any other money from any other source accepted for the benefit of the program.

#### *General Education Sustainability Requirement*

MHEC, in conjunction with USM, MSU, and SMCM, must study the feasibility of establishing a general education requirement in sustainability for public colleges and universities in the State. By December 1, 2022, MHEC must report the results of the study to the Governor and the General Assembly.

**Current Law:** Public four-year institutions are not required to be carbon neutral. For those institutions that choose to be carbon neutral, there are no requirements to meet that status.

### *Greenhouse Gas Emissions Reduction Act*

The Greenhouse Gas Emissions Reduction Act, originally enacted in 2009 and made permanent and expanded in 2016, was enacted in light of Maryland’s particular vulnerability to the impacts of climate change. Under the Act, the State was required to develop plans, adopt regulations, and implement programs to reduce greenhouse gas (GHG) emissions by 25% from 2006 levels by 2020 and must further reduce GHG emissions by 40% from 2006 levels by 2030; the 2030 reduction requirement terminates December 31, 2023. In February 2021, the Maryland Department of the Environment finalized the Greenhouse Gas Reduction Act [plan](#).

### *The Maryland Green Building Council*

The Maryland Green Building Council (MGBC), which is staffed by the Department of General Services (DGS), is charged with:

- evaluating current high-performance building technologies;
- recommending the most cost-effective green building technologies that the State might consider requiring in the construction of State facilities;
- providing recommendations concerning how to expand green building in the State;
- developing a list of building types for which green building technologies should not be applied; and
- establishing a process for receiving public input.

### *Energy Efficiency and Conservation – High-performance Buildings*

Chapter 124 of 2008 requires most new or renovated State buildings to be constructed as high-performance buildings, subject to waiver processes established by the Department of Budget and Management (DBM) and DGS. Chapter 124 defines a “high-performance building” as one that (1) meets or exceeds the Leadership in Energy and Environmental Design criteria for a silver rating or (2) achieves a comparable numeric rating according to a nationally recognized, accepted, and appropriate standard approved by DBM and DGS. Based on action approved by MGBC, DGS, and DBM, a “high-performance building” also includes one that (1) earns a two Green Globes rating or better under the Green Building Initiative’s Green Globes rating system or (2) complies with MGBC’s supplement to the International Green Construction Code enacted in November 2014.

Only new or major renovations of State buildings that are at least 7,500 square feet in scope and are built or renovated entirely with State funds, community college capital projects that receive State funds, and new school buildings that receive State public school construction funds are subject to the high-performance requirement. A major renovation must also include replacement of several systems (heating, ventilation, air conditioning, electrical, and plumbing) and retain the building shell. Unoccupied buildings are exempt from the high-performance mandate, including warehouses, garages, maintenance facilities, transmitter buildings, and pumping stations.

### *Maryland Building Performance Standards*

The Maryland Department of Labor (MDL) is required to adopt, as the Maryland Building Performance Standards, the most recent version of the International Building Code (IBC), including the 2018 International Energy Conservation Code (IECC), along with applicable modifications authorized in Title 12 of the Public Safety Article. Within 18 months of the release of each new version of IBC, MDL is required to review the new version, consider modifications, and adopt specified modifications related to energy conservation and efficiency. MDL is prohibited from adopting any modification that is more stringent than IBC, except that an energy conservation requirement may be more stringent than IECC. MDL and local governments may also adopt by regulation the International Green Construction Code.

### *Energy Efficiency and Conservation – State Building Energy Efficiency Executive Order*

In June 2019, Governor Lawrence J. Hogan, Jr., issued an executive order establishing a new energy savings goal for State government. Specifically, DGS, in cooperation with the Maryland Energy Administration (MEA), must manage a “Maryland Leads by Example” energy savings initiative that will oversee reducing, by 2029, the energy use of State-owned buildings by 10% compared to a 2018 baseline. Chapter 289 of 2020 codified the Governor’s executive order, including the goal for reducing energy use in State-owned buildings by 10%.

### *EmPOWER Maryland*

In 2008, the General Assembly passed the EmPOWER Maryland Energy Efficiency Act, which set target reductions of 15% in per capita electricity consumption and peak demand, respectively, by 2015 from a 2007 baseline. Legislation in 2017 extended the program through its 2018 to 2020 and 2021 to 2023 program cycles and established a new annual energy savings goal of 2% per year, based on each electric company’s 2016 sales. Approved program costs are recovered by electric companies on customer bills.

### *Zero-emission Vehicles*

Several State programs aim to encourage the purchase of electric vehicles in the State. For example, subject to available funding, a person who purchased a qualified plug-in electric vehicle or a qualified fuel cell electric vehicle prior to July 1, 2020, may claim a credit against the vehicle excise tax. In addition, MEA administers the Electric Vehicle Recharging Equipment Rebate Program, which provides rebates to individuals, businesses, and State and local governments.

### *State Vehicle Fleet*

DGS purchases vehicles for the State based on standards developed by DBM and approved by the Board of Public Works. DBM administers the State vehicle fleet. The standards developed by DBM must, as far as practicable and feasible, be based on the lowest possible life-cycle cost of the vehicle.

### *Regional Greenhouse Gas Initiative and the Strategic Energy Investment Fund*

Maryland participates in the multistate Regional Greenhouse Gas Initiative (RGGI) in order to reduce CO<sub>2</sub> emissions from the power sector. Each participating state limits CO<sub>2</sub> emissions from electric power plants, issues CO<sub>2</sub> allowances, and establishes participation in CO<sub>2</sub> allowance auctions. A single CO<sub>2</sub> allowance represents a limited authorization to emit one ton of CO<sub>2</sub>.

Chapters 127 and 128 of 2008 established the Strategic Energy Investment Fund primarily to contain revenue generated from the sale of CO<sub>2</sub> emission allowances under RGGI. The allocation of revenue has been altered several times in budget reconciliation legislation. The current allocation requires (1) at least 50% for energy assistance; (2) at least 20% for energy efficiency and conservation (at least one-half for low- and moderate-income programs); (3) at least 20% for renewable and clean energy, energy-related education and outreach, resiliency, and climate change programs; and (4) up to 10%, but no more than \$5.0 million, for administrative expenses.

**State Fiscal Effect:** The bill requires USM institutions, MSU, and SMCM to achieve carbon neutrality for Scope 1 and 2 emissions by January 1, 2025 (fiscal 2025) and for Scope 3 emissions by January 1, 2035 (fiscal 2035). As discussed below, it is assumed that institutions use a combination of carbon emissions reduction activities and the purchasing of carbon offsets; however, beginning January 1, 2055, carbon offsets may not be used to offset Scope 1 or 2 emissions. Institutions that purchase carbon offsets must spend an additional amount on an MHEC-administered scholarship, as specified. Thus, MHEC revenues and expenditures, including general fund administrative expenditures, increase beginning in fiscal 2025, as discussed below.

Initial costs for institutions largely depend on the social cost of carbon, although significant carbon reduction costs are also likely incurred beginning as early as fiscal 2023. All carbon reduction projects for Scope 1 and 2 emissions must be operational by January 1, 2055 (fiscal 2055). Ongoing carbon reduction costs (and potentially carbon offset costs for Scope 3 emissions) continue in fiscal 2055 and beyond. The overall costs cannot be reliably estimated; however, many institutions have estimated significant costs; by fiscal 2025, costs likely increase by hundreds of thousands of dollars annually.

As discussed below, other costs, including for personnel, are also possible.

### *Carbon Emissions Reduction Activities*

As early as fiscal 2023, public four-year expenditures increase to begin projects to reduce carbon emissions. Any such projects will reduce the amount of carbon offsets that need to be purchased beginning in fiscal 2025. Significant investment in carbon-reducing projects must occur prior to fiscal 2055 due to the bill's prohibition against using carbon offsets to obtain carbon neutrality for Scope 1 or 2 emissions beginning January 1, 2055.

According to the bill, methods for achieving carbon neutrality include increasing an institution's energy efficiency, transitioning the institution's vehicles to electric vehicles, a commitment to net-zero building emissions from the institution, transitioning the institution to renewable energy, and carbon offsets. Some of these costs are one-time expenditures, while others (such as purchasing carbon neutral energy) are ongoing costs. On the other hand, some of the projects undertaken to reduce carbon emissions may result in future year and long-term savings, such as the purchase of electric vehicles. The projects chosen depend on the institution, and costs cannot be reliably estimated.

MEA advises the availability of carbon neutral energy on the local energy grid by January 1, 2055, is necessary for public four-year institutions to achieve carbon neutrality for "Scope 2 indirect emissions." Generally, energy sources that can be energy neutral include nuclear energy and renewable energy sources, such as solar, wind, and biomass. For the purposes of this estimate, it is assumed that, in conjunction with other carbon emissions reduction projects undertaken by public four-year institutions beginning in fiscal 2023, sufficient carbon neutral energy is available for public four-year institutions to achieve carbon neutrality in fiscal 2055 and beyond. To the extent carbon neutral energy is not available, carbon neutrality may not be obtainable.

The University of Maryland Baltimore County (UMBC) estimates capital costs for carbon reduction projects of at least \$84 million; however, some of these projects, such as purchasing electric boilers, result in savings in future years. MSU estimates capital costs of at least \$575 million, including \$150 million to upgrade power to campus. The University of Maryland, College Park Campus (UMCP) estimates capital costs of at least

\$1.02 billion, including the replacement of the combined heat and power chillers and emergency generators.

Further, the bill encourages a public four-year institution to purchase a technology to address emissions from solid waste and wastewater if such a technology has been developed and if it is reasonable for an institution to purchase and use. The costs for any such system cannot be reasonably estimated but may be significant.

### *Social Cost of Carbon and Carbon Offsets*

Overall carbon offset costs and costs related to the social cost of carbon cannot be reliably estimated but are significant.

Beginning January 1, 2025 (fiscal 2025), public four-year institutions' expenditures increase to purchase carbon offsets that meet the requirements of the bill to achieve carbon neutrality for Scope 1 and 2 emissions. Beginning January 1, 2035 (fiscal 2035), public four-year institutions' expenditures increase further to achieve carbon neutrality for Scope 3 emissions. Pursuant to the bill, beginning January 1, 2055, carbon offsets may not be used for Scope 1 or 2 emissions; however, they may continue to be used for Scope 3 emissions.

For each ton of carbon offset purchased to meet carbon neutrality, a public four-year institution of higher education must also pay – for the Environmental Justice Scholarship Program – an amount that is equal to the “social cost of carbon” (as determined by the federal Interagency Working Group on Social Cost of Greenhouse Gases) minus the cost of the carbon offset.

Thus, the total cost of purchasing a carbon offset for institutions is dependent on the social cost of carbon as determined by the federal Interagency Working Group on Social Cost of Greenhouse Gases. An updated amount for the social cost of carbon was anticipated in January 2022; however, as of February 11, 2022, the report has not yet been published. The interim social cost of carbon from the 2016 report is \$51 per ton. Researchers speculate that the updated social costs of carbon will be higher than previously estimated. According to the [Center for Climate and Energy Solutions](#), many leaders are advocating for a method that would increase the social cost of carbon from \$51 to \$125 per ton.

Costs are also dependent on the carbon emissions of each institution. According to [Second Nature](#), carbon emissions by public four-year institutions in Maryland ranged from 6,600 tons to a high of 167,800 tons per institution; however, the source of this information is unclear, the most recent year of data varies by institution, and information is not available for all institutions (only for those that participate in one of Second Nature's commitments or programs).

UMCP estimates its Scope 1 and 2 emissions at 161,00 tons per year and its Scope 3 emissions at 79,700 tons per year, excluding ground travel, wastewater, and natural gas distribution, as these sources are not currently measured. UMBC estimates that, absent carbon emissions-reducing projects, its Scope 1 and 2 emissions are 27,000 tons per year, and its Scope 3 emissions are 18,500 tons per year. All institutions did not provide information on current carbon emissions.

*Under one set of assumptions*, based on *current* emissions, the Department of Legislative Services (DLS) estimates annual costs to be from \$336,600 to \$8.6 million *per institution* for Scope 1 and 2 emissions, with annual costs in the hundreds of thousands of dollars per institution likely. This estimate is based on the 2016 social cost of carbon (\$51). If the cost of carbon increases to \$125 per ton, estimated annual costs per institution instead range from \$825,000 to \$21.0 million per institution. Expenditures increase in fiscal 2035 due to Scope 3 emissions. Based on UMBC and UMCP's current reported Scope 3 emissions and the current social cost of carbon, fiscal 2035 expenditures increase by an additional \$943,500 to \$4.1 million *per institution*.

To the extent the purchase of carbon offsets is reduced, expenditures decrease. By fiscal 2055, the social cost of carbon expenditures due to Scope 1 and 2 projects decrease since the bill prohibits carbon offsets for that purpose beginning January 1, 2055. However, carbon offset costs for Scope 3 emissions may continue after fiscal 2055.

#### *Environmental Justice Scholarship Program*

The scholarship is funded through (1) environmental justice investments paid by public four-year institutions; (2) money appropriated in the State budget; and (3) any other money from any other source accepted for the benefit of the program. This estimate only addresses the environmental justice investments. Although the bill does not establish a special fund to hold and distribute these funds, it is assumed that the funds are treated as special funds.

*Under one set of assumptions*, DLS estimates the scholarship established under the bill receives \$40 per carbon offset purchased, or a total of \$3.4 million to \$87.3 million per year based on the carbon emissions of the 13 public four-year institutions discussed above. These estimates are based on the social cost of carbon price of \$51 per ton and a carbon offset cost of \$11 per ton. If the social cost of carbon increases, total revenues for the scholarship could be greater. A carbon offset cost of \$11 is based on pricing obtained by UMCP from vendors. However, according to the MIT Climate Portal, offset costs can vary widely. The price per ton can be as high as \$1,200 per ton for "direct air capture"; however, most offset purchases are between \$10 to \$30 per ton. The cost per ton of a carbon offset program based in the United States and verified in one of the methods specified by the bill is not immediately available. As the purchase of carbon offsets decreases, the annual

funding for the scholarship decreases; however, the rate of any such decrease cannot be accurately estimated.

For the purposes of this estimate, is assumed that any funding that is received for the scholarship program is distributed to eligible students the same fiscal year. At the higher estimated funding levels, the scholarship may rival the funding for the State’s largest need-based scholarship program, the Delegate Howard P. Rawlings Educational Excellence Awards.

MHEC general fund expenditures to administer the scholarship program increase by at least an estimated \$105,890 in fiscal 2025. This estimate reflects the cost of hiring one full-time administrative specialist on July 1, 2024 (fiscal 2025) to set up and administer the scholarship in anticipation of receiving funding through environmental justice investments beginning January 2025. Once the program is established, the duties for the administrative specialist include processing the scholarship funding and awarding scholarships. The estimate includes a salary, fringe benefits, one-time start-up costs (including one-time programming costs to add the new scholarship to the scholarship processing system), and ongoing operating expenses.

|   |                  |
|---|------------------|
| Position  | 1                |
| Salary and Fringe Benefits                      | \$73,271         |
| One-time Programming Costs                      | 25,000           |
| Other Operating Expenses                        | <u>7,619</u>     |
| <b>FY 2025 MHEC Administrative Expenditures</b> | <b>\$105,890</b> |

Future year administrative expenditures reflect a salary with annual increases and employee turnover as well as annual increases in ongoing operating expenses. Depending on how much funding is actually available to be awarded and the parameters for the scholarship, additional staff may be necessary.

*Personnel Costs for Public Four-year Institutions*

By August 1, 2022 (fiscal 2023), each public four-year institution must designate an existing faculty or staff member to implement and monitor the institution’s implementation of the bill. Since this must be an *existing* faculty or staff member, this requirement does not increase costs; however, to the extent that the existing staff or faculty member’s existing duties and responsibilities cannot be absorbed, higher education expenditures for other staff may increase.

By January 1, 2023 (fiscal 2023), each institution must have at least one position dedicated to sustainability. Thus, all institutions that do not currently have at least one position

dedicated to sustainability must do so. To the extent that an institution is not able to fill this role with existing staff, additional staff must be hired, and costs increase accordingly.

MHEC advises that it can study the feasibility of establishing a general education sustainability requirement using existing resources.

#### *Other Potential Costs*

Beyond the required staffing discussed above, there may be other implementation costs, such as monitoring and tracking carbon emissions. Any such costs cannot be reliably estimated, but they may be significant.

**Small Business Effect:** Small businesses involved in carbon reduction and carbon offset projects may receive additional business from public four-year institutions under the bill.

---

### **Additional Information**

**Prior Introductions:** SB 835 of 2021, a similar bill, received a hearing in the Senate Education, Health, and Environmental Affairs Committee, but no further action was taken. Its cross file, HB 803, received a hearing in the House Appropriations Committee, but no further action was taken.

**Designated Cross File:** HB 729 (Delegate Solomon, *et al.*) - Appropriations.

**Information Source(s):** Maryland Higher Education Commission; University System of Maryland; Morgan State University; Maryland Department of the Environment; Department of General Services; Maryland Energy Administration; Center for Climate and Energy Solutions; Interagency Working Group on Social Cost of Greenhouse Gases; MIT Climate Portal; Second Nature; Department of Legislative Services

**Fiscal Note History:** First Reader - February 13, 2022  
rh/lgc

---

Analysis by: Caroline L. Boice

Direct Inquiries to:  
(410) 946-5510  
(301) 970-5510