

February 14, 2022

Testimony of Marshall Duer-Balkind

To the Maryland General Assembly Senate Committee on Education, Health, and Environmental Affairs

Re: Senate Bill 528 (SB0528), "The Climate Solutions Now Act of 2022"

Position: Favorable with Amendments

Dear Senator Pinsky and Members of the Committee:

My name is Marshall Duer-Balkind, and I am pleased to offer testimony on SB 528, the "Climate Solutions Now Act of 2022." I am a resident of Mount Rainier, Maryland, in Prince George's County. For the record, I am an Associate with the deep green engineering firm Integral Group, and co-chair of "Building Energy Performance Standards Task Force" for the District of Columbia. However, I am testifying today solely in my personal capacity.

The Climate Solutions Now Act of 2022 is an inspiring and visionary piece of legislation for the State of Maryland. It is the bold bill we need to meet the challenge posed by climate change and put Maryland in a leadership position. However, there multiple opportunities available to amend the bill and make it stronger, more effective, and more just. While there are many issues raised in the bill, I am testifying today primarily on Subtitle 16, Building Emissions Standards.

Over the past few years, Building Performance Standards, or BPS, have been recognized as a leading policy for driving reductions of emissions from existing buildings. Washington, DC was the first jurisdiction in the United States to adopt a BPS. Since then, seven other jurisdictions have adopted their own BPS laws—including two states Washington State and Colorado. Montgomery County, Maryland, has introduced its own BPS legislation (Bill 16-21).¹ On January 21, 2022, the White House announced a National Building Performance Standards Coalition of 33 cities and states that have or intend to adopt BPS policies—including Montgomery County, Prince George's County, and the City of Annapolis.² With this bill, the State of Maryland takes its rightful place among this group.

I have been working on Building Performance Standard (BPS) policies since 2014: I co-authored the first municipal studies on BPS policies for Washington, DC in 2014; oversaw the District of Columbia Comprehensive Energy Plan which further expanded the concept; helped write the bill that implemented that plan and established the first BPS in the U.S.; and, since 2019, I have served as the co-chair of the Mayor's Building Energy Performance Standards Task Force. I am also actively advising multiple governments across North America on BPS policies.

¹ Montgomery County Department of Environmental Protection. *Building Energy Performance Standard*. <https://www.montgomerycountymd.gov/green/energy/beps.html>

² Institute for Market Transformation. *National BPS Coalition*. <https://nationalbpscoalition.org/>

New Construction Standards

The bill requires all new buildings to “meet all water and space heating demand without the use of fossil fuels” (page 35). This requirement is highly impactful and visionary. With it, Maryland would join New York City and many west coast municipalities in banning new buildings from connecting to natural gas. However, the bill does not fully consider the role of District Energy Systems, nor is it aggressive enough on energy efficiency and embodied carbon.

District Energy Systems

A district energy system, or DES, is a highly efficient way of providing heating and cooling to a group of buildings, often in a campus setting, such as at a higher education or medical institution. Currently, almost all DES use natural gas and other fossil fuels to generate steam or hot water that is the supplied to buildings. However, it is possible to transform these systems to be fossil-fuel free, using electricity, geothermal heat pumps, and low-temperature hot water to deliver high-efficiency, carbon-free district energy to buildings. In my professional work, I have advised multiple leading universities—including the University of Michigan and Swarthmore College—on energy master plans that will fully decarbonize their campuses. Due to the complexity and expense of retrofitting a DES, most master plans for DES electrification take over a decade to implement.

As written, a new building in a campus with a DES would be required to be all-electric and not be connected to the DES. There are substantial cost and efficiency losses from such an approach. If an institution has a plan to fully convert its district energy system to a carbon-free system, they should be allowed to connect new buildings to it in the meantime. I propose that the bill create a process whereby the owner of a district energy system may submit a transition plan to the State, that demonstrates the system will be converted to solely use electric and/or renewable resources by 2040, with the exception of emergency backup. Local governments should be authorized to grant a variance for buildings to connect to a DES with a State-approved transition plan.

Net-Zero Energy

Secondly, while the bill requires that new buildings meet the efficiency requirements of the IECC, it does not go any further. All electric buildings that are not highly efficient will increase strains on the electric grid and may increase the energy costs for businesses and residents. New buildings can be built to highly efficient, net-zero-energy-ready standards. Washington, DC has adopted an optional “Appendix Z” that provides a definition of a “net zero energy” building in building code language—and by 2026, all new buildings in DC will need to be net zero energy buildings.³ In California, all new buildings must be NZE by 2030. I recommend that in addition to requiring buildings be fossil-fuel

³ DCMR 2017-12-[CE]Z [https://dcregs.dc.gov/Common/DCMR/RuleList.aspx?ChapterNum=2017-12-\[CE\]Z](https://dcregs.dc.gov/Common/DCMR/RuleList.aspx?ChapterNum=2017-12-[CE]Z)

free by 2023, the law require that, by 2030, the energy code be amended to achieve net-zero-energy-ready levels of efficiency.

Cost of Carbon

The bill authorizes local jurisdictions to grant a variance if the incremental cost of building to all-electric standards exceeds the social cost of the carbon for the greenhouse gasses that could be reduced through compliance. While well-intentioned, this clause has several issues:

1. It is easy to “game” cost-effectiveness testing to make it appear that a requirement isn’t cost effective. This can be done most easily by making very “conservative” assumptions for the first cost of energy measures, and assuming a high discount rate.
2. The EPA does not publish one single social cost of carbon—they publish a range of values at different discount rates and percentiles of impact. The current 2020 rates range from \$14 to \$152 per ton of Carbon Dioxide Equivalent (tCO₂e), with \$51/tCO₂e being the default value.⁴
3. \$51/tCO₂e is too low to provide the needed impact. I know from my work that the “carbon abatement costs” of decarbonization projects are often well over \$100/tCO₂e.
4. No social cost of carbon analysis currently accounts for the loss of human life due to climate disasters. Yet from Texas to California, we are already seeing people die in disasters caused by climate change. If carbon costs truly accounted for the cost of lost lives, the social costs of carbon would likely be over \$250/tCO₂e and could be north of \$500/tCO₂e.⁵
5. The social cost of carbon is fundamentally not designed to be compared to a do-nothing alternative. Rather, the social cost of carbon is designed to allow the external impacts of carbon emissions to be incorporated energy prices and cost analysis.

Given these factors, I recommend that this clause be struck from the bill. Alternately, the bill could direct the Department to select a social cost of carbon that is in line with the 95th percentile for carbon impacts (presently, this would put the value at \$152/tCO₂e).

Embodied Carbon

The bill focuses solely on operational emissions from new buildings, and primarily on direct emissions. However, as we move towards net zero emissions buildings, the carbon that is emitted through building construction becomes a bigger and bigger piece of building’s total lifecycle impacts. The carbon emitted in the production and assembly of building materials is known as “embodied carbon”—concrete and steel being the two biggest sources of embodied carbon for most buildings.

⁴ U.S. Government. *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide, Interim Estimates Under Executive Order 13990*. (2021). https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf

⁵ Bressler, R.D. The mortality cost of carbon. *Nature Communications* 12, 4467 (2021). <https://www.nature.com/articles/s41467-021-24487-w.pdf>

The first step to managing embodied carbon is simply getting people to measure it. While tracking embodied carbon once required an expensive custom Lifecycle Assessment (LCA), the free *Embodied Carbon in Construction Calculator (EC3)* tool from the Carbon Leadership Forum and Building Transparency makes tracking embodied carbon easier than ever before.⁶ The bill should include a requirement that any new buildings over 25,000 ft² must submit an embodied carbon report prior to receiving their Certificate of Occupancy.

Existing Building Standards

The bill appears to contain a printing error where similar but not identical versions of the proposed 2-1602 appear on pages 46-47 and 48-49, respectively. Most importantly, the first version of 2-1602 includes net zero emissions requirement for buildings not owned by the State, while the latter does not. All my comments relate to the first version. I recommend the duplicate language on 48-49 be struck.

Emissions Scopes

Under all best practice global accounting protocols, emissions from buildings include both “Scope 1” direct emissions (which are directly generated through combustion of fossil fuels onsite) and “Scope 2” emissions from electricity and from district energy systems. It is not entirely clear whether the emission reduction requirements in 2-1602(A) apply only to “Scope 1” direct emissions or to all emissions. However, the fact that 2-1602(B) requires reporting for direct emissions implies that the standards are likewise focused only on direct emissions. This is a mistake.

Focusing only on direct emissions may end up ignoring emissions from a district energy system, depending on how reporting occurs—if a campus reports their data at the campus level, emissions from the central plant will be a scope 1 emissions source, but if each building on the network is reported separately, those emissions will be a scope 2 source that can be ignored. This creates a substantial loophole. No other jurisdiction with a BPS ignores district energy system emissions—Maryland should not either.

Moreover, focusing on direct emissions also ignores energy use and emissions from electricity. While the State of Maryland has an aggressive Renewable Portfolio Standard (RPS), we cannot put all our eggs in that one basket. Compliance with the RPS relies on Renewable Energy Credits (RECs) from the massive PJM region, and entirely ignores temporal considerations. As we move toward a net zero emissions electricity system, time of use factors will be increasingly important—renewable electricity must be available when and where it is needed, not just somewhere at some point. If the Standards do not require increased efficiency of electric use, it will be that much harder to source sufficient renewable electricity or maintain a stable grid. Finally, if the standards do not include

⁶ Building Transparency. EC3. <https://www.buildingtransparency.org/>

electricity, a building owner who passes all utility costs on to their tenants could install an electric boiler or electric baseboards, meeting the standards while saddling tenants with massive increases in energy bills. That said, I do recognize that building owners may balk at needing to comply with emissions standards when the future grid emissions intensity is unstable or unknown.⁷

Site Energy Use Standards + Onsite/District Emissions Standards

As a solution to these problems, I propose that instead of focusing just on direct emissions, the bill should set two complementary standards: an *"Onsite + District Emissions Standard"* and an *"Energy Use Intensity Standard."*

1. *Onsite + District Emissions Standard*

The bill should clearly state that the net greenhouse gas emissions standards relate to both direct onsite emissions and indirect district energy emissions. These standards will thus promote electrification of both buildings and district energy systems and avoid creating a loophole to campuses.

2. *Normalized Site Energy Use Intensity*

Many BPS policies focus not just on emissions but also in energy use and energy efficiency. Site Energy Use Intensity is the energy use at the building (as measured in utility bills) divided by the building's gross floor area. It is the industry-standard metric for energy efficiency of a building. ENERGY STAR Portfolio Manager normalizes Site EUI for weather, and EPA is working on developing algorithms that allow for the normalization of Site EUI based on business activity factors such as occupancy or operating hours. These normalizations make the standards fairer for diverse building owners and uses. Washington, DC's Building Energy Performance Standard (BEPS) and the proposed Montgomery County BPS both focus on Site EUI.

Montgomery County's BPS follows an innovative model for regulating Site EUI based on the "model BPS ordinance" from the Institute for Market Transformation.⁸ In order to account for differences in building use and conditions, each building follows its own trajectory towards a common final Site EUI target. Each building type gets its own Site EUI target, and interim progress towards that target is measured in regular intervals—see Figure 1 for an illustrative example.

⁷ Other jurisdictions with BPS policies are exploring two approaches to grid emissions: some, like New York City, have set specific emissions intensity factors for the electric grid, while others, including Washington, DC and the City of Vancouver, Canada, are exploring emissions standards as applied to both onsite and district emissions only, while looking to energy standards to address electricity.

⁸ Institute for Market Transformation. Summary of IMT's Model Ordinance for a Building Performance Standard. (2021). <https://www.imt.org/resources/imt-model-bps-ordinance-summary/>



Figure 1: BPS Trajectory Stylized Example (courtesy of the Institute for Market Transformation)

I recommend the bill charge the Department with setting final 2040 Site EUI targets for each building type. Then, at 2030 and 2035, along with achieving the specified Onsite + District emissions reductions, building owners would also demonstrate progress along the trajectory to the 2040 Site EUI target. For simplicity, covered buildings owned by the state should also have a 2040 final Site EUI target, though they will still need to reach net zero emissions by 2035.

Washington, DC, is currently examining replacing our current BEPS system with a new emissions standard. The Department of Energy & Environment has analyzed multiple scenarios and found that the deepest emissions savings occur in a scenario where a Site EUI trajectory approach is paired Onsite + District GHG emission standards.

Reporting

The bill requires owners of covered buildings to report direct emissions beginning in 2025. As noted above, I believe this should be expanded to encompass all Scope 1 and 2 GHG emissions. Moreover, the bill should be clearer on when and how building owners must report. Reports should be due each year by May 1st, and the bill should make clear that reporting should be for data from the previous calendar year. Due to utility billing cycles, building owners are unlikely to be able to report data any earlier than April 1; May 1 is a safer date. Specifying that the data is for the previous calendar year will avoid confusion. Reporting should be via the U.S. Environmental Protection Agency's *ENERGY STAR® Portfolio Manager®* online platform. Every single benchmarking or performance standard program in North America uses ENERGY STAR Portfolio Manager. It is easy to use, free, and industry-standard. There is no good reason to develop or use any custom system, and the Assembly can avoid confusion, expense, and needless bureaucratic effort by specifying the use of Portfolio Manager in this legislation.

Alignment with other jurisdictions

Montgomery County has pending legislation to create a BPS policy, and both Prince George's County and the City of Annapolis have pledged to the White House to adopt their own BPS policies. The statewide Building Emissions Standard in this legislation should contain provisions to address this. Building owners should not be required to meet two similar but distinct regulatory requirements from two levels of government if it can be avoided.

Fortunately, there is a good example of how to manage overlapping building benchmarking and performance policies already. California has a statewide benchmarking law (AB 802), and multiple cities have their own. The California Energy Commission (CEC) created a process whereby a municipality/county can apply for an exemption that allows compliance with their municipal law to also count as compliance with the state law—so long as local benchmarking requirements are equally or more stringent than the state requirements, and the municipalities agrees to share data with the state. To date, seven California cities have received exemptions.⁹

I recommend this law take a similar approach. Local governments with their own BPS policies should be able to apply for a waiver from the Department. The waiver should be based on whether the local BPS will provide all the same data as the statewide policy and determines that a building meeting the local requirements would also meet the state requirements. (For example, Montgomery County's law sets the final target date a 2035. If that law also required net zero emissions by 2035 (which it does not currently), then that would be more stringent than this bill.) If a building owner in a local jurisdiction that has received this waiver complies with the local policy, that should also count as compliance with the state building emissions standard regulations.

Regulatory Details

- In 2-1602(C)(2)(I), the Department is charged with providing “maximum flexibility” to the owners of covered buildings. This language is far too broad—it could lead to distortions, inequitable outcomes, complex schemes like emissions trading, or even the use of carbon offsets. I recommend the word “maximum” be struck.
- In 2-1602(C)(2)(III), the Department is charged with including financial incentives in the regulation. Financial incentives are good—but by and large they do not belong in a regulation or rulemaking. I recommend this clause be moved to a new subsection 2-1602(D).
- Finally, In 2-1602(C)(3), the bill once again references the social cost of greenhouse gasses. I have noted my general concern about the level of this use of the social cost of carbon above.

⁹ California Energy Commission. *Exempted Local Benchmarking Ordinances*.
<https://www.energy.ca.gov/programs-and-topics/programs/building-energy-benchmarking-program/exempted-local-benchmarking>

In addition, I would point out that most existing BPS policies have far higher penalties than the social cost of carbon. For example, New York City's Local Law 97 performance standard sets fines for non-compliance at \$268/tCO₂e. Most importantly, the social cost of carbon is simply not the right point of comparison. The proper benchmark is whether *the cost of compliance exceeds the cost of non-compliance*. In Washington, DC, the BEPS Task Force was united in holding that this is how fees should be set. If it is cheaper to do so, many building owners will simply pay the fees—especially since “fees,” unlike “fines” can often be passed on to tenants. DC did a cost-benefit study that found the costs of compliance with DC's BEPS average around \$10/ft²—and then set the penalties at this level. I recommend the legislation charge the State with conducting a similar study, and using that, not the social cost of carbon, to set the fees.

In Closing

Thank you for reading and considering my comments. I have provided potential amendment language for many of my recommendations below. I would also be happy to discuss any of these points, or other questions you may have, with you or your staff members at your convenience. I hope to work with you on creating the best possible Building Emissions Standards for the State of Maryland.

Sincerely,

Marshall Duer-Balkind
4106 31st Street, Mount Rainier, Maryland 20712

Addendum: Potential Amendment Language

Page 34:

Add a new section (b)(1)(iv) that reads *“consider changes to the International Building Code that achieve net-zero-energy ready levels of efficiency by 2030.”*

Page 35:

Add a new subsection (II)2 that reads *“A local jurisdiction may grant a variance from the requirements of subparagraph (I)1 to allow a building to connect to an existing District Energy System, provided that the owner of the District Energy System has been granted a waiver by the Department for an approved net-zero emissions transition plan that shows the system will be retrofitted to have net zero emissions prior to January 1, 2040.”*

Add a new subsection (I)3 that reads *“A requirement that new buildings over 25,000 ft² submit an embodied carbon disclosure report that conforms to as-built conditions, prior to receiving a Certificate of Occupancy.”*

Page 47:

2-1602(A)(1)(I): strike *“Net Greenhouse Gas Emissions”* and replace with *“Net Onsite and District Greenhouse Gas Emissions and 25% progress toward Normalized Site Energy Use Intensity standard, both relative to 2025,”*

2-1602(A)(1)(II): strike *“Net Zero Greenhouse Gas Emissions”* and replace with *“Net Zero Onsite and District Greenhouse Gas Emissions and 50% progress toward a Normalized Site Energy Use Intensity standard, relative to 2025”*

Add 2-1602(A)(1)(III): *“A Normalized Site Energy Use Intensity Standard on or before January 1, 2040; and”*

2-1602(A)(2)(I): strike *“Net Greenhouse Gas Emissions”* and replace with *“Net Onsite and District Greenhouse Gas Emissions and 20% progress toward a Normalized Site Energy Use Intensity standard, both relative to 2025,”*

2-1602(A)(2)(II): strike *“Net Greenhouse Gas Emissions”* and replace with *“Net Onsite and District Greenhouse Gas Emissions and 40% progress toward a Normalized Site Energy Use Intensity standard, both relative to 2025,”*

2-1602(A)(2)(III): strike *“Net Zero Greenhouse Gas Emissions”* and replace with *“Net Zero Onsite and District Greenhouse Gas Emissions and a Normalized Site Energy Use Intensity standard”*

2-1602(B): Strike the word "*direct*" and replace with "*energy use and Scope 1 and 2 Greenhouse Gas*".

2-1602(B): At the end of the paragraph, strike "*in 2025*" and replace with "*on May 1, 2025, for calendar year 2024 data. Thereafter, emissions data shall be reported by May 1 of each year for the previous calendar year. Data shall be reported using ENERGY STAR Portfolio Manager software published by the U.S. Environmental Protection Agency. Should this software cease to be available for this purpose, the Department may designate an alternative reporting platform.*"

2-1602(C)(2)(I): strike the word "*maximum*"

2-1602(C)(2)(III): strike this section and replace with "*Allow owners of buildings in a local jurisdiction with its own similar Building Performance Standard to comply with the requirements of this section through complying with the local requirements, provided the Department has issued a waiver finding that energy and emissions savings under the local program meet or exceed the requirements of this section.*"

2-1602(C)(3): add at the end: "*; or the average estimated cost of compliance as determined by a generalized cost-benefit study conducted by the Department.*"

2-1602: Add a new subsection (D) that reads "*To the extent authorized by law, the Department shall provide and support financial incentives recommended by the Building Energy Transition Implementation Task Force.*"

Pages 48-49

Strike the second variant of Section 2-1602 that appears on Pages 48-49, as this duplicates the previous section while missing some critical language.