



Virginia Department of Planning and Budget **Economic Impact Analysis**

9 VAC 5-10 General Definitions
Department of Environmental Quality
Town Hall Action/Stage: 6947 / 11074
January 6, 2026

The Department of Planning and Budget (DPB) has analyzed the economic impact of this proposed regulation in accordance with § 2.2-4007.04 of the Code of Virginia (Code) and Executive Order 19. The analysis presented below represents DPB's best estimate of the potential economic impacts as of the date of this analysis.¹

Summary of the Proposed Amendments to Regulation

The Air Pollution Control Board (Board) proposes to revise the definition of volatile organic compound (VOC) to specifically exclude cis-1,1,1,4,4,4-hexafluorobut-2-ene (also known as HFO-1336mzz-Z), which is used in a variety of applications in foam expansion or blowing agents.

Background

The federal Clean Air Act (Act) requires the U.S. Environmental Protection Agency (EPA) to prescribe national ambient air quality standards to protect public health. The Act also mandates that each state adopt and submit to EPA a state implementation plan which provides for the implementation, maintenance, and enforcement of the standards. Ozone, one of the pollutants for which there is a federal standard, is in part created by emissions of VOCs. Therefore, in order to control ozone, VOCs are addressed in Virginia's state plan and regulations.

¹ Code § 2.2-4007.04 requires that such economic impact analyses determine the public benefits and costs of the proposed amendments. Further the analysis should include but not be limited to: (1) the projected number of businesses or other entities to whom the proposed regulatory action would apply, (2) the identity of any localities and types of businesses or other entities particularly affected, (3) the projected number of persons and employment positions to be affected, (4) the projected costs to affected businesses or entities to implement or comply with the regulation, and (5) the impact on the use and value of private property.

VOC is defined in the regulation as “any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions. This includes any such organic compounds which have been determined to have negligible photochemical reactivity other than the following: ...” The regulation then includes a long list of organic compounds that are excluded from those considered to be VOCs. The Board’s proposal is to add HFO-1336mzz-Z to the list of organic compounds that are excluded from those considered to be VOCs.

Federal regulation 40 CFR Part 51 sets out requirements for the preparation, adoption, and submittal of implementation plans. Subpart F of Part 51, Procedural Requirements, includes § 51.100, which consists of a list of definitions. 40 CFR 51.100 contains a definition of VOC. This definition is revised by EPA in order to add or remove VOCs as necessary. If it can be demonstrated that a particular VOC is “negligibly reactive”—that is, if it can be shown that a VOC is not as reactive and therefore does not have a significant effect on ground-level (tropospheric) or upper-level (stratospheric) ozone—then EPA may remove that substance from the definition of VOC.

DuPont Chemicals & Fluoroproducts submitted a petition to EPA on February 14, 2014, requesting that HFO-1336mzz-Z be exempted from the regulatory definition of VOC. The petition was based on the argument that HFO-1336mzz-Z has low reactivity relative to ethane and may be used in a variety of applications in foam expansion or blowing agents where it has significant performance and energy-saving advantages. HFO-1336mzz-Z, as an alternative to other foam expansion and blowing agents, provides greater insulation values at a lower global warming potential.

EPA took final action on November 28, 2018, to respond to the petition by exempting HFO-1336mzz-Z from the regulatory definition of VOC. This action was based on considerations of the compound’s negligible reactivity relative to ethane, low contribution to tropospheric ozone, and the low likelihood of risk to human health or the environment. This delisting by the EPA became effective on January 28, 2019.

Estimated Benefits and Costs

Long-term ozone exposure is associated with increased respiratory illnesses, metabolic disorders, nervous system issues, reproductive issues (including reduced male and female

fertility and poor birth outcomes), cancer and increased cardiovascular mortality. In the short term, inhaling high levels of ozone can cause shortness of breath, wheezing and coughing; asthma attacks; increased risk of respiratory infections; increased susceptibility to pulmonary inflammation; and increased need for people with lung diseases, like asthma or chronic obstructive pulmonary disease, to receive medical treatment and to go to the hospital.²

The proposed amendment, which would add HFO-1336mzz-Z to the list of organic compounds that are not to be considered VOCs, may result in improved public health since the revision may encourage the use of HFO-1336mzz-Z in place of VOCs, which are more reactive and thereby produce more ozone. Excluding this substance as a VOC would make it easier and less expensive for industry to use it. Companies that use this substance in place of VOCs may also benefit by reducing their VOC emissions and concomitant reductions in permitting and other regulatory requirements. Facilities may take advantage of the low volatility of this substance to reduce its VOC emissions and thereby be able to expand production without triggering new source review permitting.

Businesses and Other Entities Affected

According to the Department of Environmental Quality (DEQ), no facilities in Virginia are known at this time to be manufacturing or utilizing HFO-1336mzz-Z, but there are 45 facilities that could manufacture or use it in polystyrene foam product manufacturing, urethane and other foam product manufacturing, air-conditioning and warm air heating equipment manufacturing, commercial and industrial refrigeration equipment manufacturing, motor vehicle parts manufacturing, ship building and repairing, boat building, and other miscellaneous manufacturing. Those 45 facilities may be particularly affected.

The Code requires DPB to assess whether an adverse impact may result from the proposed regulation.³ An adverse impact is indicated if there is any increase in net cost or reduction in net benefit for any entity, even if the benefits exceed the costs for all entities

² Source: <https://www.lung.org/clean-air/outdoors/what-makes-air-unhealthy/ozone#how>

³ Pursuant to Code § 2.2-4007.04(D): In the event this economic impact analysis reveals that the proposed regulation would have an adverse economic impact on businesses or would impose a significant adverse economic impact on a locality, business, or entity particularly affected, the Department of Planning and Budget shall advise the Joint Commission on Administrative Rules, the House Committee on Appropriations, and the Senate Committee on Finance.

combined.⁴ The proposed amendment neither increases net cost nor reduces net benefit for any entity. Thus, no adverse impact is indicated.

Small Businesses⁵ Affected:⁶

The proposed amendments do not adversely affect small businesses.

Localities⁷ Affected⁸

According to DEQ, the affected industries are located throughout the state. Thus, no locality is disproportionately affected. The proposed amendment is unlikely to affect costs for local governments.

Projected Impact on Employment

Since the proposal could enable some firms to expand production without triggering new source review permitting, employment may increase for these manufacturers.

Effects on the Use and Value of Private Property

Since excluding HFO-1336mzz-Z as a VOC may make it less expensive to use, some firms may have reduced costs in production. As described above, some firms may take advantage of the low volatility of this substance to reduce their VOC emissions and thereby be able to expand production without triggering new source review permitting. Thus, these firms may increase in value.

The proposed amendment does not appear to affect real estate development costs.

⁴ Statute does not define “adverse impact,” state whether only Virginia entities should be considered, nor indicate whether an adverse impact results from regulatory requirements mandated by legislation. As a result, DPB has adopted a definition of adverse impact that assesses changes in net costs and benefits for each affected Virginia entity that directly results from discretionary changes to the regulation.

⁵ Pursuant to § 2.2-4007.04 of the Code of Virginia, small business is defined as “a business entity, including its affiliates, that (i) is independently owned and operated and (ii) employs fewer than 500 full-time employees or has gross annual sales of less than \$6 million.”

⁶ If the proposed regulatory action may have an adverse effect on small businesses, Code § 2.2-4007.04 requires that such economic impact analyses include: (1) an identification and estimate of the number of small businesses subject to the proposed regulation, (2) the projected reporting, recordkeeping, and other administrative costs required for small businesses to comply with the proposed regulation, including the type of professional skills necessary for preparing required reports and other documents, (3) a statement of the probable effect of the proposed regulation on affected small businesses, and (4) a description of any less intrusive or less costly alternative methods of achieving the purpose of the proposed regulation. Additionally, pursuant to Code § 2.2-4007.1, if there is a finding that a proposed regulation may have an adverse impact on small business, the Joint Commission on Administrative Rules shall be notified.

⁷ “Locality” can refer to either local governments or the locations in the Commonwealth where the activities relevant to the regulatory change are most likely to occur.

⁸ § 2.2-4007.04 defines “particularly affected” as bearing disproportionate material impact.