DEPARTMENT OF ECOLOGY
State of Washington

Preliminary Regulatory Analyses

Including the:

- Preliminary Cost-Benefit Analysis
- Least-Burdensome Alternative Analysis
- Administrative Procedure Act Determinations
- Regulatory Fairness Act Compliance

Chapter 173-443 WAC,
Hydrofluorocarbons (HFCs)

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Chapter 173-443 WAC

Hydrofluorocarbons (HFCs)

by

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Acronyms

ANSI	American National Standards Institute
APA	Administrative Procedure Act
ASTM	American Society for Testing and Materials
CBA	Cost-Benefit Analysis
CFCs	Chlorofluorocarbon
CFR	Code of Federal Regulations
CPSC	Consumer Product Safety Commission
EPA	United States Environmental Protection Agency
ESSHB	Engrossed Second Substitute House Bill
FDA	Food and Drug Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
GWP	Global Warming Potential
HCFCs	Hydrochlorofluorocarbons
HFCs	Hydrofluorocarbons
HFO	Hydrofluoroolefins
LBA	Least-Burdensome Alternative Analysis
OSHA	Occupational Safety and Health Administration
OTC	Over-the-counter
RCRA	Resource Conservation and Recovery Act
RCW	Revised Code of Washington
RFA	Regulatory Fairness Act
SNAP	Significant New Alternatives Policy
UL	Underwriters Laboratories
USCA	United States Climate Alliance
VOC	Volatile Organic Compounds
WAC	Washington Administrative Code
WSR	Washington State Register

Executive Summary

This report presents the determinations made by the Washington State Department of Ecology (Ecology) as required under chapters 34.05 RCW and 19.85 RCW, for the proposed Hydrofluorocarbons (HFCs) rule (chapter 173-443 WAC; the "rule"). This includes the:

- Preliminary Cost-Benefit Analysis (CBA)
- Least-Burdensome Alternative Analysis (LBA)
- Administrative Procedure Act Determinations
- Regulatory Fairness Act Compliance

The purpose of this rulemaking is to establish a program to implement the requirements of Chapter 284, Laws of 2019 – ESSHB 1112 (codified in part in RCW 70.235.080 and RCW 70.235.010) related to reducing greenhouse gases by transitioning to the use of less damaging HFCs or suitable substitutes. This law establishes prohibition deadlines for various products and equipment containing HFCs. It requires manufacturers ("manufacturer" is defined in the rule as including importers and distributors) to submit to Ecology and disclose in a label, in a manner determined by rule, information about the use of HFCs and other substitutes used in products and equipment sold, leased, rented, or installed in Washington.

This rulemaking for Chapter 173-443 WAC Hydrofluorocarbons (HFCs) would require manufacturers to submit, to Ecology, information about the use of various products and equipment containing HFCs and other prohibited substitutes. The rulemaking would also require manufacturers to disclose HFCs and other substitutes used in an on-product label or other designated format.

The proposed rule would:

- Establish terms of prohibitions, in particular:
    - Modify the prohibition date for the new and existing vending machine end-use from January 1, 2020 to January 1, 2022.
    - Add bear spray and pepper spray to the list of exemptions to the prohibitions.
    - Determine that for products and equipment imported from outside the United States, the date of import may be considered the date of manufacture.
- Define terms and methods for HFC product status notifications:
    - Require manufacturers to use the Product Manufacturer Notification[1] form available on Ecology's website.
    - Clarify reporting hierarchy of manufacturers associated with the product or equipment.
- Define terms and methods of product labeling:

[1] Product Manufacturer Notification form. https://fortress.wa.gov/ecy/publications/documents/ecy070608.pdf

- Require manufacturers to label the substitutes in its products, except in the cases where the product is used in a manner listed as an acceptable use, no later than one year after the prohibition date, or no later than one year after the effective date of the rule.
- Determine that for labeling purposes a manufacturer may apply the date of July 28, 2019 to separate divisions of its business based on the end-use the products associated the division are intended to serve.
- Establish methods to label the substitutes for manufacturers of products and equipment in different end-use categories.
- Approve, in advance, the use of a symbol or code for labeling purposes.

The Washington Administrative Procedure Act (APA; RCW 34.05.328(1)(d)) requires Ecology to evaluate significant legislative rules to "determine that the probable benefits of the rule are greater than its probable costs, taking into account both the qualitative and quantitative benefits and costs and the specific directives of the law being implemented."

The APA also requires Ecology to "determine, after considering alternative versions of the rule…that the rule being adopted is the least burdensome alternative for those required to comply with it that will achieve the general goals and specific objectives" of the governing and authorizing statutes.

The APA also requires Ecology to make several other determinations (RCW 34.05.328(1) (a) – (c) and (f) – (h)) about the rule, including authorization, need, context, and coordination.

The Washington Regulatory Fairness Act (RFA; chapter 19.85 RCW) requires Ecology to evaluate the relative impact of proposed rules that impose costs on businesses in an industry. It compares the relative compliance costs for small businesses to those of the largest businesses affected.

All determinations are based on the best available information at the time of publication. We encourage feedback (including specific data) that may improve the accuracy of this analysis.

The Regulatory Fairness Act (RFA; RCW 19.85.070) requires Ecology to perform a set of analyses and make certain determinations regarding proposed rules, if they impose more than minor compliance costs on businesses in an industry.

All determinations are based on the best available information at the time of publication. We encourage feedback (including specific data) that may improve the accuracy of this analysis.

Costs

- The proposed terms and methods of notification are likely to result in following costs to all manufacturers (total):
  - Estimated total costs for all manufacturers combined for the initial reporting by December 31, 2019 is $2,136.

    - Estimated total costs of status updates would be $5,728 by the end of 2024, when manufacturers are expected to fully eliminate prohibited HFCs in their products.

- We expect no new manufacturers of HFC-products that aren't exempt from the prohibitions to enter the Washington market after 2024. If a manufacturer of an HFC-product that is exempt as an "acceptable use," does enter the Washington market, under the rule, they are not required to provide notification. For this reason, we estimated zero annual costs for notification requirement between years 2025 – 2040. Therefore, the costs for a 20 year period add up to present values[2] of $4,844.
- For labeling of retail and spray foams Ecology's choice for the requirements consists of the least costly options:
    - Using existing labeling where deemed sufficient and feasible.
    - Not requiring disclosure for acceptable uses of prohibited substances.
    - Applying labeling only to products from manufacturers using HFCs as of the effective date of HFC law.
    - Allowing up to one year after an applicable prohibition date, or up to one year after the effective date of the rule to give manufacturers time to adjust their processes if necessary.
    - Estimated total costs of developing and approving a symbol would be $4,347. If divided equally between the total number manufactures that report (61 in 2020), cost per manufacturer would be $71.27.
- For non-retail foam they could use any of the above options, with the exception of an on-packaging label or on-packaging code, or they may use a "unit-label". Our analysis assumes they would use the least costly option which would be the "unit-label" and this would result in minimal costs.

Benefits

- Additional time to transfer to safer substitutes for vending machine manufacturers.
- Clarified status of bear spray and pepper spray as exemptions for the benefit of human safety.
- Rational date consideration options and conditions for importers and distributors.
- Clear and efficient data reporting through the form available on Ecology's website.
- Cost-savings through allowing for only one person or entity to report with respect to a particular product.
- Clear time frame and definition of covered manufacturers for labeling.

[2] Ecology calculates present values based on a real discount rate of 0.98 percent, the historic average real rate of return on US Treasury I-Bonds since 1998. US Treasury Department (2020). http://www.treasurydirect.gov/indiv/research/indepth/ibonds/res_ibonds_iratesandterms.htm

- Clearer delineation of which products the rule would not apply to by determining that labeling requirements apply to manufacturers of products with HFCs as of July 28, 2019, or after that date.
- Standardized methods to disclose the substitutes for manufacturers of products and equipment in different end-uses. This would potentially reduce design and application costs by $4,275 for a manufacturer, while creating an environmental compliance symbol with prospective marketing benefits.

We conclude, based on a reasonable understanding of the quantified and qualitative costs and benefits likely to arise from the proposed rule, as compared to the baseline, that the benefits of the proposed rule are greater than the costs.

After considering alternatives to the proposed rule's contents, within the context of the goals and objectives of the authorizing statute, we determined that the proposed rule represents the least-burdensome alternative of possible rule contents meeting the goals and objectives.

We analyzed the compliance costs of the proposed rule, and whom they fall on. We determined that no businesses in Washington State would incur compliance costs under the proposed rule. Based on the available list of manufacturers (who were all required to report to Ecology by December 31, 2019 under the baseline), we expect all affected manufacturers to be businesses outside of Washington State (in other states or other countries, while their products are sold in Washington).

Based on this analysis, Ecology is exempt from performing additional analyses under the RFA.

Chapter 1: Background and Introduction

1.1 Introduction

This report presents the determinations made by the Washington State Department of Ecology (Ecology) as required under chapters 34.05 RCW and 19.85 RCW, for the proposed Hydrofluorocarbons (HFCs) rule (chapter 173-443 WAC; the "rule"). This includes the:

- Preliminary Cost-Benefit Analysis (CBA)
- Least-Burdensome Alternative Analysis (LBA)
- Administrative Procedure Act Determinations
- Regulatory Fairness Act Compliance

The Washington Administrative Procedure Act (APA; RCW 34.05.328(1)(d)) requires Ecology to evaluate significant legislative rules to "determine that the probable benefits of the rule are greater than its probable costs, taking into account both the qualitative and quantitative benefits and costs and the specific directives of the law being implemented." Chapters 1 – 5 of this document describe that determination.

The APA also requires Ecology to "determine, after considering alternative versions of the rule…that the rule being adopted is the least burdensome alternative for those required to comply with it that will achieve the general goals and specific objectives" of the governing and authorizing statutes. Chapter 6 of this document describes that determination.

The APA also requires Ecology to make several other determinations (RCW 34.05.328(1)(a) – (c) and (f) – (h)) about the rule, including authorization, need, context, and coordination. Appendix A of this document provides the documentation for these determinations.

The Washington Regulatory Fairness Act (RFA; chapter 19.85 RCW) requires Ecology to evaluate the relative impact of proposed rules that impose costs on businesses in an industry. It compares the relative compliance costs for small businesses to those of the largest businesses affected. Chapter 7 of this document documents that analysis, when applicable.

All determinations are based on the best available information at the time of publication. We encourage feedback (including specific data) that may improve the accuracy of this analysis.

1.1.1 Background

Hydrofluorocarbons (HFCs) have been used since the 1990s to replace ozone-depleting substances pursuant to Section 612 of the federal Clean Air Act. HFCs are greenhouse gases and have high global warming potentials due to their capacity to trap heat in the atmosphere. Although HFCs currently represent a relatively small proportion of the state's greenhouse gas emissions, their use has been rapidly increasing in Washington, the United States, and worldwide. HFCs can be thousands of times more damaging to the climate than carbon dioxide, the most prevalent greenhouse gas.

State law Chapter 70.235 RCW Limiting Greenhouse Gas Emissions (the HFC law)[3] directs Ecology to adopt rules to implement a program transitioning to the use of less damaging HFCs or suitable substitutes that is built on EPA's (United States Environmental Protection Agency) Significant New Alternatives Policy (SNAP) program.[4] The EPA SNAP program evaluates substitutes for ozone depleting substances and then generates a list of substitutes in these categories:

- Acceptable.
- Acceptable subject to use conditions.
- Acceptable subject to narrowed use conditions.
- Unacceptable within certain use categories.

HFCs are included in EPA SNAP Rules 20 and 21.[5] These rules were vacated by a federal district court in 2017 and 2019. The HFC law requires Ecology to regulate HFCs in the same end-use categories as SNAP Rules 20 and 21 to fill a gap created at the federal level.

The HFC law required Ecology to coordinate with other states engaging in similar rulemaking. To accomplish this, Ecology coordinated with the United States Climate Alliance (USCA)[6] while developing this rule. The USCA provides a forum for states to discuss their HFC rulemakings and other climate-related issues and rulemakings. The USCA states have worked together to develop a model HFC rule to help facilitate consistency among states developing HFC rules.

1.1.2 Emergency rules

RCW 70.235.080 required manufacturers to submit initial information about HFCs or other substitutes in their products to Ecology by December 31, 2019. Status update notifications for products with a prohibition date of January 1, 2020 were due by April 30, 2020. To meet these statutory deadlines, Ecology adopted emergency rules as they developed the proposed permanent rule.

The emergency rule established the means by which manufacturers must notify Ecology of products containing, using, or intended for use with HFCs or other restricted substitutes entering into commerce in Washington by December 31, 2019. The emergency rule also requires manufacturers provide a status update no later than 120 days after an applicable prohibition date. Ecology plans to adopt two more emergency rules before adopting the permanent rule (expected in December 2020). Ecology made no changes to emergency rule language during the subsequent emergency rulemakings. The permanent rule includes the notification requirements as established in the emergency rule.

The emergency rules were adopted as follows:

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[3] Engrossed Second Substitute House Bill 1112. http://lawfilesext.leg.wa.gov/biennium/2019-20/Pdf/Bills/House%20Passed%20Legislature/1112-S2.PL.pdf?q=20200506151521
[4] Significant New Alternatives Policy (SNAP). https://www.epa.gov/snap/snap-regulations#Rules
[5] Significant New Alternatives Policy (SNAP). https://www.epa.gov/snap/snap-regulations#Rules
[6] United States Climate Alliance (USCA). https://www.usclimatealliance.org/

- First emergency rule on July 30, 2019 (WSR 19-16-059)
- Second emergency rule on November 21, 2019 (WSR 19-24-005)
- Third emergency rule on March 16, 2019 (WSR 20-07-076)

1.2 Summary of the proposed rule

The proposed rule would:

- Establish terms of prohibitions, in particular:
    - Modify the prohibition date for the new and existing vending machine end-use from January 1, 2020 to January 1, 2022.
    - Add bear spray and pepper spray to the list of exemptions to the prohibitions.
    - Determine that for products and equipment imported from outside the United States, the date of import may be considered the date of manufacture.
- Define terms and methods for HFC product status notifications:
    - Require manufacturers or its representative to use the Product Manufacturer Notification form available on Ecology's website.
    - Clarify reporting hierarchy of manufacturers associated with the product or equipment.
- Define terms and methods of product labeling:
    - Determine that labeling requirements apply to manufacturers of products with HFCs as of July 28, 2019, or anytime after that date.
    - Require manufacturers to disclose the substitutes in its products except for the cases where the product is used in a manner listed as an acceptable use.
    - Establish requirements to disclose the substitutes in affected products that contain, use, or will use HFCs, and the products are not used in a manner listed as an acceptable use, no later than one year after the prohibition date, or no later than one year after the effective date of the rule.
    - Determine that for labeling purposes a manufacturer may apply the date of July 28, 2019 to separate divisions of its business based on the end-use that products associated with each division are intended to serve.
    - Establish methods to disclose the substitutes for manufacturers of products and equipment in different end-use categories.
    - Approve, in advance, the use of a symbol or code for labeling purposes.

1.3 Reasons for the proposed rule

The purpose of this rulemaking is to establish a program to implement the requirements of Chapter 284, Laws of 2019 – ESSHB 1112 (codified in part in RCW 70.235.080 and RCW 70.235.010)) related to reducing greenhouse gases by transitioning to the use of less damaging HFCs or suitable substitutes. This law establishes prohibition deadlines for various products and equipment containing HFCs. It requires manufacturers ("manufacturer" is defined in the rule as including importers and distributors) to submit to Ecology, in a manner determined by rule,

information about the use of HFCs and other substitutes used in products and equipment sold, leased, rented, or installed in Washington.

This rulemaking for Chapter 173-443 WAC Hydrofluorocarbons (HFCs) would require manufacturers to submit, to Ecology, information about the use of various products and equipment containing HFCs and other prohibited substitutes. The rulemaking would also require manufacturers to disclose HFCs and other substitutes used in an on-product label or other designated format.

1.5 Document organization

The remainder of this document is organized in the following chapters:

- **Baseline and the proposed rule (Chapter 2):** Description and comparison of the baseline (what would occur in the absence of the proposed rule) and the proposed rule requirements.
- **Likely costs of the proposed rule (Chapter 3):** Analysis of the types and sizes of costs we expect impacted entities to incur as a result of the proposed rule.
- **Likely benefits of the proposed rule (Chapter 4):** Analysis of the types and sizes of benefits we expect to result from the proposed rule.
- **Cost-benefit comparison and conclusions (Chapter 5):** Discussion of the complete implications of the CBA.
- **Least-Burdensome Alternative Analysis (Chapter 6):** Analysis of considered alternatives to the contents of the proposed rule.
- **Regulatory Fairness Act Compliance (Chapter 7):** When applicable. Comparison of compliance costs for small and large businesses; mitigation; impact on jobs.
- **APA Determinations (Appendix A):** RCW 34.05.328 determinations not discussed in chapters 5 and 6.

Chapter 2: Baseline and Proposed Rule

2.1 Introduction

We analyzed the impacts of the proposed rule, within the context of all existing requirements (federal and state laws and permanent rules). This context for comparison is called the baseline, and reflects the most likely regulatory circumstances that entities would face if the proposed rule was not adopted. It is discussed in Section 2.2, below.

2.2 Baseline

The baseline for our analyses generally consists of existing rules and laws, and their requirements. This baseline is what allows us to make a consistent comparison between the state of the world with and without the proposed rule. Note that emergency rules are, by their nature, not permanent, and are therefore not part of the baseline.

For this rulemaking, the baseline includes:
Engrossed Second Substitute House Bill 1112 – ESSHB (codified in part in RCW 70.235.080 and RCW 70.235.010).

In particular, this HFC law sets the following parts for the baseline:

1. Prohibits products containing HFCs and prohibited substitutes from entering into Washington commerce after the applicable prohibition date, unless the product was manufactured prior to the applicable prohibition date. The law identifies the list of prohibited substitutes as set in appendix U and V, Subpart G of 40 C.F.R. Part 82, as those read on January 3, 2017.[7]
2. Defines the effective prohibition dates for different end-uses.
3. Defines Ecology's authority to modify the effective dates, use of substitutes and defines particular conditions of when Ecology may do so.
4. Requires a manufacturer to disclose substitutes used in products by labeling and status notifications;
5. Directs Ecology to adopt rules to implement the requirements in the HFC law.
6. Directs Ecology to recognize existing labeling that provides sufficient disclosure of the use of substitutes, and to consider labels required by state building codes and other safety standards.[8]
7. Directs Ecology to adopt rules where feasible and appropriate "that are the same or consistent with the regulatory standards, exemptions, reporting obligations, disclosure requirements, and other compliance requirements of other states or the federal government that have adopted restrictions on the use of HFCs".[9]

[7] https://www.govinfo.gov/content/pkg/CFR-2019-title40-vol21/xml/CFR-2019-title40-vol21-part82.xml or see Appendix A
[8] RCW 70.235.080
[9] RCW 70.235.080

Other relevant rulings

The core of the law is modeled after EPA's SNAP program.[10] The law specifically addresses former SNAP rules number 20 and 21, which were partially vacated by the District of Columbia Circuit Court of Appeals in 2017 and 2019.[11]

SNAP implements section 612 of the federal Clean Air Act, which requires EPA to evaluate substitutes for the ozone-depleting substances to reduce overall risk to human health and the environment.

As of May 2020, the following states are joining Washington to phase out the use of HFCs and are in various stages of establishing laws and adopting rules:

- California
- New York
- Maryland Connecticut
- Delaware
- Colorado
- Massachusetts
- Rhode Island
- New Jersey
- Maine
- Pennsylvania
- Vermont

2.3 Proposed rule

The proposed rule would:

- Establish terms of prohibitions, in particular:
    - Modify the prohibition date for the new and existing vending machine end-use from January 1, 2020 to January 1, 2022.
    - Add bear spray and pepper spray to the list of exemptions to the prohibitions.
    - Determine that for products and equipment imported from outside the United States, the date of import may be considered the date of manufacture.
- Define terms and methods for HFC product status notifications:
    - Require manufacturers or its representative to use the Product Manufacturer Notification form available on Ecology's website.

[10] https://www.epa.gov/snap/snap-regulations
[11] See Mexichem Fluor, Inc. v. EPA, 866 F.3d 451 (D.C. Cir. 2017); Mexichem Fluor, Inc. v. EPA, No. 17-1024 (D.C. Cir. Apr. 5, 2019)(unpublished).

    - Clarify reporting hierarchy of manufacturers associated with the product or equipment.
- Define terms and methods of product labeling:
    - Determine that labeling requirements apply to manufacturers of products with HFCs as of July 28, 2019, or anytime after that date.
    - Require manufacturers to disclose the substitutes in its products except for the cases where the product is used in a manner listed as an acceptable use.
    - Establish requirements to disclose the substitutes in affected products that contain, use, or will use HFCs, and the products are not used in a manner listed as an acceptable use, no later than one year after the prohibition date, or no later than one year after the effective date of the rule.
    - Determine that for labeling purposes a manufacturer may apply the date of July 28, 2019 to separate divisions of its business based on the end-use that products associated with each division are intended to serve.
    - Establish methods to disclose the substitutes for manufacturers of products and equipment in different end-use categories.
    - Approve, in advance, the use of a symbol or code for labeling purposes.

2.3.1 Establishing terms of prohibitions

Baseline

The authorizing law:[12]

- States that manufacturers are prohibited from offering any product or equipment for sale, lease, or rent, or install or otherwise cause any equipment or product to enter into commerce in Washington if that equipment or product consists of, uses, or will use substitutes from the list of prohibited substances after the applicable prohibition date, unless the product or equipment was manufactured prior to the applicable prohibition date.[13]
- Specifies the effective dates of prohibition for different end-uses.
- Defines Ecology's authority to modify the effective dates, use of substitutes and defines particular conditions of when Ecology may do so.

Proposed

The proposed rule would:

- Modify the prohibition date for the new and existing vending machine end-use from January 1, 2020 to January 1, 2022.
- Add bear spray and pepper spray to the list of exemptions to the prohibitions.

[12] Engrossed Second Substitute House Bill 1112 – ESSHB (codified in part in RCW 70.235.080 and RCW 70.235.010).
[13] Appendix U and V, Subpart G of 40 C.F.R. Part 82, as read on January 3, 2017

- Determine that for products and equipment imported from outside the United States, the date of import may be considered the date of manufacture.

Expected impact

As compared to the baseline we do not expect any costs associated with establishing the terms of prohibition. They only extend compliance deadlines, add exemptions, and allow flexibility in compliance.

Benefit of more time for vending machine manufacturers to comply
Human health and the environment would potentially benefit from modifying the date because it would allow for manufactures to identify technically feasible and environmentally preferable substitutes. Vending machine manufacturers would have more time to implement substitutes with lower environmental risk in their machines.

Benefit of exempting bear and pepper sprays
Allowing bear sprays and pepper sprays as acceptable uses likely would benefit human health and safety, they would still be used while manufacturers are looking for environmentally preferable substitute.

Benefit of allowing the date of import as the manufacture date
Allowing the date of import as the manufacture date is necessary, as importers and distributors may not know the manufacture date of products purchased abroad. This option would likely result in net benefits for the importers.

2.3.2 Defining terms and methods of HFCs products status notifications for manufacturer.

Baseline

The HFC law states that a manufacturer must notify Ecology of the substitutes used in its products or equipment. By December 31, 2019, all manufacturers must notify Ecology of the status of each product class using HFCs and within 120 after the date of an applicable prohibition, must provide an updated status notification. The HFC law does not specify how the manufacturer should notify Ecology.[14]

Proposed

The proposed rule would:

- Require manufacturers or its representative to use the Product Manufacturer Notification form available on Ecology's website.
- Clarify reporting hierarchy of manufacturers associated with the product or equipment.

[14] While it is not part of Washington's baseline, we note that other states require five-year recordkeeping related to HFCs. This is relevant for manufacturers selling products in multiple states.

Expected impact

Manufacturers are given options to report by themselves or through their representative (for example, industry association). Manufacturers would be able to choose their own least-cost compliance pathway to appropriately notify Ecology through those options. Also, businesses are not required to report separately if they know that their product has already been reported by the upstream manufacturer. The proposed terms and methods of notification are likely to result in net benefits to manufacturers that choose to use the proposed additional flexibility.

2.3.3 Defining terms and methods of product labeling

Baseline

The authorizing law:

- Requires a manufacturer to disclose substitutes used in products by labeling.
- Sets requirements for disclosure by labeling.
- Designates Ecology to develop a rule to implement such requirements.

The manufacturers of some end-use categories are required to label their products by other jurisdictions or by federal laws depending on the product.

Proposed

The proposed rule would:

- Determine that labeling requirements apply to manufacturers of products with HFCs as of July 28, 2019, or anytime after that date.
- Require manufacturers to disclose the substitutes in its products except for the cases where the product is used in a manner listed as an acceptable use.
- Establish requirements to disclose the substitutes in affected products that contain, use, or will use HFCs, and the products are not used in a manner listed as an acceptable use, no later than one year after the prohibition date, or no later than one year after the effective date of the rule.
- Determine that for labeling purposes a manufacturer may apply the date of July 28, 2019 to separate divisions of its business based on the end-use that products associated with each division are intended to serve.
- Establish methods to disclose the substitutes for manufacturers of products and equipment in different end-use categories.
- Approve, in advance, the use of a symbol or code for labeling purposes.

Expected impact

The labeling requirements could generate insignificant costs of labeling for some of the manufacturers not required to disclose the substitutes or to label their products by other jurisdictions or federal rules.

Chapter 3: Likely Costs of the Proposed Rule

3.1 Introduction

We analyzed the likely costs associated with the proposed rule, as compared to the baseline. The proposed rule and the baseline are discussed in detail in Chapter 2 of this document.

3.2 Cost analysis

The proposed rule would:

- Establish terms of prohibitions, in particular:
    - Modify the prohibition date for the new and existing vending machine end-use from January 1, 2020 to January 1, 2022.
    - Add bear spray and pepper spray to the list of exemptions to the prohibitions.
    - Determine that for products and equipment imported from outside the United States, the date of import may be considered the date of manufacture.
- Define terms and methods for HFC product status notifications:
    - Require manufacturers or its representative to use the Product Manufacturer Notification form available on Ecology's website.
    - Clarify reporting hierarchy of manufacturers associated with the product or equipment.
- Define terms and methods of product labeling:
    - Determine that labeling requirements apply to manufacturers of products with HFCs as of July 28, 2019, or anytime after that date.
    - Require manufacturers to disclose the substitutes in its products except for the cases where the product is used in a manner listed as an acceptable use.
    - Establish requirements to disclose the substitutes in affected products that contain, use, or will use HFCs, and the products are not used in a manner listed as an acceptable use, no later than one year after the prohibition date, or no later than one year after the effective date of the rule.
    - Determine that for labeling purposes a manufacturer may apply the date of July 28, 2019 to separate divisions of its business based on the end-use that products associated with each division are intended to serve.
    - Establish methods to disclose the substitutes for manufacturers of products and equipment in different end-use categories.
    - Approve, in advance, the use of a symbol or code for labeling purposes.

3.2.1 Establishing terms of prohibitions

We do not expect these proposed requirements to result in costs. See Chapter 2 for discussion.

3.2.2 Defining terms and methods of HFC product status notifications for manufacturers

The proposed terms and methods of notification are likely to result in some costs to manufacturers.

Manufacturers started reporting to Ecology in September 2019, after the emergency rules established the means by which manufacturers must submit an initial notification by December 31, 2019, and a status update notification within 120 days of an applicable prohibition date. By April 2020, Ecology received 61 initial reports and 3 status updates. We used this reporting list as the basis of our list of manufacturers that would be covered under the proposed rule.

It is only necessary for one person or entity to report with respect to a particular product or equipment. Manufacturers could report either individually, or through a representative on behalf of a manufacturer. We assumed that manufacturers would choose the least-cost compliance pathway. Manufacturers would be required to dedicate employee time; either to contact their industry representative, or to submit the report through Ecology's website, both of the options require employee's time spent on providing information to meet the notification requirements.

To estimate the total costs of submitting a report, we assume it would take around one hour to fill out and submit the form by an manufacturer's employee, such as a compliance officer. The mean hourly wage for a compliance officer or similar position in the US[15] is $35.03.[16] For this analysis, we estimate the total cost for the initial reporting by December 31, 2019 as $2,136.

We expect only a small growth in the number of manufactures that must report under this rule due to a global shift away from the use of HFCs, spurred in part by legislation to phase out such substances. By some estimates, the compound annual growth rate of the global aerosol market is expected to be 6.5 percent in terms of revenue (from 2020 to 2027). Despite increasing demand, growth is hindered by the rules for Volatile Organic Compounds (VOC) emissions in Europe and the U.S. Environmental Protection Agency (EPA). We note that many aerosol product manufacturers aim to use less propellant and reduce the overall carbon footprint of their products.[17] The same is true for the refrigerant market. Global fluorocarbon phase-out through the Montreal Protocol and updated Kyoto Protocol is expected to shape the industry over the nearest forecast period.[18]

[15] Although Ecology generally uses May 2019 wages by area and occupation, for this analysis we used US mean wages, as none of the reported manufacturers has production operations in WA.
[16] US Bureau of Labor Statistics. https://www.bls.gov/oes/2018/may/oes131041.htm
[17] Aerosol Market Size, Share & Trends Analysis Report By Application (Personal Care, Household, Automotive & Industrial, Foods, Paints), By Material, By Type, By Region, And Segment Forecasts, 2020 – 2027. https://www.grandviewresearch.com/industry-analysis/aerosol-market.
[18] Refrigerant Market Size & Share Report By Product (Fluorocarbon, Hydrocarbon, Inorganic), By Application (Stationary Air Conditioning, Chillers, & Heat Pumps, Mobile Air Conditioning, Commercial), and Segment Forecasts, 2018 – 2025. https://www.grandviewresearch.com/industry-analysis/refrigerant-market

New manufacturer notifications

Based on the available global market data, we extrapolate the growth rates to the Washington market and expect to receive up to four new manufacturers per year (Table 1), which would result in the increase in costs for initial reporting of $140 per year total.

Table 1. Market growth rates and expected number of manufacturers.

Industry	Number of companies per industry	Percentage of market growth rate	Number of expected number of new manufacturers
Refrigerant	26	6.1%[19]	1.6
Foam & Refrigerant	21	6.0%	1.2
Foam	11	5.8%[20]	0.6
Foam & Aerosol	1	6.2%	0.1
Foam & Refrigerant & Aerosol	1	6.1%	0.1
Refrigerant & Aerosol	1	6.3%	0.1
Aerosol	0	6.5%[21]	0.0
Total	61	6.13%	3.7

Status updates notifications

Within 120 days after the date of a prohibition, each manufacturer affected by the prohibition or its representative, must provide Ecology with an updated status notification using Ecology's Product Manufacturer Notification form. Some manufacturers would have to submit several reports as the prohibition dates become effective, depending on the variety of the products they produce. We forecast the total costs for status updates to be $5,728 by the end of 2024, when manufacturers are expected to fully eliminate prohibited HFCs in their products.

[19] Refrigerants Market by Type (HCFC, HFC, HFO, Isobutane, Propane, Ammonia, Carbon Dioxide, Air, Water, Propene, Isopentane), Application (Domestic, Commercial, Industrial, Chillers, Split AC, VRF, Window, MAC), and Region - Global Forecast to 2023. https://www.marketsandmarkets.com/Market-Reports/refrigerant-market-1082.html

[20] Polyethylene (PE) Foams Market by Type (Non-XLPE and XLPE), End-Use Application (Protective Packaging, Automotive, Building & Construction, Footwear, Sports & Recreational, and Medical), and Region - Global Forecast to 2021. https://www.marketsandmarkets.com/Market-Reports/polyethylene-foam-market-129894004.html

[21] Aerosol Market Size, Share & Trends Analysis Report by Application (Personal Care, Household, Automotive & Industrial, Foods, Paints), By Material, By Type, By Region, And Segment Forecasts, 2020 – 2027. https://www.grandviewresearch.com/industry-analysis/aerosol-market

Table 2. Expected annual status update costs.[22]

Date of prohibition	Date of status update notification	Expected number of manufacturers	Percentage of manufacturers reporting status update based on the end-use product classes prohibition dates	Expected number of manufacturers reporting status update	Expected costs[23]
1/1/2020	4/30/2020	65	73.8%	48	$1,664
1/1/2021	5/1/2021	69	46.4%	32	$1,100
1/1/2022	5/1/2022	73	28.8%	21	$715
1/1/2023	5/1/2023	77	46.8%	36	$1,214
1/1/2024	4/30/2024	81	38.3%	31	$1,035

Total notification costs

We assume any new manufacturers entering the Washington market would:

- Produce products that meet the prohibitions.
- Use an approved substitute.
- Meet the exemptions.
- Meet the notification requirements.

For our analysis we estimate costs for a 20 year period. Based on the above assumptions we expect no new manufacturers to enter Washington market after 2024. Therefore we estimated zero annual costs for notification requirement between years 2025 – 2040. Therefore, the costs for a 20 year period add up to present values[24] of $4,844.

[22] Based on HFCs notification report. Ecology. 2020.
[23] Ecology calculates present values based on a real discount rate of 0.98 percent, the historic average real rate of return on US Treasury I-Bonds since 1998. US Treasury Department (2020). http://www.treasurydirect.gov/indiv/research/indepth/ibonds/res_ibonds_iratesandterms.htm
[24] Ecology calculates present values based on a real discount rate of 0.98 percent, the historic average real rate of return on US Treasury I-Bonds since 1998. US Treasury Department (2020). http://www.treasurydirect.gov/indiv/research/indepth/ibonds/res_ibonds_iratesandterms.htm

We expect no new manufacturers of HFC-products that aren't exempt from the prohibitions to enter the Washington market after 2024. If a manufacturer of an HFC-product that is exempt as an "acceptable use," does enter the Washington market, under the rule, they are not required to provide notification. For this reason, we estimatated zero annual costs for notification requirement between years 2025 – 2040. Therefore, the costs for a 20 year period add up to present values[25] of $4,844.

3.2.3 Defining terms and methods of product labeling

The proposed would:

- Determine that labeling requirements apply to manufacturers of products with HFCs as of July 28, 2019, or anytime after that date.
- Require manufacturers to disclose the substitutes in its products except for the cases where the product is used in a manner listed as an acceptable use.
- Establish requirements to disclose the substitutes in affected products that contain, use, or will use HFCs, and the products are not used in a manner listed as an acceptable use, no later than one year after the prohibition date, or no later than one year after the effective date of the rule.
- Determine that for labeling purposes a manufacturer may apply the date of July 28, 2019 to separate divisions of its business based on the end-use that products associated with each division are intended to serve.
- Establish methods to disclose the substitutes for manufacturers of products and equipment in different end-use categories.
- Approve, in advance, the use of a symbol or code for labeling purposes.

The proposed labeling requirements could generate insignificant costs of labeling for manufacturers not required by existing Washington, other jurisdictions or federal regulations to label or disclose their substitutes. The HFC law requires Ecology to recognize existing labeling and labels required by building codes and safety standards in its rulemaking. Such labeling covers some of the end-use categories. We do not expect this proposed requirement to result in more than small costs.

Although the HFC law does not distinguish specific labeling methods, Ecology's choice for the requirements consists of the least costly options:

- Using existing labeling where deemed sufficient and feasible.
- Not requiring disclosure for acceptable uses of prohibited substances.

[25] Ecology calculates present values based on a real discount rate of 0.98 percent, the historic average real rate of return on US Treasury I-Bonds since 1998. US Treasury Department (2020). http://www.treasurydirect.gov/indiv/research/indepth/ibonds/res_ibonds_iratesandterms.htm

- Applying labeling only to products from manufacturers using HFCs as of the effective date of HFC law.

- Allowing up to one year after an applicable prohibition date, or up to one year after the effective date of the rule to give manufacturers time to adjust their processes if necessary.

Ecology requires preapproval of any symbols or codes used for labeling purposes because there is not yet a nationally recognized symbol to reference. It is likely to be implemented by manufacturers through centralized industry-specific use of a symbol or code, which could result in insignificant costs for manufacturers.

For purposes of labeling, the HFC law does not distinguish between substitutes used for acceptable uses and those used for prohibited uses. Ecology chose to not require labeling for acceptable uses for prohibited substances (i.e., uses exempted from the prohibitions for certain substances). This decision is based on Ecology's intention to be consistent with other states, implementing HFC rules, to the extent feasible as the HFC law directs.

The HFC law applies labeling requirements to "substitutes", defined in SNAP to include HFCs and older substitutes including Chlorofluorocarbons (CFCs). In the proposed rule, manufactures are required to meet the requirements for labeling products using HFCs or other prohibited substitutes if the manufacturer uses HFCs in any of their products as of the effective date of the HFC law - July 28, 2019. Many manufacturers transitioned years before this proposed rule, and to require these companies to label products that do not now or possibly never used HFCs creates unnecessary additional costs.

For manufacturers using HFCs in some products as of July 28, 2019, but use other non-prohibited substitutes in other products, the proposed rule allows them to apply the labeling requirements to separate divisions or segments of the company based on the end-use that the products associated with the division are intended to serve. This option avoids creating the need for companies who make many products (some using HFCs and some using non-HFCs substitutes) to label all of their products with the substitute used including those non-HFC products.

The HFC law does not prescribe a start date for labeling. Ecology chose to allow up to one year after an applicable prohibition date, or up to one year after the effective date of the rule (for the January 1, 2020 prohibition dates) to give manufacturers time to adjust their processes if necessary.

Ecology distinguished the labeling options according to the regulating agency for different end-uses: aerosols; foams; and refrigeration and air conditioning. Tables three - five below address labeling requirements imposed by other agencies, both federal and other jurisdictions.

Given existing labeling requirements, that already provide sufficient disclosure of the substitutes used in different end-use categories, we analyzed how likely would it be that existing labeling requirements would meet the requirements of the proposed rule. We were then able to predict manufacturer behavior in response to the proposed labeling requirements. High likelihood means

manufactures could meet the labeling requirements in the proposed rule using existing labeling and would not lead to new costs for the manufacturers.

Aerosols

Table 3 describes the likelihood that existing Aerosols meet labeling requirements in this rule. (High likelihood means manufactures could meet requirements with existing labels.)

Table 3. Aerosol labeling requirements

Aerosol propellants	Agency	Notes	Citation	Likelihood of labeling being covered by other rules
Consumer products such as cleaners, air fresheners, laundry starch	CPSC (Consumer Product Safety Commission)	Regulates products not regulated by FDA or EPA. Requires that hazardous substances be on label.	15 U.S.C. 1261(p)(1)	Medium
Food products	FDA (Food and Drug Administration)	Does not allow HFCs to be used in food products. Requires that propellant used be listed on food label.	21 CFR 101.4	High
Cosmetics	FDA	Ingredients, include propellant, must be included on label.	21 CFR 701.3 and 21 CFR 701.30	High
Drug products – OTC	FDA	OTC products. Propellants are inactive ingredients. Inactive ingredients must be labeled.	21 CFR 201.66(c)(8)	High
Disinfectants Insecticides,	EPA – FIFRA (Federal Insecticide,	Requires that if one inert ingredient is	40 CFR 156	High

Aerosol propellants	Agency	Notes	Citation	Likelihood of labeling being covered by other rules
Herbicides Repellants	Fungicide, and Rodenticide Act)	listed on the label, than all inert ingredients must be listed.		
Products used in workplace (lubricants, adhesives, degreasers)	OSHA (Occupational Safety and Health Administration)	Does not require existing ingredients to be listed on label. Propellant appears on the safety data sheet (SDS).	29 CFR 1910.1200(g) and Appendix A	High

According to the above table of federal laws and Ecology's notifications database, which in April, 2020 showed that only 3 percent[26] of the manufacturers reported for this end-use category, we conclude that the costs of labeling should be minimal to this category of manufacturers. They are likely to be able to use existing labeling or disclosure processes required by other rules, to comply with the proposed rule.

Foams

Table 4 describes the likelihood that existing labeling and disclosure requirements for foams meet labeling requirements in this rule. (High likelihood means manufactures could meet requirements with existing labels.)

Table 4. Foams labeling requirements

Foams	Agency	Notes	Likelihood of labeling being covered by other rules
Retail foam (finished foam products sold to retail consumers)	No agencies	No information	Low

[26] Here, and later in this chapter, we refer to a share of manufacturers that reported to produce or sell a particular end-use. Same manufacturer may report several end-use product depending on their product line. We did this to illustrate a share of a particular end-use in the mix of different product classes.

Foams	Agency	Notes	Likelihood of labeling being covered by other rules
Spray foams	OSHA and state and local building codes	There is no labeling requirement to disclose foam blowing agents. Blowing agents are generally considered non-hazardous and do not trigger disclosure requirements under OSHA.	Low
Non-retail foam (foams used in household and commercial refrigeration products)	No agencies	Foam used in commercial refrigeration products is not currently required to be on the UL label. The UL label lists the refrigerant only.	Low

The proposed rule divides the foam category into three categories:

- Non-retail
- Retail
- Spray foams

There are no current labeling requirements for foams for HFCs. Several other states are in the process of developing HFC rules that may include labeling requirements.

EPA SNAP – Section 611 requires labels for Hydrochlorofluorocarbons (HCFCs) used in aerosol propellants and foams.

Non-retail foam

Products that can be manufactured in pieces (such as, panels or slats), and that are inputs into other products, which are then sold as different products, are non-retail foams. Representatives of the foam industry report that they can list the HFC on the "unit label" placed on the pallet or bundle of items sent to stores, other distributors, or building sites. A unit label would meet the rule's labeling requirement. As non-retail foam under the baseline, manufacturers already add a label for shipment and specifications indication, adding a substitute label would require only a few additional minutes. That option is likely to result in minimal costs.[27] We also assume that as other states adopt requirements manufacturers could use these requirements to meet

[27] Based on HFCs notification report. Ecology. 2020.

Washington's labeling requirements for each individual product. We anticipate that manufacturers would choose the least costly option.

Retail and spray foam

As for the retail and spray foams, under the baseline, manufacturers currently (or are expected to before the relevant prohibition dates) provide some kind of packaging label. Under the proposed rule, manufacturers would need to disclose the HFC substitutes contained in their products. We assumed that all manufacturers would incur costs associated with adding additional information to existing labels.

Options for disclosure

Under the proposed rule, manufacturers must label products or packaging that provides disclosure of the substitute used in a product. The rule allows for several options for how a manufacturer can meet the disclosure requirements depending on the product end-use category. For example, a label or a symbol on the package and on-line disclosure satisfies the labeling requirement for retail foam and spray foam products.

Labels:

For manufacturers to comply with the rule's requirement to label the products and to disclose substitutes, Ecology assumed manufacturers would work within the existing requirements for print labels. Where the existing requirement would not work, the additional printing should not require manufactures to do more than they are now. Ecology estimated this cost difference as zero, since under both the proposed rule and the baseline, manufacturers would put a label with almost identical information, and likely require the same degree of employee effort to change the programmed labeling. We also assume that as other states adopt requirements manufacturers could use them to meet Washington's labeling requirements.

Symbols and online disclosure:

The proposed rule allows labeling the product with an on-product symbol or code and on-line disclosure, which Ecology must approve in advance. This symbol or code would indicate compliance with the rule. Under the baseline, manufacturers might choose to print individual symbols on packaging – each incurring design costs, and not reaping marketing benefits associated with universally-understood markings (e.g., the USDA organic symbol, or the Energy Star label), but Ecology assumes it is possible or likely that manufacturers would develop a universal and restricted-use marking to comply with the rule and would have to approve it only once. This behavior would reduce and share design and application costs, while creating an environmental compliance symbol with prospective marketing benefits.

We assume that it would take up to 80 hours of a graphic designer to develop an environmental compliance symbol, and additional 80 hours for approval, testing and adjustments. The mean hourly wage for a graphic designer in the United States in 2019 is $27.17. We estimate a total cost of developing and approving a symbol would be

$4,347.20. As label printing is generally filling a uniform space with printed, negative space, or both when labeling products, we do not expect significant costs associated with printing relative to the baseline. We expect manufacturers to incorporate symbols into overall label design. If divided between the total number of manufacturers that reported in 2019 minimal cost per manufacturer would be $71.27. This would presumably be a one-time cost.

When businesses see a cost-savings from an action (such as centralizing compliance behavior) or a potential benefit from an action (marketing universal symbols), they are likely to take advantage of these opportunities, to maximize profits. As for the on-line disclosure, Ecology estimated that 100 percent of manufacturers of retail and spray foams that have submitted initial reports own a web-site with product descriptions[28] that could easily include the required information proposed in this rule, therefore the price of providing an on-line disclosure expected to be minimal, if not zero.

Refrigeration and air-conditioning

Table 4 (above) describes the likelihood that existing labeling and disclosure requirements for Refigeration and Air-Conditioning meet labeling requirements in the proposed rule.(High likelihood means manufactures could meet requirements with existing labels).

Table 5. Refrigeration and air-conditioning labeling requirements

Refrigeration and air-conditioning	Agency	Notes	Likelihood of labeling being covered by other rules
Household refrigeration	State and local building codes dictate label. Underwriters Laboratories (UL) publishes safety standards. Also used often is American National Standards Institute (ANSI) standards.	UL safety labeling and ASTM (formerly known as American Society for Testing and Materials) safety labeling is used in building codes. The label would include serial number, manufacturing date or date code, refrigerant type and amount and voltage requirements. A data plate or UL label would meet the rule's labeling requirement.	High
Commercial refrigeration	Same as above.	Same as above.	High

[28] Based on HFCs notification report. Ecology. 2020.

Refrigeration and air-conditioning	Agency	Notes	Likelihood of labeling being covered by other rules
Chillers (air conditioning)	Same as above.	UL labels for chillers are not required to include the refrigerant, only a code that directs where to find more information. A code, combined with online disclosure would meet the rule's labeling requirement.	High

According to the above table of federal laws and Ecology's notifications database, which in April, 2020 showed that of all substitutes 66 percent fall under refrigeration and air-conditioning end-use categories, we conclude that the costs of labeling should be minimal to this category of manufacturers. They are likely to be able to use existing labeling or notification processes required by other rules or laws, to comply with the proposed rule.

Chapter 4: Likely Benefits of the Proposed Rule

4.1 Introduction

We analyzed the likely benefits associated with the proposed rule, as compared to the baseline. The proposed rule and the baseline are discussed in detail in Chapter 2 of this document.

4.2 Benefits analysis

The proposed rule would:

- Establish terms of prohibitions, in particular:
    - Modify the prohibition date for the new and existing vending machine end-use from January 1, 2020 to January 1, 2022.
    - Add bear spray and pepper spray to the list of exemptions to the prohibitions.
    - Determine that for products and equipment imported from outside the United States, the date of import may be considered the date of manufacture.
- Define terms and methods for HFC product status notifications:
    - Require manufacturers or its representative to use the Product Manufacturer Notification form available on Ecology's website.
    - Clarify reporting hierarchy of manufacturers associated with the product or equipment.
- Define terms and methods of product labeling:
    - Determine that labeling requirements apply to manufacturers of products with HFCs as of July 28, 2019, or anytime after that date.
    - Require manufacturers to disclose the substitutes in its products except for the cases where the product is used in a manner listed as an acceptable use.
    - Establish requirements to disclose the substitutes in affected products that contain, use, or will use HFCs, and the products are not used in a manner listed as an acceptable use, no later than one year after the prohibition date, or no later than one year after the effective date of the rule.
    - Determine that for labeling purposes a manufacturer may apply the date of July 28, 2019 to separate divisions of its business based on the end-use that products associated with each division are intended to serve.
    - Establish methods to disclose the substitutes for manufacturers of products and equipment in different end-use categories.
    - Approve, in advance, the use of a symbol or code for labeling purposes.

4.2.1 Establishing terms of prohibitions

The proposed rule would likely result in the following benefits:

- Additional time to transfer to safer substitutes for vending machine manufacturers.
- Clarified status of bear spray and pepper spray as exemptions for the benefit of human safety.
- Rational date consideration options and conditions for importers and distributors.

The established terms of prohibitions would give manufacturers of vending machines additional time to switch to a safer substitute. While this switch would still be necessary later, two years of delay would allow these manufacturers to use the funds on other business needs that potentially bring additional profits, which under the HFC law requirements manufacturers would have been spent these funds on the production adjustment for non-HFCs technology. This allows manufacturers to avoid opportunity costs – the loss of potential gain from other alternatives when one alternative is chosen. Another benefit for vending machines manufacturers is that in two years the price for alternative substitutes and technology is likely to decrease in both nominal and real terms with provision of a wider range of alternatives, because of the technological progress - the continual improvement of the technologies, and the diffusion of the technologies throughout the industry.

In addition, Ecology determined that human health and the environment would potentially benefit from modifying the date because it would allow for manufactures to identify technically feasible and environmentally preferable substitutes. Vending machine manufacturers would have more time to implement substitutes with lower environmental risk in their machines.

Bear spray and pepper spray are not included as being acceptable subject to use conditions (i.e., an acceptable use of a prohibited substance) in EPA SNAP and therefore not automatically exempted in the HFC law. In both cases, there is a clear benefit to human health and safety in being able to defend oneself in cases of potential mortal danger. In addition, Ecology's position is to allow pepper spray for law enforcement and over the counter purposes based on industry input that they need an exemption for law enforcement sprays because of flammability of alternate substitutes when used with a taser. Ecology chose to not distinguish law enforcement pepper spray from over-the-counter (OTC) sprays to avoid confusion and allow for broadest allowance based on public and personal safety concerns. This clarifies the status of bear spray and pepper spray as exemptions for the benefit of human health and safety. In addition, bear and pepper spray manufacturers benefit from clarifying that these products are included in the list of exemptions, thus allowing them to avoid labeling costs and continue to sell their product.

As for the manufacturer date additional options and conditions, while products are often stamped with the manufacturer date, we heard concerns from some of the importers and distributers that this information is not always available. The proposed rule would allow date of import as the manufacture date for determining applicability of the July 28, 2019 cut-off date based on this feedback.

4.2.2 Defining terms and methods of HFC products status notifications for manufacturer

The proposed rule would likely result in the following benefits:

- Clear and efficient data reporting through the form available on Ecology's website.
- Cost-savings through allowing for only one person or entity to report with respect to a particular product.

Manufacturers started reporting to Ecology in September 2019 under the emergency rule (WAC 173-443) that requires manufacturers, importers, and distributors to submit an initial notification by December 31, 2019. The emergency rule also required manufacturers to submit a status update notification within 120 days of an applicable prohibition date. By April 2020, Ecology received 61 initial reports and 3 status updates.[29]

Ecology provides the Product Manufacturer Notification form on our website for manufacturers to use for their notifications. This results in clear and efficient data reporting. We assume in the absence of a standard form each manufacturer would report by email or phone, which would lead to a longer process and less accurate data because of the high variability. This could also result in repeated interactions between Ecology and manufacturers to finalize data submissions.

Further, the rule allows manufacturers to choose the least-cost compliance pathway to appropriately notify Ecology via our website using the form, along with an option of doing so through manufacturers' industry association representative.

The proposed rule also clarifies reporting hierarchy of manufacturers associated with the product or equipment, this allows to avoid the need to notify separately (for example, for a distributor) if the product has already been reported by the manufacturer.

4.2.3 Defining terms and methods of product labeling

The proposed rule is likely to result in the following benefits:

- Clear time frame and definition of covered manufacturers for labeling.
- Clearer delineation of which products the rule would not apply to by determining that labeling requirements apply to manufacturers of products with HFCs as of July 28, 2019, or after that date.
- Standardized methods to disclose the substitutes for manufacturers of products and equipment in different end-use categories.

Under the baseline, most manufacturers are required to provide some kind of packaging label to sell their product. Under the proposed rule, manufacturers would be required to disclose each HFC substitute contained in its products. Ecology assumed that, to comply with the HFC law requirement to label the products and to disclose substitutes, manufacturers would work within the existing requirements to print labels. For example, meet the state and local building code

[29] Based on HFCs notification report. Ecology. 2020.

standards for the construction industry and require safety standards for some foam products. See Chapter 3 for discussion and details of existing labeling requirements.

The proposed rule establish requirements to disclose the substitutes in affected products (which contain or will contain HFCs, and not listed as an acceptable use) no later than one year after the prohibition date, or no later than one year after the effective date of the rule (to address the January 1, 2020 prohibition date for some products). This clarification would likely result in net benefits for manufacturers, as 1) it offers needed time to make changes to labeling practices, and 2) it excludes potential requirement to disclosure for substitutes used for acceptable uses (as HFC law does not distinguish between substitutes used for acceptable uses and those used for prohibited uses).

Under the proposed rule, manufacturers must label products or packaging and provide disclosure of the substitute used in a product. This would result in standardizing methods to disclose the substitutes for manufacturers of products and equipment in different end-use categories. This would also create consumer awareness about HFCs and other substitutes in products to help them make more informed decisions in the future. For example, by receiving information about one category of retail products (spray foams, adhesives, etc.) they are potentially learning about the harm of HFCs in all end-use categories.

The proposed rule would allow manufacturers to label the product with an on-product symbol, or code, or on-line disclosure, which Ecology has to approve in advance for some of the end-uses. This symbol or code would indicate compliance with the rule. We assumed retail foam manufacturers would develop a universal and restricted-use marking to comply with the rule and would have to approve it only once. We estimate a total cost of developing and approving a symbol would be $4,347. If divided between the total number reported manufacturers, minimal cost per manufacturer would be $71.27. This behavior would reduce design and application costs by $4,275 for a manufacturer, compared to the baseline where no centralized development would occur while creating an environmental compliance symbol with prospective marketing benefits. For example, manufacturers, may potentially use such environmental labeling as a positive marketing identifier (like with BPA-free products, Certified organic, etc.).

Ecology determines labeling requirements apply to manufacturers of products with HFCs as of July 28, 2019, or after that date. This provides a clearer delineation of which products the rule would not apply to by determining that labeling requirements apply to manufacturers of products with HFCs as of July 28, 2019, or after that date. It creates benefits for larger manufacturers who make products in multiple covered categories, and would have to label all of their products if they make some products with HFCs as of July 28, 2019. For some of their product lines that have transitioned to safer alternatives a long time ago or never used HFCs, this would allow those manufacturers to segment only those divisions, which have to label their products, and avoid additional costs.

Chapter 5: Cost-Benefit Comparison and Conclusions

5.1 Summary of costs and benefits of the proposed rule

Costs

In Chapter 3, we identified the following potential costs resulting from the proposed rule.

- Notification costs to all manufacturers (total):
  - Estimated total costs for all manufacturers combined for the initial reporting by December 31, 2019 is $2,136.
  - Estimated total costs of status updates would be $5,728 by the end of 2024, when manufacturers are expected to fully eliminate prohibited HFCs in their products.
- We expect no new manufacturers of HFC-products that aren't exempt from the prohibitions to enter the Washington market after 2024. If a manufacturer of an HFC-product that is exempt as an "acceptable use," does enter the Washington market, under the rule, they are not required to provide notification. For this reason, we estimated zero annual costs for notification requirement between years 2025 – 2040. Therefore, the costs for a 20 year period add up to present values[30] of $4,844.
- For labeling of retail and spray foams Ecology's choice for the requirements consists of the least costly options:
  - Using existing labeling where deemed sufficient and feasible.
  - Not requiring disclosure for acceptable uses of prohibited substances.
  - Applying labeling only to products from manufacturers using HFCs as of the effective date of HFC law.
  - Allowing up to one year after an applicable prohibition date, or up to one year after the effective date of the rule to give manufacturers time to adjust their processes if necessary.
  - Estimated total costs of developing and approving a symbol would be $4,347. If divided equally between the total number manufactures that report (61 in 2020), cost per manufacturer would be $71.27.
- For non-retail foam they could use any of the above options, with the exception of an on-packaging label or on-packaging code, or they may use a "unit-label". Our analysis assumes they would use the least costly option which would be the "unit-label" and this would result in minimal costs.

Benefits

[30] Ecology calculates present values based on a real discount rate of 0.98 percent, the historic average real rate of return on US Treasury I-Bonds since 1998. US Treasury Department (2020). http://www.treasurydirect.gov/indiv/research/indepth/ibonds/res_ibonds_iratesandterms.htm

In Chapter 4, we identified the following potential benefits of the proposed rule.

- Additional time to transfer to safer substitutes for vending machine manufacturers.
- Clarified status of bear spray and pepper spray as exemptions for the benefit of human safety.
- Rational date consideration options and conditions for importers and distributors.
- Clear and efficient data reporting through the form available on Ecology's website.
- Cost-savings through allowing for only one person or entity to report with respect to a particular product.
- Clear time frame and definition of covered manufacturers for labeling.
- Clearer delineation of which products the rule would not apply to by determining that labeling requirements apply to manufacturers of products with HFCs as of July 28, 2019, or after that date.
- Standardized methods to disclose the substitutes for manufacturers of products and equipment in different end-use categories. This would potentially reduce design and application costs by $4,275 for a manufacturer, while creating an environmental compliance symbol with prospective marketing benefits.

5.2 Conclusion

We conclude, based on a reasonable understanding of the quantified and qualitative costs and benefits likely to arise from the proposed rule, as compared to the baseline, that the benefits of the proposed rule are greater than the costs.

Chapter 6: Least-Burdensome Alternative Analysis

6.1 Introduction

RCW 34.05.328(1)(c) requires Ecology to "…[d]etermine, after considering alternative versions of the rule and the analysis required under (b), (c), and (d) of this subsection, that the rule being adopted is the least burdensome alternative for those required to comply with it that will achieve the general goals and specific objectives stated under (a) of this subsection." The referenced subsections are:

> (a) Clearly state in detail the general goals and specific objectives of the statute that the rule implements;
>
> (b) Determine that the rule is needed to achieve the general goals and specific objectives stated under (a) of this subsection, and analyze alternatives to rule making and the consequences of not adopting the rule;
>
> (c) Provide notification in the notice of proposed rulemaking under RCW 34.05.320 that a preliminary cost-benefit analysis is available. The preliminary cost-benefit analysis must fulfill the requirements of the cost-benefit analysis under (d) of this subsection. If the agency files a supplemental notice under RCW 34.05.340, the supplemental notice must include notification that a revised preliminary cost-benefit analysis is available. A final cost-benefit analysis must be available when the rule is adopted under RCW 34.05.360;
>
> (d) Determine that the probable benefits of the rule are greater than its probable costs, taking into account both the qualitative and quantitative benefits and costs and the specific directives of the statute being implemented.

In other words, to be able to adopt the rule, we are required to determine that the contents of the rule are the least burdensome set of requirements that achieve the goals and objectives of the authorizing statute(s).

We assessed alternative proposed rule content, and determined whether they met the goals and objectives of the authorizing statute(s). Of those that would meet the goals and objectives, we determined whether those chosen for inclusion in the proposed rule were the least burdensome to those required to comply with them.

6.2 Goals and objectives of the authorizing statute

The authorizing law for this rule is Chapter 284, Laws of 2019 (Engrossed Second Substitute House Bill 1112) Hydrofluorocarbons Greenhouse Gas Emissions, Chapter 70.235 RCW Limiting Greenhouse Gas Emissions, Chapter 70.94 RCW Washington Clean Air Act.

Its goals and objectives are:

- To transition to the use of less damaging hydrofluorocarbons or suitable substitutes in various applications in Washington.

- Follow a manner similar to the rules that were adopted by the EPA, and that have been subsequently adopted or will be adopted in several other states around the country.

6.3 Alternatives considered and why they were excluded

We considered the following alternative rule content, and did not include it in the proposed rule for the reasons discussed in each subsection below.

- Interpreting term "substitute" for labeling
- Inclusion of acceptable use substances to labeling requirements
- Adding alternatives to the law
- Consistency with other states labeling options
- Additional options for product labeling
- Alternative date for labeling requirements
- Modified prohibition date for vending machines

6.3.1 Interpreting term "substitute" for labeling

Ecology considered applying labeling requirements to “substitutes”, defined in SNAP and the HFC law to include HFCs and older substitutes including CFCs. This alternative would have increased burden on covered parties. Ecology chose to apply the labeling requirements only to manufacturers of products using HFCs as of the effective date of HFC law (based on a strict interpretation of the definition of “manufacturer”), and then only to divisions or segments of the company that make products within the applicable end-use category.

This decision is to avoid creating the need for companies who make many products (some using HFCs and some using non-HFCs) to label all of their products including non-HFC products. Many manufacturers transitioned years before this proposed rule, so to require these companies to label products that do not now or possibly never used HFCs creates unnecessary additional costs.

6.3.2 Inclusion of acceptable use substances to labeling requirements

Ecology considered inclusion of prohibited substitutes used for acceptable uses for labeling; the HFC law does not distinguish between substitutes used for acceptable uses and those used for prohibited uses. Ecology did not include this alternative in the proposed rule because it would have increased burden on covered parties without necessarily meeting the goals and objectives of the authorizing law.

There are three broad categories for using substitutes in the rule:

- Using prohibited substances in the end -uses affected by the rule (i.e., prohibitions).
- Using prohibited substances for specific uses listed in the rule as acceptable in the relevant end- use categories (i.e., exemptions, or exempted uses).

- Using acceptable substitutes.

Ecology evaluated labeling options for all of these possibilities; including whether to require reporting only on products containing prohibited substitutes, including all substitutes in all cases and prohibited substitutes used for acceptable uses.

6.3.3 Adding alternatives to the law

Stakeholders requested that the rule include a provision from the HFC law that if EPA approves a GWP[31] < 750 HFO blend for foam blowing of polystyrene extruded boardstock and billet and ridged polyurethane low-pressure two-component spray foam, Ecology must expeditiously propose a rule consistent with the federal action. Ecology chose not to include this provision in the rule because it is already required in the HFC law.

6.3.4 Consistency with existing labeling options

Stakeholders expressed concern that labeling requirements in the proposed rule are not consistent with other states that are currently in the process of adopting HFC rules. Ecology considered allowing for a disclosure statement similar to other states to meet our state's disclosure (labeling) requirements, and determined that we could meet the objective of the authorizing law while reducing compliance burden. This alternative would have created more burden for covered parties.

While it is true that part of the HFC law requires consistency with other states, parts of the HFC law requires disclosure of the substitute contained or used. Another part of the HFC law allows for existing labeling to comply if Ecology deems that such a label provides “sufficient” disclosure.

Where possible Ecology tried to provide options that can meet all three of these conditions to the extent possible, either individually or in combination. Other states’ disclosure statements are either a simple written statement or disclosing the substitute on a label or other disclosure. Ecology allowed for this type of disclosure for foams that we have categorized as "non-retail" because of the difficult nature of on-product labeling for these types of foam end-uses, as these foams are inputs to other covered products (refrigerators) so would most likely be hidden on the final product to which they are attached or used within.

6.3.5 Additional options for product labeling

Stakeholders requested that the proposed rule include an option for using the owner’s manual to disclose the refrigerant used in commercial refrigeration and to allow for manufacturers to choose between product categories if they believe their products fall under more than one category. This alternative does not meet the goals and objectives of the law.

[31] The Global Warming Potential (GWP) was developed to allow comparisons of the global warming impacts of different gases. Specifically, it is a measure of how much energy the emissions of 1 ton of a gas will absorb over a given period of time, relative to the emissions of 1 ton of carbon dioxide (CO2). The larger the GWP, the more that a given gas warms the Earth compared to CO2 over that time period.
https://www.epa.gov/ghgemissions/understanding-global-warming-potentials

Ecology revised the proposed rule to more clearly identify the different types of product categories so that manufacturers cannot fall into multiple categories for the same product. We did not add the owner's manual disclosure option for the refrigerant used in commercial refrigeration because stakeholders previously reported that the substitute used is included in the UL label or other nameplate-type label. The HFC law requires us to consider existing labeling.

6.3.6 Consistency with other states for labeling requirements

Ecology evaluated whether we can apply the disclosure/labeling requirement only for restricted or prohibited substitutes, based on stakeholder concerns and review of the USCA model rule. This alternative would not have met the objectives of the authorizing law. Ecology must follow the direction of the HFC law, which requires disclosure of the substitute used. The HFC law did not distinguish between prohibited substitutes or acceptable uses of prohibited substitutes, or for acceptable (non-HFC) substitutes. We recognize that this would affect more products than what may be covered in other states and would not require labeling for the acceptable uses of prohibited substitutes that are exempted in the rule. This decision was based on the HFC law direction to be consistent where feasible with other states adopting HFC rules and determines the least burdensome set of requirements.

6.3.7 Alternative date for labeling requirements

Ecology evaluated alternatives for when the labeling requirement should begin. The HFC law does not prescribe a start date for labeling. Ecology chose to allow up to one year after an applicable prohibition date, or up to one year after the effective date of the rule (for the January 1, 2020 prohibition dates) to give manufacturers time to adjust their processes if necessary. The alternatives of an earlier date (or no date), or a later date, would have imposed additional burden on covered parties, or not met goals and objectives of the statute, respectively.

6.3.8 Modified prohibition date for vending machines

Moving the prohibition date for vending machines from January 1, 2020 to January 1, 2022 was done because Ecology made a determination that modifying the deadline protected the environment and public health while technology for lower risk alternative substitutes is being developed. Retaining the 2020 prohibition date would have imposed more burden on covered parties and potentially failed to meet the goals and objectives of the authorizing law by causing vending machine manufacturers to use higher risk substitutes.

6.4 Conclusion

After considering alternatives to the proposed rule's contents, within the context of the goals and objectives of the authorizing statute, we determined that the proposed rule represents the least-burdensome alternative of possible rule contents meeting the goals and objectives.

Chapter 7: Regulatory Fairness Act Compliance

The Regulatory Fairness Act (RFA; RCW 19.85.070) requires Ecology to perform a set of analyses and make certain determinations regarding proposed rules, if they impose more than minor compliance costs on businesses in an industry.

We analyzed the compliance costs of the proposed rule, and whom they fall on, in Chapter 3 of this document. We determined that no businesses in Washington State would incur compliance costs under the proposed rule. Based on the available list of manufacturers (who were all required to report to Ecology by December 31, 2019 under the baseline), we expect all affected manufacturers to be businesses outside of Washington State (in other states or other countries, while their products are sold in Washington).

Based on this analysis, Ecology is exempt from performing additional analyses under the RFA, specifically (bold added for emphasis):

- RCW 19.85.020(1), which defines industry: " **"Industry" means all of the businesses in this state** in any one four-digit standard industrial classification as published by the United States department of commerce, or the North American industry classification system as published by the executive office of the president and the office of management and budget."
- RCW 19.85.030(1)(a), which states: "In the adoption of a rule under chapter 34.05 RCW, an agency shall prepare a small business economic impact statement: (i) If the proposed rule will impose more than minor costs on **businesses in an industry**; or (ii) if requested to do so by a majority vote of the joint administrative rules review committee within forty-five days of receiving the notice of proposed rule making under RCW 34.05.320."
- RCW 19.85.025(4), which states: "This chapter does not apply to the adoption of a rule if an agency is able to demonstrate that the proposed rule does not affect **small businesses**."

References

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2. Chapter 284, Laws of 2019 (Engrossed Second Substitute House Bill 1112) Hydrofluorocarbons Greenhouse Gas Emissions, Chapter 70.235 RCW Limiting Greenhouse Gas Emissions, Chapter 70.94 RCW Washington Clean Air Act.
3. HFCs notification report. Ecology. 2020
4. Polyethylene (PE) Foams Market by Type (Non-XLPE and XLPE), End-Use Application (Protective Packaging, Automotive, Building & Construction, Footwear, Sports & Recreational, and Medical), and Region - Global Forecast to 2021. https://www.marketsandmarkets.com/Market-Reports/polyethylene-foam-market-129894004.html
5. Refrigerant Market Size & Share Report By Product (Fluorocarbon, Hydrocarbon, Inorganic), By Application (Stationary Air Conditioning, Chillers, & Heat Pumps, Mobile Air Conditioning, Commercial), and Segment Forecasts, 2018 – 2025. https://www.grandviewresearch.com/industry-analysis/refrigerant-market
6. Refrigerants Market by Type (HCFC, HFC, HFO, Isobutene, Propane, Ammonia, Carbon Dioxide, Air, Water, Propene, Isopentane), Application (Domestic, Commercial, Industrial, Chillers, Split AC, VRF, Window, MAC), and Region - Global Forecast to 2023. https://www.marketsandmarkets.com/Market-Reports/refrigerant-market-1082.html
7. US Bureau of Labor Statistics. https://www.bls.gov/oes/2018/may/oes172041.htm#nat

Appendix A
Administrative Procedure Act (RCW 34.05.328) Determinations

A. RCW 34.05.328(1)(a) – Clearly state in detail the general goals and specific objectives of the statute that this rule implements.

See Chapter 6.

B. RCW 34.05.328(1)(b) –

1. Determine that the rule is needed to achieve the general goals and specific objectives of the statute.

See chapters 1 and 2.

2. Analyze alternatives to rulemaking and the consequences of not adopting this rule.

The Washington legislature specifically directed Ecology to engage in rulemaking to implement a program for transitioning Washington away from HFCs. Waiting for a voluntary reduction by manufacturers would not meet the goals, objectives and specific compliance deadlines established by the legislation to reduce greenhouse gases in Washington. For this reason, we considered no other alternatives.

Please see the Least Burdensome Alternative Analysis, Chapter 6 of this document, for discussion of alternative rule content considered.

C. RCW 34.05.328(1)(c) - A preliminary cost-benefit analysis was made available.

When filing a rule proposal (CR-102) under RCW 34.05.320, Ecology provides notice that a preliminary cost-benefit analysis is available. At adoption (CR-103 filing) under RCW 34.05.360, Ecology provides notice of the availability of the final cost-benefit analysis.

D. RCW 34.05.328(1)(d) – Determine that probable benefits of this rule are greater than its probable costs, taking into account both the qualitative and quantitative benefits and costs and the specific directives of the statute being implemented.

See chapters 1 – 5.

E. RCW 34.05.328 (1)(e) - Determine, after considering alternative versions of the analysis required under RCW 34.05.328 (b), (c) and (d) that the rule being adopted is the least burdensome alternative for those required to comply with it that will achieve the general goals and specific objectives stated in Chapter 6.

Please see Chapter 6.

F. RCW 34.05.328(1)(f) - Determine that the rule does not require those to whom it applies to take an action that violates requirements of another federal or state law.

The actions required by this rulemaking would not require covered parties to violate existing federal or state laws or rules.

G. RCW 34.05.328 (1)(g) - Determine that the rule does not impose more stringent performance requirements on private entities than on public entities unless required to do so by federal or state law.

As directed by Chapter 284, Laws of 2019 (Engrossed Second Substitute House Bill 1112) the rule applies to manufactures of products and equipment within the same the same end-use categories as those adopted in Rules 20 and 21 under EPA's Significant New Alternatives Policy Program (SNAP). Under SNAP, certain military or space and aeronautics applications are exempt from prohibition (or have a delayed prohibition date) in the air conditioning and foam end-use categories.

H. RCW 34.05.328 (1)(h) Determine if the rule differs from any federal regulation or statute applicable to the same activity or subject matter.

[Yes]

If **yes**, the difference is justified because of the following:

☒ (i) A state statute explicitly allows Ecology to differ from federal standards.

Engrossed Second Substitute House Bill 1112 requires Ecology to adopt a rule in a manner similar to HFC regulations adopted by EPA under SNAP. The legislation requires different (later) prohibition dates than in the federal rule. The rule reflects the prohibition dates in the legislation.

☐ (ii) Substantial evidence that the difference is necessary to achieve the general goals and specific objectives stated in Chapter 6.

I. RCW 34.05.328 (1)(i) – Coordinate the rule, to the maximum extent practicable, with other federal, state, and local laws applicable to the same subject matter.

Ecology staff worked with the United States Climate Alliance (USCA) a bipartisan collation of states with governors committed to reducing greenhouse gas emissions consistent with the goals of the Paris Agreement. The USCA states adopted a "model rule" for use by states adopting HFC rules around the country. Ecology relied on the USCA model rule to the extent practicable considering specific requirements of the 2019 Washington legislation.