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IDENTIFYING “ENVIRONMENTAL GOODS”

Elizabeth Butscher

I. INTRODUCTION

The need to identify goods that can combat the harmful effects of climate change is more necessary than ever given rising global temperatures and increasing environmental degradation. In 1999, the OECD/Eurostat Informal Working Group agreed upon a working definition for an “environmental good,” also referred to as green goods.¹ The OECD determined that environmental goods are goods that, “measure, prevent, limit, minimize or correct environmental damage to water, air and soil, as well as problems related to waste, noise and eco-systems . . . includ[ing] cleaner technologies, products and services that reduce environmental risk and minimize pollution and resource use.”² However, despite the OECD’s groundbreaking and comprehensive definition, to this day there is no consensus as to which goods fall within this definition.

A number of countries and other international organizations have attempted to create their own lists of goods that can fit within the definition of “environmental goods” (or fit within similar definitions of their own). By utilizing broad categories for goods, many of these lists have been designed as “living lists,” allowing them to change collaboratively as time goes on in order to include new technologies. While international organizations and countries have successfully identified specific environmental goods, including through the use of trade agreements, the United States, lagging behind, has not identified its own environmental goods list.

Meaningful progress was made at WTO when the U.S. joined with other Members in negotiating an Environmental Goods Agreement (EGA). However, these negotiations ultimately collapsed due to differing opinions on what constitutes an environmental good. Despite this initial setback, there has been renewed interest in the EGA in recent years. In 2022, WTO Director-General Ngozi Okonjo-Iweala emerged as a proponent for relaunching EGA negotiations, noting how such an agreement could serve as a “force multiplier for climate mitigation and adaption efforts.”³ That same year, U.S. Representative Suzan DelBene introduced a resolution calling on the Office of the U.S Trade Representative (USTR) to relaunch EGA negotiations.⁴

Unfortunately, despite widespread interest in reviving the EGA and recognition of its potential as an effective trade tool, neither the U.S. government or other WTO Members have made official moves to restart negotiations. Instead, many countries have turned to plurilateral negotiations, forming agreements among like-minded countries to liberalize trade in select environmental goods.⁵ Nevertheless, even in the absence of the EGA, the U.S. incentivizes certain environmental goods through domestic policies.

One way the U.S. is showing interest in these goods is through procurement policies. According to a 2022 National Association of State Procurement

1 The term environmental goods and green goods are often used synonymously by many organizations, including the EPA. For the purpose of this paper, the term “environmental goods” will be used. See <https://www.epa.gov/greenerproducts/frequent-questions-about-sustainable-market-place-and-green-products>

2 The Environmental Goods and Services Industry: Manual for Data Collection and Analysis, OECD 9 (1999) https://unstats.un.org/unsd/envaccounting/ceea/archive/EPEA/EnvIndustry_Manual_for_data_collection.PDF

3 Emily Benson, *Beyond Bicycles: A New Momentum Behind Environmental Goods Negotiations?* CSIS (Jan. 26, 2023) <https://www.csis.org/analysis/beyond-bicycles-new-momentum-behind-environmental-goods-negotiations>.

4 Press Releases: DelBene Introduces Legislation to Encourage Green Economy & Manufacturing (Apr. 7, 2021) <https://delbene.house.gov/news/documentsingle.aspx?DocumentID=2779>.

5 See section IV(b) below for some examples.

Officials survey, 34 states have at least one green procurement program.⁶ Many of these programs focus on environmentally preferred purchasing, which involves purchasing goods that are better for human health and the environment based on specific ecolabels and third-party standards. For example, New York requires state agencies and authorities to purchase products that meet approved purchasing specifications that reduce the health and environmental risks of certain products.⁷

Current procurement trends in the U.S. aim to expand the broader market for “green” products across various sectors, including refrigerators, dehumidifiers, and even floor coverings. These products are typically listed in large databases where purchasers can search for goods independently verified as energy efficient or sustainably produced. The federal government maintains its own database (known as the Sustainable Facilities Tool),⁸ which offers energy efficient or sustainably produced alternatives for a variety of products for both commercial and residential use, helping purchasers make more informed decisions. However, while the practice of encouraging, or even requiring, the purchase of goods that meet third-party sustainability labeling is common, there has been an increase in stricter procurement programs based on embodied emissions for select products, discussed in greater detail in section III below.

The goals of this brief are to (1) survey the U.S.’s current environmental goods policies, and (2) present other examples of environmental goods to provide an overview of the goods that domestic policymakers could consider as part of their climate action strategies, both in relation to trade policy and government procurement. Notably, any list that policymakers eventually develop should be flexible or “living” so that the U.S. can respond to technological advancements. This brief examines various domestic laws, regulations, policies, and press releases that incentivize or prioritize certain goods related to the broad OECD environmental goods definition in order scope out the goods that could be prioritized by the U.S. It also identifies the various goods the U.S. seems to consider “environmental” and compares such goods with the more comprehensive international lists.

II. DISTINCTIONS BETWEEN ENVIRONMENTAL GOODS

U.S.-issued guidance and policies reveal two distinct categories of goods: procured goods and incentivized goods.

a. Procured

Procurement policies are policies guiding both federal and state government purchasing power. These purchases include tangible things such as physical materials or products and even intangibles like energy. Procurement policies place greater emphasis on calculating and reporting embodied emissions. For example, in many U.S. procurement policies, construction materials are frequently purchased to improve infrastructure. These goods, such as steel and concrete, are highly emissions intensive yet they are necessary for future building projects. So, recent procurement policies have required that, in order to be procured by the government, these goods must be produced below a

⁶ Stephen Lee, *Green Procurement Makers Struggle to Sell to US City and State Governments*, Bloomberg (Feb. 20, 2024) <https://www.bloomberg.com/news/features/2024-02-20/biden-s-push-to-buy-green-meets-resistance-from-cities-and-states>.

⁷ *Approved GreenNY Specifications*, NY Office of General Services, <https://ogs.ny.gov/greenny/approved-greenny-specifications>.

⁸ Sustainable Facilities Tool, <https://sftool.gov/>.

■ certain level of embodied emissions. This embodied emissions requirement is what makes these products an “environmental good” for procurement purposes. The focus is on the amount of energy that went into the production of the good, making its inclusion as an environmental good conditional on its production process.

■ If the procurement policy is not focused on construction materials, it is often focused on forms of energy, with the trend moving towards favoring renewable energy over fossil fuel energy. For example, a government may create a procurement policy where power from a wind farm is purchased over a coal mine precisely because the energy comes from a wind farm. The calculating of emissions is less clear compared to goods like construction materials, but it is still related. Green hydrogen is of particular interest to the federal government, but its emissions during production can vary wildly based on what technologies were used to produce the good. This distinction is what is of issue when it comes to procurement of energy.

Overall, goods found in procurement policies are very clearly tied to the political goal of that policy. If a government wants to transition to zero-emission vehicles for all of its transportation needs, then the goods within that policy will be directly tied to that goal. With that said, procurement policies tend to have shorter lists of goods because they have much more specific aims.

b. Incentivized

Policies that encourage or incentivize the use of the goods also provide clues to the goods valued by the government for environmental and climate reasons. For example, policies such as tax credits for the production of certain goods highlight which goods are valued. Lists that clearly identify “environmental goods” for the purpose of lowering barriers to trade in these goods also fall into this category. Since these goods are not included in these regulations with an explicit procurement intent, for the purpose of this paper, this category of goods is referred to as “incentivized” goods in this document.

In contrast to procured goods, there tends to be less of an emphasis on calculating and reporting the embodied emissions of incentivized goods. With the notable exception of clean fuels—which will be discussed in greater detail below—these policies do not set thresholds for carbon intensity or embodied emissions. This could be because these goods are often framed as being positively-related to the environment, since they typically come from the renewable energy, pollution control, and resource management sectors. Using renewable energy as an example, there are currently no requirements that solar panels be produced below a certain carbon intensity. The only clear requirement these products have for the majority of U.S. policies is a “Buy American” requirement. Compared to construction materials, renewable energy technologies face less scrutiny, as their environmental benefits are assumed, leading to less analysis of their production processes.

It is also possible that, as compared to procurement policies, the government is simply not familiar enough with the production processes of these incentivized goods to set thresholds at this time. Governments have been purchasing “procured” goods for years, well before the Buy Clean Initiative discussed below. The only difference today is that there is a focus on procuring lower carbon embodied versions of these products. This means that the governments have much more experience and understanding of the products they are currently procuring, which makes them easier to analyze.

III. PROCURED GOODS

Procurement policies reveal which goods governments value and want to implement. However, procurement policies also tend to have multiple goals beyond environmental ones, such as increasing domestic production and improving social equality. This means that the products included in these lists are more clearly defined in order to control all of the possible impacts. For the purposes of this analysis, the focus is on U.S. procurement policies with a primarily environmental intent.

a. Executive Order 14057 (2021)

Executive Order 14057, issued in late 2021, focused on catalyzing clean energy and federal sustainability. This Executive Order was part of a federal government effort to “lead by example” in order to achieve both net-zero emissions economy-wide by no later than 2050 and a carbon pollution-free electricity sector by 2035.⁹ A large focus of this Executive Order is on transforming federal procurement in the areas of construction, energy, and vehicle acquisitions.

i. Federal Buy Clean Initiative¹⁰

The transition towards net-zero emissions for federal procurement is best seen with the Federal Buy Clean Initiative, established under Executive Order 14057. The Initiative is split into two different branches, the Buy Clean Task Force and the Buy Clean Partnership, both of which focus on the public procurement of **construction materials with lower-embodied emissions**. To better understand the Buy Clean Initiative, the Task Force and Partnership are reviewed first, followed by an analysis of the General Services Administration’s (GSA) procurement program under Buy Clean. Although the GSA serves as a case study, the GSA is not the only federal agency working within the Buy Clean Initiative with a focus on procurement of low-embodied construction materials. Other agencies working in this area include the departments of Transportation, the Federal Highway Administration, and the Environmental Protection Agency—the agency tasked with providing technical assistance and guidance to other agencies on how to select lower-embodied carbon materials.

The Task Force is charged with developing recommendations on policies and procedures to expand consideration of embodied emissions in federal procurement and federally funded projects. This includes, among other goals, identifying materials with the highest amounts of embedded carbon and increasing transparency through supplier reporting of Environmental Product Declarations (EPDs). The Buy Clean Task Force is co-chaired by the Federal Chief Sustainability Officer and the White House Office of Domestic Climate Policy with representatives from various Departments across the federal government and White House, including the Department of Transportation, Energy, and Commerce. The Task Force accounts for 90% of all federally-financed and purchased construction materials.

The Buy Clean Partnership is a partnership with 13 different states (California, Colorado, Hawaii, Illinois, Maine, Maryland, Massachusetts, Michigan, Minnesota, New Jersey, New York, Oregon, and Washington) in which the states have committed to prioritize efforts that support the procurement of lower-carbon infrastructure materials in state-funded projects.

9 Executive Order on Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability, White House (Dec. 8, 2021) <https://www.whitehouse.gov/briefing-room/presidential-actions/2021/12/08/executive-order-on-catalyzing-clean-energy-industries-and-jobs-through-federal-sustainability/>.

10 Federal Buy Clean Initiative, Office of the Federal Chief Sustainability Officer, <https://www.sustainability.gov/buyclean/>.

An analysis of the GSA's procurement program shows that the Inflation Reduction Act of 2022 (IRA) works in tandem with the Buy Clean Initiative, with the Initiative providing guidance and the IRA providing the funding. IRA Section 60503 provides the GSA with \$2.15 billion for the acquisition and installation of construction materials and products with lower levels of embodied GHG emissions.¹¹ The materials covered under this section are:

- Concrete (and cement)
- Asphalt
- Steel
- Glass

A material or product qualifies for IRA funding if its global warming potential (GWP) reported in its EPD is lower than the limits set by the IRA in each contract. The GSA set low embodied carbon material requirements for the above products, separated into quintile (20% range) thresholds using data from EPD databases, industry-wide EPDs, and third party-verified life cycle assessments. The Top 20% Limit represents the best performing 20%, or the 20% lowest embodied GHG emissions. If there are no materials/products in the Top 20% in a project's location, then a material/product would qualify if it is in the Top 40%. If a Top 40% product is not available, then a material would qualify for funding if it is better than the estimated industry average.¹²

Bidders must submit EPDs that identify the material/product-specific GWP. The GSA requests facility-specific, supply-chain specific EPDs *where available* because this increases certainty of reported GWPs.¹³ However, as a baseline, the Buy Clean Initiative requires product-specific type III EPDs as the primary data source for implementation.¹⁴ Additionally, ENERGY STAR Energy Performance scores must be reported "for all plants in the supply chain for a specific construction product within the year of product purchase for which an ENERGY STAR Energy Performance Indicator for the product purchase category is available."¹⁵ This information gives the GSA greater insight into the energy efficiency of specific plants.

11 *Low-Embodied Carbon Program Details*, GSA, <https://www.gsa.gov/real-estate/gsa-properties/inflation-reduction-act/lec-program-details>

12 Cover Memo – EPA's Interim Determination for GDA & DOT/FHWA On Low Greenhouse Gas Construction Materials Under IRA Sections 60503 and 60506 (Dec. 22, 2022) https://www.epa.gov/system/files/documents/2023-01/2022.12.22%20COVER%20MEMO%20Interim%20Determination%20under%20IRA%20Sections%2060503%20and%2060506_508.pdf

13 *Frequently Asked Questions – GSA Interim Inflation Reduction Act (IRA) Low Embodied Carbon (LEC) Material Requirements* (May 16, 2023) <https://www.gsa.gov/system/files/FAQs-on-GSAs-IRA-LEC-Material-Requirements.pdf>.

14 *Frequently Asked Questions*, Federal Buy Clean Initiative, <https://www.sustainability.gov/buy-clean/#faqs>.

15 See *supra* note 12, at 7.

The GSA limits for low embodied carbon for the selected products are shown below:¹⁶

Concrete (and cement)

GSA IRA LIMITS FOR LOW EMBODIED CARBON CONCRETE (EPD-Reported GWPs in kilograms of carbon dioxide equivalent per cubic meter – kgCO ₂ e/m ³)			
Specific concrete strength class (compressive strength [f'c] in pounds per square inch [PSI])	Top 20% Limit	Top 40% Limit	Better than Average Limit
≤2499	228	261	277
3000	257	291	318
4000	284	326	352
5000	305	357	382
6000	319	374	407
≥7200	321	362	402

GSA IRA LIMITS FOR LOW EMBODIED CARBON CEMENT (EPD-Reported GWPs, in kilograms of carbon dioxide equivalent per metric ton – kgCO ₂ e/t)		
Top 20% Limit	Top 40% Limit	Better Than Average Limit
751	819	858

GSA IRA LIMITS FOR LOW EMBODIED CARBON CONCRETE MASONRY UNITS (EPD-REPORTED GWPS, IN KILOGRAMS OF CARBON DIOXIDE EQUIVALENT PER CUBIC METER– KGCO ₂ E/M ³)		
Top 20% Limit	Top 40% Limit	Better Than Average Limit
217	256	290

¹⁶ *Material Requirements*, GSA, <https://www.gsa.gov/real-estate/gsa-properties/inflation-reduction-act/lec-program-details/material-requirements>.

Asphalt

GSA IRA LIMITS FOR LOW EMBODIED CARBON ASPHALT (EPD-Reported GWPs, in kilograms of carbon dioxide equivalent per metric ton – kgCO ₂ e/t)		
Top 20% Limit	Top 40% Limit	Better Than Average Limit
55.4	64.8	72.6

Steel

	GSA IRA LIMITS FOR LOW EMBODIED CARBON STEEL (EPD-Reported GWPs in kilograms of carbon dioxide equivalent per metric ton – kgCO ₂ e/t)		
Steel Product Category	Top 20% Limit	Top 40% Limit	Better than Average Limit
Rebar (fabricated)	728	794	850
Rebar (unfabricated)	611	716	760
Hollow Structural Sections (fabricated)	1,778	1,854	1,898
Hollow Structural Sections from Electric Arc Furnaces (unfabricated)	1,580	1,620	1,652
Hollow Structural Sections from Integrated Mills (unfabricated)	TBD	TBD	TBD
Hot-Rolled Sections (fabricated)	1,022	1,128	1,163
Hot-Rolled Sections (unfabricated)	686	713	869
Cold-Formed and Galvanized (stud, track, framing, etc.)	2,228	2,324	2,408
Structural Steel Plate from Electric Arc Furnaces (unfabricated)	987	1,152	1,190
Structural Steel Plate from Integrated Mills (unfabricated)	TBD	TBD	TBD

Glass

GSA IRA LIMITS FOR LOW EMBODIED CARBON GLASS (EPD-Reported GWPs, in kilograms of carbon dioxide equivalent per metric ton – kgCO ₂ e/t)			
Glass Product Category	Top 20% Limit	Top 40% Limit	Better Than Average Limit
Flat Glass (per metric ton)	1,331	1,370	1,401

Source: GSA Material Requirements

ii. Carbon Pollution-Free Electricity

As part of the Federal Sustainability Plan, Executive Order 14057 outlines a path to power federal facilities with 100% carbon pollution-free electricity, including 50% on a 24 hour, 7 days-a-week basis, by 2030.¹⁷ The Department of Defense and GSA will help lead development and execution of procurement strategies focused on energy consumption. The current types of energy or products to be procured are as follows:¹⁸

- Green hydrogen energy
- Nuclear energy
- Solar photovoltaic panels

iii. Zero-Emission Vehicle Acquisitions

The Executive Order calls for the federal acquisition of zero-emission vehicles (ZEVs), such as electric vehicles by 2035, including 100% zero-emission light-duty vehicle acquisitions beginning 2027.¹⁹ A ZEV is any vehicle that produces zero tailpipe exhaust emissions of certain pollutants or greenhouse gases (GHGs).²⁰ This process involves not only acquiring electric vehicles, but also supplying the charging stations necessary to ensure these ZEVs are able to run. The goods to be procured are:

- Battery electric vehicles
- Plug-in hybrid electric vehicles
- Fuel cell electric vehicles
- Electric vehicle supply equipment
- Hydrogen stations

b. Buy Clean California (2017)

The Buy Clean California Act (BCCA), established in 2017, is a procurement regulation created to reduce GHG emissions released during the manufacture and transport of products used in public infrastructure projects in California.²¹ Since this is a procurement policy, the focus is again on construction and

¹⁷ See *supra* note 10.

¹⁸ 100% Carbon Pollution-Free Electricity on a Net Annual Basis by 2030, Including 50% on a 24/7 Basis, Office of the Federal Chief Sustainability Officer, <https://www.sustainability.gov/federalsustainabilityplan/carbon.html>.

¹⁹ 100% Zero-Emission Vehicle Acquisitions by 2035, including 100% Light-Duty Acquisitions by 2027, Office of the Federal Chief Sustainability Officer, <https://www.sustainability.gov/federalsustainabilityplan/fleet.html>.

²⁰ Federal Fleets: Zero-Emission Vehicle Implementation, GAO 1 (July 19, 2023) <https://www.gao.gov/assets/gao-23-105350.pdf>.

²¹ Buy Clean California Act, CA Department of General Services, <https://www.dgs.ca.gov/PD/Resources/Page-Content/Procurement-Division-Resources-List-Folder/Buy-Clean-California-Act>

manufacturing materials below a certain level of emissions. The maximum acceptable GWP for each material is established by the Department of General Services (DGS), in consultation with the California Air Resources Board (CARB). Specifically, the covered products are:

- Structural steel (hot-rolled sections, hollow structural sections, and plate)
- Concrete reinforcing steel
- Flat glass
- Mineral wool board insulation

Contractors must submit facility-specific material or product EPDs for either an unfabricated or fabricated product before the material will be accepted for installation. A facility-specific manufacturer EPD is a product EDP in which the environmental impacts are disclosed for a single manufacturer and single manufacturing facility.²² The EPD must show that the facility-specific GWP of the material or product does not exceed the maximum GWP, which has been set by the DGS at the industry average of facility-specific GWP for the eligible materials.²³ Alternatively, a companywide EPD can be accepted if the GWP is reported for each facility location separately. If the companywide EPD only reports an average GWP for multiple facility locations, then the EPD should not be accepted for compliance.

Beginning on January 1, 2025, and every three years after, the maximum GWP limits will be reviewed and potentially updated to reflect industry improvements. Adjustments to the GWP can only be made downwards (making the limits stricter) as the BCCA prohibits DGS from adjusting the limit upward.²⁴ The current maximum acceptable GWP limits for the covered products, both unfabricated and fabricated, are listed below.

Maximum Acceptable GWP Limit Summary

ELIGIBLE MATERIAL	MAXIMUM ACCEPTABLE GWP LIMIT FOR UNFABRICATED PRODUCT (CRADLE-TO-GATE)	MAXIMUM ACCEPTABLE GWP LIMIT FOR FABRICATED PRODUCT (A1 MODULE ONLY)
Hot-rolled structural steel section	1,010 kg CO ₂ eq. or 1.01E+03 kg CO ₂ eq. for one metric ton of structural steel	1,080 kg CO ₂ eq. or 1.08E+03 kg CO ₂ eq. for one metric ton of structural steel.
Hollow structural sections	1,710 kg CO ₂ eq. or 1.7101E+03 kg CO ₂ eq. for one metric ton of structural steel	1,830 kg CO ₂ eq. or 1.83E+03 kg CO ₂ eq. for one metric ton of structural steel.
Steel plate	1,490 kg CO ₂ eq. or 1.4901E+03 kg CO ₂ eq. for one metric ton of structural steel	1,590 kg CO ₂ eq. or 1.59E+03 kg CO ₂ eq. for one metric ton of structural steel.

22 *See id.*

23 *Buy Clean California Act (BCCA) Requirements*, Department of General Services, <https://www.dgs.ca.gov/RESD/Resources/Page-Content/Real-Estate-Services-Division-Resources-List-Folder/Buy-Clean-California-Act-BCCA-Requirements>.

24 See *supra* note 20.

Concrete reinforcing steel	890 kg CO ₂ eq. or 8.90E+02 kg CO ₂ eq. for one metric ton of bar	920 kg CO ₂ eq. or 9.20E+02 kg CO ₂ eq. for one metric ton of bar.
Flat glass	1,430 kg CO ₂ eq. or 1.43E+03 kg CO ₂ eq. for one metric ton of glass	N/A
Light-density mineral wool board insulation	3.33 kg CO ₂ eq. for 1 m ² of insulation at RSI=1	N/A
Heavy-density mineral wool board insulation	8.16 kg CO ₂ eq. for 1 m ² of insulation at RSI=1.	N/A

Source: *Buy Clean California Act Environmental Product Declaration (EPD) Compliance Guide* (Feb. 22, 2023)

While the maximum limits of embodied emissions for both IRA Section 60503 and the BCCA are relatively similar, the requirements for the BCCA are stricter because of the requirement that the EPD be facility-specific. This requires contractors disclosing the environmental impacts from a specific product *within* a specific facility. This provides the BCCA not only with explicit product information, but also information on the emissions of the facility which provides the state with a greater understanding of who they will be purchasing from. Unlike the IRA, the BCCA does not “request” a facility-specific EPD if it is available, rather the EPD must be facility-specific in order to be accepted. Even the EPA acknowledges that facility-specific EPD are at an increased level of specificity, as it provides data on a specific product from a single facility, compared to the product-specific EPDs required by the IRA.²⁵

IV. INCENTIVIZED GOODS

U.S. regulations and guidance provide a glimpse into the “environmental goods” most valued by the government, outside of procurement contexts. Lists of environmental goods created by international bodies or in the context of international initiatives are generally more capacious and more often geared at lowering barriers to trade in those goods.

a. United States

Unlike international bodies, the U.S. does not create explicit lists of environmental goods. Instead, goods are identified within certain policies or regulations as being incentivized in some manner. Some of the policies present projects or types of energy generation rather than specific products. For example, the IRA offers a tax credit for “solar technologies” without specifying a particular good such as a “solar cell” or a “solar module.” This difference in presentation (project over product) illustrates the difficulty in harmonizing some of these goods for comparison purposes.

i. EPA Green Power Partnership (2001)

The U.S. EPA developed its Green Power Partnership in 2001, seeking to encourage organizations to use “green power” voluntarily to protect human

²⁵ *Getting to Substantially Lower Embodied Greenhouse Gas Emission Construction Materials: Environmental Product Declaration Assistance*, EPA Office of Chemical Safety & Pollution Prevention (Mar. 22, 2023) https://www.epa.gov/system/files/documents/2023-04/March%202022%20-%20OCSP%20IRA%20Programs%20-%20EPD%20Assistance%20-%20final_ec.pdf.

health and the environment.²⁶ Rather than identify certain goods, this list identifies certain energy sources. According to the EPA, “green power” is defined as electricity produced from:

- Solar energy
- Wind energy
- Geothermal energy
- Biogas
- Eligible biomass
- Low-impact small hydroelectric energy

ii. Inflation Reduction Act (2022)

The IRA provided many subsidies, in the form of tax credits, to various renewable energy sectors. The Investment Tax Credit, Production Tax Credit, Carbon Capture and Sequestration Tax Credit, Clean Hydrogen Tax Credit, and the Clean Vehicle Tax Credit all incentivize renewable energy technologies. Specifically, these tax credits cover:²⁷

- Energy storage technologies
- Microgrid controllers
- Fuel cells
- Geothermal (heat pump and direct use) energy
- Combined heat and power
- Microturbines
- Interconnection costs
- Biomass
- Landfill gas
- Hydroelectric energy
- Marine and hydrokinetic energy
- Multiple solar and wind technologies
- Municipal solid waste
- Geothermal (electric) energy
- Tidal energy
- Carbon capture and sequestration technology
- Clean hydrogen technology
- Plug-in electric vehicles
- Fuel cell vehicles

The IRA also has a Clean Fuel Production Tax Credit, available for the domestic production of clean transportation fuels, including sustainable aviation fuels.²⁸ In order to receive the benefit of the tax credit, the fuels must have been created with less than 50 kilograms of carbon dioxide equivalent per million British thermal units (CO₂e per mMBTU)—this qualifies as “clean” fuel. The following fuels can be covered under this credit if they fall below the 50 kg CO₂e/mMBTU:

²⁶ EPA’s Green Power Partnership: Partnership Requirements, EPA (May 2019) https://www.epa.gov/sites/default/files/2016-01/documents/gpp_partnership_reqs.pdf.

²⁷ Summary of Inflation Reduction Act Provisions Related to Renewable Energy, EPA, <https://www.epa.gov/green-power-markets/summary-inflation-reduction-act-provisions-related-renewable-energy>; Carbon Capture and the Inflation Reduction Act, Clean Air Task Force, <https://cdn.catf.us/wp-content/uploads/2023/02/16093309/ira-carbon-capture-fact-sheet.pdf>; U.S. Department of the Treasury, IRS Release Guidance on Hydrogen Production Credit to Drive American Innovation and Strengthen Energy Security, Dep’t of Treasury (Dec. 22, 2023) <https://home.treasury.gov/news/press-releases/jy2010>; Credits for New Clean Vehicles Purchases in 2023 or After, IRS, <https://www.irs.gov/credits-deductions/credits-for-new-clean-vehicles-purchased-in-2023-or-after>.

²⁸ Notice 2024-29, Section 45Z Clean Fuel Production Credit; Registration (May 31, 2024) <https://www.irs.gov/pub/irs-drop/n-24-49.pdf>.

- Low-GHG biodiesel
- Low-GHG butanol
- Low-GHG diesel fuel
- Low-GHG dimethyl ether
- Low-GHG ethanol
- Low-GHG gasoline
- Low-GHG hydrogen
- Low-GHG liquified petroleum gas
- Low-GHG methanol
- Low-GHG natural gas

In order to receive the benefit of the tax credit, these technologies and projects need to be completed in the United States. The IRA allows a credit for the production of these fuels beginning January 1, 2025.

iii. Proposed additions to the Environmental Goods Agreement (2014-2016)

In 2014 the U.S. joined a group of WTO Members in negotiating for an Environmental Goods Agreement (EGA), with the goal of eliminating tariffs on a range of environmental goods. Unfortunately, in 2016, negotiations on the EGA collapsed.²⁹ However, within the time frame of negotiations (2014-2016), the USTR posted an update on the negotiations on their website.³⁰ Within this update, USTR presented some examples of “made-in-America” environmental technologies that the U.S. wanted included in the EGA. These technologies come from a range of sectors, specifically renewable and clean energy generation, air pollution control, energy efficiency, water and wastewater treatment, solid and hazardous waste treatment, and environmental monitoring and analysis. The specific products mentioned were:

- Solar panels
- Gas turbines
- Wind turbines
- Soot removers
- Wet scrubbers
- LED lights
- Industrial automation systems
- Ultraviolet disinfection
- Desalination equipment
- Recycling equipment
- Composting systems
- Air quality monitors
- Water quality monitors

Despite its informal nature, this is the most comprehensive list available of what the United States government considers to be environmental products.

2. International

The following lists originate from international organizations or initiatives. All of these lists were created with the purpose of identifying environmental goods to increase their uptake by lowering tariffs on their importation. They cover a wider spectrum of products compared to the U.S. lists identified above.

²⁹ William Alan Reinsch, Emily Benson & Catherine Puga, *Environmental Goods Agreement: A New Frontier of an Old Stalemate*, CSIS (Oct. 28, 2021) <https://www.csis.org/analysis/environmental-goods-agreement-new-frontier-or-old-stalemate>.

³⁰ Environmental Goods Agreement, USTR, <https://ustr.gov/trade-agreements/other-initiatives/environmental-goods-agreement>.

Due to the extensive number of products included, specific goods have been compiled into broader categories. Separate charts annexed to this document contain the more detailed lists used (See Annex 2).

i. OECD (1999)

The OECD working list was developed in 1999, based on the organization's own working definition of the term "environmental good" discussed above. This list was split into three different categories of goods: pollution management, cleaner technologies and products, and resource management. This list's large size is due in part to an acknowledgement of the dual nature of goods (i.e. the good can be used for both an environmental purpose and a non-environmental purpose).

The pollution management group is comprised of goods that are clearly supplied for an environmental purpose only, that have a significant impact in reducing polluting emissions, and are easily statistically identifiable.³¹ The cleaner technologies group is comprised of goods which reduce or eliminate negative environmental impacts, but which are often supplied for purposes other than the environment and for which—at the time—statistical assessment remained disputed, difficult, or expensive.³² Finally, the resource management group is comprised of goods which may be associated with environmental protection, although their prime purpose is not environmental protection (e.g. energy saving and management, renewable energy plants or indoor air pollution control).³³ When this list was developed, there were many unknowns surrounding the last two categories of goods, but there was an expectation that these categories would grow in importance in the future.

ii. APEC (2012)

The Asia Pacific Economic Cooperation (APEC) List of Environmental Goods was developed by the 21 APEC member states in 2012 (including the U.S.). The APEC members agreed to reduce applied tariff rates to 5% or less by the end of 2015 on these products. The list, endorsed in 2012, includes 54 sub-headings, covering primarily industrial products that can fall into wider categories of goods such as air pollution control, solid waste management, and renewable energy technology.³⁴ Though these commitments are non-binding, as of 2021, 19 APEC members were fully compliant with the environmental goods provisions.³⁵ Compared to the OECD list, the APEC list is considerably shorter and there is only a 30% product overlap between the lists.³⁶ From a development perspective, it is notable that the majority of the goods covered tend to represent the interests of developing countries, who are the primary exporters of much of the "end of line" technology included in the list.

31 *The Environmental Goods and Services Industry: Manual for Data Collection and Analysis*, OECD 11 (1999) https://unstats.un.org/unsd/envaccounting/ceea/archive/EPEA/EnvIndustry_Manual_for_data_collection.PDF.

32 *See id.*

33 *See id.*

34 The full list of categories includes: environmentally preferable products, air pollution control, management of solid and hazardous waste and recycling systems, renewable energy production, waste water management and potable water treatment, natural risk management, and environmental monitoring analysis and assessment equipment. See Annex C – APEC List of Environmental Goods, https://www.apec.org/meeting-papers/leaders-declarations/2012/2012_aelm/2012_aelm_annexc.

35 *APEC Advances Environmental Goods Tariff Cut*, APEC Market Access Group (Mar. 11, 2021) https://www.apec.org/press/news-releases/2021/0311_mag; *Scoping Study on New and Emerging Environmental Goods*, APEC Market Access Group 9 (Dec. 2021) https://www.apec.org/docs/default-source/publications/2021/12/scoping-study-on-new-and-emerging-environmental-goods/221_mag_scoping-study-on-new-and-emerging-environmental-goods.pdf.

36 *See supra* note 28.

The 2012 APEC List included “ex-outs” which are descriptions of a specific product that ensures the correct tariff is being applied. In the climate context, this would allow countries to specify when tariffs would be applied to a particular good if the good has a dual use. For example, an ex-out allows a country to specify that tariffs apply to mufflers only when they are imported for use in airplanes (a non-environmental good), but not when they are to be used in wind turbines (an environmental good).³⁷

In 2021, there were calls to increase the number of goods on the list with a focus on global-value chains and a desire to expand the list to include new technologies that might not have existed back in 2012.³⁸ There has yet to be official action taken to expand the list.

iii. EU — Environmental Goods and Services Sector Accounts Handbook (2016)

In 2016, the EU created a Handbook entirely focused on environmental goods and services and their impact on the environment. In this Handbook, the EU defined environmental products as products that directly serve environmental protection (EP) or resource management (RM) or are specifically designed products whose use serves EP or RM.³⁹ Within environmental products, they have split them up into two broad categories of products: environmental specific products and cleaner and resource efficient products. Environmental specific products primarily serve environmental protection or resource management purposes, for example, sewage services, treatment and disposal services for waste, and equipment for renewable energy protection. Cleaner and resource efficient products primarily serve a non-environmental purpose but may serve a secondary environmental purpose because they are specifically designed to be more environmentally friendly or more resource efficient than normal products of equivalent use.⁴⁰

iv. IMF (2021)

The IMF list is a modern expansion of the OECD list, which includes newly identified products that were simply not available at the time the OECD list was created, including electric and hybrid vehicles and rechargeable batteries. In this list, environmental goods are defined to include both goods connected to environmental protection (connected goods) and goods that have been adapted to be more environmentally friendly or “cleaner” (adapted goods).⁴¹

5. Trade and Environmental Sustainability Structured Discussions: Informal Working Group on Environmental Goods and Services (2024)

The WTO Trade and Environmental Sustainability Structured Discussions (TESSD), launched in 2020, is a series of structured discussions aiming to intensify work on trade and environmental sustainability at the WTO. TESSD has created informal working groups and in 2021 created a working group on Environmental Goods and Services. This working group was tasked with developing a list of environmental goods in an effort to promote and facilitate trade

³⁷ See *id.*

³⁸ Carlos Kuriyama, *A Review of the APEC List of Environmental Goods*, APEC Policy Support Unit 10 (Oct. 2021) https://www.apec.org/docs/default-source/publications/2021/10/a-review-of-the-apec-list-of-environmental-goods/221_psu_review-of-apec-list-of-environmental-goods.pdf?sfvrsn=42cdd8b7_1.

³⁹ *Environmental Goods and Services Sector Accounts: Handbook*, Eurostat 12 (2016) <https://ec.europa.eu/eurostat/documents/3859598/7700432/KS-GQ-16-008-EN-N.pdf/f4965221-2ef0-4926-b3de-28eb4a5faf47?t=1476868680000>.

⁴⁰ See *id.* at 15.

⁴¹ *Trade in Environmental Goods*, IMF Statistics 1 (last updated Nov. 15, 2021) <https://climatedata.imf.org/documents/ad5179b954ed4a8389bf6400324a901e/explore>.

in those goods. While the group hopes to expand the list over time to include more sectors, they selected the renewable energy sector as the first sector to examine in 2024.⁴²

vi. ACCTS (2024)

The Agreement on Climate Change, Trade and Sustainability (ACCTS) between New Zealand, Costa Rica, Iceland, and Switzerland is based on meaningfully addressing climate change and environmental issues through trade.⁴³ The ACCTS contributes to climate action by fostering liberalization of trade in environmental goods through tariff elimination and providing a framework to discipline and eliminate harmful fossil fuel subsidies. At the end of negotiations on June 21, 2024, it was revealed that a list of over 300 environmental goods to be liberalized and traded was created. Examples of goods on the list include solar panels, wind and hydraulic turbines, electric vehicles, wool fiber, recycled paper, electric static converters, and wood products offering a more environmental alternative to carbon-intensive construction materials. However, the full list of goods has not yet been publicly released. The Agreement is currently undergoing legal verification and official translation, a process which can take several months, after which the ACCT parties can then sign the agreement.

V. CONCLUSION

Environmental goods can span a wide breadth of sectors and uses. The policies examined in this brief cover both procurement policies and regulations that incentivize the use/trade of certain products. Procured goods tend to have a greater emphasis on embodied emissions than incentivized goods. This emphasis can be due to the inherent environmentally-related nature of some of the incentivized goods, such as solar panels or wind turbines, but may also result from the government focusing its technical expertise on products it is already familiar with.

This survey has shown that many goods appear repeatedly on various lists, with those related to renewable energy technologies being the most frequently incentivized (See Annex 1 below). The lists reviewed provide guidance on products that policymakers could prioritize, as these goods are supported and recognized as environmental goods, either domestically or internationally. For U.S. purposes, these lists offer a broad overview of the current consensus on the range of “environmental goods,” informing both procurement and trade policies:

Progress on climate action through increased trade in environmental goods can occur on at least two fronts: 1) multilaterally at the WTO or 2) plurilaterally among a coalition of willing countries. While a multilateral undertaking would symbolize a global commitment towards tackling climate change, it would be a much heftier task to accomplish. If Members can agree on the scope early on, many of the issues that stalled negotiations could be surmounted. However, given that the inability to define environmental goods was a major stumbling block in EGA negotiations, it is unclear if positions on this definition have evolved enough to facilitate consensus.

42 Informal Working Group on Environmental Goods and Services, Analytic Summary. [WT/MIN\(24\)/11/Add.3](#)

43 *What is the Agreement on Climate Change, Trade and Sustainability (ACCTS)?* <https://www.mfat.govt.nz/en/trade/free-trade-agreements/free-trade-agreements-concluded-but-not-in-force/agreement-on-climate-change-trade-and-sustainability-accts/what-is-the-agreement-on-climate-change-trade-and-sustainability-accts>.

PROCURED GOODS	INCENTIVIZED GOODS	
<ul style="list-style-type: none"> • Concrete (and cement) • Asphalt • Steel (hot-rolled, hollow structural sections, and plate) • Glass (flat glass) • Mineral wool board insulation • Energy (green hydrogen, nuclear) • Solar photovoltaic panels • Battery electric vehicles • Plug-in hybrid electric vehicles • Fuel cell electric vehicles • Electric vehicle supply equipment • Hydrogen stations 	<ul style="list-style-type: none"> • Fuel cells / energy storage technologies • Microgrid controllers • Microturbines • Low-GHG biodiesel • Low-GHG butanol • Low-GHG diesel fuel • Low-GHG dimethyl ether • Low-GHG ethanol • Low-GHG gasoline • Low-GHG hydrogen • Low-GHG liquefied petroleum gas (LPG) • Low-GHG methanol • Low-GHG natural gas • Carbon capture and sequestration technology 	<ul style="list-style-type: none"> • Clean hydrogen technology • Plug-in electric vehicle (EV) • Fuel cell vehicle (FCV) • Solar panels • Gas turbines • Wind turbines • Soot removers • Wet scrubbers • LED lights • Industrial automation systems • Ultraviolet disinfection • Desalination equipment • Recycling equipment • Composting systems • Air quality monitors • Water quality monitors

Furthermore, with large economies like the U.S. showing little interests to re-engage in negotiations, it is unlikely that progress would be swift. Pursuing the plurilateral route could lead to quicker agreements as it would involve a smaller group of like-minded countries, thereby reducing the conflicts that hindered EGA negotiations. However, plurilateral action has its own limitations. Because it involves fewer countries, the impact on climate change may be limited. While multiple smaller agreements could certainly have positive effects and push the needle forward, they may not be sufficient, especially if anti-climate actions continue globally. Regardless of which of the two paths is taken, what is key to remember is that meaningful progress on climate change requires **coordinated global action**.

Identifying environmental goods to increase their trade, whether by reducing trade barriers or increasing government purchases, is only a starting point, as boosting trade in environmental goods alone will not suffice to address the climate crisis.⁴⁴ Instead, actions like this need to be undertaken in conjunction with other policies aimed at limiting the production and consumption of environmentally harmful goods. A 2011 OECD study identified additional factors beyond the production and trade of environmental goods as determinants of green growth, including regulations that promote energy efficiency and impose higher taxes on environmentally harmful activities.⁴⁵

⁴⁴ See *supra* note 37, at 7 (“Picking certain products as targets for specific government policies may not necessarily have a big impact on growth and sustainable development at the economy-wide level”).

⁴⁵ See *id.*

- The next step should involve ensuring transparency through carbon accounting mechanisms, thereby identifying the embodied emissions of goods at the product level. Information on the carbon footprint of all goods, including goods that are labeled as “environmental goods,” adds a crucial layer of transparency, enabling governments and consumers to make informed choices about the goods they procure. Carbon accounting can help verify whether goods deemed “environmental goods” are in fact environmentally friendly. For example, if governments and consumers can verify through carbon accounting mechanisms that a solar cell has been produced below a certain level of emissions, this could confirm whether the product is a net-positive environmental good. Expanding the information available on these goods through carbon accounting is a necessary step to “greening” trade.

ANNEX 1: INCENTIVIZED GOODS – CATEGORY COMPARISONS

CATEGORY OF GOODS	POLICIES											
	IRA - Carbon Capture and Sequestration Tax Credit (45Q)	IRA - Clean Hydrogen Tax Credit (45V)	IRA - Production Tax Credit (PTC)	IRA - both ITC and PTC	IRA - Investment Tax Credit (ITC)	EPA Green Power	IRA - Clean Fuel Production Tax Credit (45Z)	Proposed U.S. additions to the EGA	EU	TESSD	APEC	OECD
Renewable and clean energy generation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Air pollution control								✓			✓	✓
Energy efficiency								✓	✓		✓	✓
Water and wastewater treatment								✓	✓		✓	✓
Solid and hazardous waste treatment								✓	✓		✓	✓
Environmental monitoring and analysis								✓	✓	✓	✓	✓