# Washington State 2021 Energy Strategy
# Industrial Sector Framing Document

## Introduction

The Washington Department of Commerce is developing the 2021 State Energy Strategy (SES) to support the state's ambitious goals to protect our climate while **ensuring an equitable transition to clean energy** and promoting the state's workforce and economy.

The development of the SES includes a sector-specific Technical Advisory Process (TAP) to evaluate policies and actions with both quantitative and qualitative analysis. The outcome will feed into a set of Advisory Committee recommendations to the Department of Commerce and, ultimately, a final report to the Governor and legislators. Please see the accompanying document for a full description of the description of WA State Energy Strategy TAP.

This document provides an overview of the key questions that the SES must address for the **Industrial Sector TAP**, an initial assessment of policy considerations and options, and topics for further research and discussion.

## 1. Focus and Framing Questions

The focus for the **Industrial Sector TAP** is on surveying the wide variety of opportunities and challenges experienced in different industries and identifying common themes that can be addressed with state-level policy and, if appropriate, local government policies. Using economic or energy data to characterize the portfolio of industries most deeply tied into Washington's energy system will be a part of the effort, providing a foundation to identify meaningful clusters or collaborations that can help meet the State Energy Strategy goals.

**A key overarching question is:**

- How will the industrial sector balance the multiple goals of state energy policy: deploy energy efficiency, develop clean energy technologies, provide clean energy jobs, and meet the state's greenhouse gas reduction targets?

**Related to this question, key issues to address in the SES are:**

1. **Efficiency, electrification, and low-carbon fuels**: Which existing technologies can reduce industry energy consumption, costs, or emissions over the next 10 years? Are these options cost-effective to the plant owner, and if so, what prevents their application? [*This question can be considered in the framework of the industry-technical strategy table shown in Figure 3.*]

2. **Innovation**: What new technologies can reduce industry energy consumption, costs, or emissions over the next 10 years? [*This question can be considered in the framework of the industry-technical strategy table shown in Figure 3.*]

3. **Economic Development**: How can Washington State be best set up to attract and host new clean energy manufacturing or R&D clusters? Are there particular technologies or business segments we should focus on?

4. **Industry retention:** What strategically important, Washington industries are currently at risk for closure or moving out of the state? What policies can be adopted, or support can be provided, to retain them? How will we balance preserving current jobs versus creating new ones?

5. **Jobs Creation, Workforce Development, and Retraining**: Are there clean energy technologies that could expand employment in a Washington industry? How can policies be used to support high labor standards, workforce readiness goals, and efforts to improve employment conditions for Washington workers? What types of training will workers need to meet future demands? Can uniform training standards support them? What are the best protections for workers impacted by changes (retraining? just transition? relocation?)

6. **Utility Role**: What roles can utilities, or other energy suppliers, play in helping industry achieve the state's energy goals?

7. **Energy-intensive trade-exposed (EITE) industries**: What specific opportunities do the cement, metals, refinery and other EITE industries have to decarbonize their production processes or increase energy efficiency? What efforts could the state take to work across state lines, regionally and nationally, to address competitiveness and emissions reduction? How can we avoid jobs leakage across state lines?

8. **Industrial markets:** Can Washington's consumers influence the energy intensity or carbon intensity of the industries that supply consumer products? How much would changes in consumer demand for low-energy or low-carbon products impact manufacturing and services in Washington, versus manufacturing and services outside Washington?

9. **Tax Policy and Public Funding**: How does Washington's tax structure affect the incentives of industrial plants to reduce emissions? What public funding mechanisms can be used to support the research, product development, and market development required to sustain a highly effective decarbonization framework in industry?

10. **Equity:** Would disadvantaged communities and vulnerable populations benefit from reductions in industrial emissions? How can environmental and economic justice be advanced through industrial policy?

The key questions will be used to guide discussions with Advisory Committee members, industry representatives, regulating agencies, and industrial energy specialists during the months of July and August. The Industry TAP will follow approximately this order of events:

1. Advisory Committee will be polled for those interested in the Industry sector.
2. Industry-interested AC members receive and review this Industry sector framing memo.

3. The technical analysis team will assess the industry-related parameters (e.g., efficiency technologies available, forecast equipment turnover, etc.) needed for computing deep decarbonization pathways, for reference in the following steps.
4. Advisory Committee meetings on July 23 and 29 will include an opportunity for attendees to provide responses to the questions, and to propose associated policies.
5. The technical analysis team will interview industry representatives, regulating agencies, and industrial energy specialists in late July and early August.
6. After the late July meetings, AC member feedback will be combined with industry-sector expert inputs to assemble possible Industrial sector policy proposals and crosswalked to the scenarios that provide the structure of the DDP modeling. This will be distributed to the AC members that have indicated their interest in the industrial sector for review and amendment.

## 2. Current Situation & Key Trends

Washington State's industrial sector is anchored on a small set of key industries. Each industry features its own unique drivers of energy consumption and associated technical and financial needs. A technical assessment of the sector needs the breadth and flexibility to accommodate a broad spectrum of solutions that invites participation of all of Washington's most important industrial businesses, not just a few.

GHG emissions from industry can be a combination of indirect emissions from electric consumption; direct emissions from fossil fuel combustion for process heat; and, more rarely, direct emissions from the process itself, for example in Washington from semiconductor fabrication and cement manufacture. The three types of GHG sources are interdependent and managing them can present challenges unique to each industry.

According to U.S. Energy Information Administration data, Washington's industrial sector induces 26% of the state's total energy demand. Greenhouse gas emissions do not correlate exactly to energy demand, and in Washington Department of Ecology's GHG inventory industrial sector emissions are about 28%. Those GHGs are caused by direct consumption of fossil fuels (13%), consumption of grid electricity (6%), and agricultural and industrial process emissions (9%).

The industrial sector presents a dual opportunity: on the one hand managing large-scale energy consumers for efficiency and GHG reduction, but on the other hand supporting cleantech and jobs growth. Balancing these two, sometimes-competing opportunities will require creativity.

**Identifying the key subsectors**

The Washington State Department of Ecology requires annual GHG reporting by all major emitters responsible for direct emissions of 10,000 $tCO_2e$/yr or more. This yields one possible characterization of Washington industries as depicted in Figure 1.

**FIGURE 1. Distribution of GHG Emissions from Major Industrial Emitters**

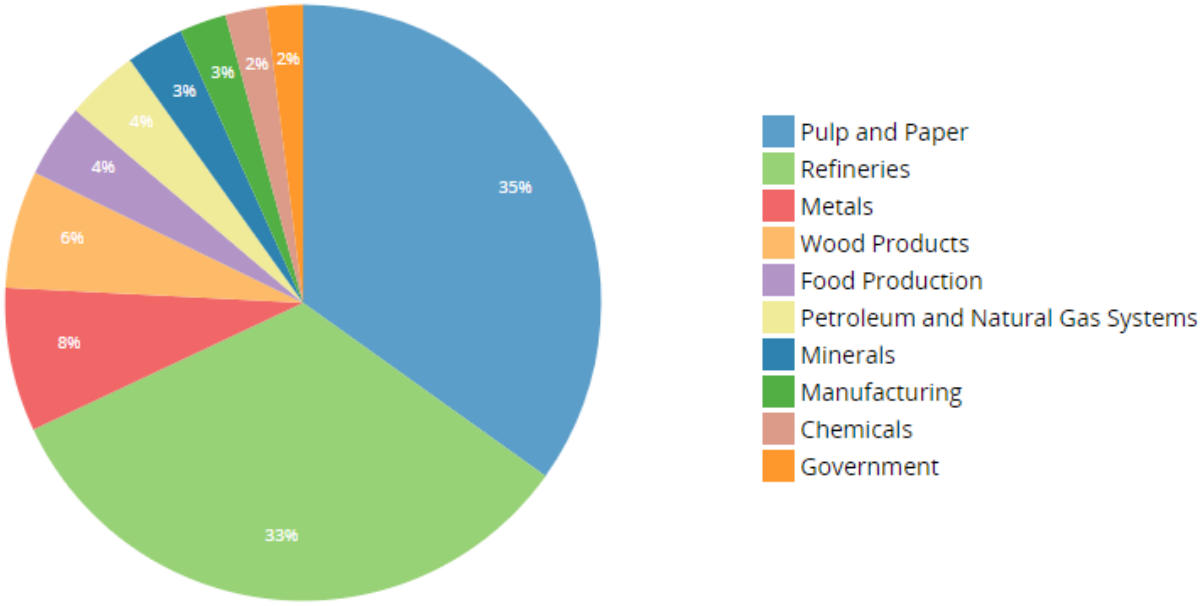


*Figure 1- Distribution of GHG emissions from major industrial emitters in 2018, by subsector. Most emissions from the Pulp and Paper and Wood Products subsectors are biogenic. The Metals subsector is dominated by the Alcoa Ferndale aluminum smelter, which is entering curtailment this year. The Government subsector consists almost entirely of steam plants operated by the federal government and by state institutions of higher education. (https://data.wa.gov/Natural-Resources-Environment/GHG-Reporting-Program-Pie-by-Sector/9zij-tfi5 retrieved 2020-06-13, subsectors* Transportation Fuel Supplier, Power Plants *and* Waste *excluded).*

In the figure, direct emissions associated with Pulp and Paper (the largest wedge) and Wood Products are mostly biogenic, originating from combustion of wood or wood derivatives. Indirect GHG emissions associated with electricity consumption are not included in industries' reporting to Ecology, so the figure gives only partial insight into the picture of industrial GHG emissions.

Another way to assess "key industries," and one that is not limited to large emitters or large energy consumers, is through economic data. The REMI model retained to support the Washington State Energy Strategy development assigns key economic indicators to 160 sectors that cover the entire state economy. Of these, 86 are "industrial" sectors in the sense intended for the Industrial TAP. Of these, Figure 2 lists the 12 with the largest shares of the state's gross domestic product.

**FIGURE 2. Washington's 12 Largest Industries by Gross Domestic Product**

| REMI industrial sector | GSP, mm$ |
|---|---|
| Aerospace product and parts manufacturing | 29,591 |
| Data processing, hosting, related services | 16,072 |
| Petroleum and coal products manufacturing | 5,452 |
| Farm | 4,263 |
| Navigational, measuring, electromedical, and control instruments mfg. | 2,102 |
| Beverage manufacturing | 1,364 |
| Fruit and vegetable preserving and specialty food manufacturing | 1,227 |
| Support activities for agriculture and forestry | 1,140 |
| Pulp, paper, and paperboard mills | 912 |
| Architectural and structural metals manufacturing | 858 |
| Plastics product manufacturing | 837 |
| Pharmaceutical and medicine manufacturing | 826 |

*Figure 2 – Washington State's 12 largest industrial sectors, in order of 2018 gross domestic product (GDP). Source: REMI.*

Unfortunately, data to construct a distribution or ranking based on energy consumption (rather than GHG emissions or economic output) is not easily available. This means steps should be taken to identify any critical industries that may be important energy consumers but do not make themselves apparent in these other taxonomies. For example, one likely "stealth" energy consumer is computing services ("data centers" or "server farms"). This industry is known to be a large energy consumer and because some areas of Washington State feature very low electricity prices, there are many such businesses located here.[1]

## 3. Key Goals for the Sector

The State Energy Strategy's enabling legislation captures the tradeoffs that industries and policy makers must manage as they find solutions to achieve industrial GHG emissions reductions. RCW 43.21F.010(1) includes nine such competing forces, of which the four most relevant to industry are:

(a) Pursue all cost-effective energy efficiency and conservation as the state's preferred energy resource, consistent with state law;

(c) Maintain and enhance economic competitiveness by ensuring an affordable and reliable supply of energy resources and by supporting clean energy technology innovation, access to clean energy markets worldwide, and clean energy business and workforce development;

(d) Reduce dependence on fossil fuel energy sources through improved efficiency and development of cleaner energy sources, such as bioenergy, low-carbon energy sources, and

[1] https://ecology.wa.gov/Air-Climate/Air-quality/Data-Centers.

natural gas, and leveraging the indigenous resources of the state for the production of clean energy;

(f) Meet the state's statutory greenhouse gas limits and environmental requirements as the state develops and uses energy resources.

Items (a) and (f) highlight the need to prioritize efficiency in the industrial sector's progress toward meeting state GHG targets. Yet, items (c) and (d) call for innovation and business development in the clean energy space. Put most simply, the industrial sector faces a balance between reducing its impact on the environment and energy system, while simultaneously increasing its contribution to a healthy economy.

## 4. Potential Policies and Actions

**Key technical strategies and supporting programs**

We propose grouping technical strategies to meet the efficiency and GHG reduction goals of industrial energy policy into five major categories as follows:

**FIGURE 3. Technical Strategies to Meet Industry Sector GHG Reduction Goals**

| Industry | Motor or Compressor Efficiency | Thermal Efficiency | Process Emissions | Biofuels | Electrification/ Cogeneration |
|---|---|---|---|---|---|
| Forest Products | | ✔ | | | ✔ |
| Petroleum Refining | ✔ | ✔ | | ✔ | |
| Agriculture | | | ✔ | ✔ | ✔ |
| Food Processing | ✔ | | | ✔ | |
| Cement & Glass | | ✔ | ✔ | | ✔ |
| Manufacturing (incl. semiconductor) | ✔ | | ✔ | ✔ | ✔ |
| Computing Services | ✔ | ✔ | | | |

*Figure 3 – Likely technical strategies by industry.*

Policies or programs that could accelerate adoption of any of these technical approaches can fall into three major areas: regulatory targets, tracking and disclosure, or funding mechanisms.

**Regulatory Targets:** In 2016, the Department of Ecology adopted the Clean Air Rule, which set mandatory emissions reduction targets for the largest emitters in the state, including industrial facilities. The rule is currently suspended. However, facilities covered by the rule must report emissions to the Department of Ecology. Going forward, a regulatory target, such as an amended version of the Clean Air Rule, could provide flexibility for a greater number of industrial facilities to meet greenhouse gas limits. Likewise, a program that adopts industry-specific targets, rather than facility-specific targets, or an industry- or economy-wide cap-and-trade program could offer an excellent way of providing flexibility to the disparate industries through a common mechanism.

**Tracking and Disclosure** can include mechanisms that are mandatory yet have comparatively low burden on operations. Tracking and disclosure programs can reveal opportunities for efficiency investments that offer payback over time and can spur significant voluntary action. Tracking and

disclosure programs might include performance benchmarking, energy rating and labeling, or tracking and communication platforms. They also provide a mechanism for collecting the data necessary to more completely characterize energy consumption and GHG emissions in the sector, which would allow better-tailored energy policymaking. There is potential here for shared policy mechanisms with the Buildings sector.

**Funding** solutions provide industries with novel mechanisms for making higher risk investments, or for reaping additional benefits from energy efficiency or GHG reduction. Supporting riskier investments with mechanisms like loan loss reserves or interest rate buydowns can encourage industrial entities to pursue less proven energy efficiency measures.

**Jobs, job retention, and training**

Supporting the industrial sector's economic health calls to a different set of policy levers. These include:

- CleanTech workforce training programs
- Retraining/Just Transition programs
- Apprenticeship and other technical career tracks targeted high school and above
- Improved STEM training
- Subsidizing CleanTech innovation
- Investment in public infrastructure near manufacturing sites

Additionally, the Department of Commerce's Green Economy Working Group is completing a report to the legislature detailing opportunities in education and workforce development, as well as policy recommendations to support them.

**Partnership and collaboration**

Of course, the industrial sector does not exist in isolation. There are a large number of collaborations that could benefit outcomes in the industrial sector:

- Industry associations can be a platform for sharing technological innovations.
- Universities and schools can engage in research & development collaborations, especially around new clean energy technologies.
- The federal government is a significant funder of technological innovation (often catalyzed by state agencies that distribute the funds). Department of Energy laboratories are important industrial innovators as well. The NIST Manufacturing Extension Partnership (MEP) assists with industry growth and retention.
- State government can support with smaller funding programs like the Clean Energy Fund, and technical assistance like the Department of Ecology's energy efficiency services for industrial and manufacturing facilities.
- Non-governmental organizations like the Northwest Energy Efficiency Alliance and the American Council for an Energy Efficient Economy have programs, or even core missions, focused on technical assistance to the industrial sector.
- Utilities can offer technical expertise in energy efficiency, innovative industrial energy tariffs (for example, interruptible services), or other partnerships.

**Existing policies**

The Industrial TAP will include compilation of existing, state-level, industrial energy policies. An initial list of these appears in Appendix A and will be expanded as work unfolds. Additional sources for state industrial energy policy include, but are not limited to, legislation, rules, executive orders, Washington Utilities and Transportation Commission decisions and opinions, and state tax code.

## 5. Topics for Further Research and Deeper Dive Discussions

**Barriers to fuel conversion**. Our key technical strategies (above) will identify technical barriers to fuel conversion, among many other hurdles. But fuel conversion also faces unique legal, political, and financial barriers, even when such a fuel conversion appears technically logical. Electrification of processes fueled by natural gas can especially face such hurdles. Are there any barriers to fuel conversion that are shared across industries, and are ripe for a solution?

**Decarbonization as corporate goal**. Programs like the Carbon Disclosure Project (CDP), We Are Still In, Climate Neutral Certified, Energy Star, and many, many others are competing to be the standard for corporate responsible climate or energy management. Should Washington corporations collaborate to provide assistance for complying with one or more of these standards? Is there a particular standard that should be favored? Are there incentives or requirements that the State should consider adopting to encourage these corporate goals?

**Energy-Intensive Trade Exposed industries (EITEs)**. There has been substantial discussion in Washington about how EITEs should be treated differently from other industries. However, there is no agreement on the definition of an EITE industry. How should EITE be defined for the purposes of climate policy, and how should policies be designed to address their needs?

**Best Practices/Lessons Learned**. What is available in literature regarding best practices or lessons learned in industrial sectors? A handful of nonprofit organizations and industry collaboratives have collected and published such lists in the past. We can methodically review these resources and bring independent ideas into Washington's discussion. There is a similar body of academic literature available as well.

## Appendix A: Overview of Existing Washington State Policies Related to the Industrial Sector

**N1.1** **Green economy jobs and training. Evergreen Jobs Initiative: (2009 Legislation** E2SHB 2227) establishes the Evergreen Jobs Initiative to create 15,000 new green economy jobs by 2020 and to prioritize programs to train workers in green economy job sectors.

**N1.2** **Clean energy leadership council. Clean Energy Leadership Initiative:** (2009 Legislation SSB 5921) enables the Governor to create a clean energy leadership council in collaboration with a private-public alliance focusing on growing Washington's clean technology sector.

**N1.3** **Creating the Joint Center for Deployment and Research in Earth-Abundant Materials (JCDREAM).** JCDREAM is through UW and WSU to establish a program in earth-abundant materials to accelerate development of next generation clean energy and transportation technologies in WA, drive research and deployment of these materials and recycling of advanced materials used in clean technologies, and promote environmentally responsible processes for the manufacturing and recycling of advanced materials. (RCW 28B)

**N1.4** **Department of Commerce Clean Energy Fund**. Money is for projects that develop/deploy clean energy technologies to save energy and reduce energy costs, reduce emissions, increase energy independence. All projects must last at least 13 years. $10m provided for revolving loan fund. (*by budget appropriation*)

[*Electricity and gas tariffs, and tax breaks – all in the second tier of the policy inventory – will be where most industry-related policy lies.*]