

From Climate Emergency to Shared Prosperity: Tacoma's Green Economic Development Strategy

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Introduction

The green economy is an imminent transformational opportunity for Tacoma

The City of Tacoma declared in 2019 that climate change is an emergency for communities in Tacoma, with highly inequitable environmental and health consequences. This strategy builds on that work by clarifying the economic opportunities that are arising as a result of public and private sector efforts to rapidly decarbonize the economy, and outlining a set of initiatives to seize these opportunities.

The greening of the economy is a multi-trillion-dollar national force, creating abundant opportunity for places that are organized and intentional. Analysts at the bank Credit Suisse estimate that public and private investment related to the Inflation Reduction Act will reach \$1.7 trillion over 10 years, prompting Robinson Meyer of The Atlantic to declare that “the fight against climate change is going to change more in the next four years than it has in the past 40” and that “the number of Americans working in a climate-relevant industry is going to explode”.¹ McKinsey estimates that achieving net-zero emissions by 2050 will require \$3.5 trillion more spending on physical assets (i.e., energy, industry, buildings, etc.) *every year* than is spent today. That \$3.5 trillion is equal to half of total global corporate profits in 2020. Put simply, there will be no bigger economic story for the next decade than the greening of the economy.

Tacoma is poised to take advantage of this generational opportunity to put its economy on a new trajectory and establish itself as a national model of inclusive economic development. There is a burgeoning group of businesses in Tacoma that are thriving by producing green products, using green processes, and entering green economy supply chains. To cite just a few examples:

- Sustainable Living Innovations is manufacturing net-zero emissions modular housing
- Aquagga is creating innovative technologies to destroy toxic industrial chemicals in water
- Richlite is creating construction material from recycled paper using low-carbon processes
- SAFE Boats is entering the offshore wind market, producing crew transfer vessels to service floating deep water turbines (a major source of federal clean energy investment)

These companies benefit from being in an ecosystem of forward-looking policies and supportive programs:

- The City of Tacoma partnered to pilot a Materials Marketplace to support the circular economy
- Tacoma Public Utilities created the nation’s first dedicated electricity rate specifically for developers of carbon-neutral fuels like green hydrogen
- The Port of Tacoma is phasing out emissions by 2050 via the Northwest Ports Clean Air strategy

Tacoma can accelerate this progress, and in doing so create high-wage jobs for Tacoma residents while also improving local environmental quality and public health outcomes. Further, it can establish itself as a model for how “normal” cities – not just the few “superstar” innovation hubs that

¹ <https://www.theatlantic.com/science/archive/2022/10/inflation-reduction-act-climate-economy/671659/>

produce earth-shattering innovations and billion-dollar startups – can drive the transition to a green economy and create a more equitable economy in the process.

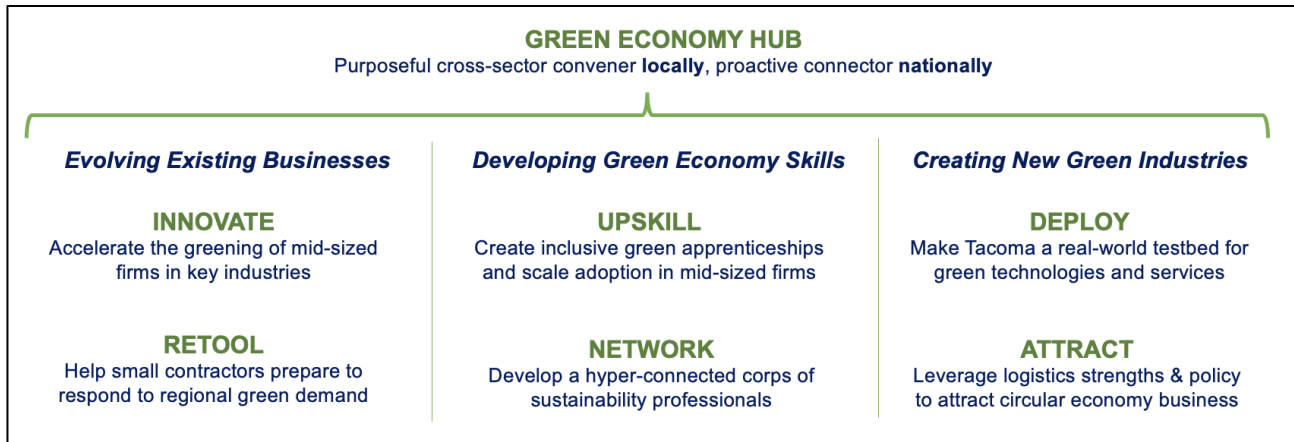
The stakes are high. Tacoma does not just need to grow its economy, it needs to transform its economy. Before the economic disruption of the Covid-19 pandemic, roughly four in ten Tacoma families with children were not economically self-sufficient. This sobering statistic almost certainly understates the extent of economic challenges that Tacoma families face: the self-sufficiency standard provides for nothing left over after paying for basic expenses – no savings for buying a house, no savings for education, no savings for starting a business. It is therefore surely the case that well over half of families in Tacoma are far from truly prospering. This is largely an effect of Tacoma’s industry structure, which compared to its peer cities is oriented towards low-wage occupations in mature industries. Without changing the structure of its economy, Tacoma can make little progress on this fundamental challenge.

The time is now. The remarkable and rapid convergence of both government and corporate investment in the green economy gives Tacoma a chance to take control of its economic future by helping existing industries find new market opportunities in the green economy and building new businesses that provide meaningful work and prosperous careers by solving environmental problems both local and global. This is a real window of opportunity, but it is a narrow window. Communities across the country are awakening to these possibilities and are organizing to cement themselves as leaders in different segments of the green economy. Tacoma’s opportunity to take a leadership position in several key industries, and to attract transformative investments from both government and businesses, will pass quickly. Now is the time to organize behind a shared set of strategic priorities and get to work with a shared sense of urgency.

Tacoma is responding with a targeted strategy and coordinated implementation

This strategy situates the green economy at the center of Tacoma’s overall economic development strategy. The term “green economy” is potentially misleading – it implies that there is a “green” sector of the economy, like the manufacturing or software or healthcare sectors. The term “greening economy” may be more appropriate – it accurately implies that the entire economy is being pushed to become greener through a combination of consumer preferences, policy decisions, corporate demands on suppliers, and supply chain disruptions. Most businesses in Tacoma either need to become greener to survive, or would benefit from becoming greener, and therefore most workers will have to acquire skills relevant to a greener economy. Enabling businesses and workers to get ahead of, and benefit from, this transition can and should be a core focus of Tacoma’s economic development efforts.

Tacoma is mustering the full capabilities of the public sector, plus economic and workforce development partners, to advance six key strategic initiatives. Some of these are new undertakings, and some are accelerated, scaled, or re-oriented versions of work that has already begun in Tacoma. Each of these will be advanced by different teams and organizations, with the City leading on certain initiatives, contributing to others, and committing resources to coordinating across initiatives. See the graphic below for an overview of the six strategic initiatives, plus cross-cutting ideas to help organize and focus the initiatives.



Who this strategy is for

This strategy was conceived of and commissioned by the City of Tacoma’s Department of Community and Economic Development (CED). In that sense, the strategy is for CED primarily and other City agencies secondarily. The City recognizes, however, that changing the trajectory of Tacoma’s economy will require activating and aligning the collective capacities of not only City government, but also economic and workforce development organizations, higher education and research institutions, employers, nonprofits, and more.

The advisory committee that helped shape this strategy (see below) is illustrative of the breadth of partners that will need to contribute to implementation of this strategy. **This strategy is best understood as a statement of what these organizations – and a growing group of local and regional collaborators – can do as a collective with leadership from the City.**

Advisory Committee Members

Name	Organization	Name	Organization
Steve Atkinson	Tacoma Planning & Development Services	Kristi Lynett	Tacoma Environmental Services
Sarah Bonds	Economic Development Board for Tacoma-Pierce County	Steve Nicholas	Port of Tacoma/Northwest Seaport Alliance
Frank Boykin	Manufacturing Industrial Council/Minority Business Development Agency	Andrew Strobel	Puyallup Tribe of Indians
Michael Catsi	Tacoma Public Utilities	Brian Young	Washington Department of Commerce
Katie Condit/Josh Stovall	Workforce Central		

As described later in this strategy, it is crucial that this group – and a diverse group of other public, private, and nonprofit entities – continues to function as the “hub” of this strategy. Not only because it is necessary for successful implementation, but because attracting federal and philanthropic investment increasingly requires cities to demonstrate active cross-sector collaborations.

Given this approach, where this strategy calls on “Tacoma” to make an investment, that in some cases means the City government, but in other cases other public and nonprofit entities will invest dollars while the city provides staff support or drives policy change. In other cases, the “hub” described above will apply to state, federal, or philanthropic entities for funding, which could go either to the City or another organization.

A guide to this document

Part 1

This document begins with **the strategy**:

- Brief summary of key findings and strategic implications
- The overarching organizational structure of the strategy
- Six distinct but interrelated strategic initiatives that Tacoma is advancing
- Cross-cutting areas of focus that draw on numerous initiatives

Part 2

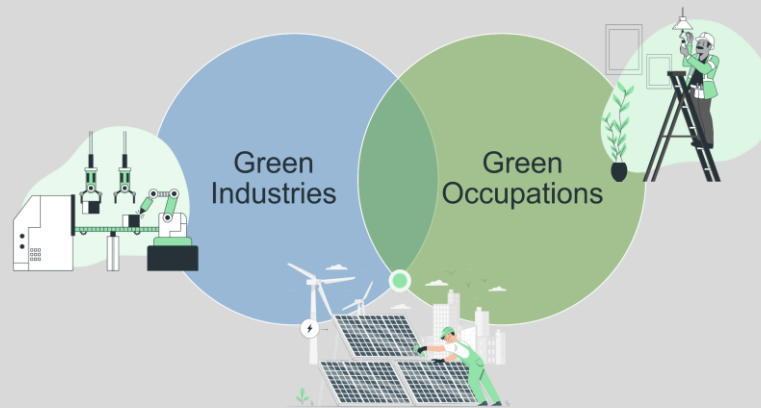
It then describes **why the strategy matters**, given the Tacoma’s goal of creating high-wage jobs and its recent economic trajectory.

Part 3

It then details **research that shaped the strategy** by reviewing analysis of: Tacoma’s current standing in the green economy, opportunities that appear to be emerging based on both policy and market forces, and Tacoma’s advantages and challenges related to these opportunities.

Defining the Green Economy

This strategy is based on a broad but specific definition of the green economy. The green economy encompasses **businesses** that make green products or services or use green processes, as well as “potentially green” businesses that *could* transition in these ways if the right incentives, expertise, and capital were available. The green economy also encompasses **workers** that make green products or services, or that implement green processes, or the workers that *could* be involved in this work if new or existing businesses entered the green economy. In some cases, these definitions overlap: for example, a worker at a business creating a green product (such as solar panels) whose daily work involves green tasks (such as solar engineering). But that is only a fraction of the green economy. There are also businesses making green products that employ workers whose tasks are not green (e.g., an executive assistant at a solar company), and many workers whose tasks are green but whose businesses are not (e.g., a logistics manager making operations at a trucking company more fuel-efficient).



This definition is laid out in more detail in the market analysis section. For now, it is important for readers to recognize that this strategy is based on a definition of the green economy that identified green tasks “hidden” across many occupations and industries, and therefore this strategy is focused on accelerating the greening underway in those industries. This orientation may strike some readers as not ambitious enough, in that it does not focus on elevating businesses and industries that are already green – but in fact it is more ambitious in that it takes seriously the hard work of greening the industries that make up most of the Tacoma economy.

Another way to think of the green economy definition that underlies this strategy is that it explores how Tacoma can be a “**producer city**” and not only a “**consumer city**”. Bruce Katz writes: *“Consumer cities adopt green technology, clean energy, and new building techniques... Meanwhile, a smaller cadre of metros drive innovation in the climate economy itself. These are the producers, home to the R&D, manufacturing, and innovation in the energy, transportation and building sectors that together will drive rapid decarbonization. These regions create the climate-aware goods and services that consumer cities—including themselves—use to cut emissions and boost resiliency.”*² Many people think of the green economy in terms of consuming green technology – i.e., workers installing solar panels. But a much wider array of industries and occupations are involved in producing green technologies, products, and processes – many of which do not look green at first glance.

² <https://www.thenewlocalism.com/newsletter/organizing-for-climate-success-lessons-from-europe/>

Part 1: The Strategy

The goal of this strategy

This strategy is designed to enable Tacoma to seize new market opportunities created by public and private sector efforts to decarbonize the economy. The goal is to put Tacoma's economy on a new trajectory – not just creating good jobs in the near-term, but more fundamentally shifting the composition and orientation of the economy so that it can continually create more and better jobs over time. This requires helping Tacoma's firms and workers gain new capabilities so that the economy can become more innovative and export-oriented, attract more high-value investment, and contribute more to improving both local and global environmental outcomes. Tacoma will do this by:

- Helping **existing businesses** transform their products, processes, and business models so that they can tap new green market opportunities
- Growing **new businesses** and industries that are developing and deploying green technologies
- Preparing **workers** – especially people of color and women – to thrive in this new economy

This strategy is both visionary and pragmatic. The greening of the economy is a once-in-a-generation transformation, accelerated by passage of the Inflation Reduction Act. Federal, state, and philanthropic leaders are looking for communities that exemplify what a greener, more prosperous, more equitable economy can look like. They are especially interested in examples of “normal” cities – those without massive “superstar” technology clusters or numerous top-tier research universities – that demonstrate that economies that struggled or stagnated in the last economic era can arise to lead this next economic era. This strategy envisions Tacoma as a leader among these communities.

While unapologetically ambitious, this strategy also provides specific and realistic near-term action steps for the City as well as its local and regional collaborators. Implementing this strategy does not require Tacoma to completely reinvent its economic and workforce development systems; much of this strategy involves Tacoma identifying its existing assets and tools and modifying them to meet the needs of a green economy at greater scale and speed.

The theory and data that shaped this strategy

Theory: How Economies Develop

As economist Mariana Mazzucato writes, economic growth has not just a rate, but a *direction*.³ The purpose of economic development is not only to increase growth, as measured by GDP and jobs, but to shape *how* the economy grows such that it creates more economic opportunity (family-sustaining jobs and wealth-creating entrepreneurship opportunities) and increases the capacity of both firms and workers to innovate and adapt (so that the economy continues to produce opportunity over time as the economy changes).

³ Mariana Mazzucato, “Mission-Oriented Innovation Policy: Challenges and Opportunities”, IIPP Working Paper 2017-1, September 2017

Economic development can change the direction of an economy by changing the mix of industries in a region's economy – moving from mature or declining industries with minimal growth prospects and/or low wages to emerging, innovative industries with high growth potential, entrepreneurial opportunity, and high wages. Every industry matures and eventually declines; successful economic development requires anticipating these declines and identifying and cultivating new sources of growth.

What does this look like up close? In “How Growth Really Happens”, economist Michael Best describes the process: “To sustain growth, enterprises must transition into new sectors applying the same capabilities or make the transition to the next higher level of production capabilities. Once, and if, a critical mass of firms makes the transition, a new range of opportunities opens as the region becomes competitive in more technically and organizationally advanced activities, processes, and products.”⁴

In other words, economic development involves helping firms either shift into new markets or innovate within their current market. Ideally this work is structured so that a critical mass of related firms (i.e., a cluster) make this shift together and learn from one another as they do so. Core to this process is investing in people – especially people of color, whose skills have been systematically overlooked and untapped – and unleashing their potential as leaders, innovators, and workers.

Progress can be measured in many ways – innovation, exports, entrepreneurship – but these are intermediate outcomes, not the ultimate purpose of economic development. Government and nonprofits invest in the capabilities of businesses because (1) it creates jobs that allow families to thrive and (2) generates the tax revenue that enables government to provide crucial services to people and communities. Economic development is about working *through* firms, *for* people.

Grounded in this understanding of the process and purpose of economic development, this strategy:

- Is focused not only on near-term job creation opportunities, but on building the capacity of firms (and people) to tap new markets, develop new products, and continually adapt – thus creating a self-sustaining job creation engine that will run indefinitely.
- Is focused on job creation opportunities in the private sector. There are many public sector jobs associated with the green economy, especially related to infrastructure. These are important for many reasons but are not the core focus of this strategy because these jobs are ultimately dependent on tax revenue generated by private sector growth.
- Envisions Tacoma as part of a regional economy. Economic development, especially the creation of new industries, is fundamentally a regional process – labor markets, entrepreneurship ecosystems, business networks, and other assets are not confined to city boundaries. Tacoma's challenge is not to develop entirely different industries than the rest of the region, but to carve out a distinct role in the value chain of industries that exist at the regional scale.

Data: Tacoma's competitive position relative to peer cities

⁴ Michael H Best, “How Growth Really Happens: The Making of Economic Miracles through Production, Governance, and Skills,” Princeton University Press, 2018.

An analysis of Tacoma relative to 14 peer cities, combined with insights on national trends and emerging models in other regions, suggests that Tacoma is in a favorable position to use the greening of the economy as a catalyst for high-wage job creation. Some of Tacoma’s advantages are inherent, and others are the result of extraordinary efforts by local public and nonprofit entities. However, Tacoma also faces challenges in terms of both market headwinds and the city’s civic and organizational capacity.

Below is a brief summary of Tacoma’s advantages, challenges, and the implications for strategy.

(See Parts 2 and 3 of this strategy for details on peer city selection process and more detailed analysis.)

Advantages	Challenges	Implications
Proximity to Seattle’s nearly unique wealth of innovation assets, but with far lower cost structure	Relatively high and rising costs compared to peer cities, driven by cost pressure from Seattle rather than increased skills/productivity	Proactively connect firms to Seattle’s innovation assets and ecosystems; Help Tacoma firms improve competitiveness to retain local talent and diversify job opportunities
Highly favorable policy environment at the state and local level	Limited economic development tools (e.g., incentives) to translate policy strengths into economic development wins	Maximize impact of these policy advantages and Tacoma’s forward-looking public and quasi-public anchors by organizing them and proactively connecting businesses to procurement and demonstration opportunities
Commitment to green economy strategy by key economic development organizations and public/private anchors	Limited regional economic development capacity, limited civic capacity within Tacoma as relates to economic development (e.g., formalized collaboration among anchors)	Invest in building green economy networks (focused on business “champions”) within Tacoma, form a strong and unified presence on the regional and local stage to take full advantage of what economic development resources do exist, translate early wins to a presence on the national stage
Large and growing workforce	Low educational attainment based on degrees awarded compared to peers	Invest in upskill/reskill efforts for current workforce, create pathways into green jobs that do not require degrees <u>and</u> provide supports to students in green degree programs, help employers redesign hiring practices
Extremely low electricity costs and renewable energy	Small and shrinking base of industrial land for new manufacturers with high energy demand	Collaborate with neighboring jurisdictions to align land use policies with economic priorities, work to preserve remaining industrial land for green economy uses with high density of quality jobs, support brownfields redevelopment
Relatively high business creation activity	Limited sources of high-growth firm creation (i.e., universities with large R&D budget, corporate HQs)	Provide startups with resources/connections needed to scale up (e.g., post accelerator support), focus on unleashing innovative potential of existing mid-sized firms

Large number of workers doing green tasks

Green economy is highly diffuse (no dominant industry or occupation to serve as focus of green economy efforts)

Take a largely industry/technology-agnostic approach to the green economy; focus on greening the economy in traded sectors that provide accessible, quality jobs

Strategic Objectives

Economic development takes time, and the transformation to a green economy may seem especially overwhelming. The City and its partners relied on a clear set of objectives to define the work and identified a right-sized set of high-impact strategic actions to achieve success. Every initiative in this strategy was selected and designed because the City and its partners believed that it would:

- **Deepen Tacoma's connection with the regional economy, while maintaining its distinct role.** Labor markets and therefore industry clusters are regional in nature. Tacoma likely cannot, therefore, create its own completely distinct industry clusters; but it can secure more than its fair share of growth and investment in industry clusters in which the region has a distinct advantage relative to other regions. Tacoma's partnership with Maritime Blue is a good example: while this is a statewide initiative, Tacoma has benefitted by making itself a location of choice for partnerships. There are many other potential opportunities to make Tacoma the go-to partner for green economy efforts that are regional or statewide in scale. Thinking regionally is also important because this strategy involves providing highly customized support to green economy businesses, and it is actors that work at the regional and state scale that can justify creating these specialized supports (these organizations can create a service that applies to 150 firms statewide that the City of Tacoma could not justify creating for 15 firms within City limits).
- **Create inclusive economic opportunity.** Creating high-wage jobs is not enough, nor is creating training opportunities for those jobs. Each initiative in this strategy must be able to directly contribute to closing racial and gender equity gaps, which are concentrated in specific geographies as revealed by the City of Tacoma's Equity Index and research associated with the Tideflats Subarea Plan process. There is a risk that the green economy could continue or even worsen inequities if it is not developed with intention.
- **Position Tacoma to attract catalytic investment from federal and other sources.** There will be a massive amount of investment made in the green economy in coming years, including potentially transformative federal investments. The priorities of federal, state, and philanthropic investors should factor into which initiatives are chosen for this strategy with an eye towards national competitiveness. Since most of these funders think about economies as regional, not based on city boundaries, this will require Tacoma to collaborate with partners to attract more funding to the regional as whole, and then positioning Tacoma within the region.
- **Create jobs in the traded sector.** Traded sector businesses sell goods and services outside the region, which means they can grow without competing against other local firms, and they bring new money into the local economy (thereby supporting local service

businesses and growing tax revenue). Many green economy strategies focus primarily on traditional green jobs, which are largely in the public sector or dependent on public sector spending (e.g., utility jobs, energy retrofit occupations). But growing the traded sector is important – a vibrant, growing traded sector will create green jobs in local-serving sectors, including government. The reverse is not true. Therefore, job creation in traded sectors should be valued more highly than job creation in non-traded sectors.

- **Position Tacoma as a “producer city” in the green economy, while also seizing opportunities to generate meaningful local environmental benefits.** The primary purpose of this strategy is to enable Tacoma to create quality jobs by being part of the global transition to a green economy. It is assumed that all of the initiatives in this strategy will have a positive environmental impact at the global scale (i.e., reduced emissions, more efficient use of resources), but where possible, initiatives should also have visible local environmental and human health impacts. For example, Tacoma can help promising green economy firms use public infrastructure as a “testbed” for new cleantech technologies (for example, methods of cleaning up contaminants in water or soil), thus cleaning the local environment while also enabling firms to show investors and customers that their technologies work in real-world settings.
- **Make Tacoma’s current industries greener and create new green businesses/industries.** This strategy should strike a balance. There are plenty of reasons to care about making Tacoma’s current mix of businesses and industries greener – from helping them access new markets with greener products to reducing local emissions and pollution. But a strategy that only made existing industries greener would be missing an opportunity to put Tacoma’s economy on a different trajectory towards diversification and modernization.

Strategy Overview

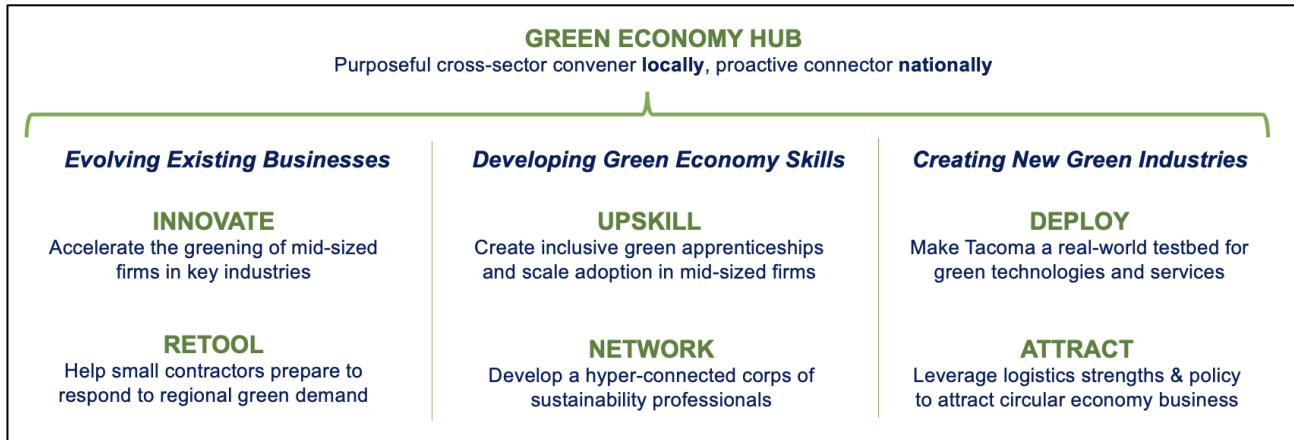
Six Key Strategic Initiatives

At the core of this strategy are six strategic initiatives guided by a “hub” comprised of leaders from Tacoma’s most important economic institutions. These initiatives are discrete, multi-year projects that each require a core team from multiple organizations to implement successfully.

While there are many ways in which these initiatives are interrelated, they are described as separate initiatives for two main reasons. First, this structure gives many organizations and motivated individuals from across Tacoma the chance to take on clear leadership roles on initiatives that draw best on their organization’s capabilities. This “distributed implementation” structure is more resilient than one that is centralized in a single organization. Second, funders find this structure compelling; each of these initiatives is a focused project with a clear purpose and outcomes that support a comprehensive strategy. (This structure is similar to what the EDA demanded from Build Back Better Regional Challenge applicants, which will increasingly be a requirement for major federal economic development grant programs.)

These six initiatives are designed to address three key imperatives: helping **existing businesses and industries evolve** to take advantage of green economy opportunities, preparing **workers**

with the skills they need to secure high-wage jobs in the green economy, and **creating new businesses and industries** in Tacoma.



Cross-Cutting Priority Sectors

Regions are increasingly specializing by function rather than industry. To illustrate: instead of region A being a center of automotive manufacturing and region B being a center of aerospace manufacturing, it is more and more common for region A to be a center of the R&D *functions* for both industries, and for region B to be a center of the logistics functions for both industries. Attracting or growing a group of startups in a high-tech emerging sector no longer guarantees that, if those firms grow, they will also situate their manufacturing, logistics, and R&D operations in the region. Another reason is that the data do not reveal any particular industry sector (as typically defined) in which Tacoma has a clear advantage or a clustering dynamic taking hold.

Green Manufacturing as a Foundational Priority

In part for the reasons above, this strategy is not highly industry- or cluster-centric. Rather, this **strategy focuses on Tacoma strengthening its position as a center of manufacturing across industries, sectors, or technologies**. Not every initiative is focused on manufacturing firms or ecosystems, but all are designed to create an environment that is conducive to the growth of firms that produce innovative, exportable products for the green economy. Importantly, **this will sometimes require investing in skills and industry development efforts in adjacent sectors**, most notably construction – because having a strong local ecosystem of businesses that employ green building processes can create a rich testbed and market for companies that produce green building products. Likewise, investing in the city’s industrial symbiosis capabilities (which in some cases will involve working with logistics operation) is a potential means of creating quality jobs in non-manufacturing firms, but also a way to help manufacturers become greener and more efficient.

Four sectors appear to be distinctive opportunities for Tacoma. These are, in no particular order, **green energy, industrial symbiosis, green building technologies, and maritime**. The identification of these sectors was based not only on economic data but also – and in many cases more importantly – a favorable state and local policy environment and the commitments of the city’s public and quasi-public institutions. These should not be thought of as discrete clusters to build separate initiatives around, but rather as growing markets in which Tacoma manufacturers can be increasingly competitive if provided with the right supports. Below is a brief description of

each of these sectors, the rationale for prioritizing each, and where each “shows up” in the strategy. A more detailed discussion of each is provided in an appendix at the end of this strategy.

Industry Clusters are Regional

Another reason that this strategy is not heavily focused on specific clusters is that industry clusters are fundamentally regional, not city-specific, phenomena. Therefore, Tacoma’s main focus should be on ensuring that it is the best location in the region (and beyond) for the production functions of clusters that exist or are developing at the regional scale. For example, R&D related to green hydrogen might take place at UW-Seattle, and generation and storage might take place on large plots of land outside city limits, but application to industry may take place in Tacoma. The implication is that Tacoma should proactively and energetically engage in regional networks that are focused on growing these clusters with an eye towards securing more than its “fair share” of investment and growth – examples include the CleanTech Alliance (and the BUILT Cluster focused on green building), the Pacific Northwest Hydrogen Association, Maritime Blue, and beyond. Tacoma should aim to be the go-to local partner for these regional and statewide entities. While Tacoma should not try to build its “own” clusters, it can and should have a sense of which clusters are most promising and most likely to take root in the city, so that firms in these clusters can be targeted and supports/policies can be customized.

Priority Sector: Green Energy

Why: Transitioning to clean energy is both a global imperative to address the increasingly urgent climate crisis, and an enormous economic opportunity for companies and cities that can supply viable and affordable clean energy solutions. Importantly, it is also an enormous economic opportunity for companies that can power their operations with clean energy – doing so enables companies to sell to different customers and markets that are concerned with sustainability, even if the product itself does not change.

As one example of Tacoma’s competitive position in this arena, Tacoma is very well positioned to become a center of innovation in the multi-trillion dollar green hydrogen sector that is crucial to realizing a decarbonized power system, thanks to TPU’s multi-faceted leadership and pursuit of innovative solutions alongside the Port of Tacoma, paired with market tailwinds (Bank of America projects \$11 trillion of infrastructure investment opportunities over the next 30 years and direct annual revenues of \$2.5 trillion) and a favorable state policy environment (including \$2M in state support for the Pacific Northwest Hydrogen Association to prepare a proposal for the Department of Energy’s regional Hydrogen Hubs competition).

Green Hydrogen potentially presents business and job growth opportunities in at least two areas. There is *generation and storage* of green hydrogen, and the jobs associated with infrastructure development and maintenance (for example, SAFE Boats is benefiting from the potential development of offshore wind infrastructure, which could be used to create green hydrogen). Then there is *application* – industries such as heavy-duty transportation and aircraft are cost-prohibitive to electrify directly or with batteries, but electro-fuels could be an economically viable substitute. Adoption of green hydrogen could help existing businesses grow (because they could sell to green supply chains), and if Tacoma becomes a center of generation and adoption it could attract startups that want to be in that vibrant atmosphere.

While hydrogen (and opportunities to develop clean energy infrastructure needed to produce it at scale) have been an emphasis so far, Tacoma may have other opportunities in clean energy production, such as production of sustainable aviation.

What: Realizing the clean energy opportunity, and ensuring that Tacoma benefits from related renewable energy investments, will require Tacoma to focus several initiatives at least in part on green energy. Key examples include:

- **Hub:** Create a Green Hydrogen Center of Excellence. This should be led by TPU, but engage the full range of city departments, local business organizations, and academic institutions whose work involves energy innovation or management. Economic development and job creation should be integral to the mission of the Center, and it should serve as the platform for coordinated strategy development, forging project partnerships, and pursuing state and federal funding opportunities.
- **Deploy:** Building on ongoing experimentation in and around the Port, make sure Tacoma is the best place in the country to deploy innovative green hydrogen technologies and test and refine them in partnership with public sector entities.
- **Innovate:** Help mid-sized businesses in manufacturing, and potentially logistics, anticipate and respond to growth opportunities related to the green hydrogen economy.
- **Upskill:** Work with regional partners to proactively create inclusive workforce development programs relevant to the green hydrogen economy; even if these jobs have not yet materialized, if these programs are designed in advance they can be used as business attraction tools.

Priority Sector: Industrial Symbiosis

Why: Transitioning to clean industry is a global imperative, given that roughly 40% of global climate pollution is from industry. By embracing industrial symbiosis, even if just in the form of a few demonstration projects, Tacoma can begin to position itself as a city of clean industry, where the best quality and greenest materials are made, and where industry is a good neighbor to communities and the anchor of a healthy regenerative economy.

A 2014 analysis by McKinsey and the Ellen MacArthur Foundation determined that savings from reusing materials could add up to \$1 trillion per year by 2025. Symbiosis results not only in cost savings for industry, but reduced waste and pollution, greater resource conservation, and new business opportunities in the clean economy. Symbiosis infrastructure enables the efficient recovery and exchange of “waste” resources such as thermal energy (waste heat), water, nutrients, and bio-feedstocks for production of chemicals, plastics, and wide variety of other valuable materials and green products.

What: Opportunities to cement Tacoma’s position as a center of industrial symbiosis innovation exist in several initiatives:

- **Deploy:** Scan Tacoma’s industrial areas, such as the Tideflats and Nalley Valley, for sets of businesses that could engage in industrial symbiosis (especially using waste heat), secure state funding for demonstration projects, and support existing efforts like the Materials Marketplace.
- **Upskill:** Connect firms engaged in the circular economy with apprenticeship programs such as AJAC’s newly-created operations specialist apprenticeship.

- **Attract:** Leverage Tacoma’s locational advantages, and its abundance of logistics and warehousing capacity, to attract firms with circular economy business models.

Priority Sector: Green Building Technologies

Why: According to the International Energy Agency, “in 2021 about 8% of global energy-related and process-related carbon emissions resulted from the use of fossil fuels in buildings, with another 19% from the generation of electricity and heat used in buildings, and an additional 6% related to the manufacture of cement, steel and aluminum used for buildings construction”, which means that about one-third of global carbon emissions are from the buildings sector.⁵ That is why the Inflation Reduction Act contains \$5 billion to incentivize the use of low-carbon building materials in infrastructure projects and government-owned buildings. And it’s why the Seattle-based Carbon Leadership Forum is organizing at least 50 large construction firms around the country, including Seattle-based McKinstry, to reduce and eventually eliminate operational and embodied carbon (see graphic below) in mechanical, electrical, and plumbing systems within their projects by 2040.



This is creating huge demand for green building technologies, which encompasses both new building products (e.g., cross-laminated timber, sustainable concrete) and related processes (e.g., modular building design, waste heat capture system design). The vision put forth by the state-funded BUILT (Buildings, Utilities, and Infrastructure Living Together) cluster convened by the CleanTech Alliance is a good guide to the expansiveness of this sector: “We strive to create a world where sustainable and equitable design, manufacturing, construction, operations, maintenance, and refurbishment of the built environment ensure a thriving economy and communities.”

The Tacoma area is well-positioned to strengthen its position as an exporter in this sector. It is home to a number of innovative building products companies like Milgard, architecture/manufacturing firms like Sustainable Living Innovations, and forward-looking contractors like Absher (which in 2022 signed the Contractor’s Commitment to Sustainable Building Practices, which requires it to measure and benchmark its own emissions, help suppliers reduce their carbon footprint, and employ practices that reduce embodied carbon and limit waste). The City of Tacoma is already a leader in incentivizing and enabling green building practices, including through its creation of the statewide Materials Marketplace, accelerated permitting for green building projects, and more.

⁵ <https://www.iea.org/reports/buildings>

What: Numerous initiatives create opportunities for supporting green building technologies firms, including strengthening the broader construction ecosystem in which they operate.

- **Innovate:** Help construction firms pursue embodied carbon certification or otherwise invest in process innovation, help green building technology manufacturers invest in product development.
- **Upskill:** Customize and expand green building apprenticeship programs that will help spur traded sector growth in the green building sector.
- **Deploy:** Use procurement to help local firms test new processes and products.
- **Retool:** Help small contractors anticipate and respond to demand for greener processes and products, through both technical assistance and workforce development.

Distinguishing Between Production and Adoption in Green Building Technologies Sector

Tacoma should be mindful of the need to focus on production rather than (just) adoption in the green building sector. Many analyses of green jobs opportunities, and many green economy strategies including King County’s, focus largely on jobs associated with the *adoption* of green building technologies – for example, construction, HVAC technicians, electric vehicle mechanics, or solar installers. Many of these are high-quality job opportunities that do not require college degrees. But many of them are also in essentially local-serving industries. Since a core principle of this strategy is that Tacoma must grow the traded sector of its economy to generate lasting and shared prosperity, these jobs are not a core focus *except to the extent that a large and skilled workforce in these occupations enables the growth of traded sector industries.*

More research will need to be done to identify which local-serving occupations are in fact important inputs to the growth of traded sector industries. To illustrate this principle, however, consider the following:

While construction jobs are generally considered local-serving (i.e., their growth is dependent on increases in population and income that stem from the growth of traded sector industries), it is possible that if Tacoma has a larger and more skilled green construction workforce, then it will be easier to build green buildings in Tacoma than elsewhere, and firms that produce green building products for export will want to locate in Tacoma – not only to fulfill local demand, but because Tacoma is a good “testbed” for developing and refining new products and processes that can then be exported nationwide or globally.

In contrast, a larger and more skilled electric vehicle repair workforce is far less likely to generate such dynamics, because Tacoma is unlikely to become a center of electric vehicle production.

This strategy calls on Tacoma to not only focus on fulfilling demand for good jobs, but on creating good jobs by strengthening and growing its economy’s capacity to export innovative green economy solutions.

Priority Sector: Maritime

Why: The Tideflats and waterfront is the City of Tacoma’s defining geographic feature, a major economic asset, and a potential center of green economy innovation. The maritime sector encompasses shipping and logistics, ship building and repair, sustainable fuels for maritime operations, offshore wind infrastructure, and water monitoring and treatment. Each of these is a major, growing market. And Tacoma has an advantageous position in that, compared to other

regions that are working to develop water technology clusters (The Water Council in Milwaukee or Cleveland Water Alliance), Tacoma has both a major international Port, a policy environment favorable to green energy, proximity to potential offshore wind sites, as well as a history of ambitious remediation efforts in contaminated waterways. In other words, Tacoma can potentially be a site for innovation, production, and deployment of a wide range of maritime technologies.

This is not news to Tacoma, or to the state of Washington. A wide range of economic development, workforce development, and environmental organizations, government agencies, and businesses have long been focused on economic opportunities in the maritime sector and have been at the forefront of pursuing opportunities related to new federal investment and policy. Tacoma is home to the Center for Urban Waters, a collaboration of the City of Tacoma and UW-Tacoma, whose specialized equipment and expertise helped attract Aquagga to Tacoma. Maritime Blue was a finalist for the highly competitive Build Back Better Regional Challenge, runs a local incubator, and is facilitating the deployment of 5G technology throughout the Tideflats. The Port of Tacoma recently adopted the Northwest Ports Clean Air Strategy, which envisions changes in equipment, fuels, and infrastructure to phase out seaport-related emissions by 2050. Seattle-based businesses Trident Winds and Glosten are leading innovators in floating offshore wind turbines, the latter having been awarded \$175,000 in cash and technical assistance vouchers from the Department of Energy's Floating Offshore Wind Readiness Prize. SAFE Boats is one local firm entering this market from an adjacent sector (ship building). These and other assets, activities, and commitments add up to a significant market opportunity for Tacoma-based firms and entrepreneurs.

What: Tacoma can develop the “blue” portion of its green economy primarily through two initiatives:

- **Innovate:** Help manufacturing firms understand emerging opportunities in the maritime sector and develop new products/processes accordingly, including by connecting them with experts and policymakers who understand the future of the industry.
- **Deploy:** Given the significant role of public and quasi-public entities in the maritime sector, there are abundant opportunities to translate commitments to decarbonization into market opportunities for local firms, including finding demonstration projects for local startups (including those graduating from the Maritime Blue incubator or the Cascadia CleanTech Accelerator).

Overview of Strategic Initiatives

The six initiatives that make up this strategy are not all the same in terms of their risk-reward profile (certainty of success versus potential impact on economic development), the role of CED versus partner organizations, or the amount of resources and attention that the City of Tacoma should dedicate.

Risk and impact are determined according to the City of Tacoma's interests, so the below table suggests that the City's top priorities should be the Innovate, Upskill, and Deploy initiatives. However, partner organizations will have different interests and levels of risk tolerance, and will be motivated to take the lead on other initiatives.

These initiatives were all chosen because they are expected to be low-risk and high-impact *relative to potential initiatives that were not chosen*, so even higher-risk or lower-impact initiatives in this chart are very worthy of investment.

Initiative	Potential Impact (1-5 scale)	Risk (5 is <u>least</u> risky)	CED Role	Key Partners
Innovate (<i>Product and process innovation in mid-sized firms</i>)	5	4	Act as core part of BRE team (identifying target firms, outreach, coordinating assistance) Push for commitments to green procurement to create demand for green economy firms	Impact Washington, universities, industry organizations
Upskill (<i>Scale green apprenticeship programs in mid-sized firms</i>)	5	4	Subsidize assistance from sources such as Impact Washington Invest in workforce intermediaries to customize apprenticeships, increase adoption, provide wraparound supports	Workforce Central, AJAC, universities, community colleges
Deploy (<i>Infrastructure and procurement as a platform for real-world innovation</i>)	4	3	Identify social/government challenges in Tacoma that new technologies/processes could help solve Connect firms with opportunities to engage with public sector entities in Tacoma (pilot projects, procurement) Focus business retention and expansion efforts on firms that engage with public sector entities	NW Seaport Alliance, Tacoma Public Utilities, Pierce County, Joint Base Lewis-McChord, anchor institutions
Retool (<i>Help small to mid-sized contractors anticipate and respond to green demand</i>)	3	2	Identify small contractors/entrepreneurs with the capability and interest in re-tooling for the green economy Convene small business development and workforce development service providers to ensure coordinated and tailored delivery of services	MBDA, Emerald Cities Collaborative, industry organizations, workforce development organizations
Network (<i>Convene sustainability professionals to accelerate business change</i>)	2	1	Co-host convenings, if convener does not exist (ideally industry organization) Fund programming, e.g., an emerging talent fellowship that provides industry exposure for college students of color	Cleantech Alliance, Maritime Blue, other industry organizations, universities
Attract (<i>Leverage logistics strengths to attract circular economy businesses</i>)	2	3	Work with other city agencies to advance relevant policies (e.g., container deposit legislation) Develop and deliver compelling pitches to OBRC and other circular economy businesses that could leverage Tacoma's logistics strengths	Economic Development Board, Tacoma Public Utilities, Greater Seattle Partners

Green Economy Hub and Six Strategic Initiatives

Create a Green Economy Hub

Create a Cross-Sector Core Team to Drive Implementation

WHY: As important as the individual strategic initiatives described below is the way in which Tacoma builds the connective tissue between those initiatives – in other words, the networks that allow key businesses, government agencies and other economic actors, economic and workforce development service providers, and external partners and funders to collaborate productively.

WHAT: To this end, the City of Tacoma will continue to lead through the Green Economy Hub, which is a formalized and potentially expanded version of the advisory committee that guided the creation of this strategy. This group of approximately 20 leaders will drive implementation, secure funding, and refine the strategy over time.

The Opportunity

Bruce Katz writes that: *“Cities are networks of public, private, civic and community institutions and leaders organized horizontally across multiple industries and disciplines. In short, they embody the way the world actually works. As organic platforms for interdisciplinary problem solving, cities are uniquely positioned to master the complexity of modern challenges.”*⁶ This quote represents an ideal – cities are not necessarily like this. More often than not, different industries and systems are siloed, there is little connective tissue or shared vision across sectors, and many small programs and initiatives add up to less than the sum of their parts. It takes real effort and real resources to create “platforms for interdisciplinary problem solving”.

The Hub’s fundamental purpose is to serve as such a platform by:

- **Creating purposeful connections between firms:** it is often assumed that businesses innovate through partnerships with universities, acquiring startups, or working with technical consultants – but in fact, most firms develop new products through interactions with customers, suppliers, and other firms in the industry.⁷ But these connections do not happen automatically, especially between industries (e.g., a “non-green” manufacturer will not necessarily connect with potential customers or suppliers in green supply chains). The Hub can ensure that firms in Tacoma learn how to prosper in the green economy by knitting together firms from across industry verticals through one-on-one matchmaking and purposeful networking opportunities.
- **Organizing government agencies and economic development nonprofits:** in many regions, some businesses are overwhelmed by outreach from economic and workforce development organizations, while other similar businesses are entirely overlooked. In many regions, different systems do not coordinate (like innovation and workforce development), and businesses and workers fall through the cracks. In many regions, systems are misaligned such that the types of business being targeted for growth and attraction do not correspond to the skills that the workforce development system is focused on. The Hub can help avoid all these outcomes by serving as a forum for alignment across systems and sectors.

⁶ <https://www.thenewlocalism.com/newsletter/a-g7-roadmap-for-sustainable-urban-development/>

⁷ <https://www.brookings.edu/research/how-firms-learn-industry-specific-strategies-for-urban-economies/>

- **Presenting a unified, interdisciplinary voice to external partners and funders:** federal and philanthropic funding is increasingly contingent on the ability to demonstrate that local efforts are being guided by inclusive and dynamic cross-sector partnerships. The Hub will therefore be a central feature of proposals to external funders, as well as business attraction efforts.
- **Actively refining the strategy as the economic and policy situation evolves:** the Hub is designed to be an active group of strategists that takes ownership of the strategy, monitors emerging trends and events, and works to adapt Tacoma’s approach as external conditions change.

This hub is a critical part of the strategy and should be resourced at a level commensurate with its importance. A well-functioning hub can pay for itself, not just by attracting outside funding but also by finding creative ways to align and leverage existing local resources. The City could staff the Hub itself, but other cities/counties have instead invested in external capacity, sometimes in the form of a small nonprofit “backbone” entity. See example from Modesto, CA below (note: the City of Modesto is the same size as Tacoma).

Regional Strategy Example: Modesto’s “Hub” for the Bioproducts Industry

Modesto, CA is a city not entirely unlike Tacoma: it is similar in size, it is located close to a “superstar” center of innovation and increasingly experiencing the ripple effects of the Bay Area’s growth, and its economy has failed to generate adequate quality jobs over the past decade – in large part due to lack of advanced industries. In 2021, the Stanislaus Community Foundation led a major, cross-sector initiative (Stanislaus 2030) designed to identify the root causes of the region’s economic stagnation and elevate a handful of catalytic initiatives that could put the economy on a new trajectory.

One of these initiatives is a bioproducts industry development strategy – an effort to grow and attract businesses that turn agriculture byproducts into high-value products and fuels – that was designed by an advisory group similar to the one that guided the development of Tacoma’s strategy.

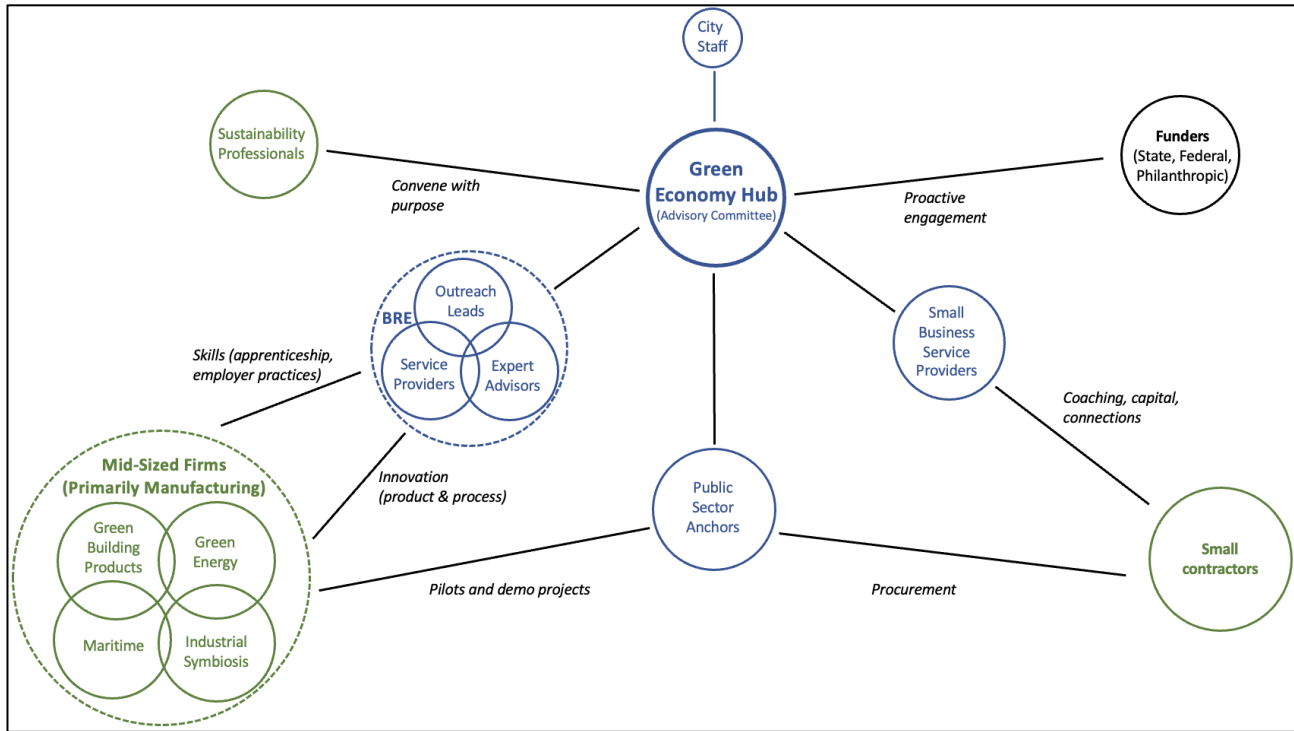
In early 2023, the County Board of Supervisors dedicated \$10 million of the County’s American Rescue Plan Act Funding to the strategy, including \$650,000 for the first year of operations for Bioeconomy, Agriculture, and Manufacturing (BEAM) Circular, an independent nonprofit that will serve as the “hub” of the strategy going forward – connecting businesses, universities, community colleges, and economic development entities locally, and raising the region’s profile with investors funders statewide and nationally. (BEAM Circular is being fiscally sponsored and incubated by Opportunity Stanislaus, the region’s public-private economic development organization.)

This hub is already leading local efforts to secure federal funding in the form of an NSF Innovation Engines grant, in partnership with the University of California-Merced. It is also in the process of forging a partnership with Lawrence Berkeley National Lab, which will likely run a new pilot-scale bioproduction facility in the city.

Structure of the Hub

The Tacoma Green Economy Hub needs to ensure that productive, dynamic networks exist in seven areas, each of which corresponds to one or more initiatives. Some of these networks take the form of “tables” around which local leaders gather regularly to exchange ideas and information,

some are processes that need to be carried out collaboratively, and some are connections with external partners that Tacoma needs to nurture. The figure below visualizes these networks.



The Hub does not necessarily need to “own” and manage each of these networks – where possible, the Hub should identify where these networks already exist and work to modify, activate, formalize, or scale them to meet the needs of the green economy. For example, if there is already a regular gathering of sustainability professionals in the region, then the Hub could simply ensure that Tacoma companies are actively engaging in those. Or if there is already a “table” for small business service providers in the city or region to coordinate and align, the Hub could make sure that the group considers the needs of businesses that are green or greening. The Hub may host and facilitate some of these networks in the near-term, but unless it is funded and staffed (as in Modesto), the Hub should spin them off to other organizations and focus on serving as a platform that reinforces the shared vision, connects the dots across initiatives, identifies and secured resources from external sources, and refines the strategy over time.

The specific networks that this strategy requires, illustrated in the above graphic, are:

- 1) **A coordinated and comprehensive business retention and expansion (BRE) team serving the needs of a targeted group of mid-sized firms:** to ensure that key green economy businesses are surrounded with the tailored resources they need in a way that feels coordinated and efficient. This is the most operationally complex network, and arguably the most important. See section below detailing an approach and system. (Corresponds to green innovation and green apprenticeship initiatives.)
- 2) **Public sector “anchor” agencies with green economy commitments:** to harness the collective resources of public sector economic anchors in Tacoma – including the City, TPU, the Port, UW-Tacoma, JBLM, and others – to create a “testbed” for small firms and to

ensure that procurement and policy decisions are advancing the green economy. One purpose of this group is to serve as the “green hydrogen center of excellence” that will guide the city’s advocacy, strategy, and partnerships to solidify Tacoma’s place in the green hydrogen sector. (Corresponds to testbed and small business initiatives.)

- 3) **Small business service providers:** as with BRE for mid-sized firms, small firms with potential to “merge” into the green economy should be surrounded with a coordinated set of resources, delivered efficiently. (Corresponds to small business initiative.)
- 4) **Sustainability professionals:** to build active networks among leaders in Tacoma that are designing and implementing sustainability strategies within large firms and institutions and support collaborative problem-solving and professional development in this group. (Corresponds to innovators network initiative.)
- 5) **External funders:** to position Tacoma as a national leader in building an inclusive green economy and thus attract resources to support implementation of this strategy. The Hub can amplify Tacoma’s early successes in various national networks and present a united front to policymakers and philanthropic leaders in the region and state. The Hub should also coordinate on identifying and applying for major grant opportunities. Over the next 5 to 10 years the challenge for funders won’t be lack of resources to invest, but rather lack of organizations and communities that have a vision for how to spend those resources and the local partnerships to make it happen – the Hub needs to ensure that Tacoma stands out as one of the few communities that has both. In addition to coordination through the Hub, attracting external resources will require investment in staff to identify funding opportunities and drive grant application processes.

Composition of the Hub

The existing members of the advisory committee are listed above. While the Hub should remain small enough to be nimble and truly collaborative, a few additions are warranted:

- Representatives from 1 or 2 **industry organizations** (e.g., Cleantech Alliance and Maritime Blue)
- Representatives from 1 or 2 **community and/or environmental organizations** that support the economic development focus of the Hub (e.g. Communities for a Healthy Bay)
- Representatives from 2 or 3 **educational institutions** (both universities and community colleges)
- Representatives from 1 or 2 **state agencies or national green economy nonprofits** that can amplify Tacoma’s successes, attract funding, and ensure the Hub is attuned to state and national policy dynamics

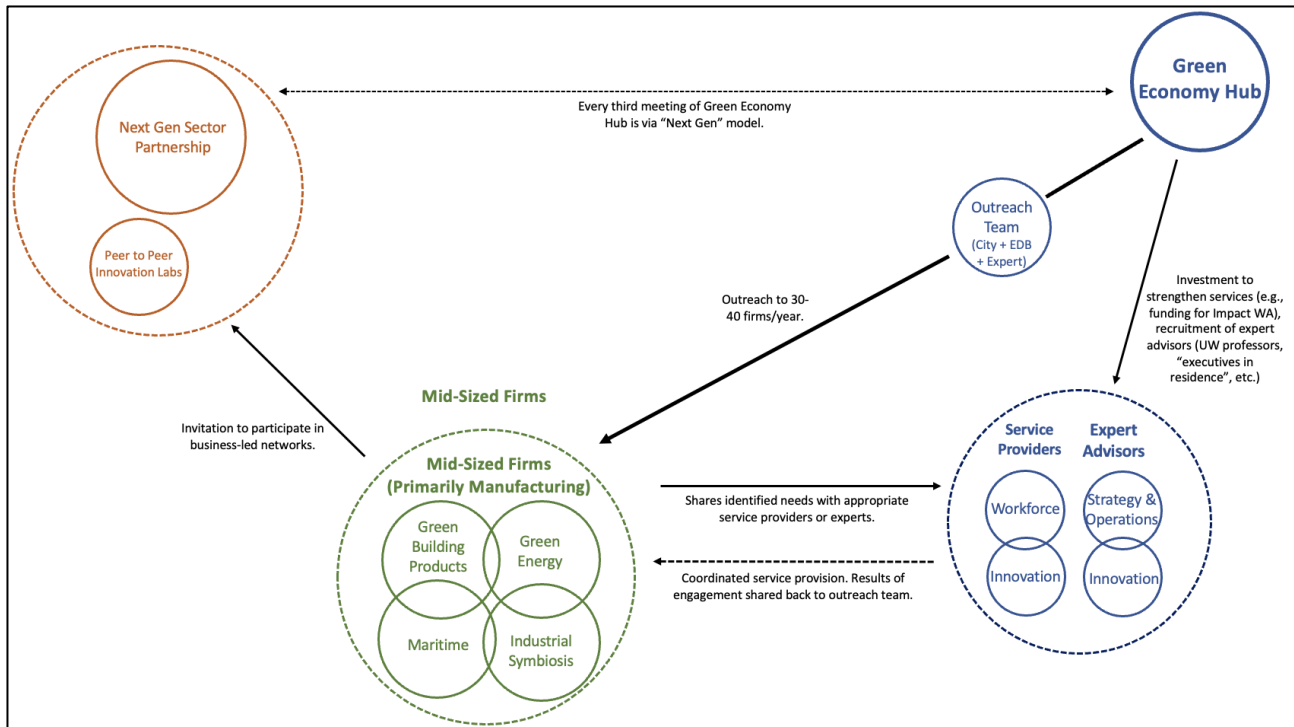
With these additions, the Hub would include approximately 16 to 18 individuals besides CED staff – a small enough group to be decisive, but representative of the types of organizations that both federal and philanthropic funders want to see engaging in productive, active collaboration.

Deep-Dive on Organizing Engagement with Mid-Sized Firms (BRE)

The most complex and most crucial network that the Hub needs to organize is the first one described above: the coordinated “BRE” system for engaging with key firms to address innovation, strategy, operations, and workforce challenges. It is not easy in any community to organize the

many actors in the economic and workforce development systems, and it is all the more difficult to do in the green economy, which cuts across traditional industry verticals and therefore requires aligning multiple organizations that typically operate in separate industries.

Below is a “zoomed in” illustration of how this network should function, followed by a written description.



The first step illustrated above is for an outreach team to meet one-on-one with approximately 30 firms in the first year, with an emphasis on manufacturing firms. This pace can lessen in subsequent years if additional resources are not available to sustain this level of engagement, but it is important for Tacoma to start implementation of its green economy strategy by connecting with these key businesses – because they are the entities that need to evolve in order for Tacoma to grow its green economy, and because they can serve as champions of the effort going forward and help contribute/secure resources. This outreach team can be comprised of the organizations in Tacoma that typically do business retention and expansion (BRE) calls – in other words, this can be thought of as a green economy “sprint” that will temporarily supplant other BRE outreach. The process should be different in two respects:

- 1) The conversations should be focused on understanding the firm’s medium- to long-term strategy as relates to the green economy, with the outreach team guiding the conversation to probe for potential needs or unrealized opportunities. This differs from many BRE interactions, in which firms are asked about what they need, as opposed to being pushed to think about opportunities they may not have fully considered.
- 2) The outreach team should consider bringing a green economy expert to meetings to help advance the conversation in this direction (a typical meeting might be one city staff, one EDB staff, and a green economy expert). This could be someone from an industry organization (Clean Tech Alliance, Maritime Blue, etc.) or a service provider like Impact

Washington. Besides their expertise on technical issues, this brings the added benefit of being able to identify regional or statewide firms that firms may want to connect with (as potential customers or suppliers).

This outreach, in addition to providing valuable information that will help Tacoma refine the strategy, may result in two concrete next steps:

- 1) Connect firms to the right team of service providers and expert advisors to help them identify and realize green economy opportunities.
 - a. This requires the Green Economy Hub to spearhead efforts to invest in strengthening and broadening the offerings of **service providers** (such as Workforce Central, AJAC, Impact Washington, etc.), as outlined in this strategy.
 - b. It also requires the Green Economy Hub to assemble a corps of **expert advisors** that are willing to provide one-on-one mentorship and guidance to Tacoma businesses. This could include business or engineering professors at UW-Tacoma, experienced entrepreneurs, retired executives, etc. A “bench” of 5-10 of these individuals could complement the expertise within existing service providers.
- 2) Connect firms to productive opportunities for collaborative problem solving. These will take two forms.
 - a. An industry leadership table that draws on the theory and structure of **Next Gen Sector Partnerships** (see sidebar below). This gives a group of green economy businesses an opportunity to lead a conversation about their shared needs, with an array of public and nonprofit entities from the education, workforce, and economic development fields seated around the outside of the room. This is how the Green Economy Hub will organize every third or fourth meeting – with businesses at the center, and economic and workforce development organizations (a broader group than is part of the Hub) situated around them in “listen mode”. This means that the Hub will have two or three meetings to focus on strategy implementation, coordination, securing funding, etc., between meetings led by businesses. This means that every time businesses convene the Hub will be able to demonstrate progress, and thus continue to attract business involvement.
 - b. **Peer to peer innovation labs**, which are short-term, facilitated opportunities for groups of businesses to work together on addressing shared operational challenges. One example is the Columbus Partnership’s “DEI Labs”, wherein 5-10 DEI leaders in large businesses work together on operational challenges within their firms (i.e., designing skills-based hiring processes and getting buy-in from executives and hiring managers). This is not meant as a substitute to deep one-on-one technical assistance, but a complement.

Next Gen Sector Partnerships

Next Generation Sector Partnerships are a model developed by the Institute for Networked Communities that involve “partnerships of businesses, from the same industry and in a shared labor market region, who work with education, workforce development, economic development and community organizations to address the workforce and other competitiveness needs of the targeted industry.” This strategy proposes drawing on these principals but organizing the partnership around a shared opportunity – the green economy – rather than a narrowly-defined industry. (It is, however, assumed that most participants will be in the manufacturing sector or

adjacent to it.) This adds additional complexity and therefore demands that the Partnership be facilitated by someone with industry experience and credibility among businesses.

One example is the Polymer Industry Advisory Council convened by the Greater Akron Chamber. Akron is a center of the polymer industry, and is focused on translating its expertise into a leadership position in recyclable and bio-derived polymer technology. This group of 25 industry leaders – most of whom have advanced degrees and are actively involved in R&D – was tasked with systematically documenting specific opportunities and challenges for the sector. Recognizing the need for expert facilitation, the University of Akron and the Chamber jointly funded a consultant – a former head of global R&D for Goodyear – to lead the Council’s strategic exploration. The director of research at the Chamber noted in an interview that: “Having a neutral industry insider at the helm of this work has greatly improved our access to industry leaders, data, and insights needed to identify and assess opportunities for our polymer industry. He understands the industry impacts of scientific advances and help us understand which companies are truly innovative. With his guidance, we’re better able to identify the right firms to elevate for support and attention.”

The Next Gen Sector Partnership in Tacoma should involve approximately 10 to 20 key businesses that commit to regular participation by C-level leaders (not government affairs representatives), along with representatives from the Hub plus the following organizations that have a role in talent development:

Education institutions: UW-Tacoma, local community college CTE programs, apprenticeship intermediaries, and relevant Washington Centers of Excellence (e.g., Aerospace & Advanced Materials Manufacturing, Clean Energy, Global Trade & Supply Chain Management, Marine Manufacturing and Technology)

Economic development organizations: Tacoma-Pierce County EDB, Pierce County, Greater Seattle Partners

Community and non-profit organizations: Impact Washington, Clean Tech Alliance, Emerald Cities Collaborative

Department of Labor grants to support sector partnerships are on the rise and many organizations, like the National Skills Coalition, offer funding opportunities for sector partnership work when combined with Workforce Innovation and Opportunity Act dollars allocated to local Workforce Investment Boards (Workforce Central).

Measures of Success

By the end of 2023, Tacoma should achieve the following:

- Commitment of 16 to 18 individuals to play an ongoing leadership role in the Hub.
- Engagement of a group of 10 to 20 green economy firms in a sector partnership inspired by the “Next Gen” model, with at least one meeting completed.
- Formal efforts by the Hub to engage major national funders (federal or philanthropic) or apply for grants (as a Hub, not just by individual members).

INITIATIVE 1: INNOVATE

Drive Product and Process Innovation in Mid-Sized Firms

WHY: Tacoma’s ability to capitalize on the greening of the economy depends on the ability of its existing mid-sized firms to seize new market opportunities.

WHAT: Tacoma will surround a targeted set of mid-sized businesses in key sectors with the expertise, capital, skills, information, and networks they need to either adopt green practices, accelerate green product innovation, or enter green supply chains.

The Opportunity

Firms that “green” their processes and products in key sectors will not only save money via more efficient processes (and therefore also improve local environmental outcomes), but also be able to enter new markets and serve large customers (public and private) that are increasingly demanding that their supply chains are green (see sidebar below). Mid-sized businesses are especially important targets for efforts to accelerate this evolution. This strategy defines mid-sized firms as approximately 15 to 150 employees, but this group can also include young, high-growth firms with 5-10 employees that are rapidly scaling towards 25 or 30 employees. These smaller, young “scaleup” firms are where most net new job growth in the economy is generated. On the other hand, the larger, more established firms in this category are among the best opportunities to intervene to retain jobs, for example by helping a “legacy” firm enter a new, higher-growth market.

Green Supply Chain Pressures

According to Net Zero Tracker, 720 of the 2,000 largest publicly traded companies in the world have net-zero targets, up from 417 companies in 2020. Nearly 300 of those companies cover all emissions in their supply chain in their net-zero targets (not just their direct activities). Some of these have target dates of 2030 (such as Apple) or 2040 (Amazon).

This is partly driven by consumer demands (an EY survey in 2021 found that 49% of consumers will prioritize climate change in terms of the products they buy and 26% say that sustainability will be their most important purchase criteria). But it is also driven by policy (the SEC is considering requiring companies to disclose more to investors about climate risk) and investors (an EY survey of global institutional investors in 2020 found that 73% of respondents will “devote considerable time and attention to evaluating the physical risk implications of climate change when they make asset allocation and selection decisions”).

Given this trio of drivers, both EY and McKinsey describe supply chain decarbonization as becoming a “license to operate” for businesses. The upshot is that if Tacoma companies can adopt green processes and products, and gain the certifications that customers demand, they will have a leg up on their competitors when it comes to selling to the largest, most sophisticated customers.

Even faced with clear and significant market opportunity, firms may face challenges responding due to:

- **Lack of expertise:** need for technical consultants to help firms identify relevant technologies, deploy them in their production processes, and modify business models accordingly
- **Limited capital to invest in new equipment or attain green certification:** need for grants or loans that risk-averse banks may be unwilling to make (perhaps due to unfamiliarity with rapidly-emerging green economy opportunities)
- **Challenges upskilling employees:** need for tailored training for existing employees, or new recruitment methods for new employees with relevant skillsets
- **Lack of information about market trends:** need clear signals from both public and private sector customers about what investments to make in order to meet their emerging needs
- **Lack of networks:** need to be able to engage with other firms to innovate together and share best/emerging practices

There are some entities that provide technical assistance in these areas – the most well-established and proven model nationally is the Manufacturing Extension Partnership (Impact Washington) – but there is not, in any city, a comprehensive set of supports that is tailored to the green economy and delivered to a targeted set of firms that are well-positioned to make green transitions and create or retain quality jobs in the process. Gaps in the system include:

- **Limited subsidies:** Impact Washington can only deliver certain types of services on a subsidized basis (subsidized services have to be delivered in the form of training for staff, rather than as direct consulting)
- **Limited capital:** Firms implementing changes after engaging with Impact Washington don't have dedicated sources of capital to buy new technology
- **Uncoordinated service delivery:** Firms are approached separately by productivity/technology and workforce service providers, even though investments in productivity require new skills and vice versa
- **Limited coverage:** Impact Washington only works with manufacturers, and only a fraction of those in any given year – and there is no comparable technical assistance provider for other sectors relevant to the green economy (e.g., green building or logistics).

The Initiative

Tacoma should identify a set of green and “potentially green” companies in these key traded sector industries and assemble a more comprehensive and seamless set of services for these firms, as well as create networks between them to facilitate peer-to-peer innovation. The key idea behind this initiative is that mid-sized firms need the same types of services that are normally only available to startups in a 3- or 6-month accelerator; Tacoma needs to essentially create a “virtual accelerator” for mid-sized firms, including a comprehensive suite of services and opportunities to engage with other firms.

- **Targeted outreach:** Identify approximately 30 manufacturing firms with which to do targeted, tailored outreach (BRE) in year 1. Deploy as coordinated team of city and EDB staff, plus green economy experts (from industry organizations or service providers such as Impact Washington, Workforce Central). Expand to construction and logistics in subsequent years (in part because there is not an obvious source of technical assistance in these sectors akin to Impact Washington). Consider doing outreach with small groups of

companies, in order to enable higher quality engagement (more time for staff to prepare for fewer meetings), and as a way to begin to informally network businesses with one another.

- **Subsidized, tailored technical assistance:** Invest in Impact Washington to enable a broader set of services to be free or subsidized (i.e., direct consulting rather than training). In the longer-term, consider subsidizing firms' engagement with other sources of expertise (within universities, national labs, etc.), borrowing on "innovation voucher" models across the country (see sidebar below).
- **Upgrade worker skills:** Invest in Workforce Central to enable it to scale delivery of its short-term upskill/reskill services to targeted companies. Promote Impact Washington's highly subsidized training services to firms. Work with both entities to ensure their training incorporates the latest developments in the green economy.
- **Strategy expertise:** Assemble a corps of expert advisors – executives from green and greening businesses in the region, researchers at universities, etc., to mentor and advise firms on issues that are beyond the scope of Impact Washington and Workforce Central's services. This is analogous to the way that accelerators provide executives- and entrepreneurs-in-residence, but available to businesses outside of an accelerator/incubator setting.
- **Certifications:** Firms that improve their processes or product mix may not be able to truly benefit in the marketplace until they have formal certifications of their environmental performance. One example is in the construction industry. For its Puget Sound campus modernization project, Microsoft set a goal of reducing embodied carbon in its construction materials by 30 percent, which required general contractors and subcontractors to report the carbon content of every material used in the building via Environmental Product Declarations. Helping Tacoma firms develop the skills and acquire the technology needed to comply with these mandates would better position them for marquee projects such as this.
- **Market insights:** Provide opportunities for firms to learn from government and corporate leaders about their investment plans and emerging needs (i.e., "reverse pitches").

Innovation Voucher Models

"Innovation vouchers" allow small- to mid-sized firms to buy hours from experts at universities or national labs to consult on product development or process innovation.

Rhode Island has one of the more robust innovation voucher programs nationally; it provides up to \$50,000 per company. The state estimates that its investment of \$4.6 million since 2018 (103 vouchers) has produced a return of over \$16.3 million. (A 2019 assessment found that the first 75 vouchers created 161 jobs and \$10 million in follow-on investment.) Companies can use vouchers to partner with a Rhode Island university, college, or hospital on R&D projects related to the development of a new product, process, or service. A recent modification allows companies to use vouchers for internal R&D projects as well. Recent voucher recipients include:

"BluDAE and the University of Rhode Island will test, demonstrate, and improve the material characteristics of an innovative 'green' concrete building material. This green concrete replaces cement with hard-to-recycle post-consumer polymers (plastics)."

"Flux Marine develops zero-emissions electric outboard motors for boats. The company is using funding to work with experts at the International Yacht Restoration School for Technology and

Trades (IYRS) to use composite materials to reduce the cost and improve longevity and the performance of the engine.”

Connecticut operates another intensive innovation voucher program for manufacturers with between 3 and 100 employees, though it includes equipment purchases as an eligible use (this accounts for approximately three-quarters of funding distributed by the program). It provides grants of up to \$100,000 and requires a 2:1 match by applicants. An evaluation by the state found that the program created one new job for approximately \$30,000 to \$40,000 in spending (a relatively high ROI compared to other economic development interventions).

INITIATIVE 2: UPSKILL

Create and Scale Adoption of Green Apprenticeship Programs in Mid-Sized Firms

WHY: Apprenticeship is the gold standard for connecting people without college degrees to high-quality jobs, while also enabling workers to make progress towards attaining a college degree – and degree attainment continues to matter greatly for upward economic mobility. Beyond creating opportunity for Tacoma residents, the development of industry-specific green economy skills will help key firms better respond to new market opportunities.

WHAT: Tacoma will work with workforce development intermediaries to customize existing apprenticeship programs for the green economy (and in the longer-term, help create new apprenticeship programs). Tacoma will also work with the same group of businesses targeted in the INNOVATE initiative to adopt apprenticeship programs at greater scale and help them adopt “good jobs strategies” that boost productivity and upward mobility.

Coordinated Approach to Innovation and Apprenticeship

The first two initiatives are intended to be implemented in very close coordination and targeted at the same firms. They are treated as separate initiatives in the strategy (a) to make sure that each part gets sufficient attention and (b) because they implicate different organizations, systems, and funding sources. **The “measures of success”, “role of CED”, and “best practices” sections for the first two initiatives are combined and included after the Green Apprenticeships initiative.**

The Opportunity

As firms in Tacoma take advantage of emerging green economy opportunities, they will need more workers with green skills, in the form of new hires and existing workers with new skillsets.

Apprenticeship is a proven way for firms to address these needs, and a proven way for workers to secure meaningful economic opportunity in the near- and long-term. Apprenticeship could be an especially powerful tool for the mid-sized firms that will be the center of Tacoma’s green innovation efforts, because it allows them to develop their own workforce rather than trying to compete with large firms for a relatively small pool of college graduates from relevant programs.

There are, however, several challenges to address before apprenticeships can become a dependable mechanism for expanding opportunity in the green economy:

- **Limited offerings:** While there are many apprenticeship programs in the sectors at the center of Tacoma’s green innovation efforts (e.g., manufacturing and construction), they are not yet attuned to the specific needs of green and greening firms; nor do businesses or other groups capable of hosting apprenticeships (unions, training funds, etc.) have access to a central hub of knowledge and support to determine the knowledge, skills, and basic competencies required to enhance an occupation’s ability to “green” processes and products
- **Low uptake among mid-sized firms:** According to Brookings, small businesses (which includes the businesses that this strategy considers “mid-sized”) struggle to launch apprenticeship programs because of limited overhead and HR capacity
- **Lack of diversity in existing apprenticeship programs:** existing apprenticeship programs relevant to the green economy are significantly lacking in both racial and gender diversity; a report by the Seattle Jobs Initiative found that from 2016 to 2020, approximately 80% of energy-related apprenticeships (such as electricians and HVAC technicians) were held by white apprentices (while only 52% of the population entering the workforce is white)
- **Lack of capacity within firms to retain and advance employees post-apprenticeship:** Adoption of apprenticeship programs is no guarantee that firms have the practices in place to retain and advance employees, which is not only good for workers, but good for firms’ bottom line given the high cost of turnover

The Initiative

Therefore, Tacoma should partner with intermediaries to modify existing apprenticeship programs to better address emerging green skills, make it as easy as possible for green and greening businesses to create apprenticeship programs, build more diverse pipelines through pre-apprenticeship programs and robust wrap-around supports for apprentices, and help businesses adopt “good jobs” strategies.

- **Make apprenticeship intermediaries a central partner in outreach to mid-sized firms:** apprenticeship intermediaries, such as AJAC, help mid-sized firms adopt and implement apprenticeship programs. Outreach to targeted firms (as described in the previous initiative) should be designed to identify firms that are good candidates for apprenticeship. Intermediaries should either function as part of the team doing initial outreach (i.e., filling the “expert” role alongside the City and EDB) or should be immediately engaged to provide follow-up assistance to firms interested in apprenticeship. Because there are well-documented misconceptions about apprenticeship – that it only applies to the trades, or that it requires union participation – this will need to involve proactive efforts to educate firms about the relatively low cost and high value of apprenticeship as well as the external supports available to help them implement programs. In the near-term, this work should focus on generating interest in existing registered apprenticeships in target sectors that can be easily modified to include green skills training. These include:
 - **Manufacturing:** industrial maintenance technician (AJAC)
 - **Logistics (industrial symbiosis):** operations specialist (AJAC)
 - **Construction (in support of green building technology development and deployment):** more research and industry engagement needs to be done to determine which construction-related occupations most require new green skills, and which of those occupations could help drive traded sector growth in this industry. Clover Park Technical College’s Construction Technology Program has a significant focus on sustainability and could provide guidance on needed green skills

in various trades. South Seattle College's Sustainable Building Science Technology program is another source of information, especially given South Seattle's extensive apprenticeship partnerships.

In the medium- to long-term, the Next Gen Sector Partnership that the Hub convenes on a regular basis should be used as a forum to identify other emerging skills needs that may be addressed by modifying existing apprenticeship programs or creating new ones.

- **Braid funding to subsidize costs for employers or wages for apprentices:** AJAC has partnered with Workforce Central to provide funds and technical assistance related to registered apprenticeship administration, apprenticeship programs, pre-apprenticeship programs including the successful Manufacturing Academy (for both youth and dislocated workers), and additional wrap-around supports that workers (new or incumbent) might need during training. Workforce Central and other partners should continue to identify ways to braid funds from various federal, state, and philanthropic sources to ensure that up-front costs for firms are minimized and that apprentices have the supports they need to succeed (e.g., childcare, transportation, work clothes, occupational-specific tools and license fees). The City, County, and Workforce Central created a model for delivering these wraparound services through the Introduction to Healthcare Apprenticeship Pathways (IHAP) program. Applying lessons from this model to green apprenticeship programs is especially important if Tacoma is to succeed in diversifying the green economy.
 - The Apprenticeship Innovation Funding program in California, created in 2022, will receive \$175M in funding from the state over three years as part of the Governor's goal of creating 500,000 apprenticeships in the state by 2029. Intermediaries will receive \$3,500 annually per active apprentice, as well as a \$1,000 bonus for every apprentice that completes training. This is far more generous than most state supports, which tend to be approximately \$1,000 per apprentice in the form of tax credits. This may be a level of support that Tacoma should aim to emulate.
- **Create or scale aligned pre-apprenticeship programs:** to ensure that there is a pipeline of talent into full apprenticeships that is at least representative of the demographics of Tacoma's emerging workforce (e.g., aged 18 to 30), if not more diverse. Invest in Workforce Central's ability to fund (directly or through nonprofits) robust wrap-around supports and stipends to these pre-apprenticeship participants, recognizing that even free programs can be costly for participants. Pre-apprenticeship participants have high employment rates upon completion, but one area to focus on is improving the rate at which pre-apprenticeship graduates end up in apprenticeship programs once hired; according to AJAC the current rate is about 30% for its Manufacturing Academy. Tacoma has several promising pre-apprenticeship models to build upon:
 - **Manufacturing:** AJAC's Manufacturing Academy
 - **Construction:** Palmer Scholars, ANEW
- **Help firms adopt "good jobs strategies" in parallel with apprenticeship:** Create a forum for peer-to-peer innovation on issues related to workforce diversity and job quality to ensure that as companies evolve and diversify their workforce, they have the practices in place to hire, retain, and advance diverse employees. Creating an equitable green economy requires innovation by HR and DEI leaders within firms, not just engineers and strategists. (See Genesis and HireReach examples below, and Columbus model in the Green Innovators Network initiative description.)

This initiative, perhaps more than any other in this strategy, could attract substantial federal and philanthropic attention. These actors share a desire to redefine “green jobs” (given that most of the discourse on this topic dates back to the 2008-2010 timeframe), a desire to expand apprenticeships, a desire to ensure that the green economy creates equitable opportunity, and a desire to help employers adopt “high road” practices. This initiative touches on each of these priorities. Tacoma should not be afraid to be ambitious and outspoken in this area, given the potential opportunity to solidify itself as a national model that outside partners want to support.

Increasing Overlap in Skills in Manufacturing and Construction

In a report about skills gaps in a time of automation, Deloitte Monitor chose to analyze gaps and opportunities in both manufacturing and construction.⁸ Explaining their decision, the authors wrote: “While there are significant differences between the industries, they have important similarities in their skills gaps. Both industries rely on a combination of psychomotor and cognitive skills, and both industries have traditionally provided high-paying employment opportunities for America’s non-college-educated workers. Additionally, experts that we spoke with highlighted the close relationship created by the extensive use of manufactured products in construction and suggested a trend toward convergence between the two industries. While the extent of this convergence is still uncertain, there are indicators, like prefabricated construction, that point toward greater transferability of technologies and skills between the two industries.” Tacoma may therefore explore ways in which workforce development programs in these two areas might be combined, or at least borrow from each other more than they do currently.

Measures of Success

By year three, Tacoma should achieve the following:

- Outreach to 75 unique firms (30-40 per year, with some repeats), with 25 regularly participating in the Next Gen Sector Partnership, 25 taking advantage of new innovation-related supports (e.g., Impact Washington engagement or meaningful engagement with an expert advisor), and 25 taking advantage of workforce development supports (e.g., apprenticeship).
- The total number of apprentices in the programs described above (including pre-apprenticeships) should double in Tacoma, and diversity should increase by 50% within apprenticeship programs (pre-apprenticeship programs are already highly diverse).
- If the 50 firms using these supports each add 10 jobs that they otherwise wouldn’t have, that would equate to 500 new jobs over three years. (Tim Bartik finds that business relocation incentives offered by other states typically cost \$200,000 per job, so this would be equivalent to what other states/regions spend \$100M on.)⁹

Community and Economic Development Department Role

Note: this describes the role of CED for both Green Innovation + Green Apprenticeships given that these should be closely aligned and coordinated by CED.

⁸ <https://www2.deloitte.com/us/en/pages/monitor-institute/articles/bridging-the-manufacturing-and-construction-skills-gap.html>

⁹ <https://www.aeaweb.org/research/tim-bartik-place-based-jobs-development>

- CED staff to serve as core part of BRE team (identifying target firms, participating in outreach to 30-40 firms, coordinating provision of follow-up assistance by service providers like Impact Washington, AJAC, Workforce Central, etc.).
- Push for commitments to green procurement (within the City, public sector partners, and private sector anchors, leveraging Tacoma’s Anchor Network) as well as green standards (within the City) that would create local markets for local firms looking to invest in green capabilities. Emerald Cities Collaborative is a valuable resource related to procurement and economic inclusion.
- Subsidize Impact Washington services related to greening firms. One example is Cook County (Chicago), which created the Cook County Manufacturing Reinvented Grant program in 2022 to provide 300 manufacturers with \$5,000 to \$25,000 each to offset the cost of services provided by IMEC, the region’s Manufacturing Extension Partnership affiliate.
- Invest in Workforce Central to support upskill/reskill services in mid-sized firms that are adopting green processes or creating green products, and to support pre-apprenticeship and apprenticeship programs (including wrap-around supports).

Best Practices

Coordinated approaches to innovation/productivity assistance and workforce development, with emphasis on job quality and workforce diversity, include:

- **Genesis (Chicago):** an initiative run by the Illinois Manufacturing Excellence Center (the region’s MEP affiliate, a peer to Impact Washington) designed to improve job quality by combining new practices on the “people” side (training, conflict resolution, compensation, employee engagement, job pathways) and the “process” side (cost reduction, quality improvement, technology adoption) for small- to mid-sized manufacturers. This is in contrast to standard MEP interventions that focus solely on the process side. The pilot project ran for two years and involved 22 companies. Genesis companies reported a 55% increase in sales over the course of the program, compared to 37% among IMEC clients that did not participate in Genesis (i.e., only focused on process improvement). Significant benefits accrued to workers as well. Annual earnings at Genesis companies increased by 12%, the share of workers making less than \$30,000 fell from 34% to 26%, and employee turnover fell from 5.8% to 3.3%.
- **Coordinated manufacturing support efforts on the East Side of Buffalo, NY:** for the past decade, three state- and federally-funded non-profit organizations have been leading a coordinated response to rebuilding manufacturing in Buffalo’s East Side. Since 2014, these organizations have been co-located alongside manufacturing firms in a business park created with \$29 million of state funding for the remediation and redevelopment of 35 acres of former industrial land.
 - **Workforce development:** the Northland Workforce Training Center (NWTC) offers associate’s degree and for-credit certificate programs that are designed and taught in partnership with Alfred State College and SUNY Erie Community College. The training programs are focused on entry and mid-level jobs in advanced manufacturing and clean energy.
 - **Applied R&D:** Buffalo Manufacturing Works (BMW) is a membership-based consulting organization that facilitates collaboration among industry, research, and academic partners to help firms create and adopt technological solutions like

- additive manufacturing and robotics. BMW provides fee-for-service consulting and provides shared use of its state-of-the-art laboratory, research, and training center.
- **Process improvement:** Insyte Consulting is the regional Manufacturing Extension Partnership (MEP) center for Western New York. Since 1982, it has provided business strategy and process improvement advice to small- and medium-sized manufacturers, with a focus on materials, machinery, marketing and business planning, quality system implementation, and information and technology development. Insyte moved to the business park in 2019 to be closer to NWTC and BMW.

Together, these three organizations work to drive inclusive innovation, a cycle wherein skilled workers enable companies to invest in technology, technology improves job quality, which attracts more skilled workers, and so on. The Shift program, for example, is a collaboration between BMW, Insyte, and a small business support organization. It exposes small manufacturers to automation technologies, with a goal of helping them understand how these can improve efficiencies and shift workers to higher-value tasks. These firms struggle more than their larger counterparts with new technology adoption due to a lack of understanding of a technology's potential or lack of technical expertise needed to implement it. The Shift Program has engaged 250 small- and medium-sized manufacturers in Western New York since it began in 2017.

- **HireReach (Grand Rapids):** an initiative of Talent 2025 (a group of 100 CEOs from the West Michigan region) and West Michigan Works (the local workforce agency) to help employers implement an Evidence-Based Selection Process (EBSP) based on a successful model at a major local health system. Results from 10,000 hires made over the first eight years of that health system using EBSP: first year turnover dropped 23%, hiring time dropped 16%, and diversity of new hires doubled. This three-year program will recruit, train, and advise businesses working to implement EBSP, including a thorough examination of entry-level and middle-skill positions to identify relevant skills and revamping the assessment and evaluation process. Cohort 1 began in January 2019 with 12 of the region's largest employers, covering six industry sectors and more than 40,000 employees. KIWD could partner with other entities in the region to assemble groups of employers and fund an organization to provide technical assistance.
- **North Carolina Clean Energy Youth Apprenticeship Program:** is designed to inspire and train community college and high school students to work in the state's burgeoning clean energy economy (offshore wind is expected to create 31,000 jobs by 2030). It was designed by North Carolina A&T, the nation's largest HBCU, with a \$165,000 grant from the Department of Environmental Quality State Energy Office. It provides high school students a pre-apprenticeship program, leading to two state certifications, then a summer program for college students that provides 80 hours of paid work-based learning, portable Journeyworker credentials from the USDOL, and transferrable college credit. Many of the apprentices are working in architecture and engineering firms. In 2022, the 30 participants were 93% minority and 69% female, and the program is expanding to 60 participants thanks to further financial support from the Governor's office.

INITIATIVE 3: DEPLOY

Use Infrastructure and Procurement as a Platform for Real-World Innovation that Helps Startups Scale Up

WHY: Young, high-growth firms create the most net new jobs in the economy – these are typically businesses that are less than 5 years old and are rapidly scaling from approximately 5 to 25 employees. Many cities provide promising entrepreneurs with startup capital, expertise, and incubator facilities. But for firms to translate early promise into ongoing success, they need large, sophisticated customers – not only for early revenue, but to help them refine their products, understand the market, and validate their business models to investors. One of Tacoma’s major strategic advantages is its forward-looking public sector entities that have made formal commitments to greening their operations.

WHAT: Tacoma will organize its public and quasi-public entities so that their collective assets and expertise are easily accessible to firms that need to pilot and demonstrate new technologies, reinforcing Tacoma’s status as a destination for innovation in a real-world setting. These efforts will be designed to both provide a platform for business growth and solve local environmental/social challenges in Tacoma.

The Opportunity

Tacoma sees itself as a city of makers and innovators, with a deep history in manufacturing and production. Like nearly every other city, however, Tacoma has seen its advanced manufacturing base decline in recent years.

Most regions have responded in one of two ways. The first is to try to create and attract high-growth startups in advanced industries. Tacoma likely cannot compete in this arena – it requires already being a center of gravity for a certain industry or cluster, or spending a lot of money to convince firms to come and stay (for example, Syracuse, NY has a state-funded accelerator that gives \$500,000 to \$1 million to every firm that participates, in addition to other post-accelerator incentives). The other approach is to attract large “greenfield” manufacturing operations. Supply chain backlogs and a push to re-patriate manufacturing operations are creating some opportunities to bring manufacturing back to the U.S. However, Tacoma’s limited available industrial land (along with a lack of incentives and higher labor costs compared to peers) puts a ceiling, at least for the near future, on the amount of manufacturing the city can recruit.

Where Tacoma can compete, however, is in the overlooked space between early-stage R&D and large-scale production. This is where firms need to validate their technology, refine processes (where most innovation actually happens), and find initial customers to provide revenue and validation for investors. While many cities have accelerators for early-stage startups, it is at this overlooked “scale-up” phase that real growth opportunities are unlocked. It is much harder to create a system that enables this type of real-world experimentation and refinement than it is to start an accelerator or throw incentives at a large manufacturer, so few cities have tried to do it. Tacoma, however, can be a national leader given its extraordinary set of public and quasi-public actors with green economy strategies – especially the City, Tacoma Public Utilities, and the Port.

With some dedicated staff, active collaboration between public sector entities, and a little bit of marketing, Tacoma can reinforce its position as a place where firms go to do “real world” innovation and deployment. To do so, public sector entities in Tacoma need to (1) make their infrastructure assets available and (2) use their purchasing power to drive innovation.

Open Infrastructure and Innovation Facilitators

In some cases, cities can help businesses realize their potential simply by making land or infrastructure available. An example of this approach already underway in Tacoma is the Tideflats 5G Network Feasibility Study. The groundwork has already been established for the many (160+) use cases of a 5G network in the Tideflats and how Port efficiency and energy infrastructure would improve with greater connectivity.

Truly unlocking the potential of firms will typically require opening up infrastructure and investing in innovation facilitators. This approach is most often seen in “smart city” efforts, where cities have a designated innovation zone and explore the use of various technologies in conjunction with city infrastructure. Globally, an example of this approach comes from Melbourne Australia, where the city established a testbed in 2018, called the Melbourne Innovation District, and a set of data sharing protocols to set the groundwork for pilot projects in the district. With this structure in place, every two years Melbourne runs an open innovation competition where companies compete for small grants to establish 12-month pilot projects to test their technology in the innovation district.

Some of these innovation facilitation efforts are more focused on establishing a proving ground with the resources to support emerging technologies in a single industry, typically one that requires field-testing to prove their products such as water technology and autonomous vehicles. A coalition of regional actors form an outward-facing organization, which anchors the proving ground and helps advocate to remove policy-related hurdles for technology testing. Examples of this approach include: the Water Council in Milwaukee’s pilot program, the Cleveland Water Alliance’s water accelerator testbeds, and the Central Florida autonomous vehicle proving ground established by the Central Florida AV Partnership. All of these examples have two things in common: (1) support from a city department or statewide agency and (2) dedicated staff and outward facing marketing to actively make connections.

Procurement as a Catalyst for Industry Development

The willingness of public sector entities to serve as the “first customer” to support local innovators – what is sometimes called “public purpose innovation” – can further enrich the testbed environment. One interviewee noted that a key challenge for clean energy startups is that “everyone wants to be the third customer” – meaning that while there are many public and private sectors that want to support innovation, they typically want some other entity to have done all of the challenging de-risking.

The Director of the Manchester Institute of Innovation in the UK writes that efforts to support early-stage startups “need to be accompanied by public procurement enabling scaling-up and diffusion. These can have a significant demand-pull effect on innovation, stimulating and rewarding technologically competent suppliers, and creating demand that drives down costs and creates economies of scale for innovative solutions. Studies have found that public sector contracts can be a more effective way of supporting product innovation than other forms of financial support, such as R&D grants or tax credits.”¹⁰

This is already happening in Tacoma, but in a somewhat ad-hoc and opportunistic way. Namatad, Inc. is an example of a company that needed to find a public-sector partner with which to co-

¹⁰ <https://blog.policy.manchester.ac.uk/posts/2022/08/public-procurements-role-in-innovation-productivity-and-societal-challenges/>

develop a technology and bring it to market. Connections between Namatad's CEO and Tacoma's Fire Chief, brokered by the City's Community and Economic Development Department, helped spur the creation of the FCC-approved Firefly emergency response system to find firefighters in burning buildings using technology, rather than simply follow the fire hose. It is worth noting that the public-private relationships envisioned here should be considered mutually beneficial – innovative businesses could help the public sector solve its own challenges, which could also build broader support for the City's green economy efforts by highlighting the local impact of these technologies.

The Initiative

The City, the Port, Tacoma Public Utilities, and other institutions should lead an effort to set the stage for mission-driven, risk-tolerant procurement for the green economy overall as well as pursuing sector-specific opportunities.

Setting the Stage

- **Take inventory.** Assess the innovation needs of public sector entities (in Tacoma, but also the region and potentially the state) and the ways in which those organizations are willing and able to partner with small, sometimes unproven businesses. Identify businesses that can address these challenges, through BRE efforts and by tapping the knowledge of partners like the Clean Tech Alliance, Maritime Blue, the Technology Alliance, University of Washington, etc., and facilitate introductions. This should include businesses producing software/services related to sustainability, not just manufacturers.
- **Formalize a collaborative to guide the initiative.** This would likely be another “spoke” whose work would be informed by the Green Economy Hub, comprised of policy and procurement leads from various public sector entities and other anchor institutions. This group could discuss shared procurement needs and policy constraints, as well as regularly meet with businesses (the Green Innovators Network, e.g.) to learn what local businesses can offer. The Energy Foundry in Chicago is an example of an intermediary that connects startups to infrastructure testbeds.
- **Facilitate reverse pitches.** Create opportunities for those public sector entities to provide “reverse pitches” to businesses in Tacoma and the region, so that startups can tailor products/services to respond to current/future market demand. The Technology Alliance is a regional entity with experience facilitating reverse pitches. This is an activity that should eventually be scaled regionally, so that Tacoma businesses can learn about the innovation needs of multiple potential customers, and so that Tacoma's public sector entities can learn about solutions provided by businesses in neighboring jurisdictions (since the growth of those businesses would likely create employment opportunities for Tacoma residents).
- **Work to retain businesses that develop relationships with local public sector partners.** This initiative provides a way for Tacoma to deepen its partnership with Maritime Blue (incubator) and the EDGE Cluster (5G at the Port, along with Maritime Blue), since demonstrating and refining technology with a public sector partner is a logical next step after completing an accelerator program. Since Washington law largely restricts the ability to offer financial incentives to firms, the city should identify other ways to support post-accelerator and other high-growth firms (for example, creating longer-term free or

subsidized incubator space specifically for green businesses and potentially green workforce development programs, which would also create a visible presence for the green economy).

Sector-Specific Opportunities

- **Focus on supporting adoption of green hydrogen by heavy industry.** This initiative should be used to solidify Tacoma’s position as a center of green hydrogen innovation and deployment, building on ongoing efforts by TPU and the Northwest Seaport Alliance. Clean & Prosperous Washington noted that cargo handling equipment at the port is a key opportunity. Grid Catalyst, a Minnesota-based accelerator focused on facilitating demonstration projects for clean energy startups, is a model to consider replicating.¹¹
- **Focus on industrial symbiosis demonstration.** Making industrial symbiosis happen requires an intermediary to take inventory of the economic landscape and identify pairs of businesses that could engage in this kind of resource sharing. In some cases, it also requires a utility to build the necessary infrastructure. Tacoma should serve as a matchmaker between firms for which waste can serve as valuable inputs (as has already begun with the Materials Marketplace), providing provide technical assistance to firms to enable them to do the necessary analysis/design to re-engineer systems around new inputs, and attract businesses/operations that contribute to industrial symbiosis systems (such as the OBRC bottle wash-for-refill facility).

Another potential focus area for demonstration projects is waste heat recovery, where the excess heat from one facility is captured to supply clean and efficient heat where it is needed by other facilities nearby. This is the right focus for launching Tacoma’s IS initiative because the business case is compelling for local industry, and the technology is mature, market-ready, and applicable to a wide variety of businesses where heating and cooling are significant cost centers. Building demonstration projects is essential because they prove to other businesses and stakeholders the technical viability, economic value proposition, and replicability of this IS technology. Two actions should be taken in the near- to medium-term:

- Partner with the Danish Energy Agency on an opportunity scan of the Tideflats and Nalley Valley industrial areas in Tacoma to identify the ripest opportunities for positive-ROI waste heat recovery projects.
 - Provide leveraged local matching funds for at least three demonstration projects identified in the opportunity scan as high-ROI project opportunities.
- **Use procurement to accelerate growth of the green buildings sector.** Many of the public and quasi-public agencies in Tacoma that have a commitment to the green economy also develop and own a lot of buildings, which creates opportunities to accelerate the growth of companies that create green building products or employ green processes. By not only stipulating that buildings should be green, but also making intentional efforts to support local startups and BIPOC-owned firms, these agencies can catalyze equitable growth. According to the Brookings Institution: “Governments own vast amounts of building stock, from offices to museums, that are often older and less energy efficient than privately

¹¹ <https://gridcatalyst.org/>

owned stock. Retrofitting them with energy efficiency devices, including sensors and smart meters, will be vital to achieve net zero carbon by 2050.”¹² Interviewees noted that the Defense Department is a massive property owner and that JBLM would therefore be a potential partner for efforts to demonstrate green products/processes in building retrofit projects.

Measures of Success

By year three, Tacoma should achieve the following:

- 15 meaningful pilot projects (first-ever demonstration on public infrastructure) or procurement relationships (\$1m+) between startups and public sector entities in Tacoma
- 10 of those companies either relocating to Tacoma or adding 5+ jobs each as a result of pilot or procurement relationships

Community and Economic Development Department Role

- Play an intermediary role, taking inventory of both businesses and opportunities to engage with the City, TPU, the Port, and other entities and actively facilitating partnerships
- Focus business retention and expansion efforts on businesses that engage in Testbed activities (go “above and beyond” to retain these high-potential firms)

INITIATIVE 4: RETOOL

Help Small Businesses – Especially Contractors – Anticipate and Respond to Demand for Green Products

WHY: This initiative would have multiple positive economic outcomes. First, it could turn non-traded businesses into more specialized firms that “export” green expertise to larger customers across the region and beyond. Second, the local presence of knowledgeable contractors could encourage and enable more Tacoma businesses to install low-carbon technologies in their facilities, saving them money and helping them meet the demands of customers that want greener suppliers.

WHAT: Tacoma will help small businesses (primarily contractors) that serve the local market develop strategies and capabilities that will allow them to tap into demand created by federal legislation. In order to directly address the racial wealth gap, these efforts will be focused on minority-owned businesses, or businesses with a high share of employees of color.

The Opportunity

Tacoma’s economy has, over the past decade, become less and less concentrated in traded sector industries. Countering this trend is crucial if Tacoma is to create more high-wage jobs. The above strategic initiatives focus on creating growth opportunities for existing traded sector businesses, especially in manufacturing, or attracting new ones. But another way to shift the makeup of Tacoma’s economy is by helping nontraded businesses – those that primarily serve the City of Tacoma market – become traded.

¹² <https://www.brookings.edu/techstream/how-governments-can-turn-procurement-into-a-climate-innovation-tool/>

The green economy offers opportunities for doing so – in particular by helping small Tacoma businesses develop specialized capabilities in areas where demand is being stimulated by federal and state policy (especially the Inflation Reduction Act or IRA). These areas include:

- **Heat Pump Installation:** RMI estimates that 7.2 million heat pump installations will be incentivized by IRA tax credits. Germany provides a cautionary tale of what could happen if this subsidy is not paired with efforts to upgrade the capabilities of contractors – the New York Times reports that, following the creation of subsidies for homeowners, there is a “dire lack of qualified mechanics” with months-long waits for consumers.¹³
- **Residential and Commercial Building Retrofit:** RMI estimates that 650,000 newly constructed energy efficient homes will be incentivized by IRA tax credits, as well as 115 million square feet of commercial space.
- **Building Automation:** estimates by various market research firms estimate that this sector will double or triple in the next decade, to a size of approximately \$200 to \$300 billion.
- **Wind and Solar Energy:** the Inflation Reduction Act is expected to expand U.S. wind and solar deployment by 2 to 2.5 times pre-IRA projections.
- **EV Charging and EV Maintenance:** an estimated 26 million electric vehicles will be on U.S. roads by 2030 (up from a 2018 estimate of 19 million), requiring about 13 million chargers.
- **Green Infrastructure Installation and Maintenance:** estimates of the size of this market are unavailable, but this is a compelling opportunity to help landscaping firms “retool”.

While some small businesses may have the capabilities and capital to respond to the surge in consumer and business demand in these and other areas, others may lack the market insights, capital, strategy, or skills to take advantage. This could lead to larger contractors – which may not be located in Tacoma, and which are likely predominantly white-owned – securing a first-mover advantage and solidifying their dominance in these new markets. Tacoma should intervene to ensure that firms in Tacoma are well-positioned to respond to new demand for green technologies, and that the owners of firms operating in these areas are representative of the city’s demographics.

The federal government has recognized that the IRA will require contractors to learn new skills. It set aside \$200M in the IRA for State-Based Home Energy Efficiency Contractor Training Grants. This is not a huge amount of funding, given that it covers the nine-year period from 2023-2031, so Tacoma should ensure that it gets its fair share of this funding and develop its own parallel, local supports for contractors.

The Initiative

This initiative is similar to the Green Innovation strategy in that it targets specific businesses for coordinated delivery of a full spectrum of supports – strategy, skills, capital, and so forth – but is organized around cohorts of small businesses and connecting them to a more standardized set of services. (Resource constraints dictate that these firms receive less one-on-one support and customized services than the mid-sized businesses targeted in the Green Innovation strategy; the needs of these small contractors are also likely to be quite similar.)

¹³ <https://www.nytimes.com/2022/12/02/world/europe/germany-heat-pumps.html>

This initiative requires a “backbone” entity – likely the MBDA in collaboration with a small business development nonprofit, like the Pierce County Business Accelerator, or an industry organization that is trusted by contractors – to organize cohorts of small businesses, identify their needs, provide market insights from leading firms and public entities, and connect them to technical/financial assistance through a network of providers in the region.

- **Identify high-potential small businesses and organize them by sector:** use estimates of the impact of IRA as a guide for which sectors to target – in the first two years, electrical/HVAC contractors (heat pumps) as well as builders/remodelers (energy-efficient construction/retrofit) are likely the top opportunities. In subsequent years, vehicle repair (EV maintenance) and landscaping firms (green infrastructure) should be targeted.
- **Help them understand emerging market opportunities:** connect groups of these firms to sources of market insight, which could include larger firms in the same sector (e.g., large general contractors), public sector entities (e.g., City, Port, TPU), industry associations, or economists/researchers.
- **Connect them with service providers:**
 - **Skills:** Workforce Central can create and fund cohort-based training programs for groups of firms (Workforce Central has already prioritized several relevant industries/occupations for this type of “reskill-upskill” training, including construction trades, renewable energy, and vehicle maintenance).
 - **Strategy:** Depending on the type of firm and the sector, different entities in the region could help business owners develop new business plans that incorporate new green economy opportunities. These entities include Community Development Financial Institutions (CDFIs), the UW Consulting and Business Development Center, Washington State Procurement Technical Assistance Center (PTAC), and mentors that are also involved in advising mid-sized businesses through the Green Innovation strategy.
 - **Capital:** Regional CDFIs like Craft 3 and Business Impact NW are well-positioned to provide capital to firms of this type and size, but may benefit from more intensive engagement with contractors and industry organizations to understand market opportunities tailor their offerings to these businesses.

Measures of Success

By year three, Tacoma should achieve the following: 20 small contractors have either been created or increased employment by 20% and increased by 50% the share of their revenue coming from outside of the City of Tacoma. Of these 20 contractors, 50% should either be minority-owned or have a minority workforce 50% higher than the minority share of Tacoma’s overall workforce.

Community and Economic Development Department role

- MBDA, WFC and CED staff can play central role in identifying small businesses with the capability and interest in re-tooling for the green economy
- MBDA and other CED staff can convene small business and workforce development service providers to ensure coordinated and tailored delivery of services

INITIATIVE 5: NETWORK

Facilitate Productive Convenings of Sustainability Professionals to Accelerate Business Change

WHY: For Tacoma’s economy to become greener, sustainability leaders within businesses will need to successfully push their firms to adopt new processes, create new products, change internal policies and practices, and enter new markets.

WHAT: To facilitate this change, Tacoma will create opportunities for people working to implement sustainability strategies within companies – whether as chief sustainability officers, environmental engineers, consultants, or otherwise – to build networks and develop their skills. As a result, Tacoma will cultivate a diverse and capable corps of established and emerging sustainability leaders that are attuned to trends in the green economy and able to drive change from within businesses.

The Opportunity

The green economy workforce discussion typically centers on the workers that will be responsible for designing and deploying new technologies – workers installing solar panels or working in production jobs. But there is a critical group of professionals that are “upstream” of these workers, informing and influencing businesses decisions about whether to invest in green processes or products in the first place. Tacoma needs to cultivate the skills of these professionals alongside its other workforce development efforts.

People working in professional services related to sustainability strategy face a rapidly changing economic environment and a dizzying array of opportunities for their businesses to contend with (new processes enabled by new technologies, new products demanded by customers, new markets created by federal policy, new legislation). Since many of the firms that employ sustainability professionals are only beginning to build out their sustainability teams and have not yet figured out how to integrate them into the business, these leaders lack networks – either within their firms or with their peers at other firms – with whom they can solve problems and identify best practices. Many are working alone, trying to solve similar challenges as their peers but without productive opportunities to exchange ideas.

This matters because firms “learn” primarily through informal collaboration with other firms (peers, suppliers, customers). The lack of collaborative networks between these individuals means that Tacoma businesses are likely to evolve more slowly than they would if such networks existed.

Peer-to-peer learning is all the more important given that the green economy is growing and changing so rapidly that the education system is likely struggling to reshape curricula at the necessary speed. This means that early- to mid-career professionals need flexible, short-term professional development opportunities, and emerging talent (i.e., college students and recent college graduates) need to pair their coursework with meaningful industry exposure.

The Initiative

Tacoma will create purposeful networking opportunities for sustainability leaders from local businesses and government agencies.

This could draw on a model being implemented by the Columbus Partnership. This model is focused on improving employer practices related to DEI, but there are strong parallels in that the

field is changing rapidly and many businesses have just one DEI leader who is often isolated within the firm and needs a peer network with which to solve operational and organizational challenges.

In this model, there is a “DEI Leaders Forum” that includes approximately 40 individuals, most of whom are chief DEI officers or have similar responsibilities. This group gathers every two to three months. In addition, twice a year the Partnership launches two “DEI Labs”, in which sub-groups of approximately 8-10 leaders gather to solve a specific operational challenge over the course of a 3- to 4-month “sprint”. These 8-10 leaders then report out to the broader group, helping to spread and scale best practices. Following this model, Tacoma could convene a broader group of cross-disciplinary sustainability leaders for semi-regular gatherings and regularly create opportunities for “deep dive” Labs on specific topics (which are selected by those leaders).

A related model is the Nashville Health Care Council Fellows program, which provides structured networking and industry-relevant talent development opportunities for a group of rising professionals every year. It is structured like “Leadership” programs in many cities, offering a customized curriculum for a cohort of C-suite or senior leaders that are “dissatisfied with the status quo” over the course of six months (seven full-day sessions, two retreats).

However it structures this effort, Tacoma should consider scaling it to the regional level, since Tacoma sustainability professionals would benefit from the ability to learn from others in the Seattle metro area (and this may be necessary to get to a group of 40+ committed leaders). The Clean Tech Alliance and other similar organizations could take on the convening role, or at least serve as a source of good candidates and an amplifier. Going further, Tacoma should consider taking this group to cities that have active networks of sustainability professionals (Portland, Vancouver, Bay Area) for learning tours.

Having established a model for “convening with purpose” for mid-career professionals, Tacoma could create a mechanism for emerging talent to engage with this group. King County, for example, piloted a model in which three college students of color received one-year internships involving work on climate projects within the County government, and received \$1,500 for a professional development course related to project management. Creating an “emerging green economy talent” fellowship program in Tacoma, with members of this network serving as mentors, could not only attract and retain talent, but diversify the industry.

Measures of Success

By year three, Tacoma should have achieved the following:

- 100 unique individuals participated in network events/convenings
- 50 individuals attended at least three events/convenings
- 10 either mentored either emerging talent or served as expert advisors to businesses involved in other initiatives

Community and Economic Development Department role

- CED could co-host with Office of Environmental Policy and Sustainability, though eventually convening/facilitation should potentially be transferred to a more industry-facing entity
- CED could provide funding for programming, especially an “emerging green economy talent” fellowship that provides both public- and private-sector industry exposure for college students of color

INITIATIVE 6: ATTRACT

Leverage Logistics Strengths to Attract Circular Economy Businesses

WHY: Over the past decade, logistics and warehousing has become a larger share of Tacoma's economy. Transportation/moving occupations are Tacoma's second largest occupational group, and median wages for these jobs is less than \$22 per hour. While logistics can be a valuable complement to export-oriented manufacturing, the growth of logistics occupations in Tacoma has happened alongside a significant reduction in production occupations (i.e., manufacturing). This is a troubling trend.

WHAT: But Tacoma has an opportunity to leverage this weakness into a green economy strength by attracting businesses involved in the circular economy – specifically businesses involved in recycling, remanufacturing, refurbishing, reuse, and the logistics and warehousing required to do so.

Other Business Attraction Targets

The City of Tacoma has a list of green economy businesses both in the region (for engagement on various initiatives as well as business retention and expansion efforts) and a list of green economy business attraction targets nationwide. The circular economy or industrial symbiosis businesses discussed below are not Tacoma's only business attraction targets, just the only ones whose attraction may require a full-scale initiative (because they require coordinated policy/legislative and economic development efforts).

The Opportunity

Driven by consumer demand, as well as supply chain uncertainty and cost pressures, major businesses are making serious investments in “circular” or “regenerative” business models. Examples of circular business models include the following:

- Renault, the French car manufacturer, remanufactures automotive engines, transmissions, injection pumps, and other components for resale. According to McKinsey, “the plant's remanufacturing operations use 80 percent less energy and almost 90 percent less water (as well as generate about 70 percent less oil and detergent waste) than comparable new production does. And the plant delivers higher operating margins than Renault as a whole can boast.” Renault also leases batteries for its electric cars so that it can refurbish or recycle them.
- Michelin, which leases vehicles across the EU through its Fleet Solutions division, collects worn-out tires to retread or re-groove them for resale; it estimates that retreaded tires require half the raw materials as new tires and deliver 90% of the performance.
- Apparel company H&M created an in-store collection program wherein consumers could return old clothes in exchange for discounts on new clothing purchases; through a partnership with reverse logistics firm I:CO, the donated clothes were distributed to global secondhand markets, used as substitutes for virgin materials in other industries, or (as a last option) used as fuel to produce electricity. Relatedly, Patagonia collected, repurposed, and resold an estimated 120,000 garments through its Worn Wear platform between 2017 and 2020.

- The Ellen MacArthur Foundation estimates that converting 20% of global disposable plastic packaging into reusable packaging is a \$10 billion opportunity. This has sparked significant innovation. For example, RePack and LimeLoop both create reusable packaging for e-commerce, and have been used by tens of thousands of consumers. Loop, which is based in New Jersey and operates in the U.S., UK, Japan, and France, works with consumer goods companies to create refillable versions of conventional single-use products, collects used packaging from consumers and retailers, enables deposit return, sorting and storing, and returning to manufacturers for refill. In 2022, Loop launched a partnership with 25 Fred Meyer stores in Portland in which products from well-known brands will be available in refillable containers, which consumers can return at the store to receive a full refund of the packaging deposit.

All of these models require businesses to rethink their logistics and warehousing processes, and in many cases, invest in new facilities closer to end users. Tacoma is a logistics hub, favorably situated within in a region whose environmental values make it a natural location for business to experiment with circular models – as evidenced by the Loop partnership with Fred Meyer stores in Portland, the first U.S. partnership of its type. Tacoma can therefore translate its logistics and warehousing capacity and expertise into a green economy job creation opportunity.

Importantly, the reverse logistics required to make circular business models work would not just create more of the same types of logistics and warehousing jobs that Tacoma already has in abundance. This type of logistics requires a lot of innovation and problem-solving, including collaborative innovation between manufacturers of logistics firms, because the costs of collecting, processing, washing, and redistributing are currently prohibitively high for many businesses. Given these complexities, Tacoma has an advantage over other regions not just due to its location, but also due to its partnership with talent development organizations like Workforce Central and AJAC, which recently created logistics specialist and operations specialist apprenticeship programs.

The Initiative

Tacoma has a potential opportunity to establish itself as the center of circular economy logistics in the region through targeted business attraction efforts.

One notable near-term opportunity is attracting a groundbreaking bottle-wash-for-refilling facility that would process glass bottles from across Oregon and Washington. Not only would this be a major success in its own right – creating dozens of good jobs, reducing costs for local breweries, and having a major environmental impact – it would also improve Tacoma’s ability to attract other businesses in the same sector.

This opportunity depends on the passage of container deposit legislation in Washington, modelled after the Oregon Bottle Bill passed 50 years ago, which requires that certain beverage containers be returnable with a refund value (currently 10 cents). The Oregon Beverage Recycling Cooperative (OBRC), a private cooperative owned by beverage retailers and distributors, collects and transports returned containers, sells the materials, and returns the proceeds to distributors. It keeps unclaimed deposits to fund operations, and thus requires no public money. OBRC processes approximately 2 billion containers each year. OBRC is lobbying for passage of container deposit legislation in Washington because 70% of the beverages sold in Washington are sold by the same distributors that operate in Oregon, and the major grocery industry association operates

in both states as well. Because expanding the system to Washington would create significant efficiency advantages for the beverage industry, so there is backing for this legislation both from environmental advocates and from industry.

Should this legislation pass – which is likely in 2023 – Tacoma has an opportunity to attract OBRC’s bottle wash-for-refill facility. In 2017, OBRC launched the first statewide refillable bottle program in the U.S. Currently, 11 Oregon beverage producers offer their beer, wine, and cider in these bottles. OBRC collects them via the same system as other bottles then washes, inspects, and delivers them back to producers. This system has 2.5 million glass bottles in circulation. It has kept over 600,000 bottles from being crushed and recycled, reduces the carbon emissions associated with each bottle by 95%, and cuts the cost of packaging for producers by 10% while increasing supply chain certainty.

If Washington were to be included in this system, industry estimates forecast at least 8 million containers in circulation within the first three years, ramping up to 15-20 million over the following five years. This would require a wash-for-refill facility of significant scale (OBRC currently uses one in Montana). Tacoma is perfectly positioned to attract that facility because it is midway between Portland and Seattle and offers a direct connection to eastern Washington wineries. OBRC envisions this facility requiring \$30 million in capital investment and up to 100 workers once full capacity has been reached.

This facility is not Tacoma’s only opportunity to attract innovative, green logistics operations. But it is a concrete, near- to medium-term opportunity that gives Tacoma a reason to articulate its vision to state policymakers and to define its competitive advantages for firms. Tacoma should take advantage of this opportunity, and then carry that momentum forward into other business attraction efforts related to the circular economy.

For example, this facility could later be expanded via partnerships with other circular economy businesses – for example, Loop (which is partnering with Fred Meyer) currently ships its reusable containers to New Jersey to be washed, likely offsetting any emissions reductions involved in reuse. And if properly situated, this facility could use hot water from industrial facilities, further improving environmental outcomes (see more discussion on industrial symbiosis below). Business attraction efforts with companies like Loop and others could be successful as independent undertakings, but would benefit from the infrastructure created through the OBRC opportunity.

Need for Strategic Site Development and Marketing

Tacoma’s limited industrial land was frequently cited by interviewees as a barrier to catalytic business attraction efforts within the City of Tacoma. The Green Economy Hub can work with Greater Seattle Partners to better quantify and map Tacoma’s available land/sites and draw actionable conclusions about what types of firms or industries would be the best targets of business attraction efforts (based on the size and other characteristics of available land/sites and the typical requirements of businesses in different industries). This process would also enable the Hub to assess where green economy business attraction efforts would be most conducive to creating inclusive outcomes – where a new facility would provide accessible jobs to residents that have been excluded from opportunity.

Measures of Success

By year three, Tacoma should have achieved the following:

- Successful attraction of OBRC facility, should necessary legislation pass, and attraction of one other circular economy business, totaling at least 75 full-time jobs.
- Productive engagement with 10 other businesses or investors in the circular economy sector.

Community and Economic Development Department Role

- Work with Mayor's office and other city departments/staff to engage with policymakers to advance progress on container deposit legislation (with a focus on potential for inclusive, green growth).
- Work with EDB, TPU, GSP and other entities to put forth a compelling, data-driven business attraction pitch to OBRC and other circular economy businesses.

Part 2: Why the Strategy Matters

The Possibility: the Transformative Potential of Economic Development

What is Economic Transformation, Why Does it Matter, and How Does it Happen?

Prosperous regional economies are able to develop specializations in high-value industries and continually adapt and re-specialize. The way that economic development can change the direction of an economy is to change the mix of industries in a region's economy – moving from mature or declining industries with minimal growth prospects and/or low wages to emerging, innovative industries with high growth potential, entrepreneurial opportunity, and high wages.

This strategy aims to not just grow Tacoma's economy as it currently exists, but to set Tacoma's economy on a path towards transformation. What does economic transformation mean, and is it even possible for cities to engineer transformations of their economies?

The basic measure of a city that is successfully evolving – or transforming – is growth in the share of the economy that is in traded sector industries (those industries that sell goods and services outside of the region). Traded sector industries matter for two reasons.

First, they are the engines of growth – a city's population can only have so many restaurants and bookstores (these scale with the size of the population), but a city can grow parts of the economy that serve external markets almost limitlessly. A city can therefore help its traded sector firms grow without creating counterproductive competition for existing local firms. Second, these industries are where the good jobs are. Traded sector jobs are roughly 40% more likely to provide living wages than non-traded sector jobs. "Advanced industries", a subset of traded-sector industries that are marked by high rates of innovation, are especially crucial – they offer a pay premium at every level of education. According to the Brookings Institution, the average worker with a 2-year degree in an advanced industry makes more than the average worker with a 4-year degree in a non-advanced industry. Relatedly, a 2021 study found that only growth in traded-sector entrepreneurship is linked to reductions in poverty in cities (not growth in non-traded entrepreneurship).¹⁴

This is why, from 2009 to 2019, Denver and Raleigh-Durham – which boast high concentrations of advanced industries and dynamic entrepreneurial ecosystems – were two of just a small handful of metro areas in the country that made progress on growth, prosperity, and inclusion (in terms of both race and geography).¹⁵ An innovative traded sector is a necessary, if insufficient, condition for inclusive growth.

How Economic Transformation Happens

Shifting a region's industry mix is not easy, but it can be done. Researchers have identified several cases in which one city's trajectory diverged from that of its peer cities. In some cases, the catalyst for this new trajectory was a business attraction deal involving huge amounts of public incentives – a pathway that is not relevant to Tacoma given the state's limitations on corporate subsidies. Upstate South Carolina, which attracted a BMW plant in the early 1990s and has since built up a

¹⁴ <https://journals.sagepub.com/doi/full/10.1177/0308518X20924422>

¹⁵ <https://www.brookings.edu/blog/the-avenue/2020/03/04/metro-monitor-2020-prosperity-is-increasing-in-americas-largest-metro-areas-but-not-for-everyone/>

robust advanced manufacturing and innovation-driven economy, is a frequently cited example. But in other cases, the divergence was based on a set of strategic and organizational decisions by public- and private-sector leaders that Tacoma can draw inspiration from. For example:

Grand Rapids, MI – a peer city of Tacoma – is the only metro area over 1 million in population that both grew jobs overall from 2000 to 2015 and grew manufacturing jobs from 2007 to 2015. (Allentown, PA, situated 90 minutes from both Philadelphia and New York City, also came close.) In 2016, manufacturing jobs in Grand Rapids were 50% higher than if Grand Rapids had followed the U.S. trend since 1990. In other words, the Grand Rapids economy diverged very sharply from other similar metro areas, especially after 2007. What drove this shift? A rigorous analysis of Grand Rapids and other successful manufacturing communities found that it was not lower taxes or larger economic development incentives, but: investment in customized job training, investment in manufacturing technical assistance, and the share of the workforce that is college educated.¹⁶ What does this look like on the ground? Grand Rapids:

- Has a **Manufacturing Extension Partnership (MEP)** within the region's economic development organization, The Right Place, allowing it to engage with more firms than most MEPs.
- The Right Place has active **industry councils**, including for manufacturing, in which firms come together to identify and solve shared problems, including related to talent needs.
- A cross-sector, CEO-led **talent development backbone** entity – Talent First – was formed to coordinate investments in skills development from pre-k through adulthood.
- **HireReach** is a nonprofit organization that helps local firms, including many leading manufacturers, adopt skills-based hiring practices with a goal of diversifying the workforce.
- Local **colleges and universities**, such as Grand Valley State University and Grand Rapids Community College, are highly engaged in economic development efforts.

None of these on their own explain Grand Rapids' extraordinary performance. But they collectively capture what it takes to transform a city's economy. In short: (1) investments in evidence-based interventions that help existing firms innovate and workers become more skilled and productive, (2) highly networked public-private leaders that share a common narrative, set clear goals, and strategize together, and (3) significant philanthropic investment in economic and workforce development.

Other studies have specifically reinforced the importance of networked, cross-sector leadership in determining different region's economic trajectories: these networks largely explain the different trajectories of San Francisco versus Los Angeles, and Rochester, NY versus Akron, OH.¹⁷

In summary, economic transformation is not only possible, but can be meaningfully influenced by local leaders that not only invest in the right things, but engage actively and collaboratively in strategy. This is all the more important today given that the federal government's massive

¹⁶ While communities are less in control of the overall skills of the workforce, the author notes that moving from the lower end to higher end of the spectrum in terms of providing customized job training and technical assistance corresponds to an increase in job growth of 3.6 percentage points.

¹⁷ See <https://blogs.lse.ac.uk/usappblog/2015/11/02/a-tale-of-two-cities-how-san-francisco-surged-forward-while-la-fell-behind/> and <https://web.mit.edu/lis/papers/LIS04-002.pdf>

investments in economic development and decarbonization are rewarding regions that have a shared vision and strong public-private partnerships.¹⁸

The Need: Tacoma’s Economic Structure and Position

Tacoma’s Industry Structure and Implications for Economic Opportunity

If economic development is fundamentally about changing the structure of the economy, then what is Tacoma’s starting point? As noted in the previous section, the share of the economy represented by traded sectors is a basic but meaningful measure of a city’s ability to provide economic opportunity. Tacoma has a lower share of traded sector workers than the nation overall and most of its peer metro areas. Less than 33 percent of Tacoma’s employment is in traded sectors, ranking 10th among peers. To put the gap in context, Tacoma would need to add 47,200 more traded sector jobs to catapult to the top of this list and match Grand Rapid’s share of traded sector employment.

Ranking (1-15)	City	Percent Traded Sector Employment
1	Grand Rapids, MI	40.8%
2	Fort Collins, CO	37.4%
3	Madison, WI	37.1%
4	Worcester, MA	36.8%
5	Vancouver, WA	36.0%
6	Lakewood, CO	35.3%
7	Stockton, CA	35.2%
8	Eugene, OR	34.5%
9	Santa Rosa, CA	33.9%
10	Tacoma, WA	32.9%
11	Salem, OR	32.9%
12	Glendale, AZ	32.4%
13	Boise City, ID	31.9%
14	St. Petersburg, FL	31.7%
15	Spokane, WA	31.2%

Industry employment is calculated to include the 30-minute driving radius around each city’s downtown, to account for industries and employment that contribute to the local economy but may be just outside official city limits.

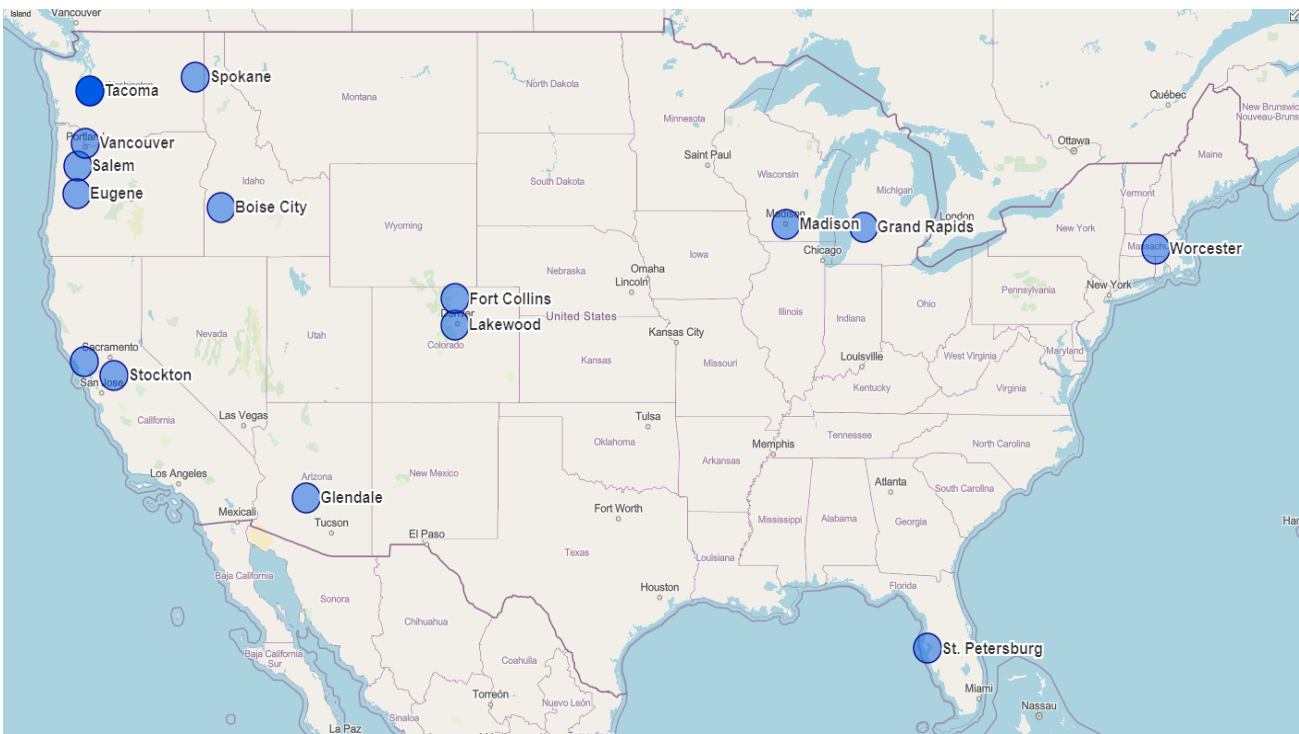
[Peer city analysis](#)

¹⁸ Examples include the \$1B Build Back Better Regional Challenge, the \$10B set aside in the CHIPS and Science Act to create regional technology hubs, the \$7B investment in regional hydrogen hubs, and so forth.

To tell Tacoma’s full story and reveal advantages in the green economy, this strategy compares 30 metrics for Tacoma against a set of 14 peer cities. This list of peers is not aspirational or intended to be used as a goal setting tool. (For example, Tacoma may not *want* to be the fastest growing of its peers and see population spikes of more than eight percent in a year. Rapid growth is usually presented as an advantage in the world of economic development in that it suggests that the local market is dynamic and exciting, but it could easily be a disadvantage if housing stock and city services cannot keep pace with growth.) Therefore, this list of peers should be considered a means of gut-checking values, unearthing advantages and challenges, and identifying major themes that are part of Tacoma’s unique place in a green economy future.

Selecting Peer Cities

Selecting a group of 14 peer cities involved scoring and ranking over 300 cities across the United States based on population, economic size, growth, density, industry similarity, and whether or not they are within a 90-minute drive of a handful of major US cities. For a full discussion on the methodology used to score cities, see the technical appendix. A short list of highly ranked cities were then put through a subjective, local filter to elevate places that stakeholders may think of as peers or that Tacoma is likely to compete with for economic development projects. This created a geographically diverse list of similarly sized locations that meet multiple criteria to be considered peers. The map below shows Tacoma and the 14 peer cities.



In addition to Tacoma’s low share of traded sector employment, the types of industries that make up Tacoma’s traded sector are not particularly conducive to high-quality job creation. Across Tacoma’s peer cities, industries such as manufacturing, professional and technical services, and educational services account for the highest shares of all traded sector employment. For example, manufacturing accounts for an extraordinary 43 percent of the traded sector employment in Grand Rapids, MI. In Tacoma, the largest share of traded sector employment is in manufacturing (27 percent), followed by transportation (15 percent). This is notable as the average share of traded

sector employment in transportation is Tacoma's peer metro areas is nine percent. This means that Tacoma's relatively low ranking in terms of traded sector employment actually *overstates* the strength of its economic structure, as transportation is not an "advanced industry" that offers high wages and innovation spillovers.

The situation in Tacoma has worsened slightly over time, even as advanced industries exploded in the Seattle metro area overall. The share of traded sector employment in Tacoma fell by roughly one percentage point over the past decade. This shift was driven by large increases in the healthcare, transportation and warehousing, and administrative services industries, coupled with small gains in professional and technical services employment and a decline in manufacturing employment. The healthcare/social assistance and retail trade industries are the two largest industries in Tacoma overall, accounting for 15 percent and 12 percent of total employment. (See industry distribution chart in appendix.)

This means that, while Tacoma has experienced some of the economic downsides of proximity to Seattle (i.e., rising housing costs), it seems not to have fully captured the economic benefits of proximity to Seattle (i.e., securing its "fair share" of the region's high-wage job growth). If current trends continue, Tacoma is at risk of becoming a city with increasingly low-wage jobs in an increasingly expensive region.

Defining Quality Wages

This analysis uses a quality wage threshold, dependent on education level, for the entire metropolitan area. "Quality wages", as defined by the Brookings Institution, for the Seattle-Tacoma MSA are jobs that pay at least \$25 an hour to someone with an associate degree or \$36 an hour to someone with a bachelor's degree. (Workers with bachelor's degrees on average make \$11 per hour more than workers with associate's degrees in Seattle, so this analysis adds that premium on top of the \$25 per hour family-sustaining wage.) In the Seattle-Tacoma MSA, only 38 percent of the population with an associate degree was earning "quality wages" and only 44 percent of the population with a bachelor's degree was earning "quality wages". These values change drastically depending on race. For example, while 45 percent of the white population with a bachelor's degree makes above \$36 per hour in the Seattle MSA, only 18 percent of the Black population with a bachelor's degree makes above that threshold.

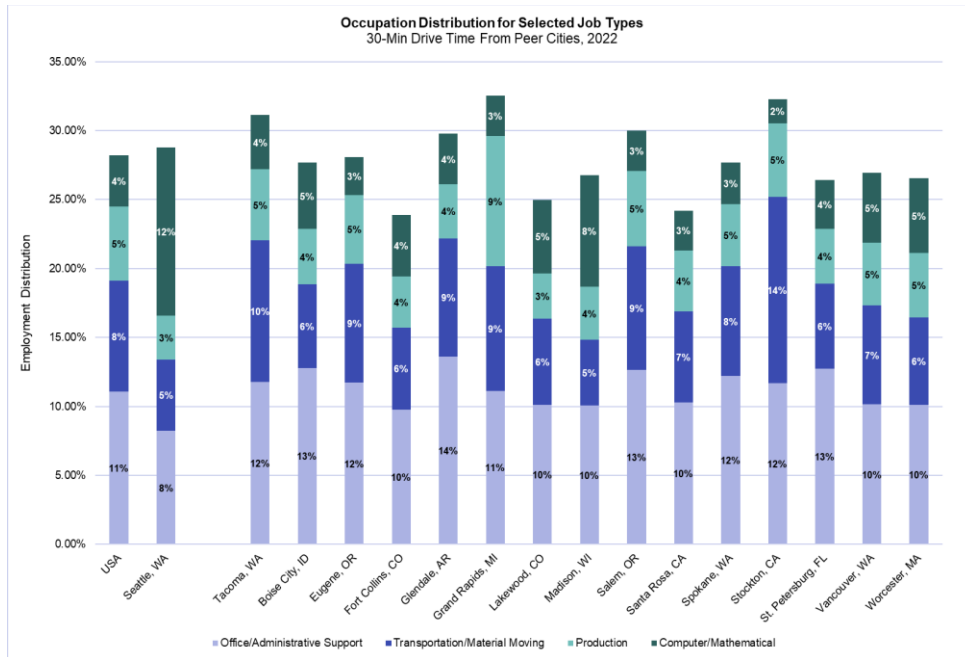
Tacoma's Occupational Structure and Implications for Individual Opportunity

The industry analysis above does not tell the whole story, because cities do not just specialize in industries, but also in certain types of occupations. For example, healthcare, retail, and manufacturing **industries** all employ people in software development, accounting, and secretarial **occupations**. Two regions with high shares of employment in the healthcare industry could have very different occupational profiles, and therefore different wage profiles – one could be oriented towards physicians and the other towards low-wage home healthcare workers. Similarly, one city could have a high concentration of engineers in the manufacturing sector, and another could have a high concentration of low-wage assembly workers.

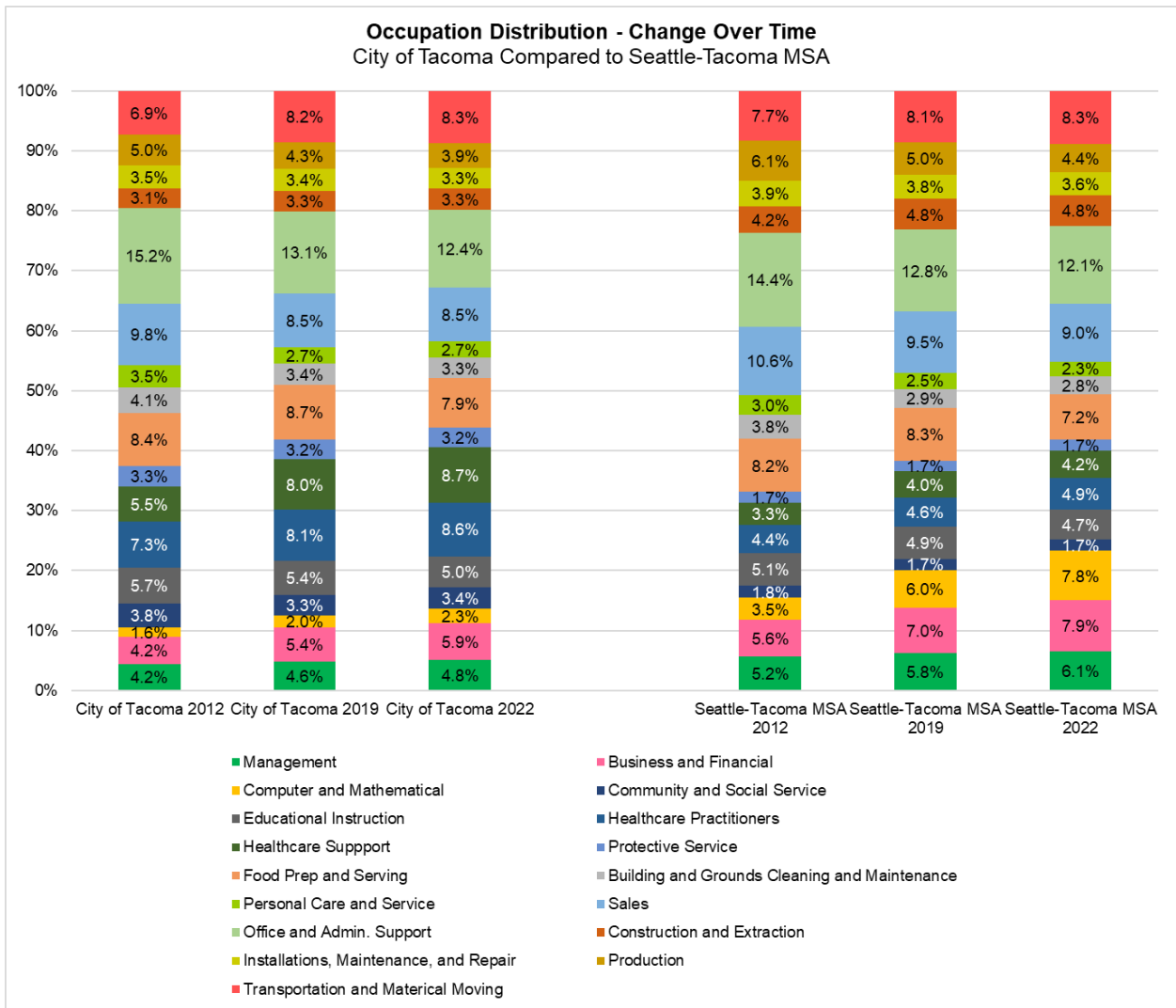
In Tacoma's case, the largest occupational category is office and administrative roles (such as customer service representatives), paying a median wage of approximately \$23 per hour or \$47,820 per year. The next largest occupation group is transportation/moving occupations (including laborers moving stock in warehouses). Median wages in these jobs is \$21.80 per hour, or \$45,270 per year. In summary, more than one in five people in Tacoma work in these two

occupations, which pay below median wages and are at high risk of automation. (See occupation distribution chart in appendix; more on automation risk below.)

Comparing Tacoma’s occupation distribution to that of its peer cities (as well as the US and City of Seattle) further illustrates that Tacoma has not been able to capture its fair share of advanced industries growth being generated by Seattle. The chart below compares the distribution of Tacoma’s top two occupation groups (office workers and transportation workers) plus two occupations that are highly desirable from an economic development perspective (computer and manufacturing production roles) relative to its peer cities. Tacoma has a higher than average share of workers in office roles and has the second highest percentage of transportation jobs compared to peers, only surpassed by Stockton, CA. Tacoma has a roughly average share of employment in computer and production jobs (compared to the US), but the divide between Tacoma and Seattle for computer jobs is striking. Only four percent of Tacoma’s employment opportunities are in computer/mathematical jobs versus 12 percent in Seattle.



Finally, while the Seattle-Tacoma MSA overall has, over the past decade, become more specialized in high-wage computer and mathematical jobs, the City of Tacoma has been adding more and more jobs in healthcare support/practitioners and transportation occupations. The chart below shows that the share of computer and mathematics roles in the Seattle-Tacoma MSA more than doubled from only 3.5 percent in 2012 to 7.8 percent in 2022, while in Tacoma, these jobs increased from 1.6 percent to 2.3 percent. The most notable shift in Tacoma during this time was the increase in healthcare support occupations, moving from 5.5 percent of jobs in 2012 to 8.7 percent of jobs in 2022. Manufacturing production jobs decreased in the region overall; the decline in the City of Tacoma was just slightly less than the decline in the broader region.



Note: analyzing the job distribution at different geography levels (City of Tacoma limits vs. 30-min driving radius from Tacoma, and Seattle-Tacoma MSA vs. 30-minute driving radius from downtown Seattle) only change the estimated percentages slightly.

Tacoma's Occupational Structure is at High Risk of Automation, Exacerbating Racial Disparities

In addition to paying low wages, Tacoma's largest occupations are also at the greatest risk of automation. Risk of automation is calculated based on the likelihood that a job task could be performed by a computer. A 2021 report by National Equity Atlas notes that "very few jobs consist entirely of tasks that can be computerized, but most occupations include enough automatable tasks to be considered at risk of automation. The national average risk is about 52 percent, indicating that about half of job tasks performed by the US workforce can be automated."

That same report included data on the Seattle-Tacoma MSA highlighting racial inequities in the labor market and how those overlap with automation risk. For example, the average automation risk for a job in the region is slightly lower than the US average at 48 percent. Overall, white workers are employed in jobs that have a 45 percent risk of automation. Meanwhile, Black and Hispanic workers in the Seattle-Tacoma MSA are employed in occupations in which risk of automation is higher than the US average at 56 and 61 percent. (See chart in appendix.)

Of the more than 400,000 jobs in the Seattle-Tacoma MSA with an automation risk greater than 90 percent, roughly 32 percent are office/administrative or transportation roles. Tacoma, as noted above, has a high concentration of these jobs. One of the largest occupations in Tacoma is laborers moving freight and stock by hand (also referred to as warehouse workers). There are 18,000 warehouse workers employed within a 30-minute drive of Tacoma, an occupation where 41 percent of the workforce in the broader region are workers of color. This job has a striking 85 percent automation risk. Not only are Tacoma's jobs increasingly in low-wage sectors and occupations, but workers of color in Tacoma are more likely to be confronted with the need to switch occupations in the coming years.

Industry and Occupational Analysis Summary

In summary, whether analyzed in terms of industries or occupations, Tacoma's economy is diverging from that of the broader MSA. Rather than Seattle's technology-driven growth pulling Tacoma's economy into a higher-wage mix of industries, Tacoma is – despite many specific examples of companies innovating and growing – becoming a center of the region's lower-wage, less-innovative sectors.

Despite being part of the Seattle MSA, where 38 percent of the jobs are in traded sector industries, less than one in three Tacoma jobs are in traded sectors (ranking 10th among peers) and more than one in five individuals work in office/administrative or transportation roles that often pay below family sustaining wages, offer limited upward mobility, and are susceptible to automation, and are more likely to be held by people of color.

These structural factors matter because they largely determine a city's ability to produce economic opportunity. There is only so much that a city can do to increase wages in local-serving industries or in sectors marked by low levels of innovation, such as retail and transportation. **The green economy, therefore, needs to be viewed not only as a growth opportunity, but as a way to more fundamentally shift the mix of industries and occupations that define Tacoma's economy.**

Tacoma's Unique Profile

As Tacoma seeks to reshape its industry mix in service of a more resilient and opportunity-rich economy, it must recognize – and take advantage of – its nearly unique economic profile nationally. Tacoma's economic profile is unique for two key reasons.

First, Tacoma is nearly unique simply by virtue of its proximity to Seattle, which is among a few superstar cities that are rapidly distancing themselves from the next tier of regions.

There are few metro areas like Seattle-Tacoma-Bellevue in terms of the pace and scale of tech-driven growth in recent years. While it is widely understood that the Seattle metro area's tech economy was the driver of regional growth pre-Covid, it is widely underappreciated just how remarkable the region is in this regard. From 2015 to 2019, the Seattle metro area added more tech jobs than any other metro area except San Francisco and San Jose. During this time, the Seattle metro area added more than twice as many tech jobs than other "superstar" metro areas like Washington, Boston, and Austin, and 30% more tech jobs than much larger regions like New York and Los Angeles. While the full economic implications of Covid-19 are not yet clear, new data covering the first year of the pandemic shows that Seattle only further solidified its position, adding more tech jobs than any metro area except New York. While the Seattle region is often talked

about in the same terms as other rapidly-growing cities like Denver and Raleigh-Durham, the reality is that it is in a different universe – and the gap appears to be growing.

Second, Tacoma is unique in that it offers an urban environment that is close to, but distinct from, the core city of the region. Most cities that look like Tacoma “on paper” are either suburbs (such as Lakewood, Colorado, only 15 minutes from downtown Denver) or distinct cities that are hours from a major tech hub (such as Grand Rapids, Michigan or Madison, Wisconsin). Our exhaustive search for peer cities yielded few, if any, cities that are quite like Tacoma: dense, urban cities of at least 150,000 that are between 30 and 60 minutes from a major tech hub and are neither dominated by a major university (e.g., Boulder, CO) or a state capital (e.g., Salem, OR). Put simply: few if any cities with which Tacoma competes and that have generally similar costs (wages, real estate) can offer truly urban amenities (light rail, downtown, 30 minutes to a major airport), and access to a world-class hub of research, innovation, and specialized talent in less than 60 minutes.

Why Tacoma Needs an Innovation-Driven Economic Development Strategy

As described above, Tacoma’s proximity to Seattle is the factor that most clearly distinguishes it from its peer cities. (“Proximity” does not mean “closeness”, as there are many other mid-sized cities that are 15 to 30 minutes from the region’s core city and therefore effectively part of the core city; proximity refers to Tacoma’s unique position as a large, distinct, urban city 45 minutes from the core city.)

Tacoma’s unique position yields a unique set of challenges and opportunities. Tacoma is close enough to Seattle to almost inevitably experience rising costs as Seattle grows, but far enough away to not necessarily experience the benefits of Seattle’s innovation ecosystem. The core challenge of doing economic development in Tacoma is to integrate with Seattle’s assets as much as possible (i.e., ensuring that the talent, know-how, capital, and capital embedded in Seattle-based economic ecosystems are accessible to businesses in Tacoma) while maintaining or improving its cost advantages relative to Seattle (and peer cities). In other words, in the best case scenario, Tacoma provides businesses most of the advantages of being in Seattle at far lower cost. The status quo trend, however, is the opposite: Tacoma’s costs are rising as its industrial ecosystems become more detached from Seattle.

The implication is not that Tacoma should seek to become a smaller version of Seattle. Rather, the implication is that Tacoma should seek to relate to Seattle’s economy in a productive way. Doing so requires making Tacoma’s economy more innovative, in a way that’s different from but complementary to Seattle’s economy (as illustrated by the example of Sustainable Living Innovations below).

Business Example – Sustainable Living Innovations

The Tacoma manufacturing facility of Sustainable Living Innovations, a leading modular high-rise construction firm, is a perfect example of the type of business that Tacoma should be focused on: it is highly innovative, in an emerging green sector with potentially massive local and global demand, and needs to be close enough to Seattle to enable frequent interaction between R&D and manufacturing staff, but far enough away from Seattle to minimize costs. As Tacoma’s cost structure rises relative to its peer metros, it will need to focus on attracting businesses that want to be part of the Seattle/Bellevue tech ecosystem.

This section describes why an innovation-driven economic development strategy is necessary given Tacoma’s unique position, and what such a strategy might look like in Tacoma. Understanding the full power of the green economy strategy requires understanding that Tacoma’s ability to generate economic opportunity for its residents depends on Tacoma’s economy becoming more innovative.

The Context for Economic Development Strategy: the Economy is Polarizing

Economic development strategies need to be created with two key trends in mind. **First, the economy is polarizing in terms of the labor market:** middle-skill, middle-wage jobs are decreasing as a share of all jobs, meaning that the economy is increasingly comprised of low-wage jobs with fewer formal education requirements and high-wage jobs with extensive education requirements.¹⁹ This is largely a result of automation and trade. **Second, the economy is polarizing regionally:** certain cities are concentrating these high-wage, high-skill jobs (“tech hubs” or “superstar cities”) while other cities are concentrating these low-wage, low-skill jobs. This is a result of what economists call “functional” rather than “sectoral” specialization, meaning that rather than cities specializing in certain industries or sectors as they did in the past, cities are increasingly specializing in certain functions in the economy – like R&D or logistics.

Combined, these trends mean that there are strong headwinds facing cities that want to maintain or grow middle-wage, middle-skill jobs. Any economic development strategy needs to recognize and purposefully confront these headwinds by making bets about how a city can attract, grow, and retain businesses that create these increasingly rare jobs.

How Mid-sized Cities Compete Economically, and Why Tacoma Needs a Different Approach

To understand how Tacoma might do this, it is helpful to zoom out to understand the set of economic development pathways available to most mid-sized cities – and why Tacoma needs a different approach given its unique position. Whether intentionally or not, mid-sized cities like Tacoma generally organize their economic development strategies around one of three pathways described in the table below.

Approach	Description	Why it Won’t Work for Tacoma
“Silicon Something”	Some mid-sized cities try to compete directly with tech hubs in certain, narrowly-defined industry niches in which “superstar” metro areas have not completely solidified their advantage. Examples include St. Louis (plant sciences), Milwaukee (water technology), Akron (polymers), etc.	This is a challenging strategy to implement, because securing an advantage in a specific niche can take ten or more years and tens of millions of dollars of investment, and in the meantime promising startups tend to be drawn away to superstar regions where there is more capital, specialized talent, and supports for high-growth entrepreneurs. This would be especially difficult in Tacoma given that it doesn’t have a clear industry/technology niche (as many cities do based on past strengths – for example, Akron was the rubber capital of the world, and much of that infrastructure/expertise still remains). Nor does it have the ability to offer major business attraction incentives (which are helping places like Columbus and Syracuse gain a foothold in brand new sectors like semiconductor manufacturing).

¹⁹ https://www.hamiltonproject.org/assets/files/20220928_THP_Proposal_Rodrik_GoodJobs.pdf

<p>“Low Cost, Medium Value”</p>	<p>Some mid-sized cities compete for the less innovative functions of high-growth industries by minimizing costs (land, labor, etc.) while maintaining moderate innovation assets and developing a somewhat tech-savvy workforce. Examples of this approach may include Spokane, Boise, and Salt Lake City – all of which are well-positioned to attract certain functions of firms priced out of west coast innovation centers.</p>	<p>This has become an increasingly untenable strategy for Tacoma in the past few years as its cost profile has been pulled sharply upwards by Seattle’s growth. Workers in Tacoma have the option of either commuting to high-wage jobs in King County or, increasingly, working from home in Tacoma but commanding high wages nonetheless. This means that Tacoma businesses increasingly have to offer Seattle wages for certain occupations. Given its proximity to Seattle, Tacoma has relatively little control over its cost structure and will struggle to compete on cost with its peer cities that are not within major tech hubs.</p> <p>Tacoma remains less expensive than other portions of the Seattle metro area, which will continue to give it an advantage in certain sectors that need to locate <i>somewhere</i> in the metro area (like warehousing and logistics). But its cost advantage relative to many of its peer metro areas has and will likely continue to deteriorate, which means that businesses that are primarily concerned about low costs and do not need to be in the Seattle metro area will likely choose to grow elsewhere.</p>
<p>“Bedroom Community”</p>	<p>Some cities compete primarily for residents, not businesses and industries. They invest in amenities to attract workers that work in the region’s core city. This pathway has taken on new relevance for many cities given the rise of remote work post-Covid.</p>	<p>This approach has several downsides in Tacoma’s case. It does not generate new opportunity for local residents, it may even worsen economic outcomes for local residents due to housing cost increases, it is bad for the environment and strains infrastructure (due to long-distance commuting), and it fails to generate tax revenue given lack of income tax.</p>

If none of the typical “playbooks” above are desirable or feasible, how can a city like Tacoma compete for high-value industries that produce good jobs? What is the right strategic stance for a city that is too far from the core city of its region to be part of its innovation ecosystem, but close enough that the cost of labor and real estate are inevitably pulled upwards?

The answer is that Tacoma needs to create the “industrial commons” – the things that all businesses depend upon, like talent, innovation supports, capital, infrastructure, productive and informed networking – that justify its almost inevitably increasing cost structure.

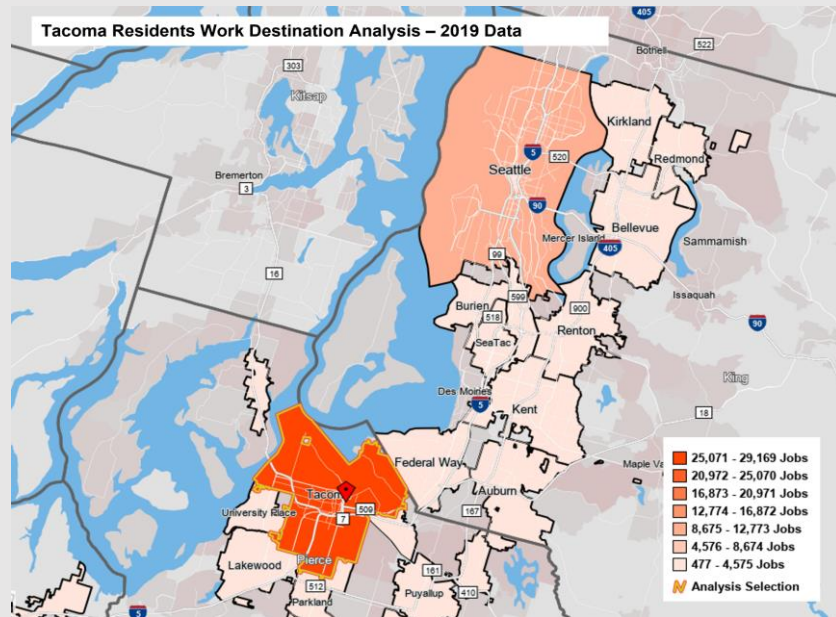
Existing firms will grow in Tacoma as the economy changes if Tacoma offers the resources they need to innovate, become more productive, and enter new markets. Those same offerings will be needed to attract new firms in emerging sectors – including, for example, retaining firms that graduate from local accelerators or spin out of local universities.

Tacoma’s Labor Market is Increasingly Integrated with Seattle’s

While the section above makes it clear Tacoma’s industry makeup has diverged from Seattle’s over the last decade and the types of jobs available in Tacoma are vastly different from just 45 minutes north, the overall labor market is becoming increasingly knit together. A labor market is exactly what it sounds like. It is the open market where companies search for talent and individuals

compete for jobs. Individuals do not necessarily care if they live in one city and work across borders in another, making the labor market as wide as people are willing to commute (and today, possibly limitless with the widespread adoption of remote work).

Commute data shows that before the pandemic, a growing number of Tacoma residents were willing to travel to Seattle for work. From 2012 to 2019, the number of City of Tacoma residents traveling an hour or more to work almost doubled from 7,700 to 14,100 (an increase from 8.7 percent to 13.6 percent of the population not working from home). Data from the Census Bureau's On the Map tool shows that behind Tacoma, the city employing the next highest number of Tacoma residents is Seattle.



Even after the Covid-19 pandemic, data on the share of the population working from home continues to show that Tacoma and Seattle have linked labor markets. In 2021, Seattle was the number two large city for the share of remote workers, just behind Washington D.C. The number of people working primarily from home jumped from about 7 percent to 47 percent in Seattle from 2019 to 2021. (For context, the U.S. average in 2021 was about 18 percent.) During this same time frame, remote workers in the City of Tacoma went from 4 percent to 21 percent of the workforce. Of Tacoma's peers, only Madison, WI and Lakewood, CO experienced a larger increase in remote workers.

This continued labor market integration means that Tacoma is quickly approaching an inflection point. In one possible future, workers will continue to leave the city in search of higher wages and take their talents to Seattle companies. The daily brain-drain of talented Tacoma residents could create an economy split into low-wage workers who stay in the region, and high-wage workers who view Tacoma as a bedroom community. A different future, however, is one where Tacoma-based businesses are innovative and productive enough – thanks to Tacoma's unique environment and resources – to pay residents wages that compete with Seattle's, keeping talent and innovation in the city.

What Might Innovation-Driven Economic Development Look Like in Tacoma?

To build this “industrial commons” that will make Tacoma’s economy as innovative and productive as it needs to be given its cost structure, Tacoma needs to do two things.

1. Tacoma needs to support forms of innovation that are overlooked by most cities. Most cities pursue innovation strategies that are narrowly-focused on early-stage innovation and startup creation – seeking to replicate the Silicon Valley model. Tacoma has an opportunity to distinguish itself by recognizing that innovation is not just about new firms creating new products – it’s also about existing firms and about creating new processes. Economist Dan Breznitz writes in *Innovation in Real Places* that innovation occurs in four stages that each require different capabilities and supportive ecosystems. Stage 1 innovation, the “novelty phase”, has dominated the attention of regions due to the “mystical and misplaced allure” of copying Silicon Valley. In contrast, Stage 3 innovation, “decried by some as ‘incremental’ innovation, is the true hero of economic growth. Firms working at this stage specialize in making existing products and technologies better, more reliable, and more appealing to wider groups of users”. (Stage 2 consists of design, prototype development, and product engineering.)

Thinking of itself as a center of Stage 3 innovation (and to a lesser degree, Stage 2 innovation) would allow Tacoma to focus on what most cities overlook: leveling up legacy industries, helping existing firms adopt new processes and products that enable them to tap new markets, and helping businesses understand critical local challenges and pushing them to innovate alongside government. It also allows Tacoma to tap regional assets purposefully and productively. Again, what’s happening at the Port is an example: 5G innovation is happening in Seattle/Bellevue, but the real-world application and refinement is happening in Tacoma.²⁰

2. Tacoma needs to take advantage of regional assets. Tacoma is inevitably part of the regional economy. If Tacoma ignores this reality, it will only experience the downsides of being near a city like Seattle. If Tacoma embraces this reality, it can strategically identify opportunities to tap into the assets and resources of the broader region. Tacoma’s attraction of the UW Tacoma campus is a perfect example of this strategic stance; it is a bridge to an incredible engine of innovation based in Seattle but tailored to Tacoma’s needs. Tacoma’s involvement with Maritime Blue (including its work with the Edge Cluster around 5G at the Port) is another, smaller example of building a bridge to Seattle-based innovation very intentionally and in a way that’s tailored to Tacoma’s needs.

Taking advantage of these opportunities will require a focused, sustained, cross-sector strategy based on a different understanding of what innovation is, where it occurs, and why it matters. The green economy is the perfect focal point for these efforts.

The Green Economy Opportunity: How Tacoma Can Benefit from the Move to Net-Zero

Achieving net-zero emissions by 2050 – a goal that the City of Tacoma embraced in its Climate Action Plan – will involve staggeringly large investments by both government and businesses.

²⁰ Note: none of these pathways is mutually exclusive. Tacoma can and should seek to attract innovative firms and nurture innovative startups. It can also try to minimize costs for firms that are in lower-margin industries. It’s just important for Tacoma to choose, collectively, which of these pathways is the focus of its strategic efforts.

- McKinsey, for example, estimates that growing demand for net-zero offerings could generate more than \$12 trillion of annual sales by 2030 across 11 sectors (transportation, buildings, power, water, consumer products, etc.).
- McKinsey estimates that achieving net-zero emissions by 2050 will require \$3.5 trillion more spending on physical assets (i.e., energy, industry, buildings, etc.) every year than is spent today. That \$3.5 trillion is equal to half of global corporate profits and a quarter of total tax revenue in 2020.
- The federal government is pouring billions of dollars into the green economy, most notably through the Inflation Reduction Act (IRA), which is expected to catalyze close to \$800 billion in investment.²¹ (A more detailed breakdown of the IRA and the Infrastructure Investment and Jobs Act are in the appendix.)
- Beyond its direct investments in the green economy and tax incentives, the federal government is pulling the market forward through its procurement policies – recently proposing that all suppliers with contracts over \$7.5 million must publicly disclose their greenhouse gas emissions.

This transition will almost certainly be the biggest force in the economy for the foreseeable future. It will be absolutely massive in scale. On a purely economic basis – setting aside Tacoma’s own climate commitments – Tacoma cannot ignore the opportunity to benefit from this surge in investment and the new businesses and jobs that will be created as a result. Besides the size of the market and Tacoma’s climate commitments, there are two other reasons to focus on the green economy as the catalyst for economic transformation:

- 1) **There is a “window of locational opportunity” for many of the technologies being developed and deployed as part of this transition.** This means that, unlike software or life sciences, which have increasingly concentrated in a small handful of “superstar” cities over the past decade, the playing field is wide open for many new green technologies. Tacoma still has an opportunity to be a first mover and cement an advantage. Many of these green economy technologies will be drawn towards cities and states with a supportive policy environment; here too Tacoma and Washington have important advantages relative to peer cities and states.
- 2) **The green economy implicates wide swaths of the economy.** The green economy includes businesses creating green products/services, businesses using green production processes, and all of the businesses that could be creating green products/services or using green processes with the right incentives and supports. Focusing on the green economy is therefore different from picking a single technology or sector and hoping that it takes hold. Focusing on the green economy is a way to move workers, businesses, and industries across the economy into more profitable value chains.

²¹ <https://www.theatlantic.com/science/archive/2022/10/inflation-reduction-act-climate-economy/671659/>

Part 3: Research that Shaped the Strategy

This section seeks to answer three questions: what does the green economy look like in Tacoma today, what opportunities appear to be emerging based on both policy and market forces, and what are Tacoma's advantages and challenges related to these opportunities?

This analysis of Tacoma's competitive position is based on three key inputs:

- Quantitative analysis of Tacoma vis-à-vis 15 peer cities
- Assessment of global and national market and policy trends, especially related to technologies and industries that are widely recognized as central to greening the economy
- Qualitative analysis of Tacoma's economic assets, organizational capacity, and policy environment, based largely on interviews of both local and national organizations.

Defining the Green Economy

The green economy encompasses businesses making green products or services, using green processes, and businesses that might do either if the right incentives, expertise, and workers were available. It can also be defined by the workers that make green products or services, or that implement green processes, or that would be involved in this work if more businesses entered the green economy (i.e., workers that would need to be hired or retrained). In some cases these definitions overlap – a worker at a business creating a green product whose day to day work involves green tasks (defined below). But that is only a fraction of the green economy. There are also businesses making green products that employ many workers whose tasks are not green (e.g., an accountant at a solar company), and many workers whose tasks are green but whose businesses do not create what is typically viewed as a green product (e.g., a logistics manager making trucking operations more fuel-efficient).

The most precise way to quantify the green economy is to look at occupations that involve green tasks. There are several reasons that this approach works better than an industry-oriented approach. One is that it is a much more sensitive measure of how the economy is becoming greener. An existing business could change its business model substantially and never show up in a different "green" industry category, but that business would likely change jobs responsibilities and hire different workers as its business model shifted – meaning job postings are a much more sensitive signal of how and where the economy is "greening" than are industry classifications.

Overcoming these challenges and creating a useful green jobs definition first requires recognizing that, rather than creating an entirely new class of jobs that are specifically "green", employers are adding responsibilities and new skills to existing jobs, such as sustainability, energy efficiency, conservation, etc., "greening" the workforce overall.²² This finding is reinforced by the U.S. Department of Labor, which in 2009 found that approximately one in seven occupations could be identified as either new green jobs, or existing jobs that required new green skills. Using a new approach in 2022, roughly one-third of occupations were identified as a green job.

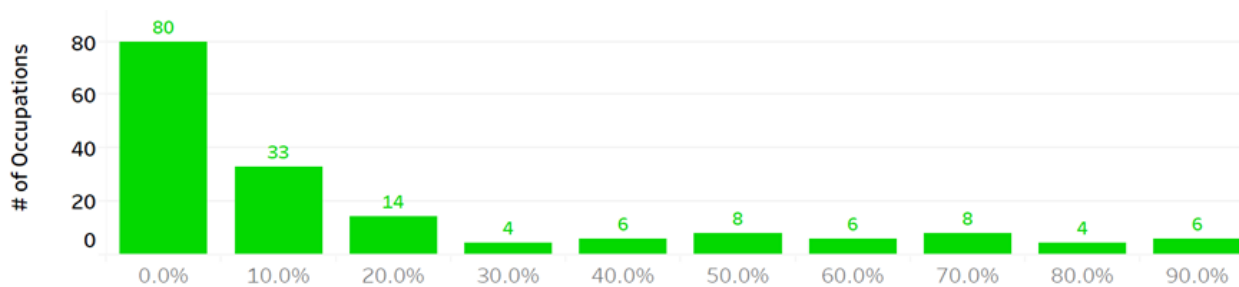
²² "For the most part, employers are adding work responsibilities and activities identified as green to existing jobs. Employers appear to be "greening" jobs through their products and services and through employee workplans." Roadmap to a Green Economy, aligning education, workforce and economic systems. E3 Washington and Pacific Education Institute. March 2021.

Workforce Central, which developed the occupational analysis method used in this strategy, took a similar approach. Workforce Central also took a linguistic approach and used O*NET task data (the lists of tasks most commonly associated with each occupation) to identify a set of tasks that qualified as “green” because they either:

- Benefit the environment, conserve energy and natural resources, or mitigate the impacts of climate change, or
- Make an establishment’s production processes more environmentally friendly or use fewer natural resources.

Workforce Central found that roughly five percent of all O*NET tasks across all occupations counted as green. Then, Workforce Central identified occupations (at the 8-digit O*Net level) that frequently used these green tasks in day-to-day roles, creating a list of 169 occupations that included anywhere from three percent to 100 percent green tasks. This method allowed Workforce Central to identify how “green” jobs were on a spectrum. For example, only 42 of the 169 occupations involved a 30 percent or higher green task concentration. Jobs with the highest concentration of green tasks (more than 90 percent) include the types of jobs most people imagine when they hear the term “green economy”, such as sustainability specialists, chief sustainability officers, wind energy engineers, water/wastewater engineers, recycling coordinators, etc. However, this method also revealed some less conventional green jobs: green tasks make up at least 20 percent of the work done by mechanical engineers, urban planners, roofers, construction managers, and agricultural engineers.

Distribution of Occupations by Concentration of Green Tasks



As the economy continues to green and new technologies are developed, it will be increasingly rare for companies to leave environmental considerations to a single chief sustainability officer. Organizations are realizing that workers at all levels of their organizational hierarchy will need to understand green tasks and technology. This further supports the approach of classifying jobs on a spectrum of greenness, as new tasks are incorporated into existing roles, rather than requiring jobs meet a 100 percent green task threshold to be considered part of the green economy.

The remainder of the analysis below relies on Workforce Central’s method to determine Tacoma’s standing in the green economy and identify possible growth opportunities.

Tacoma’s Current Position in the Green Economy

This section describes how many green jobs Tacoma has overall, which green jobs are most numerous, and other key characteristics of Tacoma’s green jobs (wages, demographics) that have important implications for strategy.

Tacoma’s Green Job Base

There are roughly 136,000 green jobs within a 30-minute drive of Tacoma, representing 23 percent of all jobs in a 30-minute drive and ranking third with peers. (Roughly 25 percent and 24 percent of the jobs within 30 minutes of Tacoma’s top two peers – Grand Rapids, MI and Worcester, MA – are green jobs.)

However, it is important to remember that many of these green jobs involve only a few green tasks. For example, the green job with the most employment in every one of Tacoma’s peer cities is laborers who move freight, stock, and other materials by hand. In Tacoma, this is the largest green job by almost a factor of four and there are 18,000 laborers moving stock within a 30-minute drive of Tacoma. This job has a green task concentration of 68 percent. Therefore, a better way to understand the true “density” of green jobs in Tacoma is to measure “green job equivalents” as opposed to a simple count of jobs that involve any green task. For example, discounting the total number of 18,000 laborers moving stock by 68 percent lessens the number of warehouse laborer jobs that count as green to 12,000. Overall, adjusting the total number of green jobs by their green concentration score lessens the count by 76 percent and brings Tacoma’s total number of green jobs to 32,000, ranking third among peers.

Metric	Tacoma Value	Peer Ranking (1-15)
Total Green Jobs in 30 Mins (<i>Adjusted Equivalents</i>)	136,000 (32,000)	4 (3)
No. 1 Green Job is Laborers (<i>Adjusted Equivalents</i>)	18,000 (12,000)	3 (3)
Specialization in Green Jobs	1.06	5
Green Jobs Growth (1 yr Forecast)	1.2%	9

See technical appendix for full description of the geographies and sources of these metrics.

The top 10 green occupations in Tacoma (adjusted counts), listed with their more detailed titles are:

Occupation (6-digit SOC)	Detailed Job Title (8-digit O*NET)	Tacoma Employment (Adjusted)
Laborers and Freight, Stock, and Material Movers, Hand	Recycling and Reclamation Workers	12,214
First-Line Supervisors of Construction Trades and Extraction Workers	Solar Energy Installation Managers	3,155

Civil Engineers	Water/Wastewater Engineers	1,939
Mechanical Engineers	Fuel Cell Engineers	1,575
General and Operations Managers	General and Operations Managers	1,339
Plumbers, Pipefitters, and Steamfitters	Solar Thermal Installers and Technicians	1,276
Heavy and Tractor-Trailer Truck Drivers	Heavy and Tractor-Trailer Truck Drivers	1,093
Construction Laborers	Construction Laborers	995
Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Solar Sales Representatives and Assessors	979
Engineers, All Other	Energy Engineers, Except Wind and Solar	867

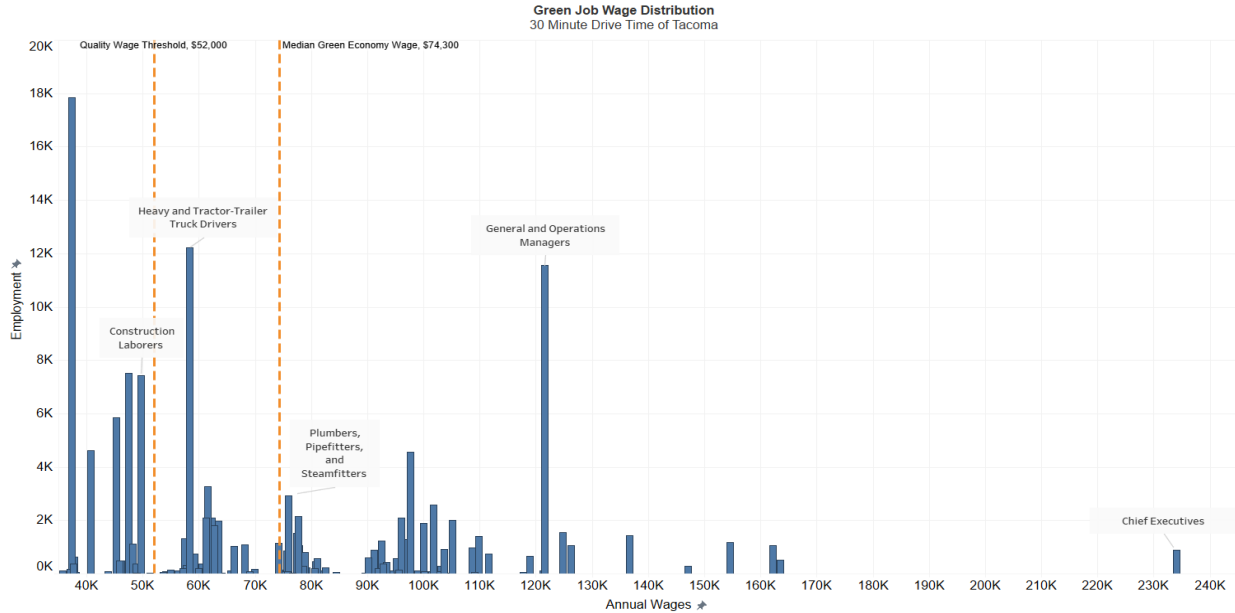
*Note, some job titles do not change between the 6-digit SOC level and 8-digit O*NET level because there is not a more detailed occupation to list in the taxonomy. For example, below Engineers, All Other there are more detailed levels of the types of other engineers including energy, wind, and solar engineers. However, there are no more detailed job titles below tractor-trailer truck drivers or construction laborers.*

Higher wages than peers, challenging wage distribution

Despite green jobs in Tacoma being dominated by laborers moving stock in warehouses, Tacoma has a high median wage for green economy jobs overall. The median wage for green economy jobs within a 30-minute drive of Tacoma is \$74,300, only lower than Worcester, MA where median green economy wages are \$78,100. However, these high wages have more to do with Tacoma's proximity to a major tech hub than any distinct feature of Tacoma's green economy. Tacoma simply has, by a significant margin, the highest wages of its peer metro areas (average of all occupations, green and non-green). The below table shows the top three and bottom three of Tacoma's peers, to give a sense of the range.

Ranking (1-15)	City / Metropolitan Area	Median Annual Wage, 2021
1	Tacoma, WA / Seattle-Tacoma-Bellevue	\$60,230
2	Lakewood, CO / Denver-Aurora-Lakewood	\$49,210
3	Vancouver, WA / Portland-Vancouver-Hillsboro	\$48,380
13	Grand Rapids, MI / Grand Rapids-Wyoming	\$38,690
14	St. Petersburg, FL / Tampa-St. Petersburg	\$38,250
15	Boise City, ID / Boise City	\$37,850

Visualizing the distribution of green economy jobs on the wage spectrum reveals that on the lower end of the wage spectrum, jobs are concentrated in a few roles with high employment numbers. On the high end of the wage spectrum, jobs exist in many different occupations, with lower levels of employment. (See appendix for the same analysis using green job equivalents.)



Race and Gender Diversity of Green Economy Jobs

The green job analysis above also shows that many of Tacoma’s jobs classified as green jobs by Workforce Central are part of the logistics and distribution or construction industries. This is generally the case for all peer cities. Many of these jobs across the country are disproportionately held by white, non-Hispanic men. However, Tacoma has an especially high share of green economy jobs held by men. Roughly 82 percent of the top green economy jobs (those with employment more than 1,000) are held by men. More than half, 59 percent, are held by white, non-Hispanic men. As shown below, this ranks Tacoma 11th out of its 15 peers on this measure. Strategies aimed at improving the quality of existing green economy jobs, or attracting more green economy jobs, should be accompanied by intentional efforts to connect women and people of color to these opportunities.

Metric	Tacoma Value	Peer Ranking (1-12)
% Green Economy Jobs Held by Men	82.5%	11
% Green Economy Jobs Held by White, Non-Hispanic Men	58.8%	6

See technical appendix for full description of the geographies and sources of these metrics.

Potential Areas of Focus

Strategy is about making choices – given limited resources, where should Tacoma invest to create the most high-wage jobs by accelerating the greening of the economy? This question cannot be answered through data alone (a broader range of considerations are described in the next section),

but this section begins to identify the pool of potential strategic opportunities to which additional filters can be applied.

[Good and growing jobs](#)

Tacoma’s green economy efforts should focus not just on the most numerous occupations, but those that are projected to grow and that offer family-sustaining wages. This analysis is the first step in identifying potential targets for economic development and workforce interventions.

This analysis switches from focusing on data at the city and 30-minute drivetime level to the broader labor market of which Tacoma is a part (the Seattle-Tacoma MSA). This is because (1) individuals in Tacoma can commute to jobs outside the city boundaries, so workforce development efforts should focus on preparing people for jobs that are good and growing at the regional level, and (2) with a strategy in place, Tacoma can attract more than its fair share of the region’s green job growth in the future, so the jobs that exist today at the regional scale are a good indication of the kinds of jobs that could exist within the City of Tacoma soon.

To determine potential targets, this analysis identified green jobs that grew by at least as much as total employment growth in the Seattle-Tacoma MSA from 2016 to 2021 (2.3 percent) and offer family sustaining wages for the Seattle-Tacoma region (at least \$25/hour). Filtering the list of green jobs by their historical growth rates, current wages, and employment numbers (all of which relate to the 6-digit occupation) narrowed the list of green occupations to only 10 that may be considered prime targets for workforce development efforts.

Occupation (6-digit SOC)	Detailed Job Title (8-digit O*NET)	MSA Growth Rate (2016-21)	Hourly Wage	Tacoma Employment (Adjusted)
First-Line Supervisors of Construction Trades and Extraction Workers	Solar Energy Installation Managers	62.7%	\$47.0	3,155
Civil Engineers	Water/Wastewater Engineers	15.5%	\$46.2	1,939
Heavy and Tractor-Trailer Truck Drivers	Heavy and Tractor-Trailer Truck Drivers	10.7%	\$28.0	1,093
Roofers	Roofers	20.1%	\$27.6	305
Insulation Workers, Floor, Ceiling, and Wall	Insulation Workers, Floor, Ceiling, and Wall	22.8%	\$27.8	261
Refuse and Recyclable Material Collectors	Refuse and Recyclable Material Collectors	47.0%	\$28.5	174
Conservation Scientists	Conservation Scientists	92.9%	\$37.8	164
Bus and Truck Mechanics and Diesel Engine Specialists	Bus and Truck Mechanics and Diesel Engine Specialists	23.5%	\$30.5	136

Training and Development Specialists	Training and Development Specialists	2.4%	\$37.2	119
Architects, Except Landscape and Naval	Architects, Except Landscape and Naval	15.2%	\$43.3	98

Growing industries and technologies

One way to think about strategic opportunities is to build around the strengths of the workforce (as described in the previous section). Another is to identify industries that seem worthy of pursuit (regardless of whether the existing workforce exists) because they are growing and because Tacoma has meaningful assets. The below table summarizes Tacoma’s opportunity in several key industries and technologies that are considered central to the greening of the economy.

Industry	Description	Market size	Policy Context	Tacoma Economic Context
Green Hydrogen	Delivering green hydrogen (low-cost production, road-transport fuel, ammonia production, steel production, aviation fuel)	From \$3T in 2010 to \$140T in 2030 (Silicon Valley Bank)	<p>Policy drivers very strong, especially in IRA & IIJA. IRA offers a 10-year production tax credit for “clean hydrogen” production facilities.</p> <p>IIJA provides \$8 billion in grants to state/local governments that may utilize or develop clean hydrogen hubs.</p> <p>Pacific Northwest Hydrogen Association is developing a response to USDOE’s national hydrogen hubs grant (will be at least 4 regional winners). Aimed at jumpstarting transition to clean hydrogen, particularly in hard-to-decarbonize sectors such as maritime, aviation, and heavy industry.</p> <p>WA legislature appropriated \$2 million to the Department of Commerce to support WA’s Hydrogen Hub application development process, plus \$22 million proposed in Governor’s 2024-2025 budget.</p>	Near-term market drivers not strong, but in medium term could be very large. TPU is a leader in this space, and could enable Tacoma to gain early-mover advantage in the green hydrogen marketplace. That might look like a sequence of demonstration projects that engage local companies, and can prove successful showcases that attract buzz.
Electrification and power grid	Electrifying transportation, buildings and industry (e.g. EV batteries, efficient building systems), remaking the power grid to supply clean electricity (long-duration storage,	\$1.5T by 2030 33M net new jobs by 2050	<p>The policy and market drivers for electrification are exceptionally strong. The state’s Climate Commitment Act of 2022 is a big driver. Additionally, federal legislation is rich in incentives that Tacoma can take advantage of.</p> <p>IRA offers \$27B for green and energy efficient projects, \$87M for low emissions electricity.</p>	As power generation is likely to double and shift to renewable resources by 2050, jobs will be driven by the increase in demand for construction, manufacturing and upstream sectors.

	controls, vehicle-to-grid integration, materials)		IIJA offers \$5B in grants to prevent outages and enhance the resilience of the electric grid.	TPU is a forward-leaning utility well-positioned to take the lead in facilitating and supporting bold moves for electrification.
Clean Materials	Reducing life cycle environmental and health impacts of products and packaging	\$300B in green materials and the products they enable by 2030	<p>Large commercial building firms have aligned around via the Carbon Leadership Forum for the 2023 legislative session. The state would require builders to disclose life cycle GHG footprints, that would include that of their suppliers.</p> <p>Washington's Green Economy (Commerce, 2020) recommended incentive program for Washington-sourced sustainable building materials. Recommends that Washington support emerging markets in the state's biomass industry, fiber recycling.</p>	This could be a top priority opportunity that is specific to building materials and suppliers.
Clean production and industrial symbiosis	Co-locating facilities to share secondary resources and make clean products, utilize clean infrastructure (renewable energy, heat districts)	(No data available on total market size.)	<p>Over \$2 million per biennium (ongoing) was appropriated in 2022, a quadrupling of funding levels set in 2021, to support IS projects in WA, and \$500,000 was directed to study potential in "agricultural symbiosis." The WA Dept. of Commerce will be requesting a further increase in IS program funding in 2023 as part of the Administration's Circular Economy budget package.</p> <p>OBRC hopes to advance bottle bill legislation in WA in 2023, and if passed OBRC will invest millions of dollars in facilities in WA. Because <i>refilling</i> containers is far more sustainable and efficient than recycling, OBRC has indicated intention to develop one or more refilling facilities in WA under a bottle bill.</p>	<p>Should be seriously considered for a top priority. One opportunity is to develop a refillable bottle facility in Tacoma, in partnership with OBRC, the industry stewardship organization that handles beverage container recycling under OR's bottle bill. It could be an IS showcase for optimizing thermal energy, water, and organics cycling.</p> <p>Tacoma Power is at the center of this, and could locate at the Port, which could use thermal heat byproducts.</p>

Tacoma's Strategic Advantages and Challenges

This portion of the analysis assesses Tacoma's advantages and challenges, not only as they relate to the green economy but in terms of the city and region's general position and capacity as it relates to economic development overall. It draws both on quantitative analysis (comparisons with

a carefully selected set of peer cities) and qualitative assessment (for example, observations on the state of regional economic development infrastructure).

Tacoma emerges as a leader among peers in the areas of workforce availability, cost of electricity (a major cost of doing business), and its innovation ecosystem. However, each strength pairs with a corresponding challenge. For example, while Tacoma’s low electricity costs are an advantage when recruiting manufacturers to the region, Tacoma also has a small and shrinking base of available industrial land and limited ability to offer firm-specific incentives, which works against the city’s manufacturing recruitment capabilities. Taken together, this implies that the city should collaborate with neighboring jurisdictions to preserve remaining industrial land for uses with a higher density of quality jobs. This section follows this formula, pairing advantages and challenges to reveal specific implications.

The following advantages and challenges are grouped into seven key ideas: 1) talent growth and availability, 2) proximity to Seattle, 3) business inputs, 4) green economy networks, 5) economic development anchors, 6) startup ecosystem, and 7) green economy focus.

Selecting Comparison Metrics

To understand Tacoma’s advantages and challenges, metrics were selected so that they might begin to tell a story about the local economy. Economies are complex systems, however the simplified story for any region is that inputs such as talent, capital, and infrastructure contribute to outcomes such as industry makeup and equity. This complex system of inputs and outcomes eventually leads to quality of life, where family sustaining wages and affordable housing stock create a resilient and prosperous economy. The 30 metrics fall into these three categories (inputs, outcomes, and quality of life) and are designed to draw out stories and key findings about Tacoma that might otherwise go unnoticed. For the full list of selected metrics, their sources, and values, see the technical appendix.

1. Talent Growth and Availability

Advantage

Tacoma has a large prime working age population that is projected to grow steadily over the next five years. Prime working age is a labor economics term that simply describes the population from post-college age to pre-retirement - age 25 to 54. Roughly 40 percent of the population within a 30-minute drive of Tacoma fall into this range. For comparison, Tacoma’s top peers who rank first and second for the share of population age 25-54 are Vancouver, WA and Lakewood, CO. While Tacoma ranks eighth for the projected growth of this age group at 1.9 percent, this is still steady growth, especially considering that projected US population growth over the next five years for this age group is only 0.4 percent. Tacoma is just outpacing Vancouver, WA and Lakewood, CO in this measure as well.

Metric	Tacoma Value	Peer Ranking (1-15)
Population Age 25-54	40.4%	3

Projected Growth (2022-27), Population Age 25-54	1.9%	8
Households Above Poverty	87.3%	6

See technical appendix for full description of the geographies and sources of these metrics.

Challenge

A lower percentage of the population in Tacoma has an associate's degree or higher compared to peers. Ranking 12th in this category, educational attainment levels in Tacoma are only higher than Stockton, CA, where 32 percent of the population has an associate's degree or higher, and Salem, OR (38 percent). Tacoma's highest-ranking peers are Madison, WI and Lakewood, CO where 66 and 56 percent of the population, respectively, have at least a two-year degree.

Metric	Tacoma Value	Peer Ranking (1-15)
Population Age 25+ with an AA/AS or Higher	42.0%	12
Population Age 25+ with an BA/BS or Higher	29.9%	13

See technical appendix for full description of the geographies and sources of these metrics.

This is a typical economic development metric that cities use as a marketing tool to promote their available workforce. Meaning, Tacoma's educational attainment levels are a disadvantage as far as they can be used for basic marketing purposes and may work against the city with site selectors who typically pull demographic information about multiple cities as a way to make first-round site cuts.

However, there are some nuances worth discussing associated with this metric. Educational attainment levels tend to correlate with a city's demographic characteristics. For example, Stockton, CA has the worst educational attainment levels but it also has the *most* diverse population of Tacoma's peers. Stockton has a diversity index score of 88.1²³ and 65 percent of the population identifies as non-White. The inverse is true in Madison, WI which has the highest educational attainment scores. Madison has one of the lowest diversity scores of Tacoma's peers (48.8) and only 23.6 percent of the population identifies as non-White. These factors have such a strong inverse correlation because of the larger barriers (both historic and current) to receiving a higher education that face people of color in America. With this in mind, Tacoma has one of the most diverse populations of its peers, with a diversity index of 74.2 and 45.1 percent of the population identifying as non-White.

In a tight labor market, employers are beginning to move away from traditional measures of educational attainment to judge a candidate and instead are looking for ways to hire more equitably, increase the diversity of their workforce, and find individuals with the right skills for the job regardless of educational background. This all works in Tacoma's favor as a diverse city that has a talent pool with desirable capabilities (given the interconnectedness of Tacoma's labor

²³ The likelihood that two people, chosen at random, will not belong to the same race or ethnicity group. Ranges from 0 to 100. Source: ESRI

market with Seattle's). We measure degree attainment in this peer analysis because of a lack of good data on the true skills of the workforce and to understand how the region appears to business leaders and site selectors.

Implications

Tacoma has a large, growing, and diverse workforce with lower levels of traditional educational attainment. This implies that it is important to:

- Invest in upskill/reskill efforts for the current workforce.
- Create pathways into green jobs that do not require degrees.
- Provide wrap-around supports to students in green degree programs.
- Help employers redesign hiring practices.

[2. Proximity to Seattle](#)

This set of advantages and challenges is outlined above in the section on Tacoma's economic position. Excerpts are repeated here for the sake of thoroughness.

Advantage

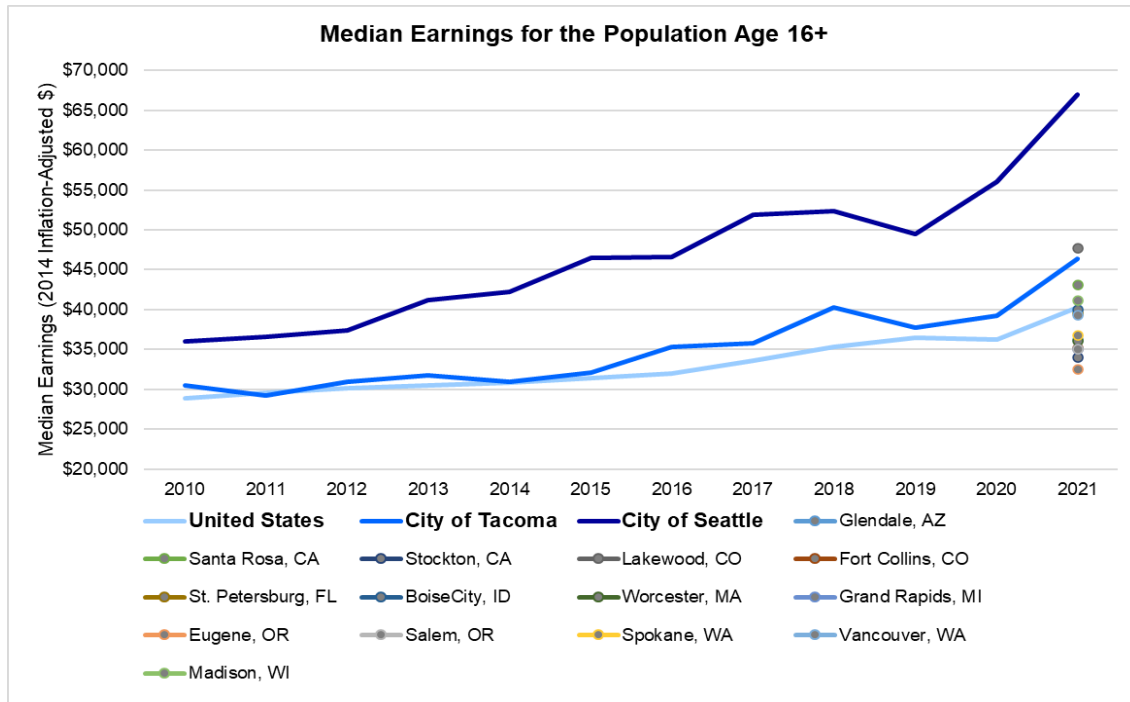
Tacoma is nearly unique simply by virtue of its proximity to Seattle, which is among a few superstar cities that are rapidly distancing themselves from the next tier of regions. There are few metro areas like Seattle-Tacoma-Bellevue in terms of the pace and scale of tech-driven growth in recent years. Second, Tacoma is unique in that it offers an urban environment that is close to, but distinct from, the core city of the region. Most cities that look like Tacoma "on paper" are either suburbs (such as Lakewood, Colorado, only 15 minutes from downtown Denver) or distinct cities that are hours from a major tech hub (such as Grand Rapids, Michigan or Madison, Wisconsin). Our exhaustive search for peer cities yielded few, if any, cities that are quite like Tacoma: dense, urban cities of at least 150,000 that are between 30 and 60 minutes from a major tech hub and are neither dominated by a major university (e.g., Boulder, CO) or a state capital (e.g., Salem, OR).

Challenge

Tacoma is close enough to Seattle to almost inevitably experience rising costs as Seattle grows, but far enough away to not necessarily experience the benefits of Seattle's innovation ecosystem. The core challenge of doing economic development in Tacoma is to integrate with Seattle's assets as much as possible (i.e., ensuring that the talent, know-how, capital, and capital embedded in Seattle-based economic ecosystems are accessible to businesses in Tacoma) while maintaining or improving its cost advantages relative to Seattle (and peer cities). In other words, in the best case scenario, Tacoma provides businesses with most of the advantages of being in Seattle at far lower cost. The status quo trend, however, is the opposite: Tacoma's costs are rising as its industrial ecosystems become more detached from Seattle.

Interviews with local economic development organizations revealed that Tacoma is losing its price advantage relative to peers as Seattle grows. This is backed up by the data. Proximity to Seattle comes with rising costs for Tacoma residents, or put another way, rising costs for Tacoma businesses that must compete with Seattle wages to find talent (an increasingly difficult challenge given the ability of workers to live in Tacoma and work remotely or in hybrid settings and earn Seattle wages).

The chart below shows rising median wages for the City of Tacoma compared to the City of Seattle and the United States since 2010. Tacoma’s wages moved in line with the United States until 2015, when wages began to separate from the US average and fall more in line with the movements in Seattle. The gray dots show wages for Tacoma’s peer cities in 2021, where Tacoma has higher wages than every peer except Lakewood, CO.



Altogether, this is an intriguing relationship. Tacoma’s industry mix is becoming more distinct from Seattle’s as the percentage of traded sector businesses shrinks in Tacoma. At the same time, however, labor markets are becoming more linked as Tacoma residents are willing to commute to Seattle for higher wages and/or Seattle workers move to Tacoma in search of cheaper housing. Again, we see how Tacoma is at an inflection point, as increased costs of doing business (in terms of wages) are not being accompanied by investment in the innovation assets that are necessary for Tacoma to justify its higher costs compared to peers.

Implications

To build on Tacoma’s unique position and avoid becoming an expensive bedroom community of Seattle, it will be important to:

- Proactively connect firms to Seattle’s innovation assets and ecosystems.
- Help firms become more productive to justify rising wages.

3. Business Inputs

Advantage

Many local stakeholders noted Washington State’s competitive advantage of the “lowest electricity rates in the country” and national data from the U.S. Energy Information Administration backs up the claim. This offers a major competitive advantage for Tacoma in terms of attracting businesses. According to a 2022 survey of corporate executives and site location decision makers, the [35th](#)

[annual survey completed by Area Development Magazine](#), energy availability and cost is the third most important site selection factor with 94.7 percent of respondents ranking energy as “very important” or “important”. According to Area Development Magazine, “it seems the global pandemic also took a toll on energy supply and demand — as with goods — but the demand has increased faster than the energy supply chain can handle it, resulting in rising costs.” The mix of energy sources is also important to corporate decision makers. In the same survey, 75 percent of respondents said, “access to renewable sources of energy are very or somewhat important to their companies.” This is a distinct advantage for Tacoma where electricity is not only inexpensive but also renewable (Tacoma Power creates power that is 100% carbon-free).

Metric	Tacoma Value (cents/kWh)	Peer Ranking (1-15)
Electricity Cost - Residential*	9.874	1
Electricity Cost - Commercial*	8.922	3
Electricity Cost - Industrial*	5.081	1

**State level data. See technical appendix for full description of the geographies and sources of these metrics.*

Challenge

Another disadvantage that surfaced in multiple interviews is the limited amount of available industrial land and the increasing use of existing industrial land for warehousing and logistics. Tacoma’s position as a logistics hub makes sense; there are 9.6 million people that live within a four-hour trucking time of downtown Tacoma and the port provides access to the Pacific Ocean and consumer markets in Asia. However, this works against the desire that the city has to build on its roots as a hub of manufacturing/production. Interviewees have noted that Tacoma is off the short-list for many company relocations or expansions because of the lack of large plots of available industrial land. Interviewees also noted that the land that does remain is becoming more expensive for existing manufacturers.

One way this specifically relates to the green economy: Tacoma Public Utilities Economic Development Manager Michael Catsi, noted that available land is especially a challenge in TPU’s service area. While there may be more land outside TPU’s service area, hydrogen producers need to use TPU’s carbon free energy to produce green hydrogen.

Implications

Given that some inputs to business costs are competitive advantages in Tacoma, such as the cost of electricity, but some are challenges, such as the availability of industrial land, it is important to:

- Work to preserve remaining industrial land for uses with a higher density of quality jobs.

[4. Green Economy Networks](#)

Advantage

Organizations in Tacoma are collaborative and aligned around this strategy. Interviewees pointed out that economic and workforce development organizations across Tacoma and Pierce County are highly collaborative (this includes regular meetings of economic development entities plus general connectivity between economic development entities and Workforce Central). Every organization interviewed for this project, including members of City Council, is enthusiastically supportive of this green economy strategy. The formal involvement of Workforce Central in this work is a major advantage, as many cities struggle to connect their economic and workforce development efforts. While Tacoma is smaller and may have fewer resources than other regions with which it may compete in certain green economy sectors, this level of collaboration and buy-in could be a differentiator.

Challenge

While the city's major economic development players are organized and supportive of this effort, some interviewees have suggested a lack of long-term leadership development efforts in the region that hamper Tacoma's ability to sustain economic development strategies over time and maintain the involvement of business leaders. Economic development efforts require a set of dedicated, internal champions to push the work forward, but importantly, they also require structures to train future leaders to take the work over. Interviewees have noted that some projects in the region have fizzled out without clearly identified successors ready to step in as the first wave of champions move on or retire. Other smaller cities like Grand Rapids, Birmingham, and Modesto – all of which are further from major regional urban centers – have much better resourced programs and networks to recruit, connect, elevate young professionals, in part because they recognize their economic future depends on doing so. Tacoma may be at a disadvantage in that many Tacoma residents are more professionally linked to Seattle.

Implications

Given that leaders are invested and animated about this strategy, it is important to:

- Invest in building green economy networks, focused on business “champions” within Tacoma.
- Form a strong and unified presence on the regional stage to take full advantage of what economic development resources do exist.
- Translate early wins to a presence on the national stage.

5. Economic Development Anchors

Advantage

Tacoma is fortunate to have three major economic anchors in the city, each of which is not only a major employer but also a potential source of innovation and/or talent for the green economy.

While the University of Washington Tacoma is not a major source of R&D investment, it is a powerhouse in terms of its core educational and economic mission. Using a rigorous methodology, Washington Monthly recently ranked the University of Washington Tacoma second out of universities in the western United States as the “best bang-for-the-buck” college, which is based on the ability of these universities to help “non-wealthy students attain marketable degrees at affordable prices”.

The Port of Tacoma is a major economic asset, comprising 10% of the city's employment and about 45% of industrial employment. Its mix of industrial uses creates opportunities for industrial symbiosis and siting of facilities relevant to the reuse economy. Its proximity to downtown creates opportunities for green industries that require both commercial and industrial land as well as access to export infrastructure.

Finally, Joint Base Lewis McChord is a potentially significant source of talent (there are 52,000 workers at JBLM and 44,000 veterans employed in Pierce County) as well as a means to tap into to the Department of Defense's growing investments in green technology. The DOD's most recent budget request included over \$3B related to climate change initiatives, and the DOD is now required by executive order to shift to 100% carbon-pollution free energy. This shift could create opportunities for local suppliers.

While some of Tacoma's peer cities may have economic anchors of similar scale in the broader region, it is rare to have them situated within or directly adjacent to the city.

Challenge

Tacoma operates within a broader region that has nowhere near the level of economic development resources or formalized collaboration as many of its peer regions. Labor markets and industry clusters are regional in nature, so it is likely that Tacoma's opportunity to grow new green economy sectors will involve positioning itself as a location of choice for a sector that is growing region-wide. As such, Tacoma's competitiveness is to a significant degree dependent on the region's competitiveness – which is why it is a major disadvantage that the greater Seattle region has far less economic development capacity than many regions with which it competes.

For example, consider Seattle's peer metros such as Portland, Denver, and Phoenix (each of which contains a peer city of Tacoma's). Not only do some of these regions have more ability to offer incentives, they have larger and more centralized economic development organizations. For example, Seattle's regional business attraction organization has only five staff; their peer organizations in Phoenix and Denver have over 20 staff. Similarly, the Seattle MSA lacks a central organization that nurtures high-growth startups; regions like Columbus and Cleveland have public-private "venture development" organizations with upwards of 25 staff. Lastly, other regions are simply more organized and proactive – for example, the Port of Portland led a regional coalition that won over \$40M from the EDA's Build Back Better Challenge. Washington's only finalist was Maritime Blue, and that proposal was statewide rather than focused on Seattle/Tacoma.

In summary, while Tacoma benefits from its proximity to a large "superstar city", the lack of capacity and organization in the region diminish this advantage and will force Tacoma to do economic development work that some of its peer cities can depend on regional actors to take on.

Implications

- Maximize impact of these anchors and Tacoma's forward-looking policy environment by organizing anchors and proactively connecting businesses to these resources.
- Tacoma needs to promote its own successes on the national stage, rather than depending on regional actors.

6. Startup Ecosystem

Advantage

Metrics comparing total business growth, the growth of startups, and SBIR/STTR award funding per capita paint Tacoma in a positive light compared to other peers.

Tacoma ranks sixth for the total number of new businesses started from 2015 to 2020, outpacing peers including Fort Collins and Lakewood, both of which are outside of Denver. Zeroing in specifically on the growth of businesses with less than five employees, Tacoma shoots to third in the ranking, past Salem, OR, Stockton, CA, and Vancouver, WA. While this data does not reveal whether or not Tacoma is creating potentially high growth, traded-sector businesses, the growth of new establishments signals that the basic inputs needed to foster business creation exist in Tacoma.

To zero in on the potential for high growth businesses, we examine the amount of SBIR/STTR funding given to local companies. Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) program. The SBIR/STTR program is the federal government's most significant investment in research and commercialization by small business. Companies such as 23andMe, Sonicare, and NortonLifeLock were born from SBIR/STTR investment.

In the last five years, Tacoma small businesses were awarded \$7.1 million from the U.S. Small Business Administration through the SBIR/STTR programs. That \$7.1 million translates to \$32 per capita, ranking the region 8th among peers. For context, while Tacoma outranked Fort Collins in terms of total new businesses created, Fort Collins ranked first for SBIR/STTR funding with \$362 per capita (roughly \$61 million in five years) and Madison, WI second in per capita funding (\$71 million in five years). Some peers received no SBIR/STTR funding in the last five years (including Stockton, CA and Salem, OR). The range is wide, but ranking in the middle of the pack shows Tacoma can credibly claim to be an active location for R&D and product commercialization. It is worth noting that all of the \$7.1 million in SBIR/STTR funding was awarded by the Department of Defense from 2019 to 2021 to three different companies, listed below.

- Mantel Technologies - (headquartered in Tacoma with a location in Fort Collins, CO) was awarded \$5 million for four contracts titled: *Freeze Dried Plasma for Canines*, *Radical Improvements in Personnel Performance through Enhanced Development (RIPPED)*, *Canine non-LOS Directional Control System*, and possibly very relevant to the green economy... *Power Dense Turbo-Compression Cooling Driven by Waste Heat*.
- Globe Machine Manufacturing Company - was awarded \$1.05 million for three contracts titled: *Agile, Rapid and Low Cost Composites Processing Technology* and a phase I and phase II contract for *Low Cost, Agile Methods for Tooling for Manufacturing Composite Parts*. Globe Machine was founded in Tacoma in 1917. The company began as a wood product manufacturer and now builds automated equipment and systems for "industries that include plastic composites, automotive, aerospace, pulp and paper, and building products."
- Namatad - received one contract from the Department of Defense worth just over \$1 million to research *Position, Navigation and Timing (PNT) Without the Global Positioning System (GPS)*. From the company's website, "Namatad, Inc. creates easy-to-use technology that connects people, promotes safety, and enables data-driven decision making." The company was founded out of the IPA research lab at the University of Washington.

Metric	Tacoma Value	Peer Ranking (1-15)
Growth, Total Establishments (2015-20)**	10.4%	6
Growth, Estabs, with <5 Employees (2015-20)**	13.9%	3
SBIR/STTR Award Funding per Capita	\$32	8

** County level data. See technical appendix for full description of the geographies and sources of these metrics.

Challenge

The data above shows Tacoma has some of the basic needs to foster new business creation. However, there is generally limited sources of dollars for high-growth firm creation such as universities with a large R&D budget or corporate headquarters.

Metric	Tacoma Value	Peer Ranking (1-15)
University R&D Expenditures (\$000s)	\$3,504	9

See technical appendix for full description of the geographies and sources of these metrics.

Implication

Given that Tacoma has the beginnings of a start-up ecosystem, but less overall capital resources compared to peers, it is important to:

- Provide startups with resources/connections needed to become scale-ups (e.g., post-accelerator support).
- Focus on unleashing innovative potential of existing, mid-sized firms.

7. Green Economy Focus

This set of advantages and challenges is outlined above in the section on Tacoma's current position in the green economy. Excerpts are repeated here for the sake of thoroughness.

Advantage

There are roughly 136,000 green jobs within a 30-minute drive of Tacoma, representing 23 percent of all jobs in a 30-minute drive and ranking third with peers. (Roughly 25 percent and 24 percent of the jobs within 30 minutes of Tacoma's top two peers – Grand Rapids, MI and Worcester, MA – are green jobs.)

Metric	Tacoma Value	Peer Ranking (1-15)
Total Green Jobs in 30 Mins (<i>Adjusted Equivalent</i> s)	136,000 (32,000)	4 (3)

No. 1 Green Job is Laborers (<i>Adjusted Equivalents</i>)	18,000 (12,000)	3 (3)
Specialization in Green Jobs	1.06	5
Green Jobs Growth (1 yr Forecast)	1.2%	9

See technical appendix for full description of the geographies and sources of these metrics.

Challenge

However, it is important to remember that many of these green jobs involve only a few green tasks. This is why the adjusted equivalents are listed in the table above. These counts adjust for the fact that the green jobs identified do not perform green tasks 100 percent of the time.

As described in a previous section, laborers and warehouse workers are included as a green job because of the task overlap with recycling and reclamation workers, making it the number one green job in many cities thanks to the explosion of warehousing and logistics operations across the country.

Despite the high number of workers performing green tasks in Tacoma, the data does not reveal a clear, traded sector green industry to target for growth. Removing logistics workers and filtering for green jobs with high growth over the last five years and jobs that offer family sustaining wages shows that most of the top green job opportunities in Tacoma are heavily concentrated in construction, logistics, sales, and general management. See the table below.

Occupation	MSA Employment Growth 2016-2021 <i>Filter – 2.3%</i>	Annual, Median Wage <i>Filter - \$52,000 (\$25/hr)</i>	Employment, 30-min Drive of Tacoma, Adjusted Equivalent
First-Line Supervisors of Construction Trades and Extraction Workers	62.7%	\$97,700	3,155
Civil Engineers	15.5%	\$96,000	1,939
General and Operations Managers	6.0%	\$121,600	1,339
Heavy and Tractor-Trailer Truck Drivers	10.7%	\$58,300	1,093
Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	69.1%	\$109,800	979
Construction Managers	43.0%	\$101,800	525
Roofers	20.1%	\$57,400	305
Architectural and Engineering Managers	9.1%	\$162,200	284
Insulation Workers, Floor, Ceiling, and Wall	22.8%	\$57,800	261
Natural Sciences Managers	20.5%	\$147,000	196

See technical appendix for full description of the geographies and sources of these metrics.

Implications

Given that Tacoma has a high number of green jobs compared to peers but not a single traded sector industry worthy of targeting for its abundance of quality jobs, it is important to:

- Take a largely, industry/technology agnostic approach to the green economy.
- Help existing industries that offer quality jobs become greener and more productive so they might “become traded sector” in the future. Example: Tacoma could develop a construction industry with a workforce so well trained in installing new, green products, Tacoma company services become in demand in other markets.