



METROPOLITAN BUSINESS PLAN  
FOR THE  
CENTRAL PUGET SOUND REGION

APRIL 2011



Prosperity  
PARTNERSHIP



Puget Sound Regional Council  
PSRC

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# PART I. REGIONAL ECONOMIC FRAMEWORK

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## I. OVERVIEW

Over the past thirty years, the central Puget Sound economy has been one of the strongest in the nation. Driven by companies in highly technical fields such as IT, aerospace, clean technology and life sciences, the region has become a national and international leader in innovation and knowledge creation. Talented people have flocked here to work in those fields, and to live in a place of great natural beauty and cultural abundance.

Yet, in the face of a constantly changing world economy emerging from the Great Recession, there are no guarantees that the Puget Sound region will continue to attract new businesses, nor that it will retain and grow existing ones. Global and national trends – such as climate change, the financial crisis, rising oil prices and increased competition from China and India – are creating challenges for the industries we have relied on, and compelling the region to foster new engines of growth.

The Puget Sound region understands that we cannot take what we have for granted. We must act deliberately and strategically to build on our existing strengths and unique assets, or we risk losing businesses, jobs and regional prosperity to competing regions. This is why, through a broad-based coalition of business, government, education, labor and nonprofit organizations known as the Prosperity Partnership, the Puget Sound region has begun to act collaboratively to ensure long-term economic prosperity through a shared regional economic strategy.

This Metropolitan Business Plan helps our region take the next step in that process, bringing additional rigor and a comprehensive analytical framework to these efforts. In the business world, business plans enable strategic thinking about a business's position in the marketplace, its key advantages and challenges, and the steps that are needed in order to grow and succeed. And they often solicit investment of the most useful, catalyzing type. The same holds true for regions: given a vision for development, the business planning process identifies a set of defined and measurable goals; the strategies for achieving those goals; and the programs, policies, products and other interventions required in order to carry out each strategy.

The purpose of this Metropolitan Business Plan is to market our region as a compelling investment opportunity for driving regional, and ultimately national, prosperity. In the U.S., leading metropolitan areas, such as the Puget Sound region, drive the national economy. In the worldwide economy, metropolitan regions function as single economic units and have emerged as the basis for global competition.

In *Part I* of this plan, we begin with a vision for the region and a framework for understanding the regional economy. We then follow with a more detailed description of the framework in terms of five key leverage points. This includes an analysis of the strengths of the region, areas in need of attention,

and recommended strategies for change, all built around this framework. The plan does not attempt to provide a fully comprehensive set of strategies; rather, we focus on key opportunities within each leverage point defined in the framework.

In *Part II*, we delve deeper into one of those strategies. Acknowledging the need to aggressively pursue opportunities in high-growth, forward-looking industries, this initiative lays out a proposal to capitalize on the enormous growth opportunity of the clean technology cluster, specifically the market opportunity associated with energy efficiency technology. The **Building Efficiency Testing and Integration (BETI) Center and Demonstration Network** aims to foster innovation and commercialization for export-oriented energy efficiency technologies as a key aspect in supporting this cluster's growth.

## **A Vision for Sustainable, Inclusive Prosperity**

The strategies in this plan drive toward a vision for the Puget Sound metropolitan area. The region we envision is globally recognized as a highly productive home to world-leading businesses in forward-looking, high-growth industry clusters. The region will be a place where businesses and institutions can attract the finest minds, and where highly talented people pursue satisfying careers. The region will sustain a high level of economic growth and a high quality of life by remaining flexible, nimble and adaptable to a changing world economy, by ensuring that the opportunities and benefits of growth are broadly shared, and by minimizing impacts on the environment.

Since it first burst onto the world scene with the Klondike Gold Rush 112 years ago, the Puget Sound region's growth has been marked by innovation, aggressiveness, risk-taking and the self-confidence to assert leadership from the far corner of the map. The region will achieve its vision only if it continues to chart its own course, build on its unique assets and trust the collective instincts that have brought it so far in so little time.

## **Starting Point**

The achievement of this vision is predicated on the ability of the Puget Sound to compete successfully for globally mobile capital and talent. We need to be a place where businesses see the best opportunities for success and where individuals see the best opportunities to put their talents to use. Before we describe the economic framework and specific actions that will improve our ability to compete, we will observe our starting point, as measured through locational attractiveness and productivity. Following that we will discuss briefly some broad factors we need to keep in mind as we develop a plan to move the regional economy forward.

### ***Locational attractiveness***

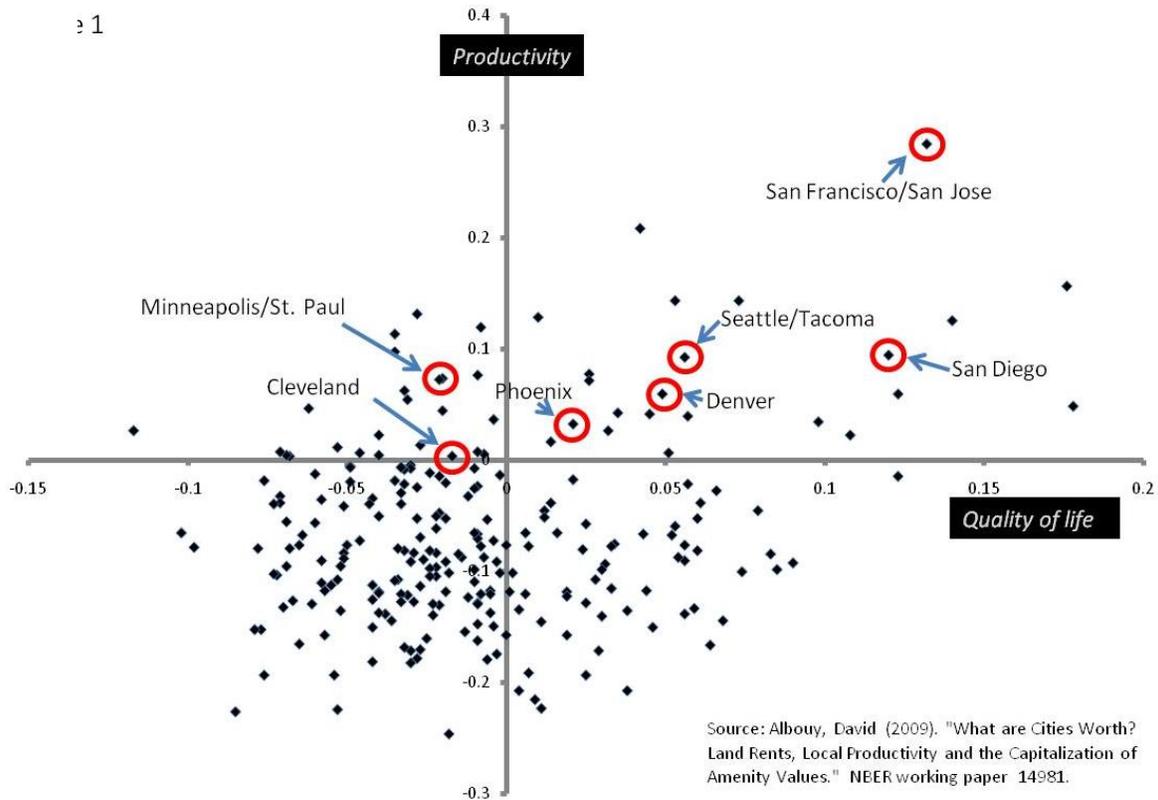
Regional competitiveness can be thought of in terms of location decisions by footloose capital, both financial and intellectual. Industry clusters rely on an influx of talent and investment, so strategies to strengthen existing clusters and build new ones depend on the region's relative attractiveness as a home for individuals and business. Firms still look for locations that offer the best return on their investment, while individuals consider a combination of earning potential and the quality of life a region

offers. Increasingly, the need to attract and retain talent causes firms to pay attention to quality of life factors as well. The regions with the most promising future offer both.

Figure 1 shows results from research into the productivity and quality of life for 240 metro areas in the U.S. with populations over 100,000 in 2008, and highlights the positions of the Puget Sound region and a set of comparison regions.<sup>1</sup> The Puget Sound region scores well, but not exceptionally, in both productivity (13<sup>th</sup>) and quality of life (25<sup>th</sup>). The question, then, is where future emphasis should be placed.

A similar study suggests that younger, highly talented people will tend to gravitate toward high productivity regions where they have the highest likelihood of launching successful careers. So although the region has room for improvement in the quality of life rankings, the largest payoff will still likely be in improving productivity to attract both businesses and high-skill individuals. Greater productivity will provide the incomes and tax base to support urban amenities and to protect natural ones.

**Figure 1. Productivity as a Function of Quality of Life in Comparison Regions**



<sup>1</sup> Recognizing that the Puget Sound region competes for investment and talent with other areas of the country, the analysis in this report includes data that benchmark Puget Sound against a group of six regions that are considered peers: Denver, Minneapolis/St. Paul, Phoenix, San Diego, San Francisco and San Jose. Metro Cleveland, a participant in the Metropolitan Business Plan program will also be included, as will, occasionally, Metro Boston.

## Productivity and wages

The Puget Sound region is very productive, but growth in that productivity has slowed. The region's 2008 per worker gross metropolitan product of \$100,223 was fully 35 percent above the national average and ahead of peer metros except the San Francisco Bay area. But as Figure 2 shows, growth in per worker productivity has lagged the national average in recent years.

While overall productivity is a key metric, individuals and families focus on wages,<sup>2</sup> which reflect the proportion of production value that labor can claim. Figure 3 shows average wages in the Puget Sound area and its peer regions, as well as the growth in wage-paying employment from 2002 to 2008. Although job growth was twice the national average, wage growth was weak, reflecting the absence of the powerful drivers of high-wage technology employment that had been so evident during the 1990s.

The lagging growth in productivity and wages is a central concern and gets to the heart of this plan. The strategy levers described in the sections that follow are aimed at boosting the productivity of the existing base of industries and providing individuals with greater earning potential. But that will not be enough. The high productivity clusters such as aerospace and IT that have provided the region with its current prosperity have not been able to generate strong growth in the past decade. This trend points to the need to foster the development of dynamic new industry clusters that have the ability to restore historic levels of productivity and job growth.

**Figure 2. Productivity Levels in Comparison Regions**

	GMP per job (2008)	Real GMP per job growth (2002-2008)	Real Total GMP growth (2002-2008)
Cleveland	\$79,808	6.8%	3.1%
Denver	\$95,147	6.7%	12.6%
Minneapolis-St. Paul	\$88,098	10.0%	13.0%
Phoenix	\$84,911	9.4%	26.5%
San Diego	\$95,545	17.9%	22.1%
San Francisco-Oakland	\$120,840	16.3%	14.6%
San Jose	\$155,882	37.8%	35.2%
Puget Sound	\$100,223	9.7%	21.1%
100 largest metro average	\$79,624	9.8%	15.8%
United States	\$80,578	10.3%	16.2%

Source: Bureau of Economic Analysis

**Figure 3. Average Wages in Comparison Regions**

	Growth in wage paying jobs (2002-2008)	Average wage per job (2008)	Average real wage per job growth (2002-2008)
Cleveland	-3%	\$44,309	1.0%
Denver	6%	\$51,870	2.5%
Minneapolis-St. Paul	4%	\$50,630	2.7%
Phoenix	17%	\$45,329	3.6%
San Diego	5%	\$50,157	7.2%
San Francisco-Oakland	0%	\$66,158	6.6%
San Jose	-1%	\$80,859	8.5%
Puget Sound	11%	\$53,962	2.1%
100 Largest Metro Average	5%	\$44,570	3.6%
United States	5%	\$45,716	4.2%

Source: Bureau of Economic Analysis

<sup>2</sup> The term "wages" is used to denote all payroll earnings, whether hourly or salaried. Wage data typically comes from unemployment insurance records and so excludes the self-employed, partners and business owners and others not covered by unemployment insurance.

## ***Looking forward***

In many ways, the Puget Sound region is weathering the Great Recession better than the nation. Unlike previous downturns that were accompanied by contractions in aerospace, the current recession has not seen large layoffs at Boeing, and high tech and life sciences are growing. Washington state has the potential to be among the national leaders of job growth as the world emerges from the recession.

However, the Puget Sound region understands we must remain proactive in growing our regional economy. Competitive regions do not rely on luck, and the future of the regional economy is not without risks. Boeing's backlog could shrink if travel remains depressed. Microsoft faces challenges as new computing platforms and services compete for dominance. Competition continues to grow among West Coast ports. And while the region has a good record of creating new companies, it is not clear that it can launch enough high impact "gazelle" firms to sustain dynamic new clusters.

Nonetheless, steadiness in base industries, a gradually improving world economy led by business investment, and a large pool of available talent combine to permit a degree of optimism about the future of the Puget Sound economy. The key to maintaining this optimism is the continuation of the region's historical pattern of renewal and diversification, and the analysis that follows points in the direction of new opportunities the region can pursue.

## **Regional Economic Framework**

To move from general goals of competitiveness and productivity into an actionable strategy we need a sophisticated understanding of how metropolitan economies work. With the Great Recession serving as a major "reset" for economic activity, a solid framework for regional economics is especially important to ensure that the fundamental assets and development strategies of metro economies are attuned to new post-recession dynamics.

We begin by emphasizing the central role of metropolitan regions in the evolving nature of the global economy. As U.S. and global populations increasingly urbanize, more labor, knowledge, networks, and other markers of productive capacity will ultimately concentrate in the largest metropolitan areas. America's largest 100 metros already account for two-thirds of the nation's population and jobs, and we can expect this share to grow. Furthermore, the outputs, or wealth, created by these metros is disproportionate to their already concentrated assets, exactly because the interaction in dense regions increases productivity of people and firms.

Metropolitan regions will thrive only if they evolve within the context of global economic dynamics. We highlight here three important global trends that inform the vision and positioning we have set out for the Puget Sound region and the fundamental aims of this Metropolitan Business Plan:

**Exports** will continue to grow based on rising global demand and relatively low dollar values, and their expansion arguably presents the only solution for reducing the nation's foreign debt while also driving growth in jobs, productivity, wages, skills, and living standards.

**Low-carbon solutions** will continue to spread, driven by climate change concerns, “greener” consumer preferences, growing world energy consumption, and the advance of low-carbon policies and regulations.

**Innovation**, resulting in new products, services, and business models, has always been critical to economic growth and competitiveness and will likely become even more imperative, but the lead long enjoyed by the U.S. is now under challenge.

Although the Puget Sound region is well positioned with respect to these trends, we must remain aware that sophisticated regions around the country and around the world are adjusting their own strategies to take these new contextual features into account. To retain a leading economic position in the face of intense competition, we can organize our strategy around five “leverage points” for affecting growth:

**Build and sustain industrial, occupational and functional clusters.** Concentrated economic activity reduces transportation costs, enables shared labor and other inputs, facilitates spillovers and exchange, and enhances innovation. An analysis of regional clusters can reveal which ones have the most potential for growth and whether specific strategies can enhance those growth prospects.

**Deploy human capital for maximum results.** The talents and skills of people constitute the single most important input to economic growth. An effective human capital strategy requires not just high levels of educational attainment, but also the retention, attraction and deployment of talent through alignment with existing and expected employer needs.

**Develop the infrastructure of innovation and entrepreneurship.** Innovation opens new markets and drives productivity gains. Tracking the stages of innovation – from idea to firm and market growth – may reveal the need for intervention to improve knowledge networks, university-industry partnerships, flows of investment capital, and the general business environment and culture.

**Enhance spatial efficiency.** The location of businesses, workers, and consumers within a region – and the infrastructure connecting them – determines transportation costs and influences the benefits of agglomeration. Examining issues of spatial efficiency can inform housing, land use and transportation strategies.

**Foster effective public and civic institutions.** Government and civil society provide the inputs and operating environment for economic activity: human capital, infrastructure, regulatory conditions and amenities. Examining the policies, activities and interactions of these stakeholders may uncover opportunities for increased service quality and an improved environment for economic activity.

Each of these leverage points is, of course, related to the others. The goal is not to shape siloed policies and programs, but integrated, multi-dimensional ones that reflect clusters, human capital, innovation, spatial efficiency and the institutional environment all interacting to create a whole greater than the sum of its parts – to constitute the regional economy. These five leverage points provide the framework that will be used below to analyze the economic performance of the Puget Sound region and to organize strategies to improve that performance.

## II. STRATEGIES FOR ECONOMIC PROGRESS

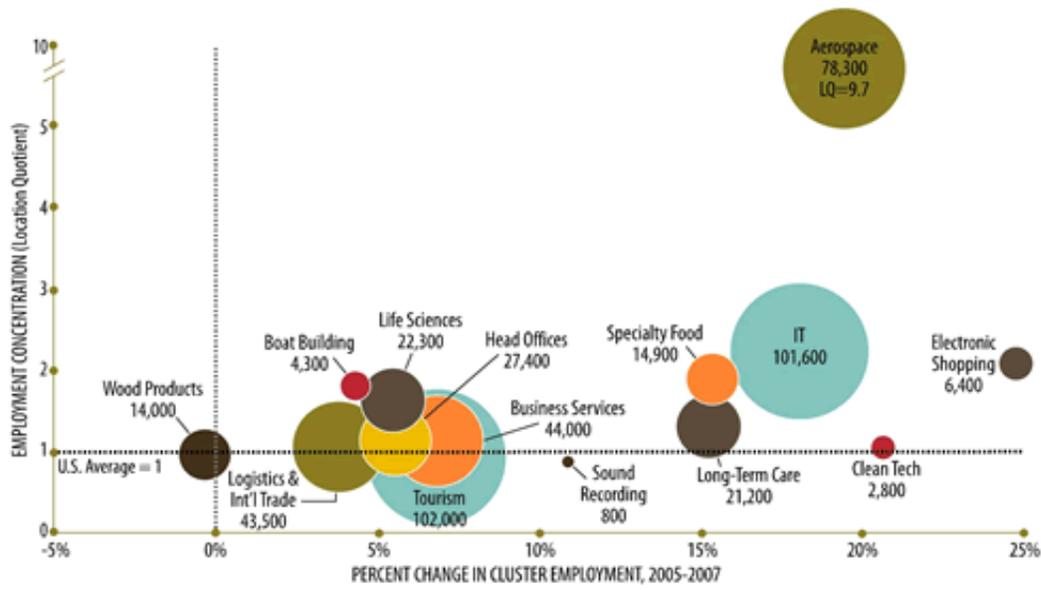
The following analysis reviews important strengths and weaknesses of the Puget Sound regional economy using the framework of five key leverage points discussed above. Each section concludes with a key strategy for the Puget Sound region that, if addressed, could drive economy-enhancing programs and initiatives.<sup>3</sup>

### Leverage Point #1: Build and sustain industry, occupational and functional clusters

#### Analysis

Key to maintaining the central Puget Sound region’s economic prosperity is our continued strength in cluster development. Before the Great Recession, the region had one of the most diverse economies in the country, with over a dozen industry clusters at or above the national average in terms of employment concentration. Figure 4 shows the size, location quotients (LQs) and growth patterns of these clusters at that time.

Figure 4. Puget Sound Region Cluster Portfolio



Source: Employment Security Department, Puget Sound Regional Council. Note: Covered employment only. Military not included. Size of bubble indicates 2007 employment.

The history of the Puget Sound regional economy is instructive with respect to clusters. Several of the region’s largest clusters – such as trade and logistics, tourism and military (not pictured here) – have

<sup>3</sup> The key strategies presented for each leverage point are not intended to address every aspect of the economy. Rather, they are the lead strategies identified by regional stakeholders to target priority challenges and opportunities facing the region.

been relatively constant over the decades, providing a reliable, gradually expanding job base. Others, such as wood products and aerospace have seen a more volatile arc of growth and maturity. Yet, what has made the region one of the most innovative and prosperous economies in the country is the third category: industries like IT and life sciences that have appeared in the last 20-30 years and become major economic drivers.

The Prosperity Partnership, the region's leading economic development coalition, developed a *Regional Economic Strategy for the Central Puget Sound Region* in 2005, to make strategic decisions about how to best grow these opportunities. The strategy is two part, built on a cluster approach that recognizes the contributions of both mature and emerging clusters as well as a focus on rebuilding the foundations of the economy that are necessary for these clusters to be successful.

On the cluster side of the strategy, the region is making efforts to support its clusters with necessary policy change, investment decisions and programmatic efforts (like the creation of new trade associations). The foundational activities align strongly with the other leverage points in this business plan, including the need to facilitate innovation and ensure sufficient human capital to serve the needs of these industries. The similarities between the Regional Economic Strategy and the Metropolitan Business Plan leverage points are no coincidence. Rather, they are a mutually reinforcing recognition that a region must address all aspects of its economy in order to be truly successful. The remainder of this leverage point section will discuss the cluster focus of the Regional Economic Strategy, and other leverage point sections will include references to the strategies foundation initiatives.

## **Assessment**

Despite a long history of successes, there are significant challenges on the horizon for the region's clusters. Aerospace manufacturing has shifted overseas and to the southeastern and southwestern United States, while increased competition comes not only from large, established companies like EADS/Airbus but also countries such as China and Russia. The wood products industry – long a mainstay in the region – has shrunk significantly as the market demands less vertical integration. Some of our region's largest, oldest employers have moved (Boeing headquarters), been purchased (Safeco) or gone out of business (WaMu). How the region compensates for these losses will define its economic prosperity in the long term.

Yet, there are many bright spots on the horizon. Traditional industries are holding steady, and the recent selection of the Boeing Company's aerial refueling tanker bid by the U.S. Air Force means 11,000 jobs and \$693 million annually for the state. And many new industries are rising up. Global health activities in Washington – a majority of which are in the central Puget Sound region – are already linked to 43,800 total jobs.<sup>4</sup> Western Washington has more than 15,000 jobs at more than 150 companies or divisions wholly involved in the interactive media ("video game") industry, including Microsoft Game Studios, Nintendo and the many smaller companies that compose the cluster.<sup>5</sup> And we have been able to identify

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<sup>4</sup> University of Washington, "Economic Impact Assessment of Global Health on Washington State's Economy" (2007).

<sup>5</sup> enterpriseSeattle, "Interactive Media Competitiveness Study" (2010).

approximately 22,900 clean tech jobs in the Puget Sound region, 40 percent of which are in fields related to building energy efficiency.<sup>6</sup>

***Key Strategy: Implement cluster initiatives of the Regional Economic Strategy.***

The region needs to support those industry clusters that have the potential to provide substantial job growth and broad business opportunities in the decades ahead. Through action initiatives that implement the cluster-based Regional Economic Strategy, the Prosperity Partnership helps grow and support both traditional and emerging clusters.

In the past few years, much of this has been accomplished by bringing key stakeholders together for targeted collective action. In 2007, the Prosperity Partnership created two statewide trade associations: the **Aerospace Futures Alliance (AFA)** and the **Washington Clean Technology Alliance (WCTA)**. Both industry clusters now have a leading voice advocating on their behalf for legislative priorities and business development. Over the last few years, the creation of the **Washington Aerospace Partnership** has been instrumental to securing the Air Force aerial refueling tanker contract mentioned above, and will play a key role as our region and state bid to be the home of the next generation 737 production and assembly.

A good example of cluster strategy efforts around emerging opportunities is the recent formation of **Global Health Nexus, Seattle**. A collaboration between the Prosperity Partnership, the Gates Foundation and the trade associations for the global health and life sciences industries, Global Health Nexus, Seattle is a new nonprofit organization that is working to brand Seattle and Washington state as the international nexus for global health discovery, development and delivery. By raising the profile of our numerous and diverse global health organizations, and connecting those organizations to new investment and growth opportunities, we can “do well by doing good,” helping to create jobs while improving the health outcomes of the world’s most vulnerable citizens. Highlights of this effort to date include the upcoming month-long global health celebration in July 2012 as part of the 50<sup>th</sup> anniversary of the Seattle World’s Fair, and an exciting new initiative to leverage the supply chain expertise of our region’s leading corporations for the benefit of global health organizations.

The newest strategy of the Prosperity Partnership is to take advantage of the enormous growth potential of the emerging clean technology cluster. This potential has, however, not gone unnoticed by other regions, and the competition will be fierce to capture these economic opportunities. Therefore, we needed to identify the specific niches of clean tech within which the region can build a world-leading presence and to array efforts on a variety of fronts toward strengthening our capacity within those niches.

According to a study done for the Washington Clean Energy Leadership Council, green building/energy efficiency was found to be the best near-term clean technology economic development opportunity for the state’s expertise and resources, and hold the greatest market potential for sales revenue, business

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<sup>6</sup> Puget Sound Regional Council, “Clean Tech Cluster Analysis Update for the Puget Sound Region” (2009).

formation, and high paying job growth.<sup>7</sup> Regional firms such as McKinstry and Mithun are national and global leaders in designing and retrofitting buildings for maximum energy efficiency, and the region still has a large building materials industry. Large companies like Microsoft are entering the growing energy management/smart grid market, as are a plethora of start-ups.

To fully capitalize on this opportunity, the Puget Sound region must think comprehensively about its efforts in four key areas: the development of a skilled and talented workforce to provide sufficient **human capital** for this cluster, the creation of a supportive **policy** environment to foster it, the facilitation of targeted **investments** that help establish new companies and grow existing companies with new ideas, and the commercialization of **innovation** to help promising technologies reach the marketplace.

Again, it is not surprising that these four areas match explicitly with the other leverage points discussed below, since comprehensive cluster strategy focused around these four areas is necessary to ensure success in establishing the region as an international hub for the energy efficiency industry. However, with respect to this leverage point strategy, our region proposes the creation of the **Building Efficiency Testing and Integration (BETI) Center and Demonstration Network**. As will be discussed in *Part II*, BETI will be a catalyzing investment in supporting innovation and technology commercialization in this space, through providing researchers, businesses and entrepreneurs with a means to test and verify new energy efficiency technologies in real-world settings.

## Leverage Point #2: Deploy human capital for maximum results

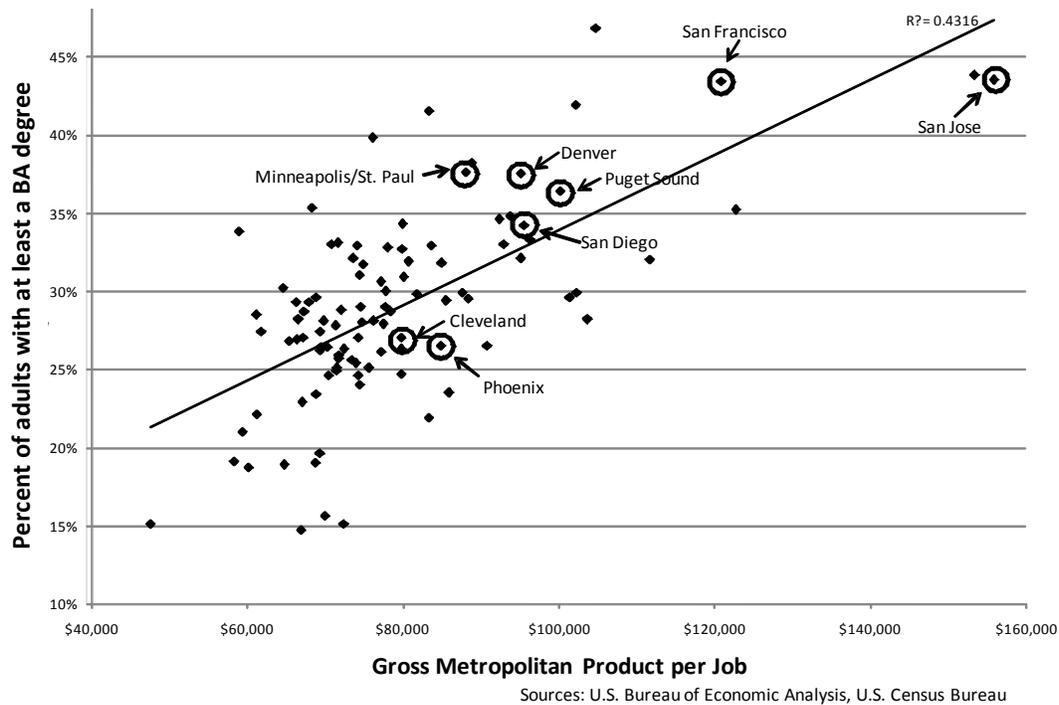
### *Analysis*

One of the region's former leaders is famous for pointing out that, "The region with the most smart people wins." So far, this region has been very successful on that metric. As Figure 5 shows, productivity is strongly associated with high levels of education, and Puget Sound ranks 11<sup>th</sup> in terms of educational attainment among the 100 largest metro areas in the country, just behind its peer regions of Minneapolis/St. Paul and Denver.

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<sup>7</sup> Navigant Consulting, "Phase I: Washington State Clean Energy Technology Landscape" (2010).

**Figure 5. Productivity as a Function of Educational Attainment in Comparison Regions**



This snapshot of educational attainment, however, masks an important concern for the region: reliance on in-migration for talent. Figure 6 shows the percentage of in-migrants that hold at least a bachelor’s degree, for Puget Sound and peer regions. Puget Sound’s particularly high general rate of net in-migration means that migration is tending to increase the share of degree holding overall.

**Figure 6. Percent Share of Population with Bachelor’s Degrees in Comparison Regions**

	Percent holding at least a bachelors degree		
	Total population	Moved from other state	Moved from overseas
Cleveland	26.6%	42.0%	43.4%
Denver	36.6%	43.3%	35.9%
Minneapolis-St. Paul	37.0%	50.6%	40.6%
Phoenix	26.8%	32.8%	28.7%
San Diego	33.8%	42.3%	39.3%
San Francisco-Oakland	42.9%	64.0%	50.7%
San Jose	43.6%	64.0%	53.8%
Puget Sound	36.3%	48.0%	51.5%
United States	27.4%	37.4%	40.0%

Source: U.S. Census Bureau, American Community Survey 2006-2008

To be sure, a large part of the economic success of the Puget Sound region is attributable to its ability to attract and retain highly skilled people, and nothing should be done to diminish this advantage. At the

same time, however, Washington ranks low nationally in the number of four-year degrees conferred by in-state institutions, and low in the rate at which young people growing up in the state graduate from college. The paucity of native talent is being made up for by in-migrants, 49 percent of whom bring college degrees with them to the region. Thus, the opportunities being created by economic progress in the region are accruing disproportionately to those moving from other states and nations.

From a purely economic perspective this is not necessarily a bad thing. Employers rarely care if the people they hire are natives, and being able to draw on a global talent pool is a great advantage. However, in the competitive global economy, relying on the best and the brightest to continue to choose your region over another region is risky at best. And by inadequately preparing local students for the best opportunities, the region is failing to fully develop and deploy our own human capital. The most sustainable strategy is to ensure that those growing up in the region, or who are transitioning between industries, can compete for jobs being created in our economy.

### ***Assessment***

The virtuous cycle, in which knowledge-intensive businesses and a highly skilled workforce feed off of each other, is underway in the Puget Sound region: in the past 20 years, the region has added 360,000 people with college degrees. In-migration of degree-holders is generally a positive outcome, indicating that talented people throughout the world perceive that the Puget Sound region is a good place to pursue a career. The concern is that the region's economy is relying on this influx of talent to mask the relatively poor performance of the state's education system in preparing those growing up in the state to compete in its world-leading industries.

### ***Key Strategy: Increase attainment of bachelor's degrees in high demand fields.***

To address the issue of nurturing local talent, a first major step is expanding the overall capacity of the state's colleges and universities to provide bachelor's degrees. Washington's Higher Education Coordinating Board's Master Plan calls for a 27 percent increase in the number of students receiving bachelor's degrees by 2018. The fact that 67% of all jobs in Washington will require some postsecondary training beyond high school by that year suggests this focus is well-placed.<sup>8</sup> Yet, as Figure 7 shows, we are likely to fall short of that goal.

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<sup>8</sup> Georgetown University Center on Education and the Workforce "Help Wanted: Projections of Jobs and Education Requirements Through 2018" (2010)

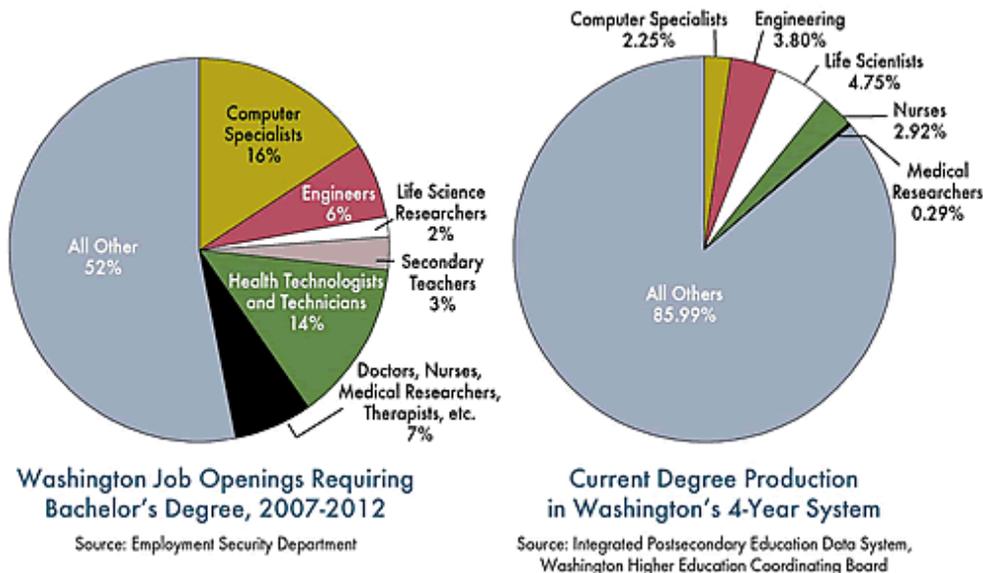
**Figure 7. Ten-Year Projected Growth in Bachelor’s Degree Production in Washington Universities, 2009-2019**

	Bachelors degrees awarded per year			10 Year growth	
	2009 total	10 year growth plan	2019 total	Rate	STEM & health degrees
Univ. of Washington - Seattle	7,150	360	7,510	5.0%	500
Univ. of Washington - Branches	1,850	450	2,300	24.3%	10
Washington State Univ. - Pullman	3,479	1,629	5,108	46.8%	514
Washington State Univ. - Branches	821	845	1,666	102.9%	385
Central Washington Univ. - All	2,360	665	3,025	28.2%	235
Eastern Washington Univ. - All	2,023	128	2,151	6.3%	96
Western Washington Univ. - All	3,275	1,429	4,704	43.6%	290
Evergreen State College	1,164	106	1,270	9.1%	37
<b>Total Public</b>	<b>22,122</b>	<b>5,612</b>	<b>27,734</b>	<b>25.4%</b>	<b>2,067</b>
Independents	5,963	1,300	7,263	21.8%	429
<b>Total all institutions</b>	<b>28,085</b>	<b>6,912</b>	<b>34,997</b>	<b>24.6%</b>	<b>2,496</b>

Source: Washington State Higher Education Coordinating Board

In addition to increasing bachelor’s degrees overall, the state needs to pay particular attention to high-demand fields, where the supply of qualified people falls well short of demand. The region’s economy requires significant numbers of workers with degrees in science, technology, engineering and math (STEM) fields, yet our state is producing a disproportionate percentage of its degrees in other fields (see Figure 8). Clearly, the industry clusters described above – both mature clusters like aerospace as well as emerging clusters like global health, interactive media and energy efficiency – will require innovators with these skills, and so our region must continue to produce people that can meet the needs of the businesses in these fields. BETI won’t have very many clients if there aren’t people developing new energy efficiency technologies to be validated and commercialized.

**Figure 8. Job Openings Requiring Bachelor’s Degrees Compared to Degree Production in Washington**



Unfortunately, Washington is moving in the opposite direction, especially as the Great Recession has forced our state to make significant cuts in higher education funding over the last four years. And so the Prosperity Partnership strategy must be to find a way to change that trend and promote increased investment in our state's four-year higher education system.

In summer 2010, the **Higher Education Funding Task Force** – chaired by Microsoft Vice President and Prosperity Partnership Co-Chair Brad Smith – identified a plan to ensure the long-term sustainability and accountability of our state's four-year higher education institutions. The Task Force's proposal contained a three-part recommendation: 1) adopt a new financial formula for the public four-year universities that better combines state budget support with increased flexibility for the universities to set their own tuition rates; 2) establish a new, privately-funded endowment – known as the Washington Pledge Scholarship Program – that supplements financial aid for low- and middle-income students to compensate for rising costs; and 3) take concrete steps to strengthen accountability and performance by the State's public universities, including the adoption of the National Governor's Association's Complete to Compete metrics.

Now that the Task Force has delivered its proposal, the Prosperity Partnership has mobilized to support these recommendations. Our coalition is leading the charge during the state legislative session to turn these recommendations into law, and is building statewide support for the Task Force's short-term and long-term ideas.

## **Leverage Point #3: Develop the infrastructure of innovation and entrepreneurship**

### ***Analysis***

For an innovation-based region like Puget Sound, developing new ideas and products is only one part of ensuring long-term economic prosperity. To successfully grow jobs and companies, locally developed research and intellectual property must be transitioned into commercially viable products and services, and then into sustainable, revenue-generating businesses.

The Puget Sound region is recognized as one of the nation's and the world's centers of innovation, ranking seventh among 145 regions in the 2008 World Knowledge Competitiveness Index.<sup>9</sup> Washington State was ranked second in the 2010 State New Economy Index,<sup>10</sup> and sixth in the Milken Institute's 2010 State Technology and Science Index.<sup>11</sup> The fact that Puget Sound and Washington State consistently rank near the top of such studies clearly indicates that the region and state have substantial assets to deploy in building an innovation-based economy.

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<sup>9</sup> Huggins, Robert, Hiro Izushi, Will Davies and Luo Shougui, "World Knowledge Competitiveness Index 2008," (Centre for International Competitiveness, 2008)

<sup>10</sup> Atkinson, Robert D. and Scott M. Andes, "2010 State New Economy Index," (Information Technology and Innovation Foundation, 2010)

<sup>11</sup> DeVol, Ross C., Kevin Klowden, and Benjamin Yeo, "2010 State Technology and Science Index: Enduring Lessons for the Intangible Economy," (Milken Institute, 2011)

Innovation begins with new technologies and ideas, many of which emerge from corporate and university R&D labs. Figure 9 shows R&D activity in several of Washington’s peer states. Washington and California are far ahead of the other states and the nation in total R&D and in business R&D. Washington leads the group in federal R&D, reflecting major funding at the University of Washington, Washington State University, Pacific Northwest National Laboratory, Fred Hutchinson Cancer Research Center, and other institutions.

**Figure 9. Research and Development Activity in Comparison States**

	Total R&D as Share of Gross State Product - 2007	Federal R&D Obligations per Civilian Worker - 2007	Business R&D as Share of Private-Industry Output - 2007	Academic R&D per \$1,000 of Gross State Product - 2008
Arizona	2.04%	\$805	1.79%	\$3.34
California	4.31%	\$1,238	4.02%	\$3.80
Colorado	2.90%	\$1,009	2.52%	\$3.72
Minnesota	2.98%	\$495	2.94%	\$2.66
Ohio	2.17%	\$461	1.77%	\$3.87
Washington	4.85%	\$1,447	4.77%	\$3.28
United States	2.62%	\$764	2.20%	\$3.66

Source: National Science Foundation

Research institutions are a key source of new technologies, but the process of transferring technologies to the marketplace is not always smooth. Figure 10 shows several measures of technology development and transfer from the major research universities in Puget Sound and its peer regions. The University of Washington does very well in terms of licensing and spinning out start-up firms, and reasonably well at creating marketable intellectual property through patenting.

**Figure 10. Technology Transfer Indicators in Comparison Region Universities**

	Active Licenses	2007 Startups	2007 Patents Issued	2007 Patent Applications
Case Western Reserve Univ.	195	3	10	73
Univ. of Colorado	271	10	21	79
Univ. of Minnesota	756	4	44	53
Univ. of Arizona	196	3	18	61
Univ. of California System	1819	38	331	959
Stanford Univ.	986	6	106	256
Univ. of Washington	1040	11	43	88

Source: Association of University Technology Managers

But while the Puget Sound region has been comparatively successful at creating new businesses from research generated at UW and other institutions, there is still a huge unmet potential for spin-off and licensing activity. The problem is that, for too long, we have been expecting research scientists to become entrepreneurs themselves, and we are disappointed when they fail to embrace this role. While

some scientists and engineers can build successful businesses, most would rather stick to their chosen professions and leave entrepreneurial activity to others.

The commercialization process clearly consists of far more than R&D: many of the most prominent research institutions in the country have a poor record of fostering innovative businesses in their regions. One factor is the commercialization culture, or lack thereof, that exists within particular universities. The financial incentives or disincentives for professors and researchers have an effect on the rate of technology transfer that occurs. One key element to realizing the unexploited potential of research is through activation of a group of intermediaries who can partner with researchers to navigate the complex commercialization process. This group includes commercialization offices at research universities, venture capitalists, entrepreneurs, incubators and specialized professionals such as lawyers, accountants and marketers.

This group of intermediaries performs the essential role of offloading risk from both scientists who develop new technologies and from established businesses that may eventually bring those new technologies to market. Intermediaries can nurture ideas through the long and uncertain process of development, making sure that promising concepts do not fall by the wayside.

The Puget Sound region has done reasonably well in creating and attracting intermediaries. As Figure 10 above shows, the UW commercialization office has been successful in moving technology to the marketplace. Figure 11 below shows that the state has done better than most of its peers in attracting venture capital. (California and Massachusetts significantly distort the venture capital picture.) The region still has a long way to go, however. The huge gap in funding and entrepreneurial success between Boston and Silicon Valley, and everyone else indicates that few regions have a sufficient network of intermediaries that can help create new businesses from locally developed technologies.

**Figure 11. Venture Capital Investments in Comparison States, 2009**

	Deals		Value	
	Number	Share of national	Total value (\$millions)	Share of national
Arizona	17	0.6%	\$116	0.7%
California	1,137	40.7%	\$8,858	50.1%
Silicon Valley	863	30.9%	\$6,984	39.5%
San Diego	107	3.8%	\$903	5.1%
Colorado	71	2.5%	\$529	3.0%
Massachusetts	303	10.8%	\$1,985	11.2%
Minnesota	33	1.2%	\$131	0.7%
Ohio	50	1.8%	\$108	0.6%
Washington	108	3.9%	\$574	3.2%
United States	2,795	100.0%	\$17,680	100.0%

Source: PriceWaterhouseCoopers

## ***Assessment***

The innovation infrastructure of the Puget Sound region is reasonably well developed, but far smaller and less capable than that found in Boston or Silicon Valley. Future commercialization success will require a larger group of entrepreneurs and venture capitalists to nurture ideas and absorb the risks of developing those new ideas. Intermediaries must be well connected and function well together, but because of the entrepreneurial nature of what they do, these individuals and organizations do not self-manage very well.

### ***Key Strategy: Expand and connect intermediaries in the university research commercialization process.***

The International Regions Benchmarking Consortium, in which the Prosperity Partnership plays a leading role, recently identified ways to ensure a successful linkage between new university-developed technological discoveries and a vibrant innovation economy. Strengthening the core group of intermediaries is of critical importance. Regional leaders can make intermediaries more effective by taking several steps:

**Inventory the players.** Know who the various intermediaries are, and where there may be gaps in competencies.

**Create venues for interaction.** It cannot be assumed that members of the Core are conscious of being part of a critical network, so there may be a need to create venues for entrepreneurs, venture capitalists, technology commercialization staff and others to regularly interact and communicate.

**Connect intermediaries to universities, businesses and governments.** It will be rare for any of the core intermediaries to have uniformly strong connections to all of the major institutions in the region, so conscious effort is needed to build relationships.

**Promote commercialization within university culture.** It is widely recognized that to the original missions of universities – education of students and basic research – must be added a third mission: economic development. But the current mission of universities has evolved over centuries, and some will not embrace this new role easily. University leaders need to clarify legal and ethical issues that inhibit commercial activity and modify internal reward systems, as appropriate, to build entrepreneurial cultures within segments of the university most likely to create marketable intellectual property.

BETI, described in *Part II*, will itself serve as a key intermediary in the commercialization process for energy efficiency technologies. Beyond its basic role in providing testing and verification services, BETI will act as a clearinghouse for ideas and a place where individuals from various disciplines can share ideas and find opportunities.

## **Leverage Point #4: Enhance spatial efficiency**

### ***Analysis***

Reducing transportation costs and maximizing the benefits of density enhance the productivity of a region. How best to do so – the question of spatial efficiency – presents increasingly complicated issues. Urbanized areas have evolved from monocentric, hub-and-spoke patterns into polycentric regions with employers and residences distributed over large areas. Vibrant regions need to offer businesses and residents ample locational choices while, at the same time, minimizing transportation congestion, greenhouse gas output and housing costs.

The spatial pattern of the Puget Sound region is typical of West Coast metros: a moderately dense service industry core and a dispersal of other industries across central city districts and suburbs of relatively uniform density. For example, aerospace is concentrated in South Snohomish and South King Counties, while IT is concentrated in East King County. Life sciences companies have clustered in Seattle and South Snohomish County. Manufacturing and logistics have gravitated to South King and North Pierce Counties.

On top of this general pattern, the region has complied with the State Growth Management Act (GMA) by enforcing an urban growth boundary (UGB) that minimizes development outside the historically urbanized area. The Puget Sound Regional Council (PSRC) – the region’s metropolitan planning organization – has approved its Vision 2040 plan, which moves Puget Sound toward a multicentric region in which urban center living and transit use are increasing while low density areas within the UGB are filling in. The PSRC’s Transportation 2040 lays out a plan for meeting Vision 2040’s goals through the future development of a comprehensive, multimodal transportation system.

A basic measure of spatial efficiency is the journey to work, both in duration and by mode. Figure 12 shows some key metrics of commuting patterns for the peer regions. San Francisco, with its dense neighborhoods and strong transit system has the highest share of non-single-occupant-vehicle (non-SOV) commuters. The Puget Sound region leads the remainder of the peer regions in non-SOV commuting, with a comparatively high share of transit users.

**Figure 12. Journey to Work Statistics for Comparison Regions**

	Percent of Commuters				Commute in less than		Average commute minutes
	Transit	Carpool	Walk/bike	Work at home	10 minutes	30 minutes	
Cleveland	4.0%	7.8%	2.3%	3.2%	12.4%	66.3%	24.0
Denver	4.7%	10.1%	3.0%	5.6%	9.7%	59.6%	27.0
Minneapolis-St. Paul	4.3%	8.7%	3.1%	4.6%	12.1%	65.8%	24.4
Phoenix	2.4%	13.7%	2.5%	4.8%	10.5%	58.3%	26.1
San Diego	3.4%	10.9%	3.6%	6.1%	11.2%	65.4%	24.1
San Francisco-Oakland	14.4%	10.1%	5.7%	5.7%	9.1%	54.8%	28.8
San Jose	3.7%	9.8%	3.7%	4.3%	9.1%	66.0%	24.5
Puget Sound	7.8%	11.7%	4.2%	5.1%	10.2%	57.4%	27.7
United States	4.9%	10.6%	3.3%	4.0%	14.3%	64.7%	25.5

Source: U.S. Census Bureau, American Community Survey, 2006-2008

Another helpful metric is the percent of commuters that can commute in less than 30 minutes, long considered an acceptable travel time. A large share of commutes longer than 30 minutes can indicate a poor jobs-housing balance. The Puget Sound region is well below the national average and most of its peers in the 30-minute test, pointing to long commutes from affordable areas within the region.

Figure 13 indicates that affordability in the Puget Sound area has not recovered as much as in some peer regions. The region never did become as high-priced as the California metros, and remains more affordable than the Bay Area and San Diego. As has historically been the case, however, the inland regions, with fewer physical and political constraints on development, are far more affordable than the coastal areas.

**Figure 13. Housing Affordability in Comparison Regions**

	NAHB Housing Opportunity Index*		
	3rd Quarter 2000	3rd Quarter 2005	3rd Quarter 2009
Cleveland	69.7	77.7	87.2
Denver	50.0	63.5	76.4
Minneapolis-St. Paul	57.2	63.6	83.9
Phoenix	64.8	41.0	82.9
San Diego	24.6	5.1	50.2
San Francisco-Oakland	5.7	8.1	23.6
San Jose	13.0	14.8	49.0
Puget Sound	44.5	34.7	55.7
United States	58.1	43.2	70.1

\* Percentage of homes sold at prices affordable to the median household income in the region

Source: National Association of Homebuilders

Housing affordability is an important consideration in the effort to achieve both economic success and spatial efficiency. The equilibrium dynamic that drives the flow of migrants around the country indicates that the economic success of a region comes at the price of some combination of lack of housing affordability and sprawl. In a successful region, when high-earning workers bid up the price of existing housing near job centers, local governments face a difficult choice between open development policies that create sprawl (the Sunbelt approach) and constrained development policies that drive up detached housing prices (the coastal approach). A third approach, greater urban infill and higher densities near job centers, has been slow to take hold, but offers the best solution to the challenge of residential spatial efficiency.

## ***Assessment***

The spatial pattern that is evolving in the Puget Sound region is proving efficient for employment growth, as industries have settled in suitable areas that encourage agglomeration efficiencies. For example, the region has easily discernable geographic clusters of companies in the global health, medical device, interactive media/gaming, and aerospace industries.

The pattern is less efficient for the distribution of moderately priced housing. Seattle and the suburbs to the east are the largest job centers, but have seen rising housing prices that force out middle-income households. Each day, tens of thousands of commuters drive to jobs in Seattle and East King County from affordable areas to the north and south, exacerbating traffic problems. On the other hand, commutes within the principal sub-regions, such as Seattle and East King County, are manageable. Thus, if there were enough housing choices within sub-regions to accommodate those working in them, much of the commute problem would abate. The region needs to ensure that its planning and housing strategies encourage a balance of jobs and housing at all price levels within sub-regions.

## ***Key Strategy: Improve sub-regional jobs-housing balance through increased affordability.***

VISION 2040 – the region’s growth management plan – sets forth an overarching goal for the region to “preserve, improve, and expand its housing stock to provide a range of affordable, healthy, and safe housing choices to every resident.” In particular, the document establishes that “our success depends on ensuring the availability of a variety of housing types and densities, as well as an adequate supply of housing affordable at all income levels, to meet the diverse needs of both current and future residents.” It calls for both the region and its local jurisdictions to take steps to increase the supply of housing, specifically adding housing opportunities to job-rich places, and promotes economic development to bring jobs to all four counties.

The **Housing Innovations Program (HIP)** was developed to support local government efforts to encourage and expand affordable and diverse housing opportunities throughout the Central Puget Sound region. The online HIP Housing Toolkit provides strategies organized around five focus areas: urban centers; transit-oriented developments; expensive housing markets; innovative single-family housing techniques; and citizen education and outreach measures. Specific strategy options for local governments to choose from include: accessory dwelling units, density bonuses, design guidelines,

multifamily tax exemptions, parking requirement reductions, small-lot single-family development, and TOD overlays.

The implementation of this program has been facilitated by the region’s successful application for funding from the HUD-EPA-DOT Sustainable Communities Program. The 3-year, \$5 million federal grant will support efforts to capitalize on the more than \$15 billion investment in new high capacity transit systems serving places where job and housing growth will be focused in the future. The new program – **Growing Transit Communities: A Corridor Action Strategy for the Central Puget Sound Region** – will support neighborhood planning for more sustainable communities around as many as 100 new transit centers that are expected in the region in the next 20 years. The new program will take a big picture approach, ultimately putting jobs and opportunity closer to where people live, while sustaining a healthy environment and a healthy economy in the decades to come. Approximately 20% of these funds will go towards the HIP strategies.

## **Leverage Point #5: Foster effective public and civic institutions**

### ***Analysis***

Governance involves the interaction and cooperation of a wide array of public, private and non-profit players. Governments provide essential public goods and services – such as highways, public safety and education – and establish the tax and regulatory environment. Private and non-profit groups – such as workforce development organizations, industry associations, and economic development groups – fill out the wider range of services that make a community thrive and grow. How these agencies and groups partner and work together is ultimately what leads to good governance – creating richer networks, more focused problem solving, increased innovative capacity and greater efficiency. The quality of governance will have an impact on the continued success in the innovation economy, as companies and workers look for locations that provide a solid business climate and quality of life.

Although not without its warts, governance in the Puget Sound region operates reasonably smoothly. Politics is clean and attracts a high caliber of individuals to office. Non-partisan, at-large councils and professional city management decrease the opportunity for mischief. The civic layer of governance – including business, arts, human services and philanthropic organizations – is well developed and works well with governments.

A history of populism and public support for environmental protections frequently create tension around economic development and infrastructure projects. The region has a reputation for taking a long time to arrive at decisions, and the “Seattle process” can be frustrating, especially for those new to the region. But participation, accommodation and an aversion to heavy-handedness are in the civic DNA and not likely to change any time soon. Governance in the Puget Sound region requires patience, but on the positive side, boondoggles are rare.

The primary jurisdictional landscape of the Puget Sound region has experienced significant growth and change during the last 20 years. The Puget Sound region consists of four counties and 82 cities. Thirteen new cities - with a combined 2009 population of 420,000 - have incorporated since 1990. During the

same period, numerous areas of unincorporated county have been annexed to adjacent cities. As a result, between 1990 and 2009, the unincorporated share of regional population shrunk from 49 percent to 33 percent. Areas with a strong historic identity decided to incorporate and other areas decided to annex in order to control planning at the city level. Moreover, city tax structures allow for a more comprehensive array of services.

Vision 2040 breaks cities into four categories: Metropolitan, Core, Large and Small. Figure 14 shows the 2009 population breakout according to these designations, as well as the regional share projected for 2040. The plan anticipates a slight shift of population into the larger cities, but there is no clear direction toward a major realignment of the local geopolitical landscape. There have been no consolidations of cities in the region since the 1960s and none are anticipated.

**Figure 14. 2009 Population by Jurisdiction Type, Puget Sound Region**

	2009 Population					Regional share 2009	Regional share 2040
	King	Kitsap	Pierce	Snohomish	Region		
Metropolitan Cities (5)	722,600	36,620	203,400	103,500	1,066,120	28.9%	31.2%
Core Cities (13)	515,380	19,140	104,195	51,720	690,435	18.7%	19.4%
Large Cities (18)	225,830	23,290	39,110	171,840	460,070	12.5%	12.9%
Small Cities (46)	102,310	17,295	84,780	48,955	253,340	6.9%	6.9%
Unincorporated area	343,180	170,395	382,115	328,285	1,223,975	33.1%	29.5%
Urban Unincorporated	217,388	75,293	207,753	206,146	706,580	19.1%	17.8%
Rural Unincorporated	125,792	95,102	174,362	122,139	517,395	14.0%	11.7%
Total	1,909,300	266,740	813,600	704,300	3,693,940	100.0%	100.0%

Sources: Puget Sound Regional Council, Washington State Office of Financial Management

All of the cities formed in the region in recent decades adopted council-manager forms of government, and most have followed the “Lakewood Plan,” making extensive use of contracting for municipal services. Most of the cities formed in the 1990s, some quite large, continue to contract for police service with the county, and many have retained existing water, sewer and fire districts. The multiplicity of cities in the region has not been seen harming the quality or cost-effectiveness of services, although the continuation of special districts is problematic.

In addition to cities, the region is dotted with 279 school, utility, fire and other special districts, shown in Figure 15. The persistence of special purpose districts in urbanized areas (many remain in place long after annexation or incorporation of their service territory) can inhibit rational development patterns. This is especially the case with utility districts that cannot or will not expand their systems to accommodate business or residential growth.

**Figure 15. Special Districts in the Puget Sound Region**

	King	Kitsap	Pierce	Snohomish	Regional total
School	19	5	15	14	53
Fire	25	5	20	22	72
Water Sewer	34	11	13	12	70
Port/transporation	3	9	2	2	16
Parks/libraries	5	6	5	4	20
Housing/health	9	3	2	6	20
Flood/drainage	6	0	7	9	22
Other	2	1	0	3	6
Total	103	40	64	72	279

Source: 2007 Census of Governments, U.S. Census Bureau

While governmental fragmentation has not created substantial inefficiencies in the provision of basic local services, the region has long struggled to create effective economic strategies at the regional level. As far back as the 1950s, regional leaders recognized the need for the Puget Sound region to act in a more coordinated and cohesive way to further economic interests. A multi-county economic development agency existed for a time in the 1960s and 1970s, but did not last.

The interaction between governance and economic development came to a head at the beginning of this century when the Boeing Company first moved its headquarters to Chicago and then bid out the creation of its new airplane (now known as the 787). The idea that “Jet City” might no longer be the world’s aerospace capital shocked the community into action, and we were able to maintain the assembly of the 787 in the region. The realization that we could no longer rely on our economy to continue its course spurred a new commitment to intentionality and strategic coordination. Yet, without a true “regional economic entity,” that coordination was inefficient, hence the formation of the Prosperity Partnership, which serves as the regional table around which business, government, nonprofit, labor and education organizations can gather to identify targeted initiatives to grow and sustain our regional economy and then coordinate the implementation thereof.

The region has achieved significant gains through the first five years of the Prosperity Partnership. Highlights include many of the points mentioned above: the formation of cluster associations like the Aerospace Futures Alliance and the Washington Clean Technology Alliance; securing increased investment by the state to create more opportunities for college students in the high-demand fields of science, technology, engineering and math; developed strategies to sustain and grow seven of the region’s leading industries; and building bridges from the Puget Sound across the Cascade Mountains to find ways to work productively with the rest of the state.

The functional implication of this coalition activity is the creation of a governance system in which the abovementioned leverage points can be coordinated. The Metropolitan Business Plan framework is the next step in enhancing these efforts to be as targeted as possible, and to maximize the return on these investments.

## ***Assessment***

The basic layer of local governance in the region – cities, counties, special districts, civic and community organizations – has generally been supportive of economic strategies. Individual cities vary in their willingness to accommodate the needs of industries, but the spatial sorting of businesses reflects the existence of ample choices for efficient location. The one significant area of concern, as discussed above under the leverage point of spatial efficiency, is housing affordability and the lack of support provided by the existing governance structure for improvements to the jobs-housing balance.

In recent years the region has made strides in moving beyond the traditional governance pattern of uncoordinated action by individual cities and counties. This began with the institution of multi-county planning under growth management, led by the Puget Sound Regional Council, and was extended to economic development planning through the Prosperity Partnership. The region had been able to act in a coordinated way, but on an ad hoc basis, such as in planning a regional transit system. The Prosperity Partnership has provided a venue for industry, education, labor, non-profit and government leaders to come together around an agreed-on agenda to address our economic future. With the conclusion of the first five years of this effort, attention now turns to the next five years.

### ***Key Strategy: Further enhance regional coordination through the development of the next Regional Economic Strategy.***

The current Regional Economic Strategy is based on a 2005 analysis of the region's employment concentrations and their projections for growth. With the dynamism of both the regional and national economy – and the significant changes due to the current economic downturn – that data is no longer up-to-date. The region needs to undertake another comprehensive analysis of our employment concentrations and projections, and then use this data to drive the development of a new Regional Economic Strategy for the 2011-2016 period.

As the Prosperity Partnership embarks on its next five-year Regional Economic Strategy, the most important goal is to make both the process and the outcome even more of a driver of regional economic coordination and collaboration. The strategy itself must be sensitive to the sometimes divergent or even contradictory needs of local public and private stakeholders, and identify those crosscutting initiatives that everyone can get behind and find mutually beneficial. Examples that would bring multiple jurisdictions and organizations together in shared efforts might include coordinated regional marketing to attract new companies or additional foreign direct investment, or investments that leverage our strong manufacturing base to diversify into new opportunities.

The basis of that successful collaboration will be a strong comprehensive data analysis, and there are a number of ways that we can improve our efforts in this regard:

- **Additional Sub-regional Analysis:** to determine which industry clusters are driving the economy at the county and city level, with comparison to peer jurisdictions nationally;
- **Inclusion of Industry, Occupational and Functional Cluster Analysis:** to look at employment levels not only within specific industries but also by job type (e.g., machinists or engineers) and

function (e.g., head offices, business services, logistics), to determine where our workforce strengths can be leveraged cross-industry; and

- **Expanded Industry Cluster Component Analysis:** to determine where our comparative economic advantages lie within larger industry clusters (e.g., analyzing the components of the life sciences cluster such as biotech, medical devices and global health), so that we can more specifically target the emphasis of our shared activities.

In addition, the Metropolitan Business Plan process, as reflected in this document, has raised important new issues and ways of looking at economic development and will play a central role in this new analysis and strategy. BETI provides an excellent example of how economic strategies can drive toward very specific actionable outcomes that loop back to reinforce larger strategic objectives.

Now more than ever, our region needs to continue and extend the reach of its partnerships as global and domestic competition intensifies and we work to recover from the current economic downturn. We must be thoughtful and forward thinking in our investments, and move toward improving how we use our land, how we move people and goods, and how we invest in our residents and workforce. A clearly articulated plan can be the basis of that strategic collaboration toward ongoing prosperity.

### III. CONCLUSION

This overview of the Puget Sound region's economy shows considerable strengths. If we employ the strategies discussed above to pursue opportunities and address weaknesses, we will continue to prosper in the decades ahead, even in the face of the many challenges posed by the global economy. The region has shown a remarkable ability to renew itself, introducing new, dynamic industries to replace maturing ones. The section that follows proposes a new initiative that is centered on one of the strategies – articulated in leverage point #1 – and also provides a framework to address strategies within the other four leverage points.

The history of economic growth in the Puget Sound region prompts a question: do we rely on good fortune and happy accidents or do we employ deliberate strategies to strengthen our existing base of industries and accelerate the growth of new clusters?

It seems obvious that a strategy of waiting for the next stroke of luck is no strategy at all, and yet mobilizing the region around intentional approaches to economic development has always been challenging. We struggle to find messages that resonate. Suggesting that our future is imperiled by rapid global change risks losing credibility since it is clear that we have weathered, and even prospered under, such changes better than the great majority of regions: fear mongering will not work. A better approach will be to convey a sense of excitement and opportunity – a chance to be at the center of new industries that will help build a better future.

This is exactly the tone we wish to set with the initiative we describe below. Starting with the region's considerable resources in energy efficiency, we believe we can move the region into a position of global

leadership in this critical sector. What could be more exciting than nurturing a high-growth, highly productive new industry that creates global economic efficiencies and reduced carbon output?

Management guru Peter Drucker warned of the tendency of organizations to “feed problems and starve opportunities.” The Puget Sound region has frequently fallen into this trap. While we will continue to work on shoring up general weaknesses in the region’s economy, we need to concentrate more of our efforts on actions that help us capture opportunities that will drive the next wave of prosperity for the region. The levers and strategies described above will help us do both. We now turn to one of those opportunities.

# PART II. THE BETI CENTER AND DEMONSTRATION NETWORK: A CATALYST FOR CLUSTER GROWTH

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## I. OVERVIEW

Part I of the Metropolitan Business Plan identified that the fostering of new and emerging industries in our region is a key to our ongoing economic competitiveness. Among the many opportunities to create long-term, sustainable prosperity is the energy efficiency cluster, and the **Building Efficiency Testing and Integration (BETI) Center and Demonstration Network** is an initiative that addresses one of the biggest challenges to growing this industry: commercializing new products and technologies.

We begin with an overview of the Puget Sound’s clean tech cluster and why the energy efficiency niche in particular is the best emerging cluster growth opportunity for the region. This is followed by an analysis of the global and domestic markets for energy efficiency and the assets and opportunities the Puget Sound has in this particular segment. We go on to describe the strategy framework for growing the energy efficiency cluster in terms of four key areas of importance: human capital, policy, investment and innovation. The remainder of the document proposes the BETI Center, an initiative that tackles the innovation area of this energy efficiency cluster strategy.

## II. ENERGY EFFICIENCY MARKET ANALYSIS

Given the Puget Sound region’s culture of innovation and environmental consciousness, clean technology (clean tech) is a natural focus as a potential next major cluster. This potential has, however, not gone unnoticed by other regions, and the competition is fierce to capture these economic opportunities. Therefore, the strategic imperative is to identify the specific niches of clean technology within which the region can build a world-leading presence and to array efforts on a variety of fronts toward strengthening our capacity within those niches.

According to a study done for the Washington Clean Energy Leadership Council (see sidebar), energy efficiency was found to be the best near-term economic development opportunity for the state’s expertise and resources, and hold the greatest market potential for sales revenue, business formation, and high paying job growth.<sup>12</sup> For the clean tech cluster community in the Puget Sound region, this finding comes as no surprise. A confluence of factors, both externally and internally driven, explains why the region is already a leader in energy efficiency industries and poised for export-oriented growth and development.

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<sup>12</sup> Navigant Consulting, “Phase I: Washington State Clean Energy Technology Landscape” (2010).

The industry is growing, as it must, from a primarily local-serving industry, to an export-oriented industry that provides goods and services for deep energy efficiency gains. Weatherization efforts alone will not be enough to meet the energy and greenhouse gas reduction goals of today and into the future. Deep energy efficiency gains will go beyond simple insulation or window replacements. It will require new products, processes and technologies that the industry as a whole has yet to reveal or deploy into the marketplace. Given the region's existing assets in green building, building energy services, software development, and advanced manufacturing, the region is poised to grow this industry beyond its local serving base to an export-oriented cluster that puts the region on the world map as the center for building energy efficiency.

**Figure 16. Select Building Energy Efficiency Demand Drivers**

- Government Policies to Address Climate Change
- Volatile Energy Prices
- Limited Generation and Delivery Capacity
- Innovation and Technological Change
- Competitive Pressure to Find Cost Savings
- Corporate Social Responsibility and Consumer Preferences
- Aging Building Stock

The following sections will describe the Puget Sound region's energy efficiency opportunity in terms of domestic and global market trends, the industry and community assets the region possesses, and the challenges and opportunities to growing these industries.

**Washington Clean Energy Leadership Council**

[www.washingtoncelc.org](http://www.washingtoncelc.org)

The CELC is a public-private partnership dedicated to securing Washington state's clean energy leadership. Formed by the legislature in 2009, this group comprises 23 representatives from the private, public and non-profit sectors active in the clean energy industry in the state. CELC commissioned an in-depth analysis of what Washington State government and industry can do to grow the clean energy sector and promote economic development and green job creation in Washington. Based on these findings, the Council submitted its recommendations and final report to the Governor and the Legislature on Jan. 19, 2011.

**International and Domestic Market Estimates and Projections**

In recent years, a broad consensus has emerged on the need to develop new approaches to the reduction of energy consumption. Global concerns about climate change, high oil prices, instability in the Middle East, and overall economic downturns have created strong demands for clean tech products, technologies and services. Resulting local, national and international policies and high levels of public and private sector investment are creating huge business and economic development opportunities in the clean tech cluster. In fact, experts at the American Council for an Energy Efficient Economy have estimated that U.S. spending on energy efficiency technologies and infrastructure will top \$700 billion by 2030, up from \$300 billion in 2004.<sup>13</sup>

<sup>13</sup> Ehrhardt-Martinez, Karen, John "Skip" Laitner, "The Size of the U.S. Energy Efficiency Market: Generating a More Complete Picture" (American Council for an Energy Efficient Economy (ACEEE), 2008).

Efficiency has also become a leading energy policy priority for many global markets—including many of Washington’s leading export destinations—as evidenced by the implementation of energy efficiency targets, reasonably aggressive building energy codes, and green economic stimulus programs with energy efficiency components (see Figure 17). Market analysts predict energy efficiency to be the single largest opportunity by 2020, growing at 13% compounded annually, to \$1.2 trillion worldwide, and with China being the fastest growing share of the market. Building efficiency alone is a \$245 billion market.<sup>14</sup> As a result, the market for energy efficiency extends well beyond U.S. borders and offers strong potential to contribute to the Puget Sound’s overall export-based economic development strategy.

**Figure 17. Export Potential for Washington Energy Efficiency Goods and Services**

	Washington State Origin Exports (\$Mil)	Supportive Policies		
		Energy Efficiency Targets	Building Energy Codes	Green Stimulus (\$Bil)
China	\$9,113	strong	mandatory	\$221
Canada	\$6,791	strong	mixed	\$3
Japan	\$5,567	strong	mandatory	\$12
UAE	\$2,763	-	-	-
S. Korea	\$2,034	strong	mandatory	\$31
Ireland	\$1,856	strong	mandatory	-
India	\$1,844	-	voluntary	-
Hong Kong	\$1,740	strong	mandatory	-
France	\$1,696	strong	mandatory	\$7
Germany	\$1,438	strong	mandatory	\$14

According to a study focused on building energy efficiency, cutting global annual building sector emissions by 8.2 billion tons below business-as-usual by 2050 would require an additional \$1 trillion per year in investment between now and 2050 without taking into account the savings from energy efficiency.<sup>15</sup> Of this, \$209 billion per year would take place in the United States, \$158 billion in the European Union, \$114 billion in China and \$37 billion in Japan, assuming per-building transformation occurs equally across regions.<sup>16</sup>

In the U.S., approximately 40% of all primary energy is used in buildings. It’s no surprise, then, that reducing building energy consumption figures prominently in national, state, and local energy strategies. More and more, government policies are stimulating demand for energy efficiency goods and services via conservation targets, building energy codes, consumer rebate programs, tax incentives, R&D initiatives, and related efforts. In addition, improving payback rates/return on investment for energy efficiency solutions are making these purchases more attractive to building owners and operators, manufacturers, and even homeowners.

For the U.S. market, a number of organizations have made estimates of the size and growth prospects for energy efficiency goods and services. Although the available market estimates summarized in Figure 18 below come from a variety of sources – causing some overlaps and double counting – it is clear that a significant opportunity exists.

<sup>14</sup> Robins, Nick, Charanjit Singh, Robert Clover, Zoe Knight and James Magness, “Sizing the climate economy,” (HSBC, September 2010).

<sup>15</sup> World Business Council for Sustainable Development, “Energy Efficiency in Buildings: Transforming the Market” (2009).

<sup>16</sup> Ibid.

**Residential and commercial building construction and retrofit.** U.S. energy efficiency investment in new buildings and building retrofits was estimated at \$90 billion in 2004.<sup>17</sup> This included spending on building envelope (building materials, lighting, glass, insulation and coatings), mechanical systems, and energy efficient fixtures and finishes. Areas expected to perform particularly well going forward include advanced HVAC systems, high R-value windows with electronics and/or chemical layers, smart lighting systems and solid state lighting, and insulation products.

**Appliances and electronics.** U.S. spending on energy efficient washers, dryers, freezers, printers, PCs, and other appliances and electronics was estimated at \$88 billion in 2004.<sup>18</sup> Demand for efficient appliances and their component electronics (e.g., low-power semiconductors) is expected to be strong both domestically and internationally over the medium to long term.

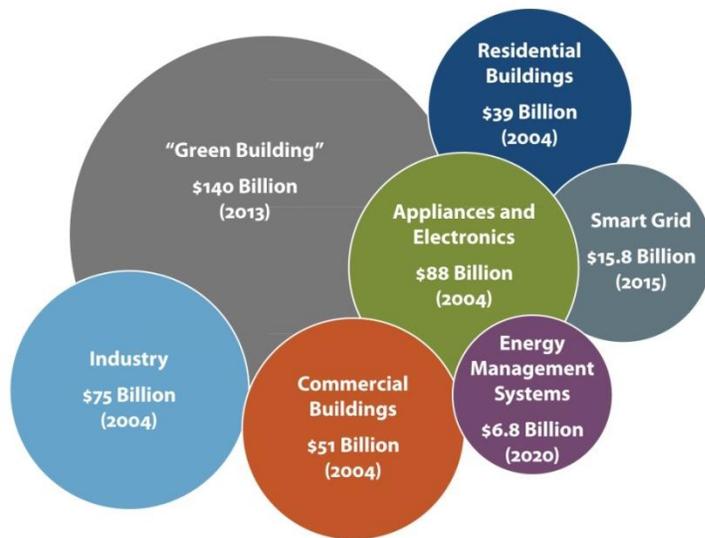
**Energy services.** The U.S. ESCO (Energy Services Contract) market was estimated at \$3.8 billion in 2006, and is projected to reach \$23 billion by 2015.<sup>19</sup> Worldwide, revenues are projected to reach \$115 billion by 2015.<sup>20</sup>

**Energy management systems / building controls.** The U.S. market for building automation and controls technology—including components such as meters and sensors as well as software—to manage HVAC, lighting and other building systems in commercial buildings is projected to reach \$6.8 billion by 2020.<sup>21</sup> Global growth is also

expected to be robust. Integrated information and communications technologies (ICT) systems that can adjust energy usage based on usage patterns and energy pricing, advanced diagnostics, equipment and controls for remote monitoring, advanced low-power sensors, and related technologies are helping to fuel segment growth.

**Smart grid.** U.S. smart grid spending—including smart meters, data management, demand response, integration, building and home management, vehicle-to-grid, grid monitoring, networking infrastructure,

**Figure 18. Market Size of Energy Efficiency Opportunities**



<sup>17</sup> Ehrhardt-Martinez, Karen, John "Skip" Laitner, "The Size of the U.S. Energy Efficiency Market: Generating a More Complete Picture" (American Council for an Energy Efficient Economy (ACEEE), 2008).

<sup>18</sup> Ibid.

<sup>19</sup> Navigant Consulting, "Phase I: Washington State Clean Energy Technology Landscape" (2010).

<sup>20</sup> Ibid.

<sup>21</sup> Webber, Alan, "Energy Management Systems for Commercial Buildings: Energy Efficiency, Demand Response, and Advanced Building Management Systems" (Pike Research, 2009).

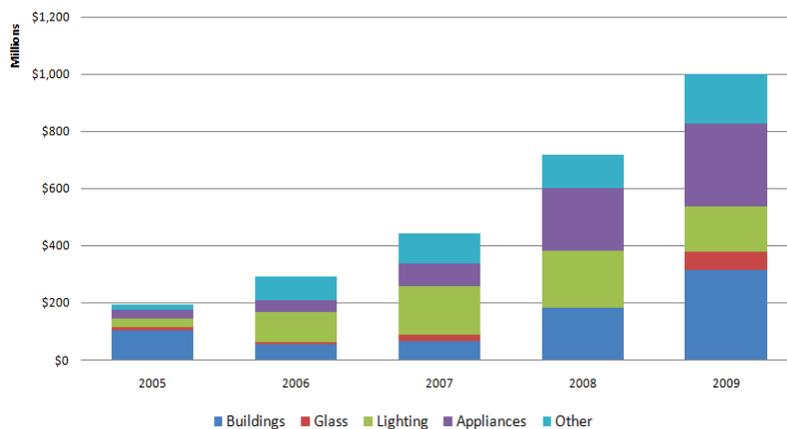
and related technologies—reached \$4.5 billion in 2009.<sup>22</sup> By 2015, market experts expect spending to top \$15.8 billion.

**Green design.** While no market estimates are available for green design services and tools such as architecture and building energy modeling software, these sectors are key enablers of the growth in green building. Dramatic increases in the number and share of construction projects pursuing LEED and other green certification credentials require green design specialists and sophisticated tools for integrated architectural, mechanical, and construction planning.

## Venture Capital Investment

Venture capital investments are another indicator of prospects for the energy efficiency industry, as highly informed investors make judgments about what products and services might find a large market. Venture capital investment has been progressively more focused on the energy efficiency market in recent years, with total sector investment reaching \$1 billion in 2009—up 39% over 2008, and with a compound annual growth rate of 40% since 2005 (see Figure 19).<sup>23</sup> Some of the hottest areas of venture capital investment have been in building technologies (including building automation, building envelope and insulation, and HVAC systems), advanced glass technologies, appliances and their associated components, and “other” technologies including monitoring, metering and control, sensors, and efficient motors.

**Figure 19. Investment in Energy Efficiency Sub-sectors**



Source: Cleantech Group, LLC

<sup>22</sup> Lux Research, “The Smart Grid Market Charges Up to Reach \$16 Billion by 2015,” available at <http://www.luxresearchinc.com/blog/2010/01/the-smart-grid-market-charges-up-to-reach-16-billion-by-2015/> (January 2010)

<sup>23</sup> Cleantech Group LLC and Deloitte, “Cleantech Investment Monitor Volume 8 / Issue 4” (2009).

## Industry Challenges

Firms in the energy efficiency goods and services cluster face all of the challenges posed by any dynamic, growth industry. However, there are a number of aspects of the energy efficiency market that pose unique difficulties:

**Fragmentation of ownership.** Individuals and small businesses own a large portion of the new and existing stock of residential and commercial buildings, each with a unique willingness or capacity to invest in energy efficiency.

**Uniqueness of structures.** Residential and commercial buildings are typically built one-off, with few common features that can be upgraded at scale. Even tract homes built from common plans will have been modified over the years to make them unique.

**Financing.** Even though there is a clear financial benefit from energy efficiency, it can be difficult to monetize that benefit to create financing tools for retrofit. Furthermore, the energy efficiency of a building is not currently reflected in its market value, undercutting the investment.

**Fragmentation of industry.** Energy efficiency is a very fragmented industry, with a variety of players including technology developers, designers, and utilities. Too often, many of these stakeholders have limited interaction or coordination. Additionally, utilities themselves have difficulty coordinating with and investing in these new goods and services, due to a range of structural and regulatory challenges.

**The “human factor.”** The actual performance of energy efficiency improvements depends on actions of the buildings’ owners and operators, some of which are beyond the control of the product or service provider. The most energy efficient building in the world will fail to deliver expected results if, for example, someone leaves the window open or turns up the thermostat too high.

**Lack of supportive infrastructure.** Because the industry is still changing, the facilities and organizations necessary to facilitate growth are few and difficult to access. In particular, testing of energy efficiency goods and services is only available on a limited basis in university laboratories and other technology facilities; and even within these facilities, it is difficult to simulate the range of uses and product integrations faced by this industry.

Compounding these industry challenges is the widely variable policy and financing environment within which these businesses must operate. Although energy efficiency is a priority for federal, state and local governments, and for public and private utilities, the array of programs and incentives driven by these entities varies greatly in time and place, making it difficult to build scale.

## Competitive Landscape

Any region attempting to make a mark in the clean tech market needs to be mindful of one thing: everyone else is thinking the same thing. Strong competition is expected from regions including:

**Silicon Valley**—boasting a large number of energy efficiency companies operating in all parts of the industry, as well as an internationally admired innovation ecosystem.

**Austin**—with a strong stated focus on growing its clean energy cluster, an impressive semiconductor/electronics/IT base, and innovative technology deployment initiatives (e.g., the Pecan Street Project).

**Philadelphia**—the recent winner of the DOE Energy-Efficient Building Systems Design Energy Innovation Hub and \$122 million in associated R&D funding

**Denver**—located in close proximity to the National Renewable Energy Laboratory (DOE’s primary lab for renewable energy and energy efficiency R&D) and with a strong regional clean technology strategy and energy industry base.

**A range of other metropolitan areas with headline firms in the industry**—such as Milwaukee, home to Johnson Controls, and Buffalo Grove/Chicago, home to Siemens Building Technologies.

**Global regions** – Higher energy prices and more proactive governments are stimulating activity in the energy efficiency sector around the world. Just as U.S. regions see opportunity in clean tech, so do sophisticated regions on every continent. In particular, EU countries like Germany and Asian economies such as China are making significant investments in developing the technology and economic development infrastructure to lead internationally in this cluster.

## Four Key Factors in Growing Puget Sound’s Energy Efficiency Industries

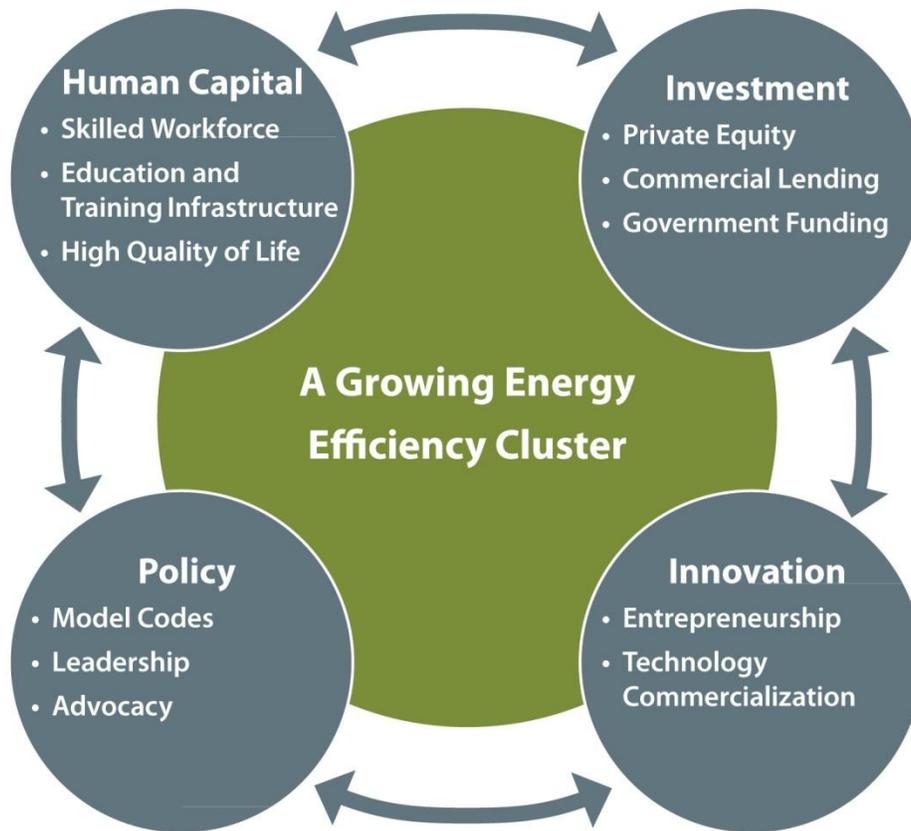
To be successful in the energy efficiency market, a region needs to have core assets to deploy. The Puget Sound region is well situated to build an internationally recognized energy efficiency industry. Many of the assets are already in place, and great strides have already been taken. Yet, there is more to do to ensure success, and to overcome global competition for this opportunity.

The actions that the region must consider fall into four key areas: a skilled and talented workforce to provide sufficient **human capital**, a supportive **policy** environment and legislative leadership, targeted **investments** that help establish new companies and grow existing companies with new ideas, and **innovation** potential - the ability to realize promising technologies and commercialize them into the marketplace. As discussed in *Part I*, these four areas correspond with the leverage points in the Metropolitan Business Plan framework and the Regional Economic Strategy’s foundation initiatives – a

recognition that a region must comprehensively address all aspects of its economy in order to be truly successful with specific cluster development strategies.

In each area, we outline the considerable assets that can be built on for future growth, as well as the significant challenges that must be addressed. A strategy focused around these four areas is necessary to ensure success in establishing the region as an international hub for the energy efficiency industry.

**Figure 20. Four Key Factors for Growing Energy Efficiency in the Puget Sound Region**



## ***#1. Human Capital***

### **Assets**

The Puget Sound region's human capital has a potent combination of highly educated, entrepreneurial, and environmentally conscious workers uniquely suited to the energy efficiency industry. But this workforce is not merely a talented group of green-minded citizens; they happen to be the industry leaders, continually pushing the envelope and advancing the state of the art. Puget Sound has some of the top talent in the world in the areas of green building, energy services, software development and advanced manufacturing.

As depicted in Figure 21, the Puget Sound's energy efficiency economy is incredibly diverse, ranging from companies that design and build buildings to those that focus on minimizing the energy use of building operations through software and hardware systems, and advanced building materials. The region is perhaps best known for its strength in architecture, construction and engineering –as well as energy services companies (ESCOs); it boasts a national reputation for green building leadership and expertise. Seattle ranks third among US cities for the total number of Leadership in Energy and Environmental Design (LEED) buildings and Washington is the #3 state in the union in LEED buildings per capita. It also has one of the highest rates of LEED accredited professionals per capita in the country.

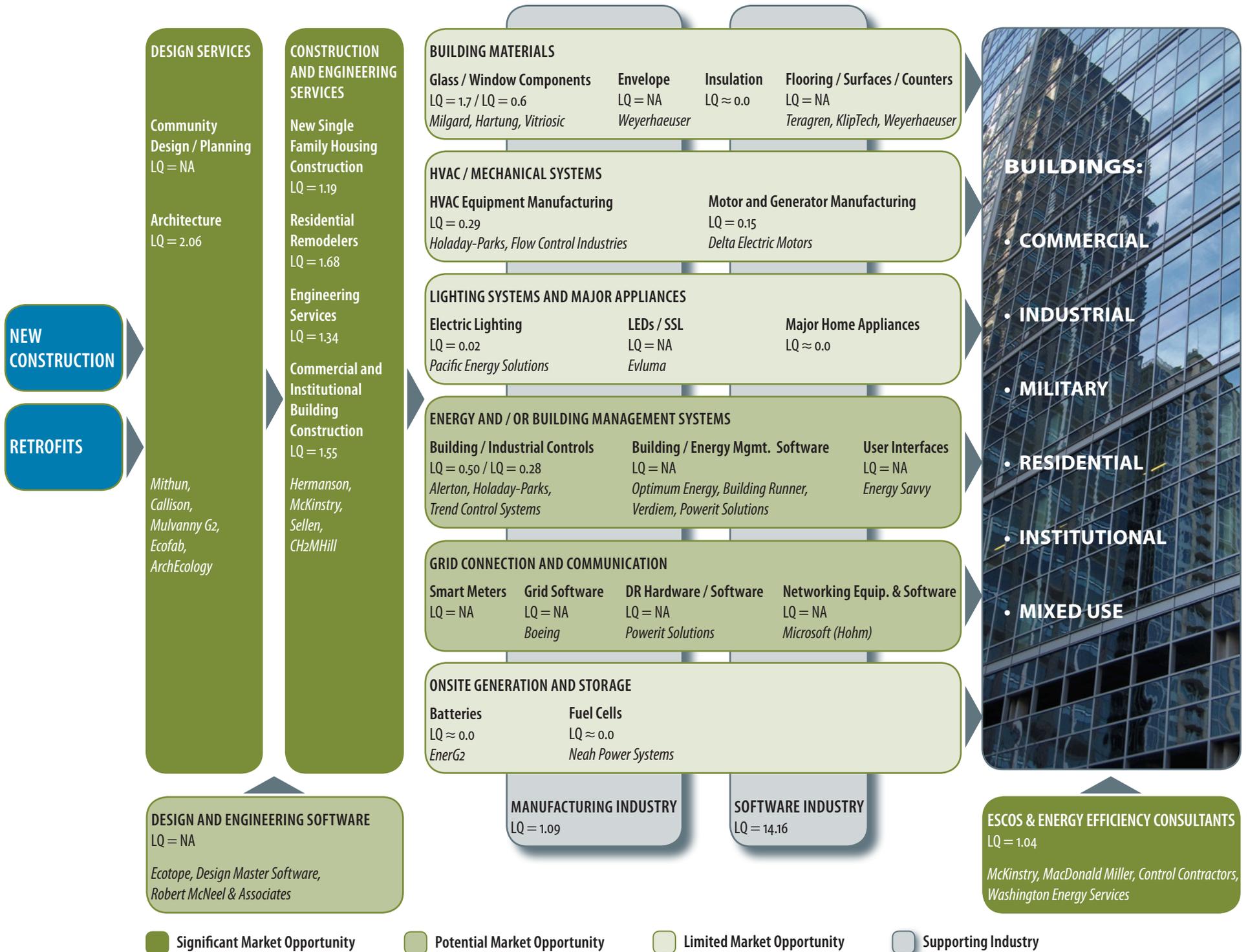
Green building and energy efficiency developers, architects, engineers, and technicians have been pioneers in designing, building, operating and retrofitting some of the most cutting-edge and energy efficient buildings in the country, and the expertise and experience found in Puget Sound firms are sought after around the world. Development firms like Unico and Vulcan Real Estate; architecture firms such as Mithun, ZGF, and Callison; and energy services and construction firms such as McKinstry, Macdonald-Miller, and Hoffman Construction join with organizations like the Cascadia Green Building Council and the New Buildings Institute to push the industry worldwide to achieve higher building performance through innovations in building science. Perhaps even more important, these businesses are well organized; the Northwest Energy Efficiency Council has been in place since 1995, promoting policies and programs that enhance market opportunities for energy efficiency.

It is through this high concentration of green building expertise here in the region that led to such initiatives as the Sustainable Building Advisor Institute, which offers a 9-month training course for practicing professionals, and the International Living Building Institute whose Living Building Challenge aims for the most advanced measures of sustainability possible in the built environment. Both were initiated by Puget Sound organizations and are now offered across the US and Canada.

The growing role of information technology in the energy efficiency industry is an exciting development for the region as well. The Puget Sound has one of the nation's strongest and most innovative information technology clusters; for example, Washington was ranked as the second most innovative state economy in the Information Technology Industry Foundation's New Economy Index. The region is home to some of the major players in the high-tech world, and is a hotbed of talent and innovation when it comes to entrepreneurial pursuits. Microsoft and its alumni have helped start or spin off numerous software, hardware, and related technology companies, many of them focused on smart grid and other automation technology used to manage building energy use. Verdiem, V2Green and Optimum Energy are a few of the energy efficiency software and hardware firms started in the region by IT entrepreneurs entering this realm. Harnessing intellectual and experiential wealth of the tens of thousands of professionals in this sector offers significant promise to tackling many of the barriers to achieving a fast ramp-up of energy efficiency solutions.

Finally, while there is not currently much energy efficiency product manufacturing in the region, the presence of Boeing and its supply chain offers a labor base with strong technical knowledge and machining capacity that could be readily transferred and adapted to new market opportunities. The lean manufacturing practices used by firms here add an additional incentive for locating manufacturing

# The Puget Sound Region's Building Energy Efficiency Cluster



activities here for the energy efficiency market.

To meet the needs of the increasing number of these companies, there is a growing cadre of education and workforce training programs geared towards training future and existing workers for energy efficiency fields. In fact, several nationally renowned training programs for green building and energy efficiency were developed right here in the Puget Sound region. Some of these specialized training programs include:

- **Sustainable Building Advisor Institute** (formerly known as the National Sustainable Building Advisor Program) offers a certificate training program for practicing professionals that was developed in Seattle and is now offered by course providers throughout the US and Canada.
- **Building Operator Certification** is a nationally recognized program administered by the Northwest Energy Efficiency Council (NEEC), a business association for the energy efficiency industry in the Pacific Northwest, and headquartered in Seattle. In 2010 NEEC received a Recovery Act grant of \$549,000 from the US DOE to support enhancements to its program.
- **Cascadia Green Building Council** is the local chapter of the U.S. Green Building Council, which provides training for LEED Professional Accreditation. The Cascadia chapter also offers other specialized trainings, workshops and presentations that keep the region's green building professionals at the cutting edge of industry advancements.
- **South Seattle Community College** provides green jobs training and apprenticeships in building sustainability management, building science, and construction. It is also a training affiliate of the Building Performance Institute, which provides national certification for residential energy efficiency professionals.

In addition, the University of Washington – located in Seattle – is the state's largest university and the top ranked public research university in the nation. From its academic programs to research capabilities to technology commercialization services, the UW offers a wealth of knowledge for educating and supporting existing and future workers and innovators in energy efficiency fields.

- The **College of Built Environments** is an interdisciplinary program of the Architecture, Construction Management, Landscape Architecture and Urban Design & Planning departments with a focus on the tangible improvement of the built and natural environment. The **Integrated Design Laboratory** (IDL) network, a consortium of laboratories dedicating to providing the best building performance knowledge available, is an extension of the UW Department of Architecture.
- The **Computer Science & Engineering Department** ranks among the top ten programs in the nation and is among the top suppliers of talented young engineers to firms such as Microsoft, Amazon and Google. Among its many talented alumni are Jeremy Jaech, former CEO of Verdiem, a power management software company, and Carl Imhoff, manager of the Gridwise program at the Pacific Northwest National Lab.

In addition to these existing academic and worker training programs, several initiatives have emerged in the last few years to improve and build on existing workforce training programs to meet employer skill

needs in energy efficiency industries. **SkillUp Washington** created the **Northwest Energy Efficiency Opportunities Project (NEW OP)**, bringing together industry, government and college partners to ensure trainings are responding to the labor market needs of employers, and create career pathways to help low-income working adults find green collar living wage jobs. The **Workforce Development Council of Seattle-King County** led or partnered with other regional organizations to win over \$10 million in competitive Department of Labor grants through the 2009 Recovery Act. These funds went to study the emerging needs of the green economy, develop new courses and curricula to meet those needs, and directly provide training to nearly 3,000 people in energy efficiency skills and occupations.

## **Challenges**

Building science and energy management are increasingly complex areas, requiring computer and engineering knowledge even among the skilled trades. But the current reality is that the region faces an imminent shortage of workers in the skilled trades and in high-demand fields such as math, science and engineering – all skills necessary to support a thriving energy efficiency industry. Already our region – which employs more engineers per capita than any state in the country – is in the bottom echelon of states in terms of actually producing graduates in science and engineering fields. Unfortunately, this problem is being exacerbated by an increasing disinvestment in higher education – in both two-year and four-year degrees – by the state of Washington, due to the current economic downturn.

While the stimulus funds awarded to organizations such as NEW OP and the WDC of Seattle-King County for green jobs training have provided a needed infusion of funds to study emerging green jobs skill needs, develop courses and curricula, and offer the trainings, employers are still struggling to fill positions. And, once the funds are spent, the resources necessary to continue offering those courses will become limited.

When it comes to capturing energy efficiency IT opportunities, those companies face the same challenges in hiring talent as the rest of the IT industry. The region's high educational attainment masks an important concern for the region: reliance on in-migration for talent. Larger companies, such as Microsoft, have the funds to recruit from outside the region and around the world, but smaller companies and startups will find that more challenging. In order to be successful, Washington must find a way to increase its development of human capital to meet the needs of this industry.

## **#2. Policy**

### **Assets**

The emphasis on energy efficiency in the region is evident in Washington state's associated policies, legislation and public-private initiatives. The American Council for an Energy Efficient Economy (ACEEE) 2010 State Energy Efficiency Scorecard ranked Washington sixth in doing the most to implement energy efficiency.<sup>24</sup> Sustainlane, which prepares a scorecard of cities, ranks Seattle first (tied with Portland) in

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<sup>24</sup> American Council for an Energy-Efficient Economy, "2010 State Energy Efficiency Scorecard," (October 2010).

innovation, energy, and climate change, and fourth in green building construction.<sup>25</sup> Much of this past success is thanks to our region's progressive utilities - both municipal and investor-owned - which have a strong history of promoting conservation and new technology deployment in order to avoid building fossil fuel plants to supplement hydropower. In fact, the Sixth Northwest Power Plan of the Northwest Power and Conservation Council calls for meeting 85% of future regional demand with energy efficiency savings rather than investment in new generation. Combined with progressive building energy efficiency codes, targeted legislation, and coordinated regional planning, the Northwest has a history of energy policy leadership.

Select energy efficiency policy initiatives and legislation of note in the region and the state are described below. These are very much aligned with current federal policy goals and activities, such as the recently announced Better Buildings Initiative.

#### Energy Efficiency Regulation:

**Model building codes and standards.** In 1989, Washington adopted Model Conservation Standards for residential buildings – one of the first states in the nation to do so. Twenty years later, in 2009, the legislature passed a bill establishing voluntary reach codes, in advance of making them mandatory, moving toward a goal of net-zero energy codes by 2030. Currently the Washington State Energy Code exceeds the very high standards of the International Energy Conservation Code.<sup>26</sup>

**Energy conservation targets.** In November 2006, Washington voters passed Initiative 937 (I-937).<sup>27</sup> Under I-937, utilities are required to identify their achievable cost-effective conservation potential through 2019. Each utility will set an annual target consisting of a certain share of this achievable cost-effective conservation potential, and will have to meet that share. The requirement applies to all utilities, not just investor-owned utilities. This is expected to help drive utilities to be more aggressive in pursuit of energy efficiency opportunities. Washington's I-937 was the first state renewable energy standard in the nation to require utilities to also meet energy efficiency standards. In 2007, House Bill 1010 was enacted, requiring utilities to prepare resource plans to demonstrate that they have adequate resources to meet their load-serving obligations.<sup>28</sup> It makes the utilities' efficiency targets public, puts them into context with other resource acquisition goals, and tracks progress towards meeting the targets.

**Recording energy consumption data.** In 2009, the Washington legislature passed SB5854, which requires utilities to maintain records of energy consumption data of all nonresidential buildings and upload that data to the U.S. Environmental Protection Agency's (EPA's) Energy Star Portfolio Manager upon request by the building owner or operator. In February 2010, a Seattle city ordinance went even further by requiring building owners to obtain an Energy Star rating every year, to make

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<sup>25</sup> <http://www.sustainlane.com/us-city-rankings/overall-rankings>

<sup>26</sup> Washington State University, "Energy Efficiency Industry, Trends and Workforce Development in Washington State, Study Report, Phase I," (June 2009).

<sup>27</sup> <http://www.commerce.wa.gov/site/1001/default.aspx>

<sup>28</sup> <http://apps.leg.wa.gov/billinfo/summary.aspx?bill=1010&year=2005>

that information available to the city, and to disclose that information to prospective buyers and tenants.<sup>29</sup> Provision of this information has potential to create a market signal and stimulate significant energy efficiency activity in nonresidential buildings.

**Energy retrofits for public buildings.** The Washington JOBS Act of 2010 appropriated \$100 million for energy efficiency retrofits for public schools (K-12), higher education campuses, and state-owned buildings. The appropriation places a priority on projects that connect to federal initiatives and that use technologically innovative approaches to achieve significant energy savings.

Energy Efficiency Initiatives:

**Strategy for growing Washington’s clean energy economy.** The Washington Clean Energy Leadership Council was formed by the state legislature in 2009 with a mission of developing strategies and recommendations for growing the state’s clean energy sector and position Washington state as a leader in clean energy development and policy. An in-depth market analysis commissioned by the Council found energy efficiency and green building to be the best clean tech sub-segment – in terms of market attractiveness and competitive advantage – for Washington state to focus its efforts. As a result of that work, the state is creating the Clean Energy Partnership, which would be responsible for developing and managing initiatives to expand the clean energy sector in Washington. In particular, it will work with public and private utilities to develop recommendations to align state policies and investments.

**Seattle 2030 District.** Inspired by the architecture industry’s 2030 Challenge to dramatically reduce the greenhouse gas emissions attributable to the building sector, a public-private partnership is striving collectively to meet the energy use reduction goals in Seattle’s downtown core. What began as an ad-hoc group now includes six major property owners and managers, two City utilities, Cascadia Green Building Council and the City of Seattle. The partnership continues to grow and has obtained an EPA grant to support its work.

**Emerald Cities Collaborative in Seattle.** Emerald Cities Seattle is a public-private-nonprofit partnership comprised of civic, labor, community and business leaders in Seattle committed to working together to address the issues of carbon pollution, energy waste in the built environment, job quality, equitable opportunities, and healthy communities. As its first project, Emerald Cities Seattle is focused on a comprehensive retrofit of Seattle’s commercial, industrial, residential and municipal building stock. Their strategies for success include advocacy for policy reform and innovative financing options, and the development of Community Workforce Agreements that ensure retrofit work results in high quality employment in the skilled trades.

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<sup>29</sup> Council Bill 116731, or Ordinance 123226, <http://clerk.ci.seattle.wa.us/~public/CBOR1.htm>.

### Advocacy and Trade Groups

In addition to these collaborative efforts are a number of industry and trade groups involved in supporting or advocating on behalf of energy efficiency. Notable regional associations and local chapters of national organizations include:

- AIA Seattle (American Institute of Architects)
- BOMA Seattle (Building Owners and Managers Association of Seattle King County)
- Cascadia Green Building Council
- Business Leaders for Climate Solutions
- NAIOP Washington State Chapter (Commercial Real Estate Development Association)
- New Buildings Institute
- Northwest Energy Efficiency Council
- Washington Clean Technology Alliance

### Challenges

The low electricity rates in the Puget Sound region can be considered both a blessing and a curse for growing the energy efficiency cluster. It can be difficult to persuade building owners within the region to invest in the infrastructure and services necessary to reduce energy use, because these low rates cause investment payback periods to be long. In addition, the current pricing structure of the utilities does not encourage efficiency; they do not utilize dynamic or time of use pricing to reduce peak loads.

Interestingly, a by-product of this low-cost power is the significant number of “server farms” in the state, particularly eastern Washington, which also provides complementary low land costs. These facilities require significant energy, not only to power the technology required to store large amounts of data but also to maintain very specific climate conditions that protect servers from overheating. The mission-critical nature of these HVAC systems also reduces openness to unproven technologies that might significantly reduce energy usage.

In their summary report, the Washington Clean Energy Leadership Council identified several specific areas of regulatory change that would enhance clean energy and energy efficiency economic growth in Washington including:

- Provide greatly increased assurance of utilities’ recovery of investment in or expenditures for clean energy measures and programs that support the State’s clean energy policy.
- Amend utility rate structures to avoid disincentives to utilities for successfully implementing energy efficiency programs (so-called “decoupling”).
- Create incentives to meet or exceed renewable energy and cost-effective energy efficiency targets.
- Encourage and enable the regulated, investor-owned utilities to partner with public power utilities and similarly incent the public power utilities to collaborate and share in renewable energy, energy efficiency, and smart grid pilot projects to pool investment risk. Sharing the informative results of such pilot projects will benefit all retail customers in Washington as well

as enhance Washington's in-state economic platform to more quickly access out-of-state markets.

### **#3. Investment**

#### **Assets**

##### **Government Funding**

In 2009 the Puget Sound region obtained more than \$117 million in both competitive and formula-based grants from the American Recovery and Reinvestment Act, targeted to green building and energy programs. These grants leveraged existing programs and initiated several new and exciting projects in the region. While much of the activity funded through federal programs primarily benefit local markets in the near term, they have helped advance industry knowledge and leadership that position the region for growth into global markets.

**Energy Efficiency Conservation Block Grants (EECBG).** In addition to the \$33 million in formula grants from this fund to most local jurisdictions and tribes, two communities – Seattle and Bainbridge Island/Bremerton raised an additional \$25 million in competitive EECBG grants. As part of DOE's Retrofit Ramp Up program, Seattle's Community Power Works program supports projects that deliver energy efficiency retrofits in residential and commercial buildings and establishes financing programs for energy efficiency improvements. The Bainbridge Island's Energy Challenge project will enable home and small business owners to sign up for energy audits.

**State Energy Program (SEP).** Washington State's \$60.9 million allocation in SEP funding has gone towards an Energy Efficiency and Renewable Energy Loan and Grant program and a Community Energy Efficiency Pilot Program.

**Weatherization Assistance Program (WAP).** WAP funds go towards improving the energy efficiency of low income housing in order to help reduce energy bills for needy families. Approximately \$27.7 million of those funds have been allocated to the Puget Sound.

**Public Housing Capital Funds (PHCF).** The region received \$26 million in PHCF Green Communities funds to allow public housing authorities to develop new energy efficient housing projects and retrofit existing ones.

While additional ARRA dollars are unlikely, many local governments – along with the state and federal government – are continuing to identify opportunities to invest public dollars in energy efficiency. The U.S. Department of Energy has ongoing programs, as well as the Small Business Administration's Small Business Innovation Research (SBIR) and the Small Business Technology Transfer (STTR) Programs. The U.S. Department of Commerce's Economic Development Administration has just announced their i6 Green Challenge, aimed at accelerating technology-led economic development in pursuit of a vibrant, innovative clean economy. The region has had significant success in applying for federal energy efficiency funds in the past, and can expect to continue to be competitive for future opportunities.

### Venture Capital

The Puget Sound region has a range of venture capital (VC) firms and angel partnerships that contribute to the early-stage development of firms in the region. Seattle is ranked fourth in venture funding in the United States, and most of the in-region venture capital firms are based in the Seattle area, primarily investing in medical or technology start-ups. However, some of these firms have also backed clean tech and energy efficiency (see Figure 22).

**Figure 22. Venture Capital Firms and Angel Partnerships in the Puget Sound Region**

<b>Entity</b>	<b>Interest</b>
Pivotal Leaders/Pivotal Investments	The Pivotal Leaders business network is designed to expand resources for innovation in the clean tech sector in Oregon, Washington, Idaho and British Columbia. Pivotal Investments, the Northwest's first venture capital firm enables a sustainable economy through a disciplined, early stage investment approach that recognizes exceptional value today and tomorrow.
Sustainability Investment Fund 2007	Professionally managed angel participation fund focused on early stage companies, primarily in the Northwest region, targeting the rapidly growing market opportunities in the sustainable economy.
Northwest Energy Angels	Membership organization of private investors that only fund entrepreneurs in cleantech.
OVP Venture Partners	Makes early stage investments in three core categories: digital biology, cleantech, and information technology. The common thesis underlying the investment approach in each category is focus on infrastructure and platform deals; they invest in technologies that enable broader applications.
Vulcan Capital	The firm's portfolio spans a range of industry sectors, including media and communications, energy and natural resources, financial and information services, technology, and life sciences. No defined limits on transaction size but generally targets direct equity investments of \$25 million to \$250 million or more, as well as select smaller venture investments.
Pacific Northwest Clean Tech Open	Matches clean tech entrepreneurs with business mentors, and introduces them to venture capitalists and business support organizations from around the Northwest. The winning company from the region goes on to the national business plan competition for a chance to win \$250,000 in cash and services.
Zino Society	Angel investment and networking group that connects accredited investors with entrepreneurs seeking funding.

Over the past 10 years, there have been 64 venture capital deals with clean tech companies in the Puget Sound area, representing approximately 80 percent of all 79 clean tech deals made statewide. The Energy Efficiency and Energy Storage & Infrastructure categories combined made up the largest share of

all deals in the past 10 years.<sup>30</sup> These included such firms as Verdiem, Powerit Solutions, NEAH Power Systems, and EnerG2.

### Commercial Lending

Many local financial institutions will provide homes and businesses with capital to make energy efficiency investments, as well as to start and grow energy efficiency related businesses. Certainly, in the Pacific Northwest, several institutions are more likely than the national average to lend for such purposes. For example, Enterprise Cascadia is a nonprofit CDFI providing loans and services to businesses, individuals and organizations that align with their mission of promoting economic opportunity and a healthy environment to communities in Oregon and Washington. Their Energy Efficiency Program offers affordable financing for energy efficiency retrofits and training. Enterprise Cascadia's parent company, Shorebank Pacific, also offers green building loans for commercial projects.

### Challenges

The 2009 Recovery Act's one-time infusion of 'stimulus' funding was intended to do just that – stimulate the economy to encourage job creation and promote private sector investment and growth. As such, future federal funding is uncertain and certainly not sustainable. While some are annual programs, such as the EECBG and the State Energy Program, the temporary increase for ARRA was a one-time event. In most cases, once these funds are spent, their long-term impact in terms of jobs is unclear. Much of the Recovery Act funds for energy efficiency went towards local projects with limited opportunity for subsequent growth.

Federal investments that help the energy efficiency market take hold beyond our local borders would ensure that subsequent subsidies would not be necessary. The region's ability to extend into new domestic and global markets is what will help sustain business growth into the future. As will providing targeted funding towards innovation and technology commercialization to reduce the initial risk of demonstrating market-leading clean energy solutions.

In terms of venture capital, although Seattle is ranked fourth, it captures less than 5% of total U.S. venture capital, with the Silicon Valley region capturing more than one-third of the total. Not only are local VC firms looking outside the region for startups to invest in, but they also, not surprisingly, tend to specialize in IT and biotech ventures. Observers of the venture markets point to the longer timeframes for returns on investment in clean tech industries. Others suggest the local VC community's lack of familiarity with clean tech, although this is changing. Paradoxically, not only are VCs looking outside the region to invest, but local energy efficiency companies are also looking outside the region for investors. More must be done to promote the availability of capital for energy efficiency investments.

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<sup>30</sup> Clean Edge LLC

## **#4. Innovation**

### **Assets**

Washington's motto is "Innovation is in Our Nature" and nowhere is that more evident than in the Puget Sound region. Home to such powerhouses as Microsoft, Boeing and Amazon, the region also has one of the highest business startup rates in the country. Patenting activity in the region, at 3.49 patents per capita, is much higher than that of the nation's average of 2.80.<sup>31</sup> Washington is also among the top 10 recipients nationwide of DOE National Industrial Competitiveness through Energy, Environment and Economics grants between 2000 and 2008, which is indicative of the region's innovation surrounding energy and environment.

Much of this innovation comes not only from companies and entrepreneurs, but also from our region and state's world-class research institutions. The University of Washington, Washington State University and the Pacific Northwest National Lab are major generators of R&D activity and new discoveries in the energy efficiency field. Complementing these innovation drivers is a diverse infrastructure that supports the commercialization of energy technologies and practices, such as:

**Integrated Design Laboratory.** IDL is a regional network of design assistance laboratories drawing upon the capabilities of the five Northwest schools of architecture, including the University of Washington. Primarily funded through the Northwest utilities, IDL is a project of the Northwest Energy Efficiency Alliance (NEEA)'s BetterBricks and aims to provide the best building performance knowledge available to regional design teams to produce the most energy efficient buildings in North America.

**UW Center for Commercialization.** The UW C4C acts as an innovation hub, helping researchers take their ideas from the lab to the marketplace and coaching them through the commercialization process. The Center has supported the commercialization of over 100 projects and helped spin out new clean tech companies, such as energy storage company, EnerG2. The Center also manages a Commercialization Gap Fund in partnership with the Washington Research Foundation. The fund provides up to \$1.25 million per year for applied research.

**Sirti.** Sirti – an agency of the State of Washington – is a collaboration of business, higher education and government to accelerate the development and growth of technology-based companies in the Inland Northwest, especially in Eastern Washington. Its target clients are innovative technology companies with defensible intellectual property, large market potential, and principals who show a strong desire to grow their business. Sirti offers two state-of-the-art buildings with a total of 40,000 square feet of usable incubation space with wet labs and light manufacturing potential along with full service offices and a sophisticated IT infrastructure. Sirti's experienced staff and veteran entrepreneurs provide expertise in technology assessment, market research, strategic planning, marketing, finance and management for both start-ups and high-growth businesses.

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<sup>31</sup> The Pew Charitable Trusts, "The Clean Energy Economy: Repowering Jobs, Businesses, and Investments Across America," (June 2009).

**McKinstry Innovation Center.** McKinstry, a leading energy efficiency firm in the region, announced the launch of this new business incubator in October 2009. The Innovation Center brings new and emerging companies together to foster the advancement of clean energy technologies. The 24,000-square-foot neo-industrial offices are designed to stimulate entrepreneurial collaboration between companies to develop new technologies, products and services for building energy efficiency.

**Cascadia Center for Sustainable Design and Construction.** The Bullitt Foundation is spearheading a visionary effort to develop the Cascadia Center for Sustainable Design and Construction in Seattle's Central Area. The Center will be one of the nation's first mid-rise commercial buildings to achieve "living building" status, a new benchmark for environmental sustainability. The Foundation and its partners will use the project to promote innovative sustainable building technologies and practices in Seattle's urban neighborhoods, the Northwest and around the world. As the first urban building of its kind, the Center will serve as a community resource for urban sustainability education and help reduce the environmental impact of building construction and operations.

Geography plays an important role as well in our ability to commercialize new technologies. For example, the Puget Sound region has one of the largest concentrations of military assets in the nation, including major bases for the Army, Navy, Air Force and Coast Guard. Because all service branches are under orders to radically reduce their energy consumption, they provide a major local customer for new technologies. In addition, the Puget Sound is among the most globally connected regions in the country and has the ability to form productive trade relationships to sell energy efficiency goods and services around the world.

### **Challenges**

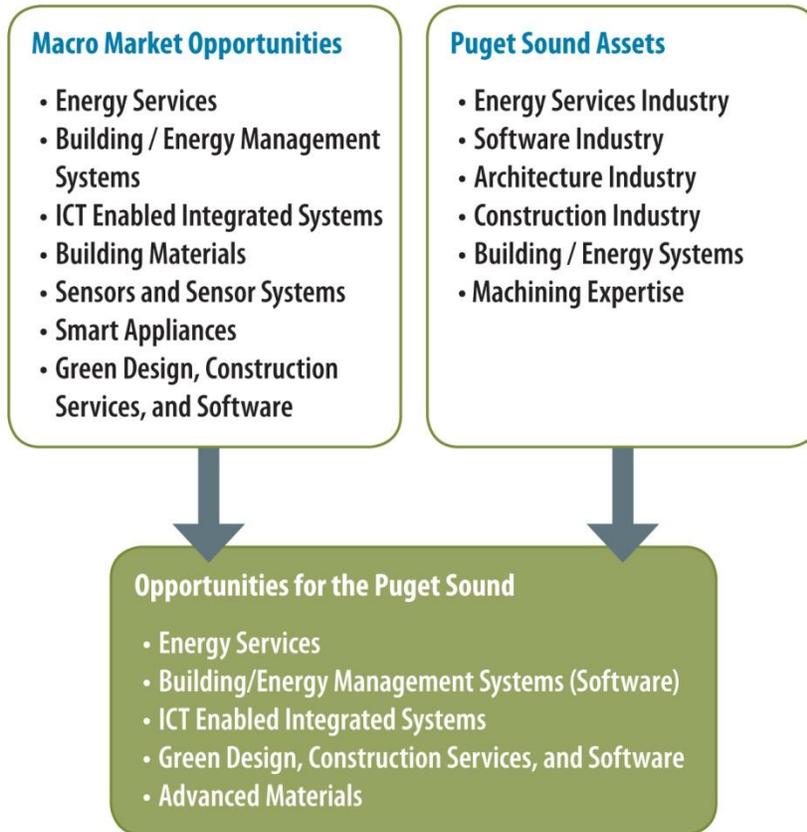
The region clearly has strong assets in the discovery, development and commercialization of new energy efficiency technologies. However, two major market barriers inhibit local companies from successfully launching new energy efficiency products into national and global markets: the need for performance verification, and the need for improved technology integration. Because the cost-effectiveness of building efficiency technologies – materials, equipment, fixtures, designs – depends on energy use reduction outcomes, it is critical that providers be able to say with some certainty what their technologies can promise. And to maximize energy efficiency, the various elements of the building need to work together in an integrated way, rather than each sector delivering isolated fixes. While some companies and entrepreneurs take on this task in isolated settings, that approach lacks third-party validation. Without a consistent way to objectively prove the impact of these technologies, it will be difficult to maximize the market penetration of these new technologies.

## **Putting It All Together: Energy Efficiency Opportunities for Puget Sound**

Matching up the region's unique capabilities with national and international market opportunities, the Puget Sound's best prospects are in software and services – as might be expected given the software

and services expertise that exists throughout the region’s economy and workforce. In particular, energy services, building energy management systems, information and communications technologies (ICT)-enabled integrated systems, green design, construction and software, and advanced materials are strong short- to medium-term opportunities (see Figure 23).

**Figure 23. Energy Efficiency Market Opportunities for the Puget Sound**



Vendors in the energy management space are presently pursuing a wide range of software platforms, communication methods, and hardware connections. The lack of an obvious “killer application” means significant opportunities still exist in the market, despite the presence of large IT industry players.

As the region is able to leverage its considerable manufacturing expertise toward the development of products in this industry, other opportunities will also arise. Already, companies like Weyerhaeuser are utilizing their long-recognized strength in product development and production to develop energy-efficient building materials / building envelope solutions. Other potential opportunities include smart meters, building controls, sensors and sensor systems, and smart appliances.

### III. DETAILED DEVELOPMENT INITIATIVE FOR BETI

To successfully take advantage of market opportunities to grow the energy efficiency industry cluster in the central Puget Sound, the region must take an ecosystem approach, identifying key market barriers and creating an intervention that will significantly improve the overall business climate for local companies to sell energy efficiency goods and services to the rest of the country and the world.

Two of the most significant supply-side barriers for energy efficiency market penetration are performance verification and integration:

**Performance verification.** One of the most pressing and unique challenges to bringing an energy efficiency good or service to market is the significant level of product demonstration and proof of energy savings often required to secure a first buyer. At present, few resources are available to help address this need.

**Integration.** While energy efficiency goods and services often achieve greater energy savings via integration across building components and systems, there are limited opportunities for integrated product development and testing.

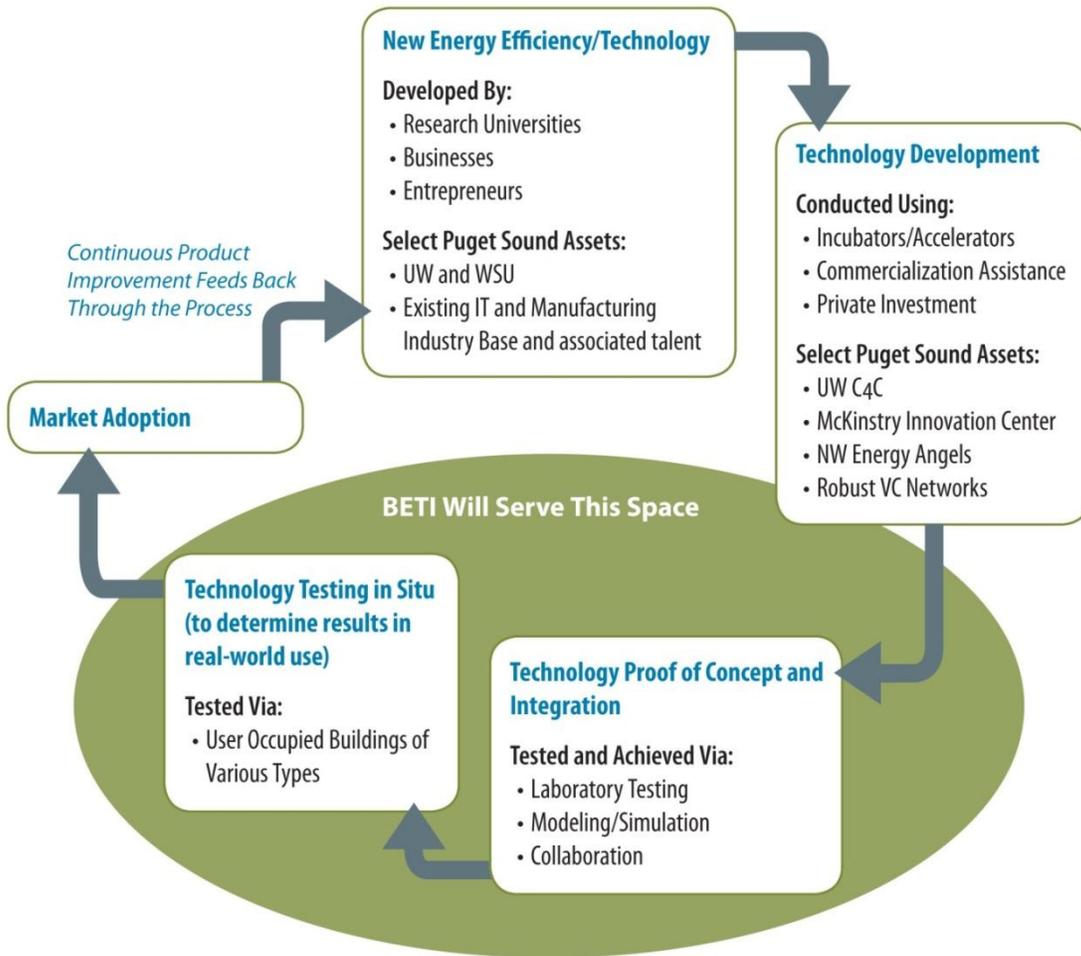
In addition, energy efficiency companies face all of the typical business development challenges faced by companies entering emerging markets, such as connecting to business services and obtaining financing.

**To lower these energy efficiency market barriers and catalyze the growth of the region's energy efficiency cluster, the Puget Sound will create the Building Efficiency Testing and Integration (BETI) Center and Demonstration Network, focused on building energy management software and automation technology.** BETI will allow innovators – researchers, entrepreneurs, manufacturers and service providers – who have successfully developed promising products, applications, designs and services to test them in real world settings prior to launching them into the marketplace, and to work with members of the broader energy efficiency industry to integrate these technologies with other aspects of the built environment.

By creating an atmosphere in which all companies have a better chance to grow their customer base and market penetration, BETI will support the growth of the energy efficiency industry in the Puget Sound, creating jobs and importing wealth into the region. Indeed, if the region becomes the best place to launch new goods and services into the global energy efficiency market, BETI will not only help local companies grow; it will attract companies from other places who will want to collaborate with local companies and to move their operations and employment here permanently.

Figure 24. BETI's Space in the Technology Commercialization Pathway

## How BETI Fills Gaps Along the Technology Commercialization Pathway



## BETI Services

BETI will provide four broad categories of services designed to support the commercialization and market penetration of energy efficiency products and services, integrated development and design, and enhanced intra-industry collaboration:

### 1. **Controlled (laboratory) testing and integration**

Managed by a contracted entity with expertise in the energy efficiency and product development/testing fields, BETI will include a laboratory facility designed to simulate a variety of building types and operating conditions so that products, configurations and services can be evaluated. In particular, the facility will be designed and equipped to verify the effectiveness of building energy management software and automation technology, providing strong indications of how these products will work under real-world conditions.

The center will also specialize in testing the integration of various products and installation designs to judge how well they work together. Not only will these services benefit the technology and product development stakeholders, but also the architects, engineers, building managers and other service providers who will learn how they can leverage technology to maximize the efficiency of the buildings they design, build, retrofit, and/or operate. Key characteristics of BETI's controlled testing include:

**Access:** Potential users of the BETI lab will be vetted by the contracting entity and its staff. Criteria will include previous testing and verification efforts, reliability and risk assessment and readiness for market.

**Services:** The depth of services provided will depend upon the sophistication of the client. In general, BETI will offer comprehensive laboratory services—developing testing protocols, completing tests, and evaluating and providing feedback on results.

A user of the facility may conduct the tests themselves or may avail themselves of technical services provided by BETI staff and contractors, including evaluation of the results of controlled tests and recommendation of potential product changes in response to those results.

The BETI laboratory contractor will select and manage appropriate testing certification programs. BETI technicians will also be able to consult on poor performance results, and will work with clients to identify solutions.

**Referrals and sub-contracting:** BETI will connect clients with business and research institutions that can provide complementary laboratory equipment and services—or sub-contract for services when appropriate.

**Costs:** BETI laboratory services will be offered on an á la carte, fee-for-service basis, taking into account the resources and sophistication of the participating individual or firm and their testing needs.

## ***2. Real world (field) demonstration and testing***

BETI will build relationships with owners and managers of user-occupied residential, commercial, industrial, and institutional facilities in which energy efficiency products, configurations, and services can be installed and monitored for performance and reliability over time. Located throughout Washington to take advantage of the state's diverse climate, this network of buildings will be used to demonstrate the effectiveness and return on investment of technologies that have already been proven in controlled testing (either at the BETI testing facility or in-house by an established firm). Key characteristics of BETI's real-world testing include:

**Access:** In order to utilize the demonstration network, a product or service must be vetted and recommended by a selection committee composed of BETI staff and Board members. In the interests of safety and practicality, products and services will undergo a scaled rollout.

**Services:** The depth of services provided will depend upon the sophistication of the client and requirements of host facility. In general, services will include product installation, regular inspection, ongoing monitoring, and real-time feedback on performance. BETI technicians will be able to consult on poor performance results, and will work with clients to identify solutions.

**Costs:** BETI demonstration costs will be determined on an á la carte, fee-for-service basis, taking into account the resources and sophistication of the participating individual or firm and their testing needs. In general, demonstration network clients will be expected to provide the product or service being tested, and to contribute to or cover the costs of installation, maintenance, monitoring, and required insurance.

In certain cases, BETI may facilitate and/or underwrite some or all of the costs of the demonstration. Alternatively, BETI may use a revolving loan fund to pay for demonstrations and then use the energy cost savings to pay back the loan for future demonstrations.

**Network participants:** BETI staff will partner with building owners and operators toward the goal of offering test sites of different types (new vs. retrofit, as well as institutional, commercial, residential, and mixed use) and in different climate zones across Washington (from rain forest to desert). The benefit to buildings in the demonstration network will be the potential for lower costs of operation and an increased “green” brand; in certain situations, building owners and managers will also be reimbursed for some or all expenses related to the installation and testing.

### ***3. Facilitated Industry Collaboration***

The Puget Sound currently has a wealth of energy efficiency-related trade associations, consortia, and research networks, but no mechanism that brings the industry together to address shared technical challenges and market opportunities. BETI will offer proactive, targeted programming to facilitate intra-industry interaction, bringing together large and small businesses, researchers, utilities, the building industry and others to develop new technological solutions that can be launched into the marketplace.

Programming may include technology forums and showcases, technology integration workshops, financing workshops, integrated design workshops, an annual conference, and vendor / purchaser matchmaking services.

### ***4. Business Development, Commercialization, and Regulatory Assistance Referrals***

In order to support product and service commercialization efforts, BETI staff will develop relationships with the region’s business support and commercialization assistance providers and link clients to needed expertise, such as marketing, management, legal, manufacturing, regulatory and export assistance. BETI will not seek to duplicate the services already available in the region, but rather to link clients to its partners. BETI may also host programs featuring its business development, commercialization, and regulatory assistance partners.

## **Differentiation**

BETI must be able to distinguish itself from other providers in the cluster, locally and nationally, in order to attract users. BETI is unique in two important ways. First, there are very limited services directed to testing and demonstration of energy efficiency software, services, and integration (see Figure 25). In fact, the need for the types of testing and performance verification services to be offered by BETI was regularly noted by entrepreneurs, venture capitalists, utilities, and ESCOs asked to identify barriers to cluster growth. Second, BETI specifically does not compete with research institutions and incubators, but rather serves a need between those steps and the market. This differentiation will be used both in the development of BETI services, as well as in the marketing of these services to potential clients, partners and investors.

**Figure 25. BETI in Comparison to Related Testing Labs and/or Demonstration Programs**

	BETI	NAHB Research Center	Oak Ridge National Lab BTRIC	EPRI Industry Demonstration Projects	Pacific Energy Center	Better Bricks	GPIC for Energy Efficient Buildings	UC Davis Energy Efficiency Center	NDCEE <sup>1</sup>
<b>GENERAL INFORMATION</b>									
Location	Puget Sound	Upper Marlboro, Maryland	Oak Ridge, Tennessee	Across U.S.	San Francisco, California	Boise, Bozeman, Portland, Eugene, Seattle, Spokane	Philadelphia	Davis	Various Military Installations
Focus on building design / geared toward design professionals	limited focus	no	no	no	yes	yes	limited focus	no	limited focus
Focus on building materials / building envelope innovations	limited focus	yes	yes	no	no	no	yes	yes	limited focus
Focus / capability to test software solutions	yes	very limited (occasionally subcontract for large projects)	no	unknown	unknown	no	yes	no	limited focus
Programs primarily utilities-serving	direct and indirect service	no	no	direct service to utility	indirect service via customers	indirect service via customers	direct and indirect service	no	no
Fee-for-service	yes	yes	yes	yes	yes*	yes*	unknown	no	n/a
<b>TECHNOLOGY DEVELOPMENT</b>									
Technology development focus	yes	yes	yes	implementation focus	implementation focus	design focus	yes	yes	yes
Specialized laboratory facilities/ equipment	yes	yes	yes	no	limited	yes	yes	yes	yes
On-site engineers / technical professionals	yes	yes	yes	no**	yes	yes	yes	yes	yes
<b>TECHNOLOGY DEMONSTRATION</b>									
In situ technology demonstration component or focus	yes	yes	unoccupied buildings only	yes	no	no	yes	no	varies
<b>ANCILARY / RELATED SERVICES</b>									
Support navigating regulatory environment for product approvals	yes	yes	no	no	no	no	no	unknown	unknown
Provides standard industry certification for products	yes	yes	no	no	no	no	no	no	no
Linkage to commercialization and business development services	yes	no	no	no	no	no	yes	yes	yes
Forum for energy efficiency industry stakeholders	yes	no	no	no	no	no	no	no	no
Linkage to export assistance programs	yes	no	no	no	no	no	no	no	no

<sup>1</sup> National Defense Center for Energy & Environment.

\* Many services available without charge. \*\* EPRI staff develop demonstration project protocol.

## Customers for Testing and Demonstration Services

The BETI Center and Demonstration Network will be available to any individual or organization that needs to have a product, design or service tested for efficacy, safety, reliability, performance and/or interoperability—pending successful application. The goal of BETI is to promote innovation and foster the development of new jobs in this industry cluster in the region, and so its facilities and services will be open to businesses of all sizes and stages of maturity. In fact, a strength of BETI will be to bring new technologies together with established firms to foster collaboration and increase successful commercialization.

Marketing efforts will focus on:

**Researchers.** New technologies and ideas emerge from laboratories at universities and research centers, and BETI will provide a place to test those technologies in their earliest stages.

**Start-up businesses.** Businesses that have built prototypes and begun exploring markets will need to test for safety and interoperability and to determine the level of performance their customers can expect.

**Established product and software providers.** Large and mid-sized companies that make energy efficiency goods and software will need to improve the performance of existing products and test new products that improve building energy performance.

**Established service firms.** Architects, engineers, building managers and other service providers will need to upgrade their design skills and may want to develop new, proprietary designs that allow them to expand their building efficiency business. In addition, service providers will have the opportunity to learn how they can leverage new products and software to maximize the efficiency of the buildings they design, build and retrofit.

**National and international customers.** Energy efficiency goods and services developers from around the country and the world will be interested in using BETI services. As a regional economic development tool, there are significant advantages to working with national and international customers, including growing BETI's fee-for-service client base as well as luring those companies to relocate to or expand in the region because they see proximity to BETI as the best path to market.

## BETI Members and Partners

In addition to serving users of its testing and demonstration services (its “customers”), BETI will provide programming and services for a broader base of energy efficiency stakeholders such as utilities, ESCOs, the architecture, design, and engineering community, and others. These stakeholders can be divided into two categories: members and partners.

**Figure 26. BETI Fee and Service Structure**

	Access	Fees/Costs
<b>STAKEHOLDERS</b>		
Users/clients	Lab and network testing facilities	Fee-for-service on a sliding scale based on client’s annual budget
Members	Industry outreach and programming	Varying levels of annual dues
Partners	Specific programs and events	A la carte payments
<b>SERVICES</b>		
Laboratory testing and integration attempts	Potential users vetted by application evaluating previous testing and products’ market readiness	Fee-for-service on a sliding scale based on client’s annual budget
Field demonstration and testing	Products and services vetted by a selection committee of BETI staff and board members	Fee-for-service; A revolving loan fund may also be used to cover some costs that uses projected energy cost savings for payback
Facilitated industry collaboration	All users/clients, members, partners	A la carte payments for events and programs
Business assistance	All users/clients, members, partners	A la carte payments for events and programs

## Members

Members are those organizations whose core mission is driven or impacted by energy efficiency, and, as a result, are likely to receive direct and significant returns from BETI industry programming. Members will pay varying levels of annual dues to help guide and participate in BETI industry outreach and programming activities and may even choose to co-locate with BETI.

**Utilities.** Utilities are required to achieve increased levels of energy efficiency, and thus have a direct stake in the development and adoption of proven energy efficiency technologies. However, utilities are in the business of generating and/or distributing power to customers—not developing technologies or nurturing emerging energy technology businesses. Many regional utilities have noted the difficulty and inefficiency of dealing individually with emerging energy efficiency manufacturers to find solutions to achieve mandated levels of energy savings. BETI programming will help utilities by verifying potential technology solutions and addressing technology and integration issues of interest.

**ESCOs.** An energy services company’s business is improving energy efficiency, and ESCOs are generally on the lookout for proven products and services to add to their portfolios. However, ESCOs typically are not in the business of testing new technologies with unverified levels of real-world performance. BETI would provide value to ESCOs by serving as a proving ground for potential new product and service offerings and providing a forum to address technology integration opportunities.

**Architecture, construction, and engineering firms.** Integrated design, which views the building as a system where each component works together to achieve greater efficiency requires architects, developers, engineers and energy consultants to work in concert from design through construction.

Individual ACE firms must focus day-to-day on securing and serving clients, making multi-stakeholder discussions about integrated design a luxury. BETI will facilitate such discussions, as well as introductions to new building technologies and installation techniques.

**Clean tech investors.** Investors in the energy efficiency space may see BETI membership as a means of identifying potential portfolio companies, as well as growth and exit strategies for their investments.

**Large energy efficiency companies/ integrators.** Once BETI has established itself as center of gravity for the development of new energy efficiency technologies, large energy efficiency companies and integrators could be expected to become members to gain early access to new technologies and industry talent, as well as industry networking opportunities.

**Pacific Northwest National Laboratory.** PNNL is one of ten Department of Energy Laboratories that perform energy-related research for public and private sector organizations. In addition to their relationship with local energy efficiency stakeholders, PNNL has relationships with large national energy efficiency companies. BETI will offer PNNL a new venue in which to expand its engagement with other energy efficiency researchers in the public and private sectors.

**Universities.** The University of Washington and Washington State University have active research programs in building design and engineering, materials, alternative energy and other programs that feed ideas and new technologies into the building efficiency industry. Their top-ranked undergraduate and graduate programs in clean tech-related disciplines prepare future leaders to create these new technologies. They also are major engines of next-generation job creation, with university-related jobs making up more than six percent of Seattle's workforce. These institutions will not only produce potential BETI clients, but also provide complementary testing services for them. BETI membership will offer expanded opportunities for networking and collaboration.

## **Partners**

Partners are those organizations who have a strong interest in supporting the growth of the energy efficiency cluster and related employment in the region, but for whom doing so is part of a much broader agenda or not mission critical. Partners will pay to participate in specific programs and events and may spell out common goals and interests with BETI through a memorandum of understanding (MOU).

**State, regional and local governments.** Governments at all levels are in alignment on a strategy of expanding the clean technology cluster. These partners will be able to leverage BETI programs to better understand the impacts of potential policy and regulatory changes on the growth of the energy efficiency industry. Government partners (e.g., economic development organizations, offices of sustainability) may refer clients, participate as partners in the demonstration network, and/or engage in joint marketing/branding efforts.

**Commercialization organizations.** Universities and research organizations have offices charged with moving promising ideas out of the laboratory and into the marketplace, and several incubators –

most recently the McKinstry Innovation Center – are focused on the launch of new clean tech and energy efficiency companies. BETI and these entities will refer clients to each other as appropriate.

**Workforce development programs.** Community colleges and other workforce development programs understand the potential for future job creation in energy efficiency. For example, South Seattle Community College is developing the Puget Sound Industrial Excellence Center and will develop energy efficiency training pathways, ranging from basic weatherization to advanced commercial energy auditing. BETI offers the potential to train workers in the installation and operation of new energy efficiency technologies through its demonstration network, as well as in product testing in its laboratory.

**Investment and finance community.** Banks and investment firms are increasingly working to monetize and catalyze energy efficiency investments. These organizations will want to learn about how new technology can help achieve those goals, and may see an advantage to contributing to the capitalization of the demonstration network’s revolving loan fund.

**Military community.** The Puget Sound region has among the largest concentrations of military facilities in the country, and all service branches have made energy efficiency a major priority. Local military facilities might be part of the demonstration network, or be target customers for new goods and services.

## Measuring Success

The success of BETI will be judged along three dimensions:

### ***1) Is BETI catalyzing the expansion of the Puget Sound energy efficiency industry?***

BETI’s service offerings are designed to grow the region’s energy efficiency industry by helping companies overcome market barriers, develop integrated solutions, and access needed support services. Accordingly, BETI’s impact should be measured in large part by its ability to attract new companies, enable start-ups to form, and support the growth of existing client companies.

#### **Success metrics:**

- Increases in revenue, employment, and exports for BETI clients
- Number of non-Puget Sound firms opening facilities in region following use of BETI services

### ***2) Is BETI becoming a center of gravity for industry activity?***

BETI is envisioned as a focal point for the building efficiency cluster—creating a venue for interaction and collaboration among regional and national industry players and raising the Puget Sound region’s national and international profile for industry innovation. Accordingly, BETI should be able to attract members, partners, and interest from both inside and outside the region.

**Success metrics:**

- Number of BETI members and partners—from within and outside the region
- BETI media coverage
- Value of competitively awarded R&D funding to BETI customers, members and partners
- Number of new partnerships or collaborations
- Number and value of investment deals
- Number of new products or technologies developed, patented and/or licensed

**3) Can BETI achieve financial stability within five years?**

BETI is intended to be a self-sustaining entity within five years—generating sufficient value to clients and members to cover its expenses. Accordingly, BETI should be able to recoup costs with fees that are fair and not burdensome.

**Success metrics:**

- Net operating gain / loss
- Share of revenues generated by fee-for-service work and membership fees

**The Returns**

BETI will result in 1,000 new jobs for the region by 2020, and \$140 million in annual economic impact – a return on investment of almost 18:1. With the U.S. market for building automation and controls technology projected to grow to \$6.8 billion and with a commensurate market internationally, the overall market opportunity is \$14 billion. Therefore, a reasonable assumption of a 1% increase in market share for the Puget Sound region by 2020 would result in a \$140 million annual economic impact. This 1% growth is in line with HSBC’s estimation that the United States as a whole will increase its global market share in the energy efficiency industry from 20% in 2009 to 21% by 2020.

BETI’s impact comes from two sources. First is the direct impact that BETI services will have on its clients’ ability to expand their market share. Second, more broadly, is BETI’s role in establishing an internationally recognized energy efficiency software and automation technology hub in the region, which will attract new companies and new investment while facilitating increased exports.

**Company Expansion, Creation & Attraction.**

At full scale, BETI will be working with approximately a dozen clients at any one time, ranging from large corporations doing multiple building tests to small entrepreneurs with more limited scale. On an annual basis, this means that between 24-48 new technologies are being validated and sent into the marketplace. For existing companies, BETI services will allow for an expansion of staff to support the increased market share they can expect from having a significant market advantage over their non-validated competitors. For entrepreneurs, BETI demonstration will allow them to convert their ideas into viable products, spurring new firm creation. Finally, as the international brand of this regional cluster

grows, national and international companies will want to relocate here, both to collaborate with others as well as to access BETI services. Overall, the impact of this business expansion, creation and attraction will result in a 10% increase in our region's energy efficiency industry, generating 1,000 new jobs for our region's residents.

### **Investment Attraction.**

By helping its clients refine their products and improve their readiness for market launch and success, BETI will boost the overall attractiveness of its clients to potential investors. In fact, by helping to brand the Puget Sound as an international hub for the development of this kind of technology, more capital will flow to the region's EE industry in general, as top clean tech investors come looking for "the next big thing." While Washington state attracted \$200 million in clean tech venture capital in 2008, California attracted \$3.5 billion, and so we can expect a significant shift from current regional levels. A conservative estimate would be at least a 25% increase in regional energy efficiency venture capital investment, or an additional \$50 million

### **Export Promotion.**

Approximately 75% of sales growth from BETI clients will come from domestic markets, due to proximity and ease of doing business; commensurately, around \$100 million of the economic impact of BETI will be from U.S. sales. However, through a combination of BETI support and related local, state and federal activity, we foresee a 25% increase in sales of energy efficiency software and automation technology by local firms. Again, these companies will be more competitive in the international market because of the third-party validation of their products, and can expect increased success in new market development because of that factor. Top markets for initial export will be Canada, France and Germany, as well as Japan and South Korea. Washington currently does \$17 billion in trade with these countries, and so a \$40 million increase from EE technology sales is a reasonable assumption.

## V. OPERATIONAL PLAN FOR THE BETI CENTER

### Legal Structure

BETI will operate as a public development authority (PDA) under RCW 35.21.730. The PDA will be chartered by the county in which the primary facility is located, and then linked through interlocal agreements to the other four counties in the Central Puget Sound. Under Washington’s PDA statute, a PDA must be financially independent, and the sponsoring jurisdiction is not responsible for any liabilities incurred by the PDA. Financial independence does not preclude receipt of grants from federal, state or local governments. Grants from private foundations can be administered via an associated non-profit entity.

The PDA will be governed by a board that is representative of the various BETI stakeholders. The board will adopt an organizational and operating model, hire the Chief Executive Officer, approve budgets and work programs and otherwise conduct the customary activities of a governing board.

### IP Policies

The intellectual property of clients using BETI lab and demonstration services will remain their sole property. Assignments for intellectual property developed jointly via collaborative efforts will be handled on a case-by-case basis. BETI will utilize its professional services partners to design appropriate contracts and protections for all users of the lab and demonstration network.

### Organizational Structure

BETI will be managed in-house by its own staff focused on bringing diverse energy efficiency stakeholders and business development experts together. Its laboratory and certification services will be provided by a contracting entity with substantial technical expertise.

**President/Chief Executive Officer.** The CEO reports to the PDA Board and is responsible for all operations, subject to appropriate direction from the Board. The CEO will maintain high level industry and community contacts.

**Administrator.** The Administrator will be responsible for basic systems within the facility but will not be responsible for equipment specific to testing processes. He/she will have responsibility for managing the master contract and any needed services contracts.

**Vice President, Industry Relations.** The VP of Industry Relations will be the principal “sales” person for BETI membership and services, and will be responsible for building and maintaining relationships with the diverse range of regional and national energy efficiency stakeholders and community partners. The VP of Industry Relations will oversee the creation and management of the demonstration network, as well as programming and events to facilitate industry interaction (workshops, conferences, and related services), a comprehensive marketing program, and linkages to business support services providers.

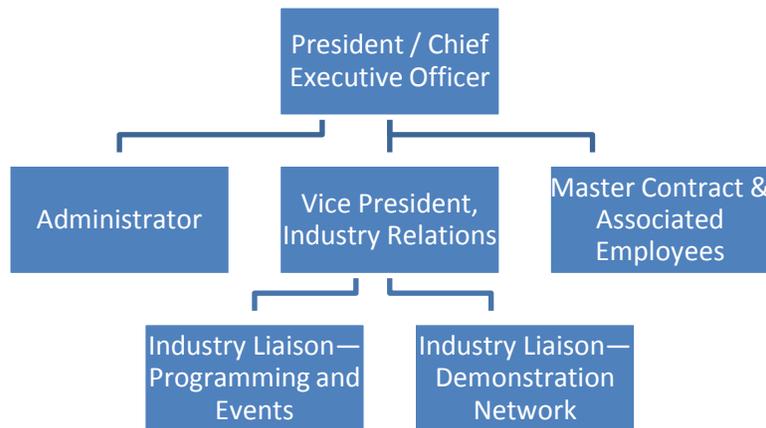
**Industry Liaison—Programming and Events.** The Industry Liaison for Programming and Events, reporting to the VP for Industry Relations, will develop and manage programming for BETI members and partners (e.g., technology workshops and forums and an annual conference). This Industry Liaison will have a solid understanding of the energy efficiency industry and build strong relationships with regional energy efficiency stakeholders.

**Industry Liaison—Demonstration Network.** The Industry Liaison for the Demonstration Network, reporting to the VP for Industry Relations, will develop and manage BETI’s demonstration network, focusing first on building relationships with property owners or managers with large footprints (e.g., institutional players and developers). This Industry Liaison will manage all contractual arrangements between demonstration network clients and building owners, and will act as the conduit of information regarding product performance.

**Contractor for Laboratory Services.** The contracting entity will provide technical expertise to oversee the development of testing facilities, equipment, and technicians; all laboratory testing activities (including the client application process); and the administration of any eventual product certification programs. In addition, the contractor will handle the monitoring and verification services of the demonstration network. The contractor will be responsible for ensuring protection for intellectual property that enters the laboratory.

The contracting entity will be an established public or private sector expert in clean energy research with industry credibility and connections.

**Figure 27: Organizational Structure**



## Facilities

In order to create the necessary synergies and to test integration of various technologies, it is critical that BETI be housed in a facility that brings most operations under one roof. The facility will need to house:

**Controlled-environment testing.** This laboratory-style space will allow testing of technologies and products in a highly controlled environment that limits variables. In particular, the facility will be designed and equipped to verify the effectiveness of energy management software and automation technology, providing strong indications of how these products will work under actual conditions.

**Environment simulations.** More elaborate testing environments – rooms, walls, roofs, spaces – can be created within the facility that simulate uses while still controlling variables and allowing sophisticated monitoring and measurement. These capabilities will be of particular use for the integration testing functions.

**Shop space.** Shop space will be required to build and maintain testing environments and equipment. To avoid contamination of testing facilities, shop space must be physically separated.

**Office space.** In addition to administrative offices, space will be required for personnel conducting evaluations and providing business assistance.

Following is an estimate of required space:

**Figure 28: BETI Facilities**

Use	Configuration	Floor area
Testing laboratories	12 foot ceilings, sophisticated HVAC, electrical plumbing	5,000 sf
Simulation space	Warehouse style, 20-30 ft. ceiling, access to loading dock.	50,000 sf
Shop space	Warehouse/mfg style, 20 foot ceilings. Industrial HVAC and electric.	5,000 sf
Office	Class B style, Space for permanent staff plus conference and partners	10,000 sf

## Marketing Plan

BETI will employ a two-part marketing plan to reach its customers and members/partners.

### *Customer Marketing Plan*

To attract fee-for-service users to the BETI laboratory and demonstration network, BETI will target energy efficiency researchers, start-ups, and established product and services firms across the U.S. and in select international markets.

Marketing tactics will include:

**Dedicated BETI website**—with search engine optimization

**Ad placements/sponsorships**—with select industry organizations and select industry media outlets/trade publications (e.g., the websites of Greentech Media, Cleantech Group, and Clean Edge)

**Direct mail**—via purchased lists (if appropriate lists are available)

**Clean tech conferences and trade shows**—and/or trade shows involving specific energy efficiency product categories served by the BETI Center

**Relationships/referrals**—generated from outreach to regional business support services providers (e.g., incubators, ADOs, SBDCs) and partner organizations (e.g., the Trade Development Alliance, Washington Clean Technology Alliance, universities, labs, utilities, venture capitalists), as well as national resources used by the industry (e.g., national lab user facilities)

**Public relations outreach**—placing stories with clean energy media outlets

### ***Member/Partner Marketing Plan***

To attract dues-paying members and event-attending partners, BETI staff will engage in extensive local and limited national marketing efforts including:

**BETI staff outreach**—direct personal outreach to regional energy efficiency stakeholders—including utilities; energy efficiency-related trade associations; ESCOs; architecture, construction, and engineering firms; cleantech investors, PNNL/Battelle, and universities—as well as leading national names in the energy efficiency industry (e.g., Siemens, Johnson Controls, Trane)

**Regional listserv**—to promote upcoming events

**Referrals**—generated from regional outreach efforts

The Vice President, Industry Relations will be responsible for the creation and implementation of a comprehensive marketing plan.

### **Financial Plan**

The preliminary estimated cost of running all BETI activities at a fully operational level—including BETI staff, contracted laboratory services, demonstration network costs, marketing, and overhead—approach \$8 million annually (as detailed in Figure 29). Upfront costs—including laboratory equipment, facility build out, the capitalization of a revolving loan program, and BETI website—are estimated at just under \$7 million.

Ongoing costs would be supported by fee-for-service income, rents from co-located partners, and recurring grant funding. Given the size of the energy efficiency industry, the amount of time required to establish and build a client base for a new service organization, and the high cost of required talent and equipment, the goal is for BETI to work toward financial sustainability over a five-year period.

**Figure 29: BETI Annual Budget at Year 5 (2015)**

Annual Revenues*		
<b>Fee-for-Service</b>	\$	<b>1,500,000</b>
<b>Memberships</b>	\$	<b>3,000,000</b>
Annual sponsorships from utilities, the investment community, industry partners, and others	\$	3,000,000
<b>Federal Research Grants</b>	\$	<b>500,000</b>
<b>Rents from co-located partners</b>	\$	<b>100,000</b>
<b>Demonstration Network Cost Share</b>	\$	<b>2,000,000</b>
From participating building owners/operators and product/service developers		
<b>Fees for Industry Events / Programming</b>	\$	<b>15,000</b>
<b>Marketing Co-op Income</b>	\$	<b>5,000</b>
<b>TOTAL</b>	\$	<b>7,120,000</b>
*does not include revolving fund loan fund payback		

One-time / Up-front Revenues	
<b>State Appropriation</b>	<b>\$5,500,000</b>
<b>Grants for Revolving Loan Fund</b>	<b>\$1,500,000</b>
U.S. Department of Commerce and private investors	
<b>Grants for Equipment and Build Out</b>	<b>\$3,000,000 to \$4,000,000</b>
Federal grants and private/foundation grants	
<b>TOTAL</b>	<b>\$10,000,000 to \$11,000,000</b>

Ongoing Expenses (Annual Costs) at Full Operation	
<b>Salary &amp; Benefits</b>	\$ <b>663,000</b>
CEO	\$ 160,000
Administrator	\$ 80,000
VP Industry Relations	\$ 130,000
Industry Liaison 1	\$ 70,000
Industry Liaison 2	\$ 70,000
Benefits (assumes 30% of salary)	\$ 153,000
<b>Rent</b>	\$ <b>1,050,000</b>
60,000 square feet of warehouse space co-located with 10,000 square feet of class B office space @ \$15/SF/year	
<b>Master Contract Costs</b>	\$ <b>1,455,500</b>
Staff Costs (assumes 3 senior staff @ \$125,000 each, 2 senior technicians @ \$85,000 each, 2 junior technicians @ \$55,000 each, and 2 administrative positions @ \$40,000 each, plus 30% benefit costs)	\$ 955,500
Management fee	\$ 500,000
<b>Lab Equipment, Maintenance, &amp; Upgrades</b>	\$ <b>200,000</b>
<b>Legal Fees</b>	<b>\$10,000</b>
<b>Marketing Plan</b>	\$ <b>26,000</b>
Website Maintenance	\$ 1,000
Advertising / Branding	\$ 25,000
<b>Demonstration Network Costs*</b>	\$ <b>3,000,000</b>
Costs such as installation, insurance, and misc. monitoring equipment and administration costs (excludes staff and cost of tested product)	
<b>Other Operating Expenses / Overhead</b>	<b>\$1,500,000</b>
Data services, utilities, insurance, office equipment rental, supplies, etc.	
<b>TOTAL</b>	\$ <b>7,904,500</b>
* some of which will be paid for via the revolving loan fund	

One-time / Upfront Costs	
<b>Lab Equipment</b>	<b>\$4,000,000</b>
<b>Capitalization of Revolving Loan Fund</b>	<b>\$1,500,000</b>
<b>Facilities Build-Out</b>	<b>\$1,250,000</b>
<b>Website</b>	<b>\$15,000</b>
<b>TOTAL</b>	<b>\$6,765,000</b>

**Figure 30. BETI Five-Year Pro-Forma Budget Summary**

	2011 (\$)	2012 (\$)	2013 (\$)	2014 (\$)	2015 (\$)
<b>REVENUES (cash only, excludes in-kind)</b>					
Restricted state appropriation		5,500,000			
Federal grants		3,500,000			
Other donations/grants	150,000	1,250,000			
BETI-generated fees and income		1,125,000	3,165,000	4,770,000	6,515,000
Research grants			150,000	375,000	500,000
Rents and marketing co-op income			105,000	105,000	105,000
<b>TOTAL REVENUES</b>	<b>150,000</b>	<b>11,375,000</b>	<b>3,420,000</b>	<b>5,250,000</b>	<b>7,120,000</b>
<b>EXPENSES (cash only, excludes in-kind)</b>					
Legal and consultant fees + PSRC staff	118,000	90,000	10,000	10,000	10,000
BETI staff		386,208	663,000	663,000	663,000
Revolving loan fund capitalization		1,500,000			
Facilities build-out + rent		1,325,000	1,050,000	1,050,000	1,050,000
Lab equipment, maintenance		4,000,000	200,000	200,000	200,000
BETI lab contract + network costs		1,100,000	2,500,000	3,250,000	4,455,500
Other operating expenses, including web		785,000	1,526,000	1,526,000	1,526,000
<b>TOTAL EXPENSES</b>	<b>118,000</b>	<b>9,186,208</b>	<b>5,949,000</b>	<b>6,699,000</b>	<b>7,904,500</b>
<b>NET OPERATING GAIN/LOSS</b>	<b>32,000</b>	<b>2,313,792</b>	<b>(1,779,000)</b>	<b>(449,000)</b>	<b>215,000</b>

## Conclusion

Overall, the Puget Sound has all the pieces in place to create BETI and use it as a catalyst to establish our region as an international hub for energy efficiency technology. The Puget Sound is already recognized as a leading region in the innovation economy, and has considerable experience in planning and executing regional initiatives. Moreover, the region boasts an array of assets that can be deployed to help implement BETI, including progressive utilities; strong research capabilities at UW, WSU, and PNNL; major military bases with orders to reduce energy consumption; related large industry clusters in IT and manufacturing; and a well-developed international business infrastructure capable of selling energy efficiency goods and services to the world.

With trends pointing to major growth in the national and international energy efficiency markets over the next couple of decades, and President Obama's Better Building Initiative catalyzes this effort even further. Against this backdrop, BETI's value proposition is clear: the provision of testing, demonstration, and business assistance services to energy efficiency innovators will help them take advantage of national and global market trends to better grow this regional cluster, turn it into a major export sector, and brand the region as leader in this industry niche.

## About the Metropolitan Business Plan

In collaboration with the Brookings Institution, the Prosperity Partnership has piloted the idea of the Metropolitan Business Plan, using the discipline of business planning to drive regional economic development. This Metropolitan Business Plan for the Central Puget Sound focuses on increasing the region's collective ability to sell energy efficiency goods and services to the rest of the country and the world. The Metropolitan Business Plan creation process was led by Mayor Ray Stephanson, City of Everett; Phyllis Wise, Interim President, University of Washington; John Gardner, Vice President for Economic Development and Global Engagement, Washington State University; Norman Rice, President & CEO, Seattle Foundation; and Phil Bussey, President & CEO, Greater Seattle Chamber of Commerce. In addition, a steering committee of more than 40 industry experts and community stakeholders contributed to the development of the plan.

## About the Prosperity Partnership

The Prosperity Partnership is a coalition of over 300 government, business, labor and community organizations from King, Kitsap, Pierce, and Snohomish counties dedicated to developing and implementing a common economic strategy. Our shared goal is two-fold: long-term economic prosperity for the Central Puget Sound region and jobs for our region's residents. For more information, visit [www.prosperitypartnership.org](http://www.prosperitypartnership.org).

## For More Information

An investment prospectus for the BETI Center and Demonstration Network is available at [www.prosperitypartnership.org/businessplan](http://www.prosperitypartnership.org/businessplan). For more information, please contact:

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# Acknowledgements

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Mr. John Gardner, Washington State University  
Mr. Norman Rice, Seattle Foundation  
Mayor Ray Stephanson, City of Everett  
Interim President Phyllis Wise, University of Washington

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