UNIVERSITY of WASHINGTON

CITY OF BELLEVUE

In Partnership with the
University of Washington

ASSESSING BENCHMARKING STRATEGIES TO ENCOURAGE SMART BUILDINGS IN BELLEVUE

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Livable City Year 2018–2019
in partnership with
City of Bellevue

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LIVABLE
CITY YEAR

Livable City Year 2018–2019
in partnership with
City of Bellevue
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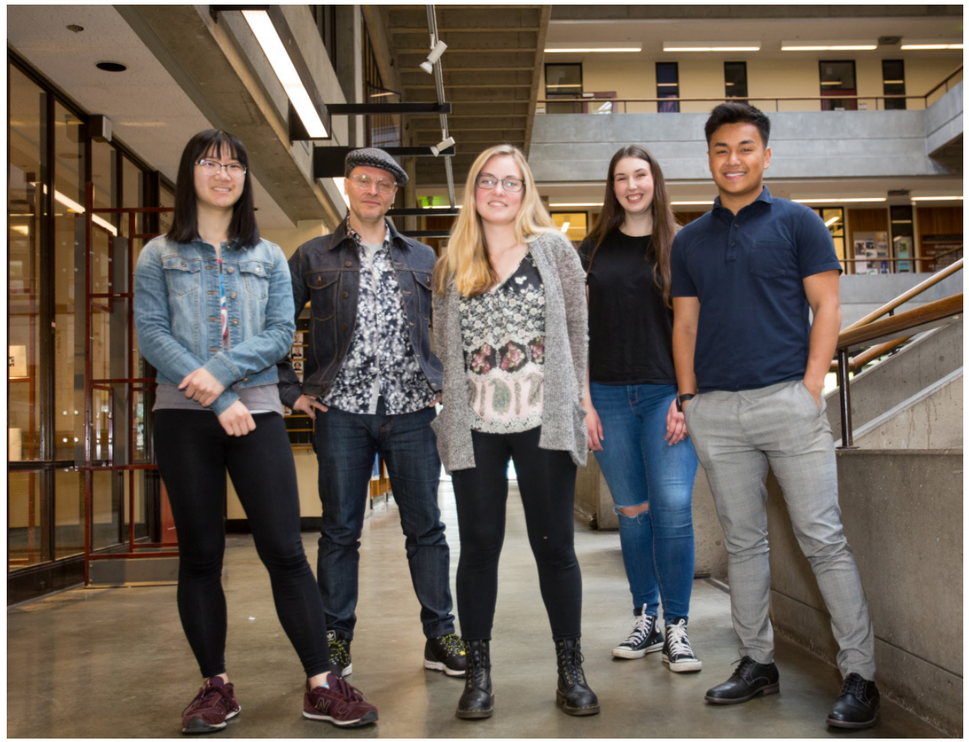

The LCY student team in Gould Hall, from left to right: Jasmine Leung, Christoph Von Strouse, Hanna Peterson, Devin Fritz, and Viet Nguyen (not pictured: Sophia Militello). TERI THOMSON RANDALL

ACKNOWLEDGMENTS

This project would not be possible without the guidance and support from our project advisor and City of Bellevue contact, Emma Johnson, who worked as the City of Bellevue Resource Conservation Manager at the time of our project. Emma provided direction for our report, as well as invaluable resources that contributed to the overall final product, and thus we would like to thank Emma for her help in the project process.

In addition, we would like to extend our gratitude to Brittany Quigley, the Project Director for the Northwest Energy Efficiency Council (NEEC) Smart Buildings Center; Chris Meek, the Director of the University of Washington's Integrated Design Lab; Christian Delgado, the City of Phoenix Water Services Department Water Resource Specialist; and Jared Silliker, owner of green building consulting Firm, Silliker + Partners, and board member of the Seattle 2030 District. All of these individuals graciously offered their time to meet with us and share their expertise and insight in their respective fields, which we then applied to our report and project recommendations. In particular, Mr. Meek was especially helpful in informing us of larger current trends and barriers in the smart buildings industry, while Ms. Quigley gave great insight into the use of visualizations to display energy building use. Mr. Silliker was particularly helpful in guiding us to learn more about some of the City of Seattle and the Seattle 2030 District's smart building programs and strategies, and Mr. Delgado, while his expertise was not in energy conservation, gave helpful advice in general marketing for community members. Overall, all our interviewees contributed enormously to our final recommendations.

Finally, we would like to thank the City of Bellevue for providing this opportunity to our team, awarding us a glimpse into urban planning and City projects, and giving us real-world experience in research, interviewing, and report development. This opportunity also has allowed us the opportunity to learn more about energy, resource conservation, marketing strategy, and community outreach.

Downtown Skyscraper in Bellevue. CITY OF BELLEVUE

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ABOUT LIVABLE CITY YEAR

The University of Washington's Livable City Year (LCY) initiative is a partnership between the university and one local government for one academic year. The program engages UW faculty and students across a broad range of disciplines to work on city-defined projects that promote local sustainability and livability goals. Each year hundreds of students work on high-priority projects, creating momentum on real-world challenges while serving and learning from communities. Partner cities benefit directly from bold and applied ideas that propel fresh thinking, improve livability for residents, and invigorate city staff. Focus areas include environmental sustainability; economic viability; population health; and social equity, inclusion and access. The program's 2018–2019 partner is the City of Bellevue; this follows partnerships with the City of Tacoma (2017–2018) and the City of Auburn (2016–2017).

LCY is modeled after the University of Oregon's Sustainable City Year Program, and is a member of the Educational Partnerships for Innovation in Communities Network (EPIC-N), an international network of institutions that have successfully adopted this new model for community innovation and change. For more information, contact the program at uwlcy@uw.edu.

LIVABLE CITY YEAR

ABOUT CITY OF BELLEVUE

Bellevue is the fifth largest city in Washington, with a population of more than 140,000. It's the high-tech and retail center of King County's Eastside, with more than 150,000 jobs and a skyline of gleaming high-rises. While business booms downtown, much of Bellevue retains a small-town feel, with thriving, woodsy neighborhoods and a vast network of green spaces, miles and miles of nature trails, public parks, and swim beaches. The community is known for its beautiful parks, top schools, and a vibrant economy. Bellevue is routinely ranked among the best mid-sized cities in the country.

The city spans more than 33 square miles between Lake Washington and Lake Sammamish and is a short drive from the Cascade Mountains. Bellevue prides itself on its diversity. Thirty-seven percent of its residents were born outside of the US and more than 50 percent of residents are people of color, making the city one of the most diverse in Washington state.

Bellevue is an emerging global city, home to some of the world's most innovative technology companies. It attracts top talent makers such as the University of Washington-Tsinghua University Global Innovation Exchange. Retail options abound in Bellevue and artists from around the country enter striking new works in the Bellwether arts festival. Bellevue's agrarian traditions are celebrated at popular seasonal fairs at the Kelsey Creek Farm Park.

Bellevue 2035, the City Council's 20-year vision for the city, outlines the city's commitment to its vision: "Bellevue welcomes the world. Our diversity is our strength. We embrace the future while respecting our past." Each project completed under the Livable City Year partnership ties to one of the plan's strategic areas and many directly support the three-year priorities identified by the council in 2018.

CITY OF BELLEVUE WASHINGTON

BELLEVUE 2035:
THE CITY WHERE YOU WANT TO BE

Assessing Benchmarking Strategies to Encourage Smart Buildings in Bellevue supports the High Quality Built and Natural Environment target area of the Bellevue City Council Vision Priorities and was sponsored by the Department of Finance and Asset Management.

HIGH QUALITY BUILT AND NATURAL ENVIRONMENT

Bellevue has it all. From a livable high-rise urban environment to large wooded lots in an equestrian setting, people can find exactly where they want to live and work in Bellevue. The diverse and well-balanced mix of business and commercial properties and wide variety of housing types attract workers and families who desire a safe, sustainable, and accessible community.

Bellevue has an abundance of parks and natural open space. Known as a "city in a park," our park system is one of the best in the nation due to its high park acreage-to-population ratio. From neighborhood walking paths and forested trails to a regional waterfront park, we enjoy a variety of recreational opportunities within walking distance of our homes and businesses. Bellevue is a "Smart City" with a clean, high-quality environment and excellent, reliable infrastructure that supports our vibrant and growing city, including high-tech connectivity. The city has a connected multi-modal transportation system that blends seamlessly with its buildings, plazas, and parks.

Whether it's an urban high rise, a classic Bellevue rambler, or a historic resource, the constant is our people. Our neighborhoods and businesses transcend age, ethnicity, and culture to create safe, welcoming places to live and work.

BELLEVUE 2035:
THE CITY WHERE YOU WANT TO BE

Bellevue welcomes the world. Our diversity is our strength.
We embrace the future while respecting our past.

The seven strategic target areas identified in the Bellevue City Council Vision Priorities are:

ECONOMIC DEVELOPMENT
Bellevue business is global and local.

TRANSPORTATION AND MOBILITY
Transportation is both reliable and predictable. Mode choices are abundant and safe.

HIGH QUALITY BUILT AND NATURAL ENVIRONMENT
From a livable high-rise urban environment to large wooded lots in an equestrian setting, people can find exactly where they want to live and work.

BELLEVUE: GREAT PLACES WHERE YOU WANT TO BE
Bellevue is a place to be inspired by cuilture, entertainment, and nature.

REGIONAL LEADERSHIP AND INFLUENCE
Bellevue will lead, catalyze, and partner with our neighbors throughout the region.

ACHIEVING HUMAN POTENTIAL
Bellevue is caring community where all residents enjoy a high quality life.

HIGH PERFORMANCE GOVERNMENT
People are attracted to live here because they see that city government is well managed.

For more information please visit: https://bellevuewa.gov/city-government/city-council/council-vision

EXECUTIVE SUMMARY

PROJECT OVERVIEW

The objective of the Livable City Year (LCY) Smart Buildings project is to help the City of Bellevue develop an effective building energy benchmarking strategy that resonates with the downtown Bellevue community and supports the City of Bellevue's objectives to create a more livable, sustainable, and resilient city.

Energy benchmarking is the measurement of a building's energy use over time (Keicher, n.d.b). It is an important strategy for reducing energy use in large commercial buildings because building energy benchmarking can help stakeholders better understand a building's energy performance and how it changes over time. This allows stakeholders to track energy use and energy savings and identify further opportunities for energy performance improvement.

The findings and recommendations of this research should inform the development of Bellevue's energy benchmarking program, ensuring that it aligns with industry best practices. With this report, our team aims to address the following questions:

- Do existing energy intensity (EUI) metrics resonate with neighborhoods like Downtown Bellevue?
- Are comparisons motivating for neighborhoods such as downtown Bellevue—and if so, what type of comparisons motivate them?
- What tactics most effectively engage neighborhoods like downtown Bellevue to embrace energy benchmarking programs?
- Are there particular technologies or best practices that Bellevue should consider when developing an energy benchmarking program?
- Would the findings and approach for one neighborhood remain relevant if applied to another neighborhood in Bellevue? What might be different?
- Which stakeholders care about energy benchmarking information? Building owners, property managers, tenants, future tenants, customers, the government, PSE, or residents? Are we targeting the right audience with energy performance information, or is there something that Bellevue should do differently?

The objective of the Livable City Year (LCY) Smart Buildings project is to help the City of Bellevue develop an effective building energy benchmarking strategy. LCY STUDENT TEAM

KEY FINDINGS

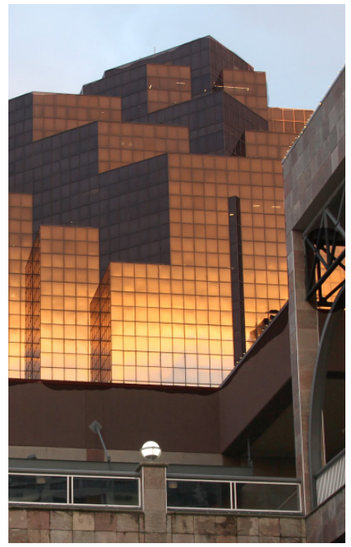
- There are more than 25 city benchmarking programs in the United States.
- Benchmarking programs typically apply to buildings 50,000 square feet or larger.
- Building energy benchmarking has been shown to result in average building energy savings of 2.4% per year.
- ENERGY STAR Portfolio Manager is the national standard for building energy benchmarking programs.
- The ENERGY STAR 1-100 Scoring System is the most commonly used and easiest to understand metric to communicate building energy use and performance. In contrast, energy use intensity (EUI) is the primary metric for reporting used by cities, and does

not typically resonate with the general public because it is too technical.
- Comparisons using the ENERGY STAR score have the potential to be motivating if they are aligned by building type and use. At the same time, building stakeholders show strong interest in personalized benchmarking information and recommendations.
- Building energy benchmarking programs are much more established in dense, urban regions and cities in comparison to suburban regions and cities.
- Different strategies, tactics, and messaging are more engaging depending on stakeholder group and on building size, use, and age. The primary market demographic for benchmarking is the commercial building sector of building owners, property managers, and reality brokers, however all stakeholder groups generally respond well to benefits around energy savings and increased property value.
- Visualizations of energy benchmarking data can be very helpful in strengthening stakeholders' understanding and use of benchmarking data.
- Partnering with local and regional utility companies and other organizations can provide benchmarking programs with valuable benefits and support.
- Primary barriers to engaging building stakeholders in energy benchmarking are lack of understanding of energy benchmarking and its benefits, benchmarking process time requirements and high learning curve, and slow return-on-investment.
- Many of Bellevue's building owners and operators also own and operate buildings in Seattle or other markets, which have building energy benchmarking programs.

KEY RECOMMENDATIONS

- Use ENERGY STAR Portfolio Manager for benchmarking.
- Partner with Puget Sound Energy, Bellevue's local utility, in program development.
- Establish strong public and private partnerships with local and national organizations, businesses, and community groups.
- Use the 2030 District as a model for a building benchmarking program for Downtown Bellevue.
- Incentivize participation in an energy benchmarking program and building performance improvements by emphasizing potential financial savings, increased portfolio value, and reductions in market risk through improved energy efficiency.
- Use workshops, training sessions, webinars, and other instructional resources.
- Keep it simple.
- Although comparisons of building performance between buildings of similar use and type can be motivating, personalized energy performance data and recommendations should still be provided to building stakeholders.
- Communicate individual building energy performance results through energy benchmarking scorecards and consider communicating performance data through intuitive, interactive, and outward-facing technologies such as dashboard and kiosks.
- Use success stories as evidence of program benefits.
- Use messaging focused on loss aversion and energy efficiency that is generally positive and acknowledges improvements.
- Incentivize energy performance improvements with increased zoning allowances, additional height and floor area allowances, and tenant improvement amenities.
- Implement program elements in a multi-step or multi-phase sequence.
- Increase building stakeholder engagement through connection and community building.
- Look towards students as a resource.

With careful planning, intentional marketing and outreach, and proactive use of local, regional, and national resources, the City of Bellevue can implement a successful energy benchmarking program and take a step towards creating a smarter, more sustainable, and more energy efficient America.



With careful planning, intentional marketing and outreach, and proactive use of local, regional, and national resources, the City of Bellevue can implement a successful building energy benchmarking program.
LCY STUDENT TEAM

INTRODUCTION

"You can't manage what you can't measure."

— Caroline Keicher

WHAT IS ENERGY BENCHMARKING?

Energy benchmarking is the measurement of a building's energy use over time (Keicher, n.d.b). This data can help stakeholders—such as building owners, operators, property managers, facility managers and tenants—gain a better understanding of their building's energy performance and how it changes over time. This in turn allows them to track energy savings when building performance improvements are applied and identify further opportunities to improve energy performance. In addition, individual building benchmarking data can be presented comparatively against other buildings' data of similar building size, type, and use (e.g. commercial, residential, mixed-use), encouraging stakeholders to improve their buildings' performance.

Because buildings are one of the most energy intensive sectors in the United States (Keicher n.d.b), there is both need and opportunity to reduce energy consumption in buildings and improve their performance. However, "you can't manage what you can't measure" (Keicher n.d.b). Thus, as a tool to measure and create baselines for a building's performance, energy benchmarking acts as an informative resource to motivate building stakeholders to take steps towards improving their building's performance.

BELLEVUE, ENERGY BENCHMARKING, AND THE SMART BUILDINGS PROJECT

The City of Bellevue is currently interested in improving building energy efficiency and performance city-wide, as discussed in its Smart City Strategic Plan. As part of this plan, Bellevue seeks to develop an energy benchmarking program as an avenue to encourage more energy-efficient building performance practices by relevant stakeholders.

The goal of the Livable City Year Bellevue Smart Buildings Project is to provide the City of Bellevue with recommendations and best practices for a voluntary building energy benchmarking program that will generate support and interest in building energy conservation. The focus of the project is on Bellevue's downtown core, which primarily consists of high- and low-rise commercial and multifamily properties. However, the findings of this research could be applied to inform a benchmarking approach to other mixed-use commercial neighborhoods in Bellevue. Furthermore, these findings can be used as a foundation for a building energy benchmarking system or energy conservation program for the City of Bellevue in the future.

Downtown Bellevue is an opportune location to begin a new building energy benchmarking program. The City of Bellevue can use the recommendations of this report to develop an energy benchmarking system or conservation program in the future.
LCY STUDENT TEAM

METHODS

In order to understand current best practices and make informed recommendations for a downtown commercial building energy benchmarking program, our team examined policy reports from organizations, such as the Institute for Market Transformation (IMT), reviewed reports of energy benchmarking programs of other cities, and interviewed industry experts in energy benchmarking and related fields. In addition, the research team evaluated reports, articles, policies, and trends related to current and emerging energy benchmarking industry practices, potential outreach strategies, stakeholder engagement, and program marketing and visualization. The various findings from the research were condensed into key findings and then synthesized into key recommendations for the City of Bellevue to consider in future development of a building energy benchmarking program.

CASE STUDIES

More than 25 cities in the United States have already implemented building energy benchmarking programs. The research team looked into both mandatory benchmarking programs and voluntary benchmarking programs. We also evaluated suburban benchmarking programs and voluntary benchmarking district programs, where districts within a city are benchmarked, rather than the entire city. When reviewing building energy benchmarking programs as case studies, the researchers looked for common trends among programs, unique characteristics of different cities' programs, and successful program features. By reviewing case studies of energy benchmarking programs, the research team was able to understand different approaches currently in use for energy benchmarking, and assess which approaches may be applicable to an energy benchmarking program for Bellevue. Voluntary and suburban benchmarking programs were of particular interest, considering the size and larger city lifestyle of Bellevue, as well as the City's interest in a voluntary energy benchmarking program.

In order to synthesize key recommendations, the research team evaluated existing energy benchmarking programs, industry expert advice, and relevant publications. LCY STUDENT TEAM

EXPERT INTERVIEWS

Throughout the project period, the research team connected with a variety of professionals from different fields and engaged with them in in-person, and through conference calls and phone interviews. The goal of these interviews was to learn more about their work and gain insight and recommendations for the project. For each interview, the team created a set of questions to explore during the conversation, although interviewees also guided the conversation and discussed other topic areas relevant to their expertise. During these sessions, researchers took notes, which they used to focus on potential avenues for the City of Bellevue to consider in its energy benchmarking program. Interviewees included Brittany Quigley, the Project Director for the Northwest Energy Efficiency Council (NEEC) Smart Buildings Center; Chris Meek, the Director of the University of Washington's Integrated Design Lab; Christian Delgado, the City of Phoenix Water Services Department's Water Resource Specialist; and Jared Silliker, owner of a green building consulting firm and board member of the Seattle 2030 District.

INDUSTRY REPORTS AND OTHER RELEVANT SOURCES

In addition to researching different energy benchmarking case studies, the research team reviewed industry reports, policy reports and publications, and articles related to energy benchmarking best practices. Furthermore, the researchers also looked into articles and information on marketing, visualization, and elements Bellevue culture and identity that could be used to support a building energy benchmarking program in Bellevue. The goal of this research was to create recommendations on how to develop and promote a building energy benchmarking program that effectively communicates energy performance and engages relevant Bellevue stakeholders.

EXPERT INTERVIEWEES

Brittany Quigley: Project Director for the Northwest Energy Efficiency Council (NEEC) Smart Buildings Center.

The Smart Building Center program uses data analytics and visualization techniques to promote and support building energy efficient practices. It is operated by the Northwest Energy Efficiency Council and supported by the Washington Department of Commerce. Brittany shared information on energy benchmarking incentives, visualization techniques, and energy benchmarking offered by NEEC.

Chris Meek: Director of the University of Washington (UW) Integrated Design Lab.

The UW Integrated Design Lab works to improve building performance through research, industry partner guidance and assistance, and educational events. Chris provided insight into current and emerging energy building benchmarking best practices.

Christian Delgado: Water Resource Specialist at the City of Phoenix Water Services Department.

The City of Phoenix has an impressive water conservation program, which has enabled the city to reduce its per capita water usage over the past several decades despite a significant population increase. Christian shared the tactics, particularly in outreach and marketing, that made the Phoenix water program so successful.

Jared Silliker: Owner of Silliker + Partners, Board Member of Seattle 2030 District

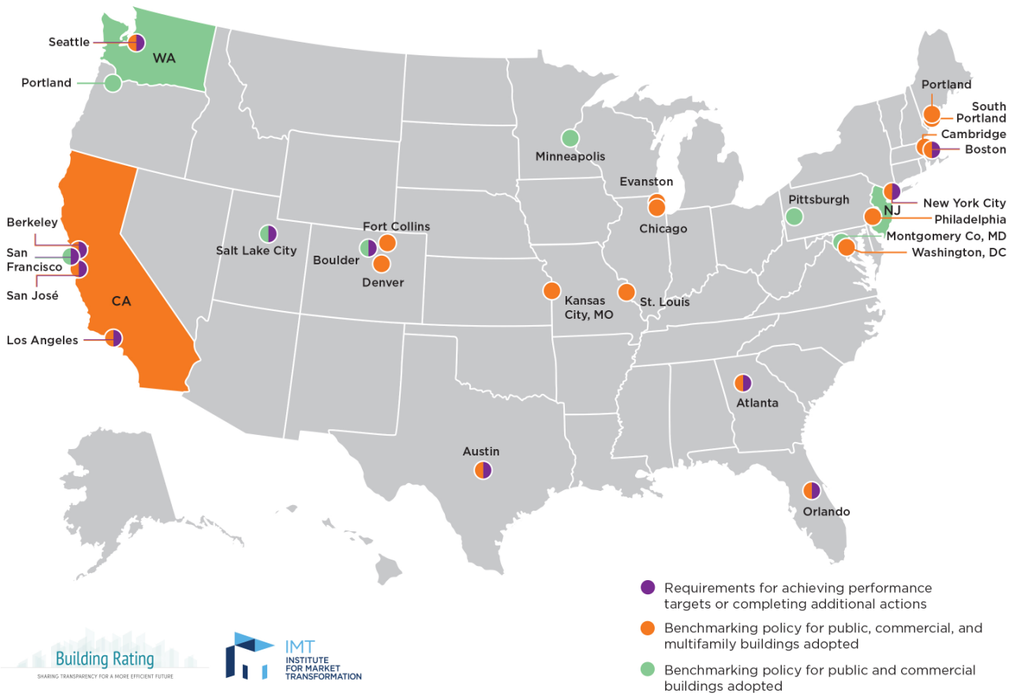
Silliker + Partners is a consulting firm that helps its clients understand, adopt, and advance green building and sustainable business practices. The Seattle 2030 District is an energy benchmarking business district program in Seattle. Jared shared background on the 2030 District program and provided insight into successful outreach and marketing strategies

CONTEXT

NATIONAL POLICY AND MARKET LANDSCAPE

More than 25 US cities have implemented benchmarking and disclosure ordinances for buildings 50,000 square feet or larger. Furthermore, there is a growing number of cities that are enacting policies beyond benchmarking, such as requiring retro commissioning and tune-up policies to improve existing building performance. Generally, building benchmarking policies nationwide have followed a framework of policy element adoption, including reporting, disclosure, audits, and retro commissioning in addition to or after benchmarking policies are enacted.

US CITY, COUNTY, AND STATE POLICIES FOR EXISTING BUILDINGS



Current benchmarking policies in the United States. More than 25 US cities have implemented benchmarking and disclosure ordinances for buildings 50,000 square feet or larger. INSTITUTE FOR MARKET TRANSFORMATION

Within these benchmarking policies, the primary platform used for energy benchmarking is the EPA ENERGY STAR Portfolio Manager (for more details on ENERGY STAR, see Key Energy Benchmarking Programs and Metrics). To improve ease of access to data for building benchmarking, several utilities around the nation who provide energy to regions with building energy benchmarking policies also provide services allowing utility users to receive energy consumption data. This data can be directly connected or uploaded to ENERGY STAR Portfolio Manager. In the Puget Sound region, both the Seattle City Light and Puget Sound Energy utility companies provide such services.

Furthermore, to help support adoption and compliance of energy benchmarking policies by building stakeholders who are unfamiliar with building energy benchmarking, cities have also begun to provide help centers to support benchmarking stakeholders in the benchmarking process (Krukowski & Keicher 2012). Located in Seattle, the Smart Building Center is one such support center that provides education, trainings, and consultation on code and policy development.

In terms of market benefit trends, buildings that participate in energy benchmarking programs and take actions in response to improve their energy efficiency have potential for increased property values. Furthermore, a number of studies have shown correlations between ENERGY STAR certified buildings and rental and occupancy premiums, which increases the Net Operating Income for building owners (Wiley et al. 2010, Fuest & McAllister 2009/11, Jackson 2009, Pivo & Fischer 2010, Eicholtz et al. 2010).

THE IMPACT OF MANDATORY BENCHMARKING POLICIES

According to the Institute for Market Transformation, mandatory policies for building energy benchmarking impact four to 16 times the floor area of voluntary programs. In the team's interview with Chris Meek, Meek explained that a significant reason for the larger impact of mandatory policies is that building owners and operators who manager multiple buildings in a region may expand building benchmarking and energy efficient practices to all of their regional buildings—even those outside of a required ordinance area—if required to perform these practices on some of their buildings. Thus, buildings in areas outside the mandated region become likelier to adopt more energy efficient practices, creating a larger area of impact.

WASHINGTON STATE MANDATORY BUILDING ENERGY BENCHMARKING POLICY: EXECUTIVE ORDER 12-06

In 2012, Executive Order 12-06 was enacted in Washington State. The reasons for the implementation of Executive Order 12-06 were cited as job creation, reduction in Washington state agency operating costs, and increase of energy efficiency in Washington State (Washington State Legislative Office 2012). This executive order required all state-owned buildings 10,000 square feet or larger to benchmark their building energy. Furthermore, each state agency is required to complete a preliminary energy audit for their buildings and implement subsequent cost-effective energy savings measures where appropriate (Washington State Legislative Office 2012). Included in this executive order was also the requirement to document and monitor energy use with ENERGY STAR Portfolio Manager. The goal set by the Executive Order was for each cabinet agency to reduce total building energy use by 20% by 2020 from a 2009 baseline (Washington State Legislative Office 2012).

Similarly, state-leased buildings were also required to disclose energy benchmarking data, perform energy audits, and install cost-effective energy efficiency improvements. If buildings leased by the State did not meet energy performance requirements, the building ran the risk of having the State consider not renewing its lease.

Overall, as Executive Order 12-06 requires state-owned buildings to benchmark their energy use, any state-owned or leased buildings in Bellevue are already currently benchmarking their energy usage and working towards improving their energy performance. While state-owned and state-leased buildings do not compose the majority of Bellevue's buildings within the larger downtown core, Executive Order 12-06 has already established a precedent and foundation for energy benchmarking in Bellevue and other cities in Washington State.

WASHINGTON STATE MANDATORY BUILDING ENERGY BENCHMARKING POLICY: CLEAN BUILDINGS ACT, HOUSE BILL 1257

The Washington State Clean Buildings Act (HB 1257), passed in Spring 2019, is a recent bill that requires energy benchmarking and encourages greater energy efficiency for buildings in Washington State, beyond those owned by the state. It requires all commercial buildings 50,000 square feet or larger, with certain exceptions, to benchmark energy usage and make the appropriate investments so that their building's energy usage meets greenhouse emissions and energy use intensity standards set by the State.

The standards will be set by 2020 and updated every five years after 2031 (Inslee 2019). Compliance for the bill has been set in phases, with buildings with more than 220,000 square feet required to comply by July 2026, buildings with 90,000 to 229,001 square feet required to comply by June 2027, and buildings with 50,000 to 90,001 square feet required to comply by June 2028 (State of Washington House Appropriations 2019). Qualifying buildings that do not comply with the set standards, submit the appropriate documentation, or accurately report their building's energy use, can face monetary penalty. The bill also sets up a $75 million early action incentive fund for qualified retrofit projects to help lower capital costs and reduce payback periods associated with investments to help buildings meet the bill's standards. There is also an "alternative compliance pathway" for building owners who cannot achieve the bill's standards, even after making cost-effective investments (Inslee 2019).

Although the standards set by the Clean Buildings Act will not be required for buildings until 2026 at the earliest, there will inevitably be buildings in Bellevue that will need to meet the Clean Building Act's standards. Building energy benchmarking and building energy improvements may already be or are likely to begin to be important considerations for some Bellevue building owners and developers. Thus, establishing a building energy benchmarking program in Bellevue that aligns with the Washington State Clean Buildings Act, or using the Clean Buildings Act as a precedent or resource while creating Bellevue's energy benchmarking program, could be helpful for the City of Bellevue.

BELLEVUE SMART CITIES STRATEGIC PLAN

Smart cities are cities that utilize innovative technologies and strategies to improve its efficiency, quality of life, economic growth, and sustainability. The City of Bellevue recognizes the opportunities of becoming a smarter city, especially with its already-booming high tech and advanced technologies economy. In recognizing these opportunities, the City of Bellevue published the Bellevue Smart: Planning for a Smarter City plan, where it outlined smart city strategies in the areas of connectivity, transportation, public safety, water, buildings, and energy. With these strategies, the City of Bellevue hopes to improve the livability, sustainability, and resiliency of the city.

A buildings energy benchmarking program is directly connected to the Bellevue Smart plan, where "building energy data benchmarked to influence conservation [and] resource savings" is a key element in their strategy (City of Bellevue 2017). Furthermore, part of the timeline for the Bellevue Smart building plan is to "develop a commercial buildings benchmarking program" (City of Bellevue 2017).

The City of Bellevue has several principal strategies it aims to utilize in carrying out its smart city strategies. The strategies that have been identified as most relevant to developing smart buildings and developing a building energy benchmarking program are the Driving with Data and Pursuing Partnerships strategies (City of Bellevue 2017). Collecting, analyzing, understanding, and applying data about building performance and energy use will be a key element in an energy benchmarking program and its effects on improving building energy performance. Furthermore, with the wealth of expertise and innovation around advanced technologies in Bellevue, due to its abundance of high tech businesses and industries, there is great opportunity to partner with businesses and industries, including PSE, to help the City of Bellevue become a smarter city. Although not highlighted in the Bellevue Smart plan, there is also great potential in leveraging regional relationships in a building energy benchmarking program. By partnering with regional organizations and entities, Bellevue can develop a program that helps further a larger regional movement towards building energy benchmarking and energy conservation.

When the Bellevue Smart plan was published in 2016, Bellevue evaluated its smart city position in the buildings sector as "opportunistic," but saw potential to increase this to a "managed" state (City of Bellevue 2017). In 2016, 70 commercial buildings in Bellevue had achieved an ENERGY STAR rating. Generally, buildings with ENERGY STAR certification use significantly less energy, generate fewer greenhouse gas emissions, and cost less per square foot to operate, while also achieving higher rental and occupancy rates (City of Bellevue 2017). Furthermore, at this time, Bellevue had also already benchmarked 27 buildings (City of Bellevue 2017). According to the Bellevue Smart plan, Bellevue has potential to adopt commercial data disclosure but not residential home energy scores, as Puget Sound Energy already provides automated data downloads to the EPA's Portfolio Manager benchmarking tool for commercial buildings.

Principal strategy	Buildings strategic actions
DRIVE WITH DATA	• Collect data on smart building technology adoption in Bellevue businesses and provide building performance data to the community to influence behavior and decision-making.
PURSUE PARTNERSHIPS	• Expand on partnerships with PSE and others to increase smart buildings and energy savings through programs like Urban Smart Bellevue. • Develop performance-based pilots and policies to grow the stock of advanced green buildings.

Driving with Data and Pursuing Partnerships are the two principal strategies the City of Bellevue plans to apply to its Bellevue Smart plan. CITY OF BELLEVUE

URBAN SMART BELLEVUE (USB) PROGRAM

The Urban Smart Bellevue (USB) program was a downtown commercial building energy conservation program that focused on raising awareness of and increasing the use of energy-conservative behavior and tools. The program targeted building owners, operators, property managers, businesses, and tenants, and was led by the City of Bellevue in collaboration with Puget Sound Energy (PSE). Over two years, the program involved 66 buildings and 100 individual participants. Although it did encourage energy conservation and promote energy literacy to an extent, energy benchmarking did not play a major role in the USB program (C+C et al. 2018). The USB program was one of the first major steps that the City of Bellevue took towards its Bellevue Smart Strategic Plan in the area

of buildings and building energy. Overall, the USB program highlighted the difficulty in engaging businesses and building communities in energy conservation.

The primary strategies of the USB program were to use energy management information systems (EMIS) to help operators track energy use and understand the effect of energy-efficient decisions, to use a strategic energy management (SEM) approach to reduce energy use at

The Urban Smart Bellevue (USB) program was a downtown commercial building energy conservation program that focused on raising awareness of and increasing the use of energy-conservative behavior and tools. BOMA SEATTLE

present and in the future, and to use community-based social marketing (CBSM) approach to foster more sustainable, energy-saving behaviors. Critical tools and resources that were used by the USB program included an online dashboard where participants could track their progress, resources and guidance to reduce building energy use, incentives and recognitions for reaching energy targets, energy engagement campaigns and materials, and support from USB staff through energy evaluation and coaching sessions. Outreach was customized to target offices, hospitality, retail, and healthcare businesses in the downtown area, and customer groups were categorized as either tenants, small to medium businesses (SMBs), or large facilities. Program materials were tailored to

URBAN SMART Bellevue
Energy saving actions, powerful results.

URBAN SMART BELLEVUE

the categorical group of a participant as well as their building size (C+C et al. 2018).

Although a building energy benchmarking program would differ in many ways to the USB program, which did not focus on energy benchmarking, there are several takeaways from the USB program that can be applied to a building energy benchmarking program:

- **User input processes should be simple and user-friendly**. Limitations on internal capacity and time constraints may have been a barrier to business participation in the USB program, underscoring the importance of a user-friendly process.
- **Energy Champions can play a key role in buildings' and businesses' engagement.** Passionate individuals serving as "energy champions" for each building or business in the USB program kept participating entities engaged and could help building stakeholders with building performance improvement or energy benchmarking programs.
- **Consider program design that is scalable to company facilities outside Bellevue.** Larger corporations with multiple facilities throughout the region are likely to respond better to programs they can also adopt to their facilities outside Bellevue, such as the use of ENERGY STAR (see Key Energy Benchmarking Programs and Metrics).
- **Look to alternatives for one-on-one coaching.** The success of one-on-one coaching and regular check-ins the USB program could be made less time-intensive and staff-intensive through alternatives such as automated emails or regular reporting scorecards with contact numbers and group and cohort coaching.

- **Networking events build community and program engagement.** USB participants, especially energy champions, appreciated networking and peer learning opportunities to connect, learn, and gain feedback from other participants. Supporting such events can also bring opportunities for multi-building collaboration, competition, and community building to improve individual building performance and participant experience.
- **Workshops were a popular USB program feature and should be continued in an energy benchmarking program.** An initial, mandatory workshop could be especially helpful for new program participants in introducing complex topics, walking through the ENERGY STAR process, and building community.
- **Be specific with action items.** Participants liked being given specific action items to improve their energy conservation in the USB program, such as customized actions to improve an energy benchmarking score or building performance metric.
- **Workplace engagement campaigns can be used to engage tenants in energy conservative behavior.** Similar to how workplace engagement campaigns were used in the USB program, workplace engagement campaigns can be used as annual, promotional events to engage tenants in benchmarking and building energy conservation programs.

The City of Bellevue's previous initiatives, such as the USB program, can be valuable sources of information when creating a new building energy benchmarking system. LCY STUDENT TEAM

BENCHMARKING

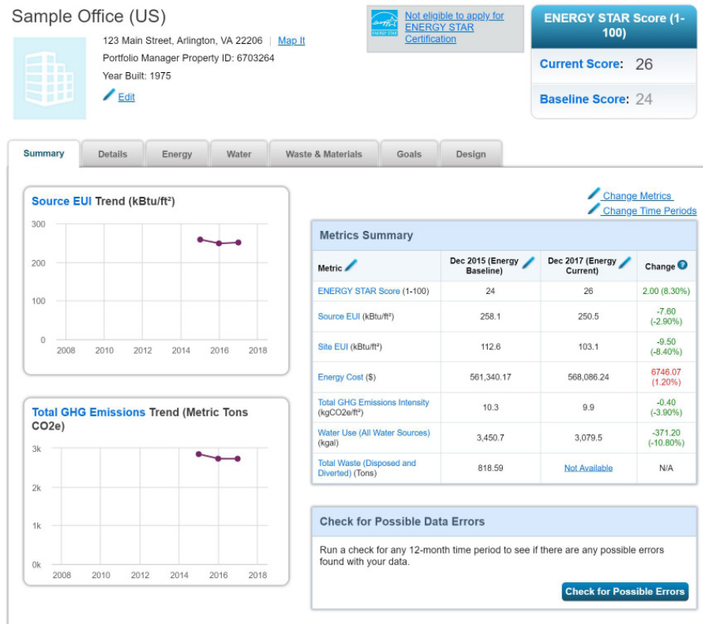
ENERGY STAR

ENERGY STAR is a government program that works with the US Environmental Protection Agency (EPA) and the US Department of Energy (DOE) to encourage and support the adoption of energy efficient products, practices, and decisions. In the buildings sector, ENERGY STAR resources can help building stakeholders calculate and track and compare their building's energy use.

ENERGY STAR is a government program that aims to encourage and support the adoption of energy efficient products, practices, and decisions. US EPA

ENERGY STAR PORTFOLIO MANAGER

ENERGY STAR Portfolio Manager is an energy measurement and tracking tool used to measure individual buildings' energy consumption, water consumption, and greenhouse gas emissions over time (ENERGY STAR n.d.a). After inputting data on building consumption—which can be extracted directly from utility bills—and details around building characteristics, operation, and usage, Portfolio Manager provides a variety of metrics about the building's performance (ENERGY STAR n.d.b, ENERGY STAR n.d.c). Portfolio Manager offers tools that allow users to create graphs, report their results, and estimate energy costs and savings, which can be used to show stakeholders how to improve their buildings' performance (ENERGY STAR n.d.c). Among these tools is the ENERGY STAR score, which is normalized for building type, size, use, and regional climate, thus providing a relatively comparable metric of building energy performance to other similar buildings.



Sample of a Portfolio Manager building profile for an office building, as would be seen in one's account on the Portfolio Manager site. US DEPARTMENT OF ENERGY

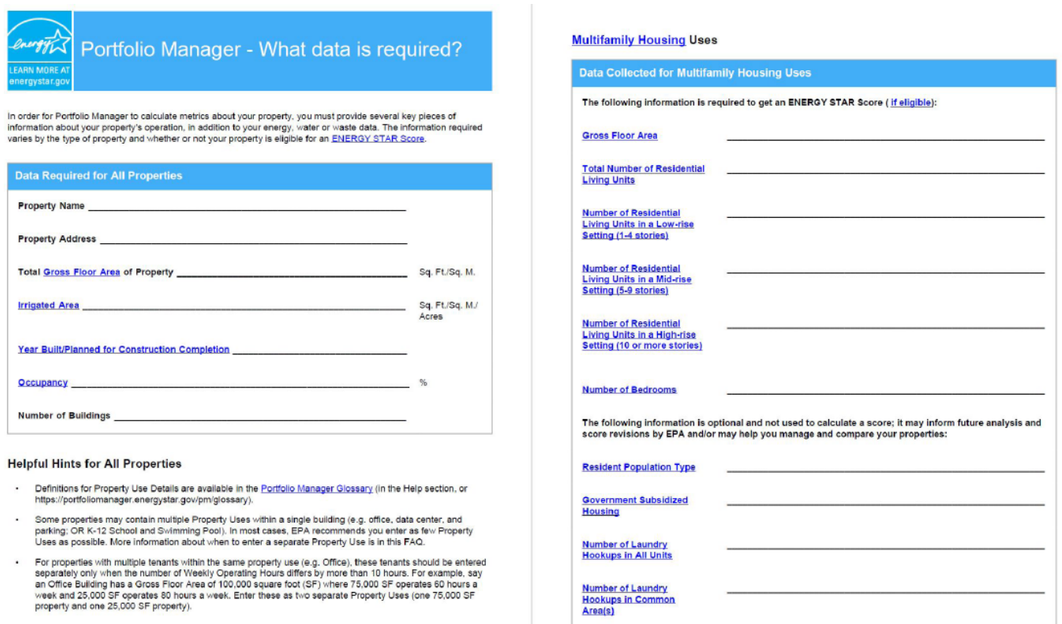
ENERGY STAR Portfolio Manager is already used by many municipalities involved in building energy benchmarking in the United States. It has been shown that using ENERGY STAR can lead to building energy savings and that ENERGY STAR certified buildings have been correlated to higher rental and occupancy premiums, which increases building net operating income (Wiley et al. 2010, Fuest & McAllister 2009/11, Jackson 2009, Pivo & Fischer 2010, Eicholtz et al. 2010). Furthermore, according to the United States Environmental Protection Agency, between 2008 through 2011, over 35,000 buildings which that participated in the ENERGY STAR Portfolio Manager program achieved average annual savings of 2.4%, with a total savings of 7.0% (United States Environmental Protection Agency 2012).

One drawback to using Portfolio Manager is that it requires a large amount of building information to be inputted into the system. Gathering this data can be time consuming and acts as a barrier to participation and

ENERGY STAR certified buildings have been correlated to higher rental and occupancy premiums, which increases building net operating income.

engagement. Fortunately, there are utility providers that provide services that streamline access to energy benchmarking data to assist customers with Portfolio Manager benchmarking. Puget Sound Energy, Bellevue's utility provider, offers the MyData tool service to automatically upload a building's energy data to Portfolio Manager (ENERGY STAR 2018).

Another challenge to using Portfolio Manager is that it can take time to learn how to use and navigate the Portfolio Manager interface and tools. This could be a barrier to adoption of an energy benchmarking program that relies on Portfolio Manager, especially as building owners and property managers would not likely want to spend a lot of time figuring out how to use Portfolio Manager.



Portfolio Manager - What data is required?

LEARN MORE AT energystar.gov

In order for Portfolio Manager to calculate metrics about your property, you must provide several key pieces of information about your property's operation, in addition to your energy, water or waste data. The information required varies by the type of property and whether or not your property is eligible for an ENERGY STAR Score.

Data Required for All Properties

Property Name _____

Property Address _____

Total Gross Floor Area of Property _____ Sq. Ft./Sq. M.

Irrigated Area _____ Sq. Ft./Sq. M./ Acres

Year Built/Planned for Construction Completion _____

Occupancy _____ %

Number of Buildings _____

Helpful Hints for All Properties

- Definitions for Property Use Details are available in the Portfolio Manager Glossary (in the Help section, or https://portfoliomanager.energystar.gov/pm/glossary).
- Some properties may contain multiple Property Uses within a single building (e.g. office, data center, and parking; OR K-12 School and Swimming Pool). In most cases, EPA recommends you enter as few Property Uses as possible. More information about when to enter a separate Property Use is in this FAQ.
- For properties with multiple tenants within the same property use (e.g. Office), these tenants should be entered separately only when the number of Weekly Operating Hours differs by more than 10 hours. For example, say an Office Building has a Gross Floor Area of 100,000 square foot (SF) where 75,000 SF operates 60 hours a week and 25,000 SF operates 80 hours a week. Enter these as two separate Property Uses (one 75,000 SF property and one 25,000 SF property).

Multifamily Housing Uses

Data Collected for Multifamily Housing Uses

The following information is required to get an ENERGY STAR Score (If eligible):

Gross Floor Area _____

Total Number of Residential Living Units _____

Number of Residential Living Units in a Low-rise Setting (1-4 stories) _____

Number of Residential Living Units in a Mid-rise Setting (5-9 stories) _____

Number of Residential Living Units in a High-rise Setting (10 or more stories) _____

Number of Bedrooms _____

The following information is optional and not used to calculate a score; it may inform future analysis and score revisions by EPA and/or may help you manage and compare your properties:

Resident Population Type _____

Government Subsidized Housing _____

Number of Laundry Hookups In All Units _____

Number of Laundry Hookups In Common Area(s) _____

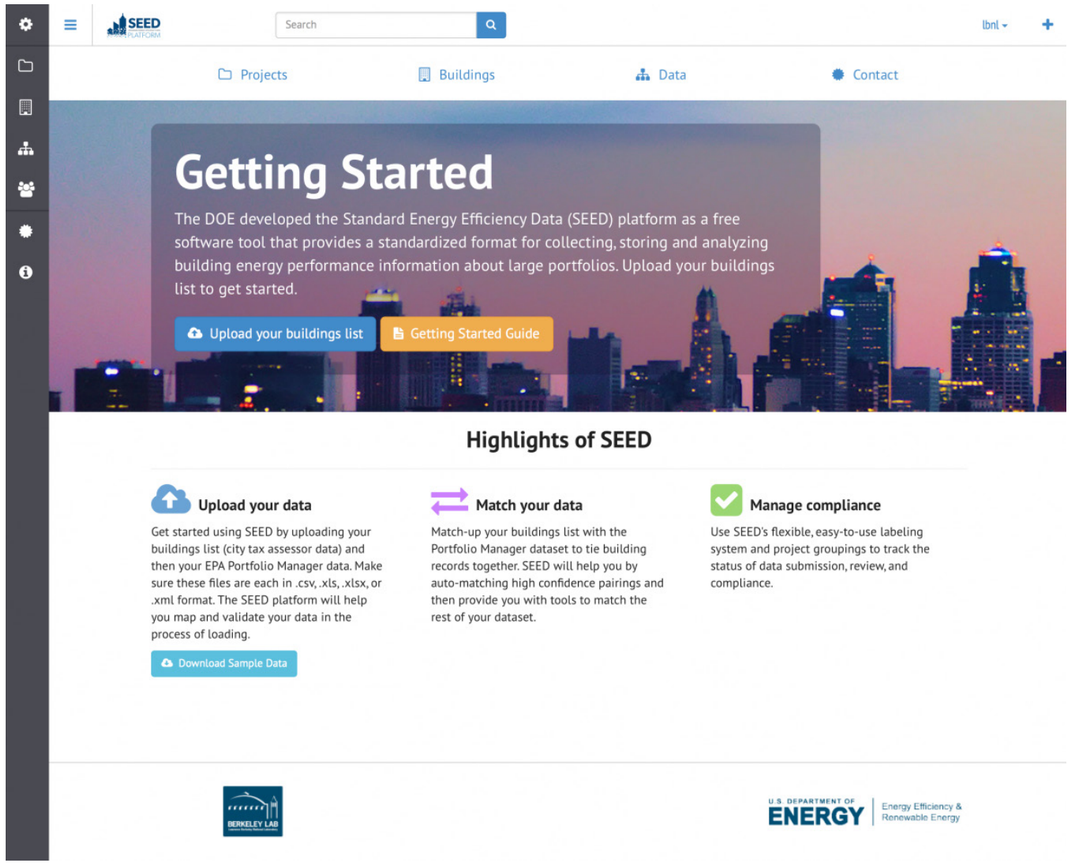
Part of a sample generated form listing data needed for a building stakeholder of a multifamily housing building to input into Portfolio Manager.
US DEPARTMENT OF ENERGY

PUGET SOUND ENERGY'S MYDATA TOOL

As a utility company, Puget Sound Energy (PSE) already tracks a building's energy use data. PSE can automatically send requested energy usage data to a building's Portfolio Manager account. To use MyData with Portfolio Manager, the building must have a Portfolio Manager account, a MyData account, and a building address or the building's meter address (Puget Sound Energy n.d.a).

STANDARD ENERGY EFFICIENCY DATA PLATFORM (SEED)

The SEED Platform is a free, secure data platform developed by the U.S. Department of Energy to help reduce the time, resources, and effort needed to implement building performance reporting and transparency programs by public agencies and other organizations. SEED helps agencies and organizations manage data by helping automate data formatting, matching, cleaning, and validation, as well as allowing for data to be shared with other software tools. SEED can also import data from ENERGY STAR Portfolio Manager, so manual data entry is not required (United States Department of Energy n.d.). Due to project constraints, the project team could not conduct in-depth research on the potential usefulness and applicability of the SEED Platform to a Bellevue energy benchmarking program. However, SEED could be a very helpful resource for the City of Bellevue in tracking and managing data for an energy benchmarking program and is worth further research and consideration.



The SEED Homepage Interface. SEED helps agencies and organizations manage data by helping automate data formatting, matching, cleaning, and validation, as well as allowing for data to be shared with other software tools. US DEPARTMENT OF ENERGY

COMPARISON OF ADVANTAGES AND DISADVANTAGES OF CERTAIN ENERGY BENCHMARKING TOOLS AND SUPPORT PROGRAMS

Benchmarking Program/Tool	Benefits	Drawbacks
ENERGY STAR Portfolio Manager	• Measures energy, water, and greenhouse gas (GHG) emissions over time • Graphing and reporting tools • Monetary saving estimates • Comparative data to similar buildings	• Requires large amounts of data to be inputted • Can be time intensive to learn how to use tools and interface
PSE MyData Tool	• Allows utility data to be uploaded directly into Portfolio Manager, easing data input process	• Limited to customers of Puget Sound Energy
SEED Data Platform	• Eases data management burden for building performance reporting • Data sharing options with other software tools • Can import data from Portfolio Manager	• Limited information known on the SEED platform, its effectiveness, and its use by agencies and organizations

ENERGY BENCHMARKING METRICS

ENERGY STAR SCORE

The ENERGY STAR score is a metric for a building's energy performance relative to other 'peer' buildings of similar type, size, and climate. It is customized to reflect a building's energy performance with not only energy use in mind, but also building assets, age, climate, operational hours, worker density, and other factors that affect building energy use and performance. Comparison in ENERGY STAR is calculated by using data from the Commercial Building Energy Consumption Survey (CBECS), which is a national-level data source on commercial building characteristics and energy use (ENERGY STAR n.d.d).

The ENERGY STAR score ranges on a scale of one to 100, with a higher score reflecting better energy performance. An ENERGY STAR score of 50 represents the median, meaning that a building with a score of 50 has better building energy performance than 50% of comparable buildings. Buildings with an ENERGY STAR score of 75 or higher are considered 'top performers' and may be eligible to receive or apply for annual ENERGY STAR certification (ENERGY STAR n.d.d).

The Score Does	The Score Does Not
• Evaluate actual billed energy data • Normalize for business activity (hours, workers, climate) • Compare buildings to the national population • Indicate the level of energy performance	• Sum the energy use of each piece of equipment • Credit specific technologies • Compare buildings with others in Portfolio Manager • Explain why a building performs well or poorly

The ENERGY STAR Score can be informative to users, but cannot give them certain information, such as why a building performs the way it does. US DOE ENERGY STAR

Overall, the ENERGY STAR score is a very useful energy performance and energy benchmarking metric, as it is relatively simple to understand, it is already being widely adopted in the energy benchmarking sector, and it features built-in peer-comparison tools. It is an ideal metric to express building energy performance, as it can be easily understood by all audiences. While the ENERGY STAR score "does not by itself explain why a building performs a certain way, or how to change the building's performance," "it does, however, help you assess how your building is performing and identify which buildings offer the best opportunities for improvement and recognition" (ENERGY STAR n.d.d).

ENERGY USE INTENSITY (EUI)

Energy use intensity (EUI) is a measurement of the energy use of a building relative to its size, expressed as energy per square foot of a property (Beddingfield et al. 2017). In this way, EUI normalizes for the size of a building. EUI is calculated by dividing the total energy the building consumers in a certain time period—usually one year—by the total gross floor area of the building, with the EUI number thus being expressed in kBTU (kilo British Thermal Units) or GJ (gigajoules) per square foot per year. Generally, a lower EUI indicates better energy performance (ENERGY STAR n.d.e).

TYPES OF EUI

Site EUI is annual energy property uses per square foot on site, reported on utility bills.

Source EUI is total annual amount of raw fuel per square foot required to operate a property, and includes losses from generation, transmission, and distribution. Source EUI is used to calculate ENERGY STAR scores in Portfolio Manager.

Weather normalized Site and Source EUIs are similar to Site EUI and Source EUI, but are normalized against energy use that a property would have used during 30 year average weather conditions (Beddingfield et. al. 2017).

For most individuals and building stakeholders, EUI may not be very intuitive.

For most individuals and building stakeholders, EUI may not be very intuitive. The units of EUI, kBTU and GJ, are relatively technical and usually only understood and used by engineers and other technical specialists. Furthermore, EUI is not inherently a comparative metric, like the ENERGY STAR score is, as it does not factor in building characteristics outside of energy use, square footage, and occasionally climate data.

CHOOSING A METRIC

If the City of Bellevue was to use energy intensity (EUI) metrics for building energy benchmarking, the key to making EUI metrics resonate with downtown Bellevue would be to increase energy literacy throughout the city, as well as to decrease the complexity of presenting benchmarking or ranking information. Increased energy literacy could be achieved for building owners, operators, and property managers on relatively short time scales through training, workshops, and webinar sessions. Including EUI metrics in building benchmarking information would be useful to building stakeholders as a more direct indication of their building energy usage in comparison to an ENERGY STAR score, which is an indirect, representative metric of building performance and energy use. However, it is recommended that an ENERGY STAR score be prioritized, and coupled with EUI, if EUI is to be used as a metric. In this way, building stakeholders can more quickly and easily interpret their building performance compared to their past performance and their peers' performance.

It is recommended that an ENERGY STAR score be prioritized, and coupled with EUI, if EUI is to be used as a metric.

*If the City of Bellevue was to use energy intensity (EUI) metrics for building energy benchmarking, the key to making EUI metrics resonate with downtown Bellevue would be to increase energy literacy throughout the city, as well as to decrease the complexity of presenting benchmarking or ranking information.*LCY STUDENT TEAM

CASE STUDIES

DISTRICT CASE STUDY: 2030 DISTRICTS

2030 DISTRICTS

2030 Districts are designated urban areas centered around the development of private-public partnerships between property owners, building managers, local government, businesses, and community stakeholders to improve urban sustainability and building performance through collaboration, leveraged financing, and shared resources (2030 Districts Network n.d.a). Together, stakeholders of 2030 Districts benchmark building performance and develop and implement creative strategies, best practices, and verification methods for measuring progress towards a common goal of reducing the use of energy, water, and carbon dioxide emissions to specific targets by the year 2030 (2030 Districts Network n.d.a). First established in Seattle, 2030 Districts have now formed in more than 20 cities across the country. Collectively, 2030 Districts have led to roughly 463 million square feet committed towards high performance buildings.

Through the 2030 Districts membership, building owners, property managers, and developers access a suite of resources, tools, and opportunities to develop a plan for their city's 2030 District and improve building performance within the district. Resources include: support and software to assess benchmarking and building performance, access to the 2030 Districts Owner and Manager database, trainings and workshops, data evaluation assistance, financing resources, and a set of best practices. (2030 Districts Network n.d.a).

RELEVANCE OF THE 2030 DISTRICT TO BELLEVUE

Since the 2030 Districts program concludes in the year 2030, it would be difficult for the City of Bellevue to join the program, develop its own 2030 District, and meet the energy, water, and emission reductions goals for the program by the 2030 deadline. However, since the 2030 Districts model is a collaborative, voluntary, urban district centered on business development, it serves as an exemplar and could be modified to suit the needs of the City of Bellevue.

Page from the Seattle 2030 District 2016 Report, which could serve as a useful example to the City of Bellevue in creating a new energy benchmarking system. SEATTLE 2030 DISTRICTS NETWORK

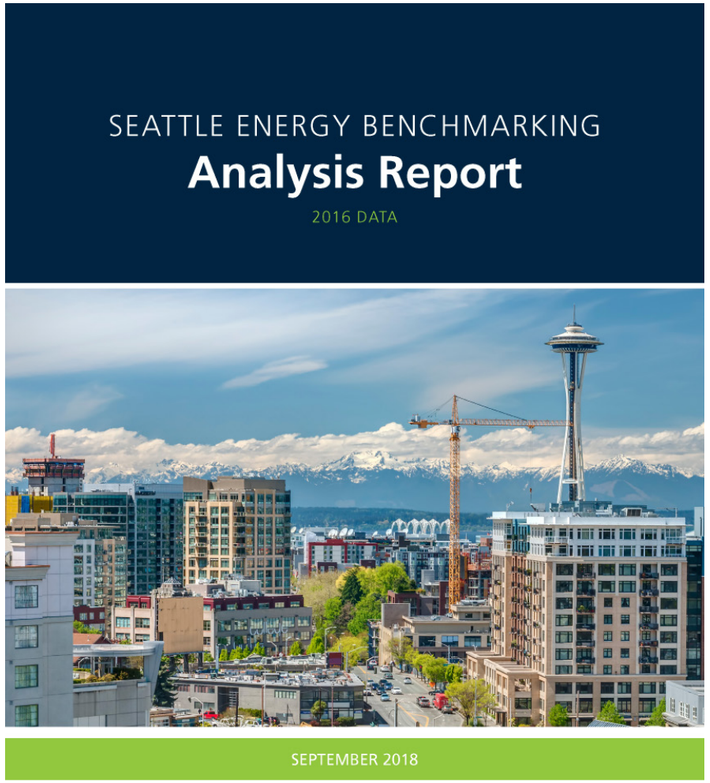
2030 DISTRICTS TAKEAWAYS AND RECOMMENDATIONS

Bellevue could consider adopting a model similar to the successful voluntary 2030 Districts model to benchmark, develop, and implement creative strategies, best practices, and verification methods to measure progress.

Bellevue could consider developing and leveraging strategic private-public partnerships that unite property owners and building managers with local governments, businesses, and community stakeholders to create a business model for urban sustainability.

Bellevue can look into strategies that 2030 Districts cities have utilized to help the City develop a strategy to incentivize the private sector to adopt building benchmarking and efficiency goals.

Bellevue could consider looking into the Seattle 2030 District not only as a model, but as a resource. Since 2030 Districts originated in Seattle, Bellevue could leverage existing regional partnerships with industry, government, organizations, developers, and property management companies.



Cover of Seattle 2016 Benchmarking Report. Through this program, certain building owners are required to track their buildings' energy performance, annually report the results, and disclose these results, if requested, to tenants, buyers, and lenders. CITY OF SEATTLE

CITY CASE STUDY: SEATTLE

SEATTLE'S BUILDING ENERGY BENCHMARKING AND REPORTING PROGRAM

Since 2014, Seattle's Building Energy Benchmarking and Reporting policy has required building owners of nonresidential and multifamily buildings 20,000 square feet or greater to annually benchmark their buildings' energy performance with EPA ENERGY STAR Portfolio Manager, annually report performance results, and disclose upon request a report of energy performance to tenants, buyers, and lenders (Seattle Office of Sustainability & Environment 2015). In 2016, the ordinance was amended to require public disclosure of benchmarking reports and require utility companies to upload utility consumption data into building owners' ENERGY STAR Portfolio Manager accounts. In 2016, Seattle also passed another ordinance that required owners of non-residential buildings greater than or equal to 50,000 square feet to complete a tune-up of buildings every five years (City of Seattle n.d.b).

FLOOR-AREA-RATIO BENEFITS THROUGH SEATTLE'S LIVING BUILDING AND 2030 CHALLENGE PILOTS

Seattle has established two pilot programs that allow certain buildings to gain additional height and floor area beyond the Seattle Land Use Code limitations, if the buildings meet specific high performance requirements (City of Seattle n.d.c). These requirements are focused on reducing total building energy use, reducing fossil fuel use, and increasing sustainable water use (City of Seattle 2018). Benefits include up to 25 to 30% more floor area and 12.5 to 30 feet of additional height depending on building structure, regional zoning height limitations, and building type (City of Seattle n.d.c).

The 2030 Challenge Pilot is focused on incentivizing high-performance renovations of existing buildings (City of Seattle 2018). However, the 2030 Challenge Pilot Legislation was just passed in June 2018, and thus has not yet likely implemented or passed many projects (City of Seattle n.d.d).

Pilot programs in Seattle allow certain buildings to gain additional height and floor area beyond the Seattle Land Use Code limitations, if the buildings meet specific high performance requirements. KYLER BOONE ON UNSPLASH

RELEVANCE OF SEATTLE'S BENCHMARKING PROGRAM TO BELLEVUE

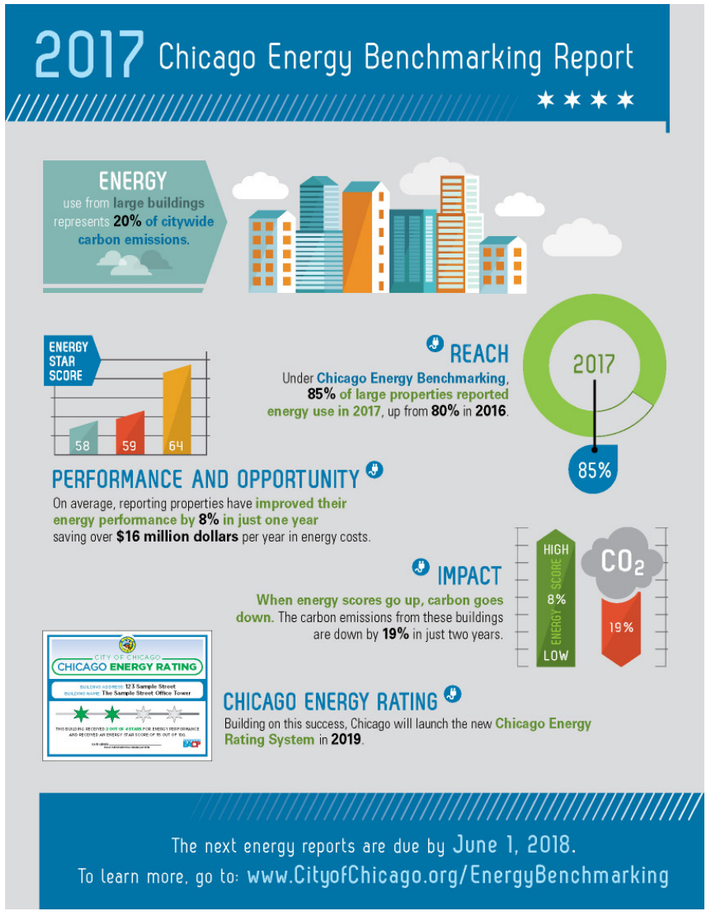
Seattle serves as a key model for Bellevue as it develops a building energy benchmarking program. Firstly, Seattle's benchmarking program is well-established and successful in energy use and emissions reduction, with already a 3.6% decline in total energy use and a 4.8% decrease in total emissions between 2014 and 2016 (Perry et al. 2016). In addition, Bellevue may be able to look towards Seattle as a model of how to best engage with big businesses. Bellevue, like Seattle, has attracted the interest of large technology companies and houses offices for Microsoft, Amazon, Comcast, CenturyLink, T-Mobile, among others (Bellevue Downtown Association n.d.). Furthermore, due to the cities' close proximity, it is likely that several Bellevue property owners also own properties in Seattle—and, by extension, have experience working with Seattle's benchmarking requirements. Finally, as Seattle's neighbor, Bellevue can take advantage of resources, opportunities, and expertise that have already been established in the Seattle. For example, Bellevue's utility company, Puget Sound Energy, also serves Seattle and is therefore more likely to be able to adapt and support a benchmarking program in Bellevue.

As Seattle's neighbor, Bellevue can take advantage of resources, opportunities, and expertise that have already been established in Seattle.

The Microsoft Office in downtown Seattle. The City of Bellevue may be able to look towards Seattle as a model of how to best engage with big businesses. LCY STUDENT TEAM

SEATTLE CASE STUDY TAKEAWAYS AND RECOMMENDATIONS:

- Consider beginning a benchmarking program by benchmarking the largest buildings first, similar to how Seattle only requires compliance for buildings 20,000 square feet and larger. By beginning with only the largest buildings, Bellevue can ease City staff and building stakeholders into energy benchmarking processes. Larger buildings may also show larger energy savings as they have higher energy use, which increases the likelihood of capturing building stakeholders' interest in the program.
- Consider establishing energy performance ranges for building types to help owners see how their building's energy use compares to their peers. Seattle provides a chart of energy performance ranges by building type on its website.
- Consider establishing additional height and floor area incentives to encourage participation in building energy benchmarking and performance improvements. Although Seattle's 2030 Challenge Pilot Program is relatively new and therefore may present difficulty in evaluating the efficacy of additional height and floor area incentives, these types of incentives could be very motivating for building stakeholders and would not require the City of Bellevue to directly fund other potentially costly incentives such as rebates or subsidies.



Infographic of City of Chicago's 2016 Benchmarking Program results. Participating building stakeholders use the program as a resource without municipal mandate to invest in costly improvements. CITY OF CHICAGO

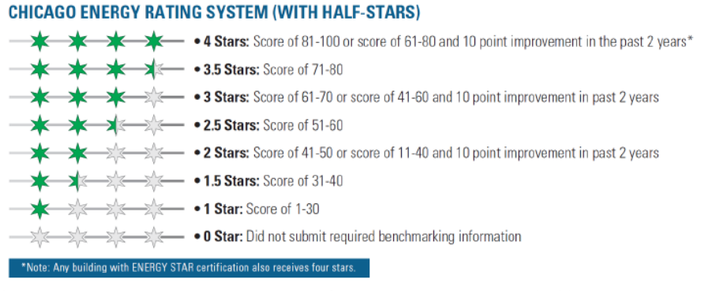
CITY CASE STUDY: CHICAGO

CHICAGO ENERGY BENCHMARKING PROGRAM

In 2013, the Chicago's energy benchmarking program mandated that buildings over 50,000 square feet must use ENERGY STAR Portfolio Manager to benchmark and report their energy use annually to the City (Chicago Energy Benchmarking Working Group 2017). Buildings are not required to make building performance improvements. This encourages building stakeholders to use the program as a resource without municipal mandate to invest in costly improvements.

Another key feature to Chicago's program is its building energy ranking system, called the Chicago Energy Rating System. This system uses a zero- to four-star rating system based on the building's ENERGY STAR score and recent performance improvement. In 2017, an ordinance amendment mandated that buildings of over 50,000 square feet will be required to post their rating on their property (City of Chicago 2017). This system was designed to "be easy to understand in ten seconds or less by a member of the general public" (City of Chicago 2017). The City of Chicago believes that making building energy performance easier to understand will "enable prospective buyers or tenants to make more informed decisions about operating costs related to energy," and that "additional visibility and transparency of ratings can improve performance" (City of Chicago 2017).

Other outreach strategies Chicago utilizes include promoting benefits of energy benchmarking for businesses, highlighting economic improvement



Chicago's Energy Rating System uses a zero- to four-star system to represent building performance. INSTITUTE FOR MARKET TRANSFORMATION

opportunities, and utilizing partnerships with various energy and environmental nonprofits, labor unions, residential groups, and housing authorities (Chicago Energy Benchmarking Working Group 2017). The City also hosts events and meetings about benchmarking. Overall, the City aims to create an informed public that supports and pushes building stakeholders towards adopting building energy benchmarking and energy efficient practices. Chicago's program has merited success despite an increasing population; while population has increased, the city's economic health has also increased, and greenhouse gas intensity has decreased nearly 20% between 2015 and 2017 (Unger 2017, 2017 Chicago Energy Benchmarking Report 2018).

RELEVANCE OF CHICAGO'S BENCHMARKING PROGRAM TO BELLEVUE

Chicago is another example of a successful energy benchmarking program implemented in a very urbanized area not unlike Bellevue's urbanized downtown core. Although Chicago's benchmarking program is mandatory, its lack of a strict requirement to improve building performance results in a softer, more flexible, and less intimidating approach for building stakeholders. With Bellevue's interest in a voluntary benchmarking program, this type of approach may be helpful for Bellevue to consider.

CHICAGO CASE STUDY TAKEAWAYS AND RECOMMENDATIONS:

- **Bellevue can consider developing its own indicator of building energy performance** that makes it easier to understand the complexity of building energy performance similar to Chicago's Energy Ranking System. This system could also be used as a marketing tool to represent Bellevue's own program, as it would be a unique system only for Bellevue buildings.
- **Bellevue could consider implementing a benchmarking program that, at least in the beginning stages of the program, mainly emphasizes benchmarking and registering with ENERGY STAR before strongly pushing for buildings to improve building performance.** This softer approach may be likelier to appeal to building stakeholders and businesses.
- **Bellevue could consider looking into partnering with local or regional energy and environmental nonprofits, labor unions, residential groups, and housing authorities** as Chicago did for their benchmarking program.
- **Bellevue could consider emphasizing building performance improvement in addition to overall performance,** similar to how Chicago's Energy Rating System is based on both. In this way, even lower performing buildings' efforts will still be recognized if they have made significant steps towards improvement.

Chicago's energy benchmarking strategies could be an example to Bellevue, as they create a flexible and less intimidating system for building stakeholders. KING OF HEARTS

The City of Minneapolis adapted the Kilowatt Crackdown to encourage voluntary participation in an energy benchmarking program in 2012. BOBAK HA'ERI

CITY CASE STUDY: MINNEAPOLIS

MINNEAPOLIS KILOWATT CRACKDOWN

In 2012, the City of Minneapolis adapted an already existing energy challenge called the Kilowatt Crackdown to fit with their city. This is a voluntary program where all the buildings that chose to be involved did so because they want to reduce their energy usage. This challenge relies on the ENERGY STAR Portfolio Manager to determine the standing of buildings throughout the competition. About 80 buildings participated in the first Kilowatt Crackdown and the participants collectively cut down their energy use by millions of kilowatt-hours. This program has now become an annual challenge in Minneapolis, and roughly nine to 13 million kilowatt hours are saved each year due to the challenge (Eagles 2012, Freshwater 2013). Each year, the year-long competition culminates with awards for the top-performing buildings. There are many different categories for the awards including most improved, best in show, and most valuable tenant (Eagles 2012, Freshwater 2013).

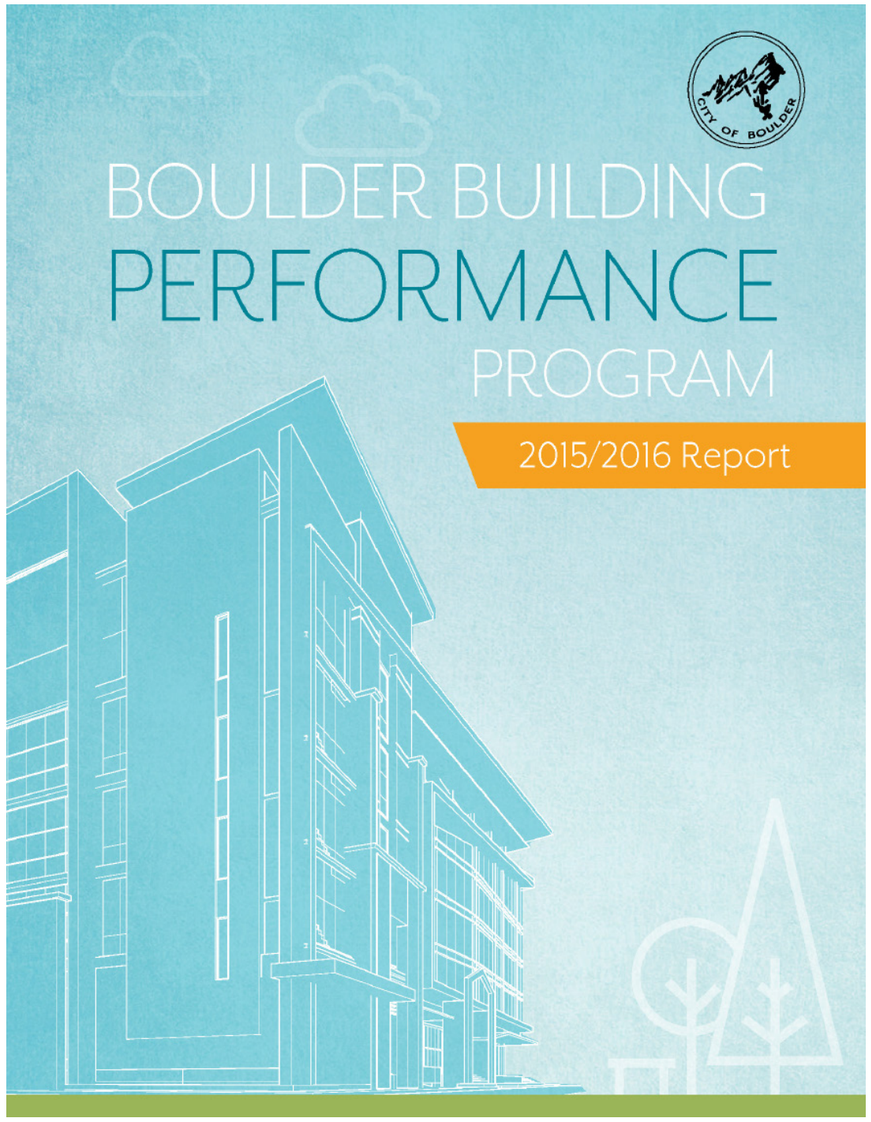
A key feature of the program's success is partnership between the City and Xcel Energy, the primary energy provider in Minnesota. Xcel Energy offered participants rebates to cover the retrofitting costs and other building changes to help make them more energy efficient. In 2012, Xcel gave one million dollars in rebates to participating buildings (Eagles 2012). This partnership created an enticing incentive for buildings to become more efficient, and reduced costs for buildings by using the rebates to cover a portion of their retrofitting costs.

RELEVANCE OF THE MINNEAPOLIS KILOWATT CRACKDOWN PROGRAM TO BELLEVUE

The Minneapolis Kilowatt Crackdown is an example of a program that not only has successfully encouraged building stakeholders to benchmark energy use, make building energy improvements, and adopt more energy efficient practices, but also to do so while remaining a voluntary program that has created sustained interest in the community.

MINNEAPOLIS CASE STUDY TAKEAWAYS AND RECOMMENDATIONS

- Bellevue could consider partnering with Puget Sound Energy, similarly to how Minneapolis partnered with Xcel Energy. A partnership with Puget Sound Energy could be very beneficial, especially to get older buildings to improve performance through rebate and incentive programs.
- The success of Minneapolis' Kilowatt Crackdown shows that voluntary programs can succeed, as long as incentives and financial benefits for participants are clear. Even small, non-financially-based incentives such as recognition, bragging rights, and awards can encourage building stakeholders to work towards energy efficient practices.



Cover page of City of Boulder 2015/2016 Benchmarking Report. Boulder requires certain buildings to annually rate and report their energy use, perform energy assessments and tune-ups, and install one-time lighting upgrades. CITY OF BOULDER

CITY CASE STUDY: BOULDER

BOULDER 2015 BUILDING PERFORMANCE ORDINANCE

In 2015, the City of Boulder enacted an ordinance that required certain buildings to annually rate and report their energy use using ENERGY STAR Portfolio Manager, perform energy assessments and building tune-ups every ten years, and install one-time lighting upgrades (City of Boulder 2017).

The ordinance affects privately-owned commercial and industrial buildings 20,000 square feet or larger, recently constructed commercial and industrial buildings 10,000 square feet or larger, city-owned buildings 5,000 square feet or larger, and large industrial campuses. Buildings are exempt from the ordinance if they have received ENERGY STAR certification (City of Boulder 2017).

A primary feature of Boulder's Building Performance Ordinance is how it phases in requirements over time depending on a variety of factors such as building size, ownership type, and ordinance requirement. This was done to "allow time to fine tune systems and procedures, while providing building owners time to plan for upcoming requirements. Phasing in the largest buildings first kept the first year of the program manageable [...] but also ensured that a large amount of floor area would be impacted" (City of Boulder 2017).

Ordinance Requirement	City Buildings ≥ 5,000 sf	Existing Buildings ≥ 50,000 sf New Buildings ≥ 10,000 sf	Existing Buildings ≥ 30,000 sf	Existing Buildings ≥ 20,000 sf	Large Industrial Campuses
Rating & Reporting	2016	2016	2018	2020	2016
Public Disclosure	2019	2019	2021	2023	2016
Energy Assessments	2019	2019	2021	2023	2019
Lighting Upgrades	2021	2021	2023	2025	2025
Retro-commissioning	2021	2021	2023	2025	N/A
Implement Cost Effective Measures	2023	2023	2025	2027	2021

Timeline table for City of Boulder's Benchmarking Ordinance Requirements, organized by building type. Boulder's Ordinance phases requirements over time, so that building owners are not overwhelmed, and systems can be fine-tuned. BOULDER BENCHMARKING REPORT

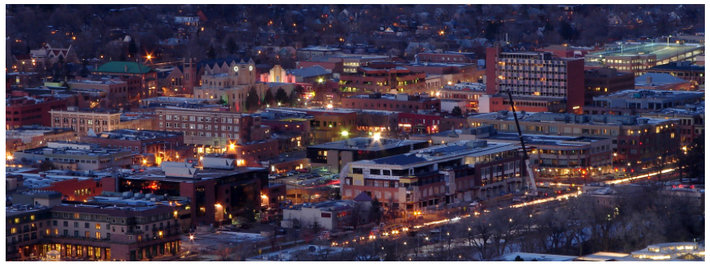
Another key feature of Boulder's program is the City's partnership with Partnership for a Clean Environment (PACE) and its local utility company, Xcel Energy. PACE provides advising services, financial incentives, and certification programs for buildings impacted by the ordinance, and Xcel Energy provides trainings and information on ENERGY STAR, utility rebates, and energy data access (City of Boulder 2017). Furthermore, Xcel Energy was able to ease some of the data collection and input burden of ENERGY STAR Portfolio Manager by providing a service that uploads utility data automatically into Portfolio Manager, similar to Puget Sound Energy's MyData program.

High ordinance compliance, 100% in its first year, is attributed to Boulder's relatively small city size and number of buildings required to comply—165 buildings in the first year—as well as significant outreach effort by City of Boulder staff. Outreach strategy includes the use of notification letters, an online claim form to confirm building contact information with the city, an email listserv, and a monthly newsletter (City of Boulder 2017).

RELEVANCE OF BOULDER'S BENCHMARKING PROGRAM TO BELLEVUE

The City of Boulder is one of the closest cities in population size to Bellevue that has enacted building energy performance policies. Furthermore, both Bellevue and Boulder are becoming tech-oriented cities, with Boulder was named an emerging tech city (Florida 2017), and features offices for both Google and Amazon, as well as an IBM industrial campus. With these similarities in mind, the City of Boulder's strategies have potential to resonate with businesses and stakeholders in Bellevue and could be worth further investigation.

On the other hand, the Boulder community may have potentially stronger business and community support of environmentally-friendly policies, as suggested by the passing of the City of Boulder's Climate Action Plan Tax and other energy efficiency and conservation programs (Boulder's Climate Action Plan n.d., City of Boulder 2017). This support could have been a large factor in the effectiveness of the Boulder program. Furthermore, although the two cities have similar population sizes, downtown Boulder is much less urbanized than downtown Bellevue. Thus, some of Boulder's benchmarking program strategies may not be easily applicable to the City of Bellevue's downtown core.



Some of Boulder's benchmarking program strategies may not be easily applicable to Bellevue, because Boulder may have stronger support of environmental policies, and Bellevue is far more urbanized than Boulder. FLICKR

BOULDER CASE STUDY TAKEAWAYS AND RECOMMENDATIONS

- **Bellevue could consider implementing a similar outreach program to Boulder** involving notification letters, an online claim form, an email listserv, and potentially a semi-regular newsletter. This was cited as being a key factor to high compliance for Boulder's ordinance. Furthermore, this outreach strategy, as it is mostly technology-focused, could be reasonably carried out with minimal staffing.
- **Bellevue could consider partnering with Puget Sound Energy and local, state, and county companies, entities, and nonprofits,** similar to how the City of Boulder partnered with PACE and Xcel Energy. Partnerships not only helped Boulder to increase resources and support to businesses and building stakeholders, but also reduced burden on City of Boulder staff.
- **Bellevue could consider a multi-phase approach to implementation of an energy benchmarking program,** similar to how Boulder implemented ordinance requirements in phases. By recruiting buildings with larger square footage first and phasing in program requirements, such as asking participants to start with benchmarking and then, after a year of program participation, encouraging use of energy assessments or lighting upgrades. This strategy could take a longer time to achieve strong results, but would give city staff time to adapt to additional responsibilities, as well as give time for benchmarking to be to better understood by building stakeholders and normalized in the downtown area.

SUBURBAN BENCHMARKING SYSTEM IN BELLEVUE

There are few cases of successful suburban energy benchmarking programs. However, successful urban benchmarking programs may affect surrounding suburbs' relationship with energy benchmarking and building performance. For example, the success of Minneapolis' benchmarking ordinance encouraged its own county, Hennepin County, to offer other cities in the county support services to implement their own benchmarking programs (Hennepin County 2017). In addition, the building benchmarking program of the suburban city of Evanston, Illinois was also likely influenced by Chicago's benchmarking program (Smith 2016).

CHALLENGES TO SUBURBAN BENCHMARKING PROGRAMS

It is easier to conduct case studies and programs on smart energy use in areas of higher density. With a larger pool of individuals to draw from, programs and studies are likelier to gather more participants, larger amounts of data, and have an overall larger energy impact through the program.

Urban areas have more resources to support the implementation of energy benchmarking and performance programs. Governance and institutional capacities are generally stronger in larger urban areas compared to smaller, suburban towns, which generally makes it easier for the former to implement effective benchmarking programs and policies.

Urban areas are more energy-intensive and generate more concentrated emissions. This results in more significant energy savings and environmental benefits from energy benchmarking and building performance programs compared to suburban programs. This preference for energy-intensive targets is also reflected in how larger buildings tend to be required to benchmark before smaller buildings, and how commercial buildings are generally required to benchmark before single-family residential buildings.

The scarcity of suburban benchmarking programs may discourage formation of benchmarking policies in suburban areas, as there is less data and information to guide and inform policy for suburban benchmarking programs.

EVANSTON, ILLINOIS BENCHMARKING PROGRAM

Qualifying buildings in Evanston are required to benchmark building performance using Portfolio Manager and submit an annual benchmarking report to the City. Compliance with the ordinance was phased in with buildings of a gross floor area of 100,000 square feet or larger required to start benchmarking in 2016, buildings of 50,000 square feet or larger required to start benchmarking in 2017, and buildings between 20,000 square feet and 50,000 square feet required to start benchmarking in 2018 (City of Evanston 2016).

A central part of the city's economy and culture is Northwestern University. Northwestern benchmarked its buildings before the Evanston ordinance was implemented, which may have influenced some City members to consider supporting a benchmarking ordinance in Evanston. Another factor to consider is the City's support of sustainability, as it was named the World Wildlife Fund's 2015 US Earth Hour Capital for its green policies and for setting a community carbon neutrality goal in 2018 (City of Evanston n.d.). Although further research into Evanston's benchmarking program could be insightful, it may not be the most relevant case study for Bellevue, due to Evanston's much smaller population size, less urbanized downtown, and pro-sustainability culture, which could have made implementing a benchmarking program relatively more streamlined.

The City of Evanston, Illinois, features some building performance benchmarking requirements, but may not be the most relevant case study for Bellevue, due to the cities' population and cultural differences. NUTMEGGER

MARKETING AND ENGAGEMENT

When creating a benchmarking program, the City of Bellevue should consider how the program will engage with and appeal to building stakeholders. JELSON25

WHAT MOTIVATES BUILDING STAKEHOLDERS?

A key feature of an energy benchmarking program strategy is appealing to the interests of various stakeholders. Although "boosting the bottom line" is a common, primary motivation for most building stakeholders (Slobe 2015), marketing approaches to different building stakeholders can still differ depending on stakeholder type.

BUILDING OWNERS AND LANDLORDS

Building owners usually are focused on the return on investment (ROI) derived from an increase in energy savings, and tend to favor a three-year ROI (Christensen et al. 2018). Overall, quicker ROI are more appealing to building owners, but building performance improvements can have a high up-front cost. Thus, building performance improvements that are promoted in an energy benchmarking program are most appealing if they involve a three-year ROI or shorter. Landlords and building owners may also be responsive to energy benchmarking and performance improvement programs if tenants show strong preference and desire for sustainable and energy efficient building practices. Landlords and building owners favor high tenant quality as it reduces risk, and green building design and operation can affect tenant decision-making in choosing a leasing or office space (Christensen et al. 2018). Thus, prospective marketing opportunities of buildings to tenants as green, energy efficient, and sustainable can be a motivator for building owners to consider energy benchmarking and performance programs.

PROPERTY MANAGERS

Property managers are the gatekeepers—and the first decision-makers—of whether a property should implement an energy benchmarking program. Our research indicates that access to credible data on building energy use, trends and savings opportunities, information on rebates and financial incentives, and examples of buildings that successfully implement similar projects is critical in making a strong case to property managers to seriously consider energy benchmarking and building performance improvements for their buildings (Slobe 2015).

> "It is property managers who must prove beyond a shadow of a doubt that energy-saving improvements are worth the investment. Managers are, in fact, the first decision makers—they are the gatekeepers. If an idea doesn't get past them, it won't make it to the owner."
>
> *— Slobe 2015*

BUILDING OPERATORS

As building operators are responsible for maintenance and operation of buildings, they are likelier to be more familiar with or interested in different energy efficient upgrades or improvements to strengthen their building's efficiency. Therefore, energy benchmarking can best appeal to building operators as a tool to highlight building energy inefficiencies that they can then target and improve upon (Christensen et al. 2018).

TENANTS

In the team's interview with Jared Silliker, Silliker stated that, while tenants may see a building's energy efficiency as a positive factor, it is not always a high motivator when deciding whether to rent a space. Silliker concluded that a stronger public understanding of why energy efficient buildings are beneficial is necessary before it can become a major factor in the decision-making process for prospective tenants. On the other hand, current tenants could show interest in their building's energy efficiency if it positively affects costs associated with their lease or utility bills.

Current and prospective tenants may or may not show interest in energy benchmarking for their buildings. LCY STUDENT TEAM

COMMON COMMUNICATION BARRIERS AND SOLUTIONS FOR USING ENERGY BENCHMARKING DATA

Building benchmarking data provides better information for transactional real estate decisions, such as leasing or purchasing space, and helps to identify opportunities to save money through efficiency improvements. Making this data available in the real estate market is only useful if market actors understand the information and know how to incorporate it into their business activities. Barriers that prevent the optimal use of this benchmarking data include awareness of data and understanding how it can be used, and are presented in the table below.

CATEGORY	BARRIER	CITY GOVERNMENT SOLUTION
Awareness	Market decision makers, including building owners and tenants, investors, brokers, and energy service providers, may not know that datasets of reported benchmarking data are publicly available.	• Building owner benchmarking (a primary mechanism for increasing awareness of building energy consumption) • Data published and searchable on a City website • Visualization platforms that enable easy identification of a building's efficiency
Understanding	Market decision makers, including building owners and tenants, may not understand how benchmarking data can be used in their operations to increase energy efficiency.	• Direct one-on-one outreach from the City to building owners and property managers • Energy scorecards sent to building owners • Annual benchmarking reports summarizing impact of all compliant buildings • City-hosted educational events and workshops to review data and identify energy-saving actions • Dissemination of information through local partners with real estate industry relationships

Common communication barriers for using benchmarking data include awareness and understanding. These barriers can be overcome through, for example, visualization platforms and direct outreach. BEDDINGFIEL

Energy benchmarking must remain positive to increase and maintain participation.

GENERAL MESSAGING AND MARKETING STRATEGIES AND BEST PRACTICES

KEEP IT POSITIVE

A key feature to implementing effective benchmarking programs is to make sure that people are not discouraged by communication strategies that could be facilitated by public comparisons (Eggleston 2015). Being compared to other buildings may be embarrassing for buildings that are ranked low relative to other buildings, and they may become discouraged to continue participating in the program. On the other hand, if their results are framed positively, as an accomplishment that can only grow more impressive, they are likelier to continue participation in the program to maintain that sense of accomplishment. For businesses, accomplishments could also be desired for marketing purposes to advertise their building or business as sustainable and high-performing, or at least making strides to do so. This could be especially important for voluntary programs, since voluntary programs rely on participant interest and commitment instead of a policy mandate.

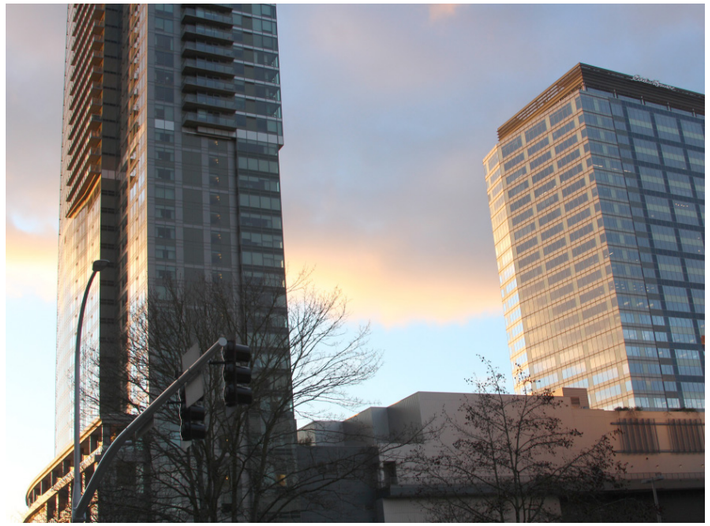
In the interviews with Jared Silliker and Christian Delgado, both individuals highlighted that energy benchmarking must remain positive to increase and maintain participation (Delgado 2018, Silliker 2018). For example, one should congratulate users for the progress they have made rather than shame them for the potential they have not yet reached. Also, acknowledgement of participation and recognition of improvements is important to show that every building's participation in the energy benchmarking program is valued (Beddingfield 2017).

At the same time, while positive framing is important, it is also recommended to still maintain a push for improvement. In this way, performance progress will continue to occur. This tactic of positive framing coupled with continuous encouragement to improve, was cited as an important tactic for the Phoenix Water Department's water conservation program (Delgado 2018). It is recommended that a balance be found between positive framing and improvement, because if improvement messaging is too aggressive, participants may feel like their accomplishments are not being recognized.

LOSS AVERSION AND ANCHORING

Loss aversion is the "perception that losses are more painful than equivalent gains" (Jewel et al. 2016). Research has suggested that loss aversion is more motivating than effort to make gains of the same value, with one study showing that individuals weigh losses roughly "twice as much as equivalent value gains" (Jewel et al. 2016). Thus, it is worth considering marketing energy benchmarking financial savings as loss aversions rather than value gains.

Another term, "anchoring," means initially giving one number to influence how someone feels about another figure given later. This individual will subconsciously compare the two and see the lesser number as more enticing to achieve rather than if the number were standing alone (Shonk 2018). This can be used when convincing stakeholders to reduce their energy consumption by communicating the previous year's energy use (and therefore, the number of dollars spent) and contrasting it with current use. If there is improvement, this tactic could help emphasize savings and encourage stakeholders to continue to work towards reducing their energy use.



The City of Bellevue could consider employing loss aversion and anchoring strategies in its new building energy benchmarking program. LCY STUDENT TEAM

It is recommended that the City of Bellevue look towards developing strategy and programming that makes all stages and aspects of the energy benchmarking program as easy, simple, and quick as possible for building stakeholders.

KEEP IT SIMPLE

Throughout the team's research and interviews with industry experts, the idea of simplicity and ease has been emphasized. Building owners, property managers, and other building stakeholders already have many responsibilities and thus do not have a lot of time to commit to a building energy benchmarking program. This has been described as stakeholders potentially suffering from "time scarcity" (Jewel et al. 2016), which can cause individuals to "delay completing the requirements not because they intentionally decide not to comply, but because the task is postponed while they handle other concerns" (Jewel et al. 2016).

Furthermore, the multi-step process of benchmarking may be perceived as arduous in addition to time consuming. Studies have identified that processes involving several small steps can inhibit prosocial behavior (Jewel et al. 2016). These, perceived "hassle factors" of steps that are often involved in energy benchmarking may affect whether building stakeholders decide to participate in an energy benchmarking program.

To mitigate these "time scarcity" and "hassle factor" barriers to energy benchmarking engagement, it is recommended that the City of Bellevue look towards developing strategy and programming that makes all stages and aspects of the energy benchmarking program as easy, simple, and quick as possible for building stakeholders. For example, the City of Bellevue could create a quick and simple onboarding process that involves a brief, online sign up form and a single orientation session, and help building stakeholders learn how to use PSE's MyData to make the data input process easier and more streamlined. In addition, reducing the number of action steps building stakeholders need to take in the onboarding or benchmarking process could also improve perception around high time and effort commitments for energy benchmarking. This could potentially be achieved by helping stakeholders complete some of the onboarding process or get a head start on early stages of benchmarking at an orientation session, so that the stakeholders do not have to commit additional time later on to perform these tasks. Such tasks that could be done at an orientation include creating an ENERGY STAR Portfolio Manager account, creating a PSE MyData account and linking it to Portfolio Manager, and giving a basic walkthrough on how to input data that is not uploaded by PSE into Portfolio Manager.

PROVIDE SUCCESS STORIES AS MOTIVATORS

Building owners and managers are more likely to adopt energy benchmarking practices and energy performance improving behaviors if shown real-world examples of how energy benchmarking and practices have saved other buildings and businesses money and increased their buildings' energy efficiency. Building owners and managers want to see evidence that adopting these practices and putting in the effort to benchmark and make building performance improvements will pay off for them. In a focus group session interviewing Seattle building owners and property managers about motivations for energy-saving improvements, participants shared that they were very interested in learning what actions and strategies had been used by other owners and managers that improved building performance and saved their buildings money (Slobe 2015).

There are many ways to distribute strong examples of the efficacy and financial gain of energy benchmarking and energy performance improvements. Examples of success could be shared during orientation sessions, trainings and workshops, and during recognition events. Furthermore, examples of success could be included in emailing lists or included along with energy benchmarking reports that are sent to participants.

More creative ways to distribute examples of success could include creating "mini-profiles," which give visually simple, summary snapshots of businesses and buildings that have successfully saved money through improved energy performance, how much they saved, and the basic steps and actions they performed to accomplish their savings (Slobe 2015). These profiles could be posted on the City of Bellevue's website and social media pages, as well as the Bellevue Downtown Association's website. Another creative way to distribute examples of success is to create an annual or quarterly newsletter highlighting examples of success. The City of Bellevue can also frame these strategies as free recognition and advertisement incentives, as well as rewards for good building performance.

Falmouth Youth Ice Hockey Rink

Power Purchase Agreement (PPA)

Since 1965, Falmouth Youth Hockey Rink has served thousands of young skaters within the community. Wanting to reduce rising utility costs, the rink turned to Con Edison Solutions for help. Using a power purchase agreement, Falmouth Rink financed the installation of 3,302 solar panels across more than 60,000 square feet of rooftop and parking space. The installation covers 100% of the facility's needs, and it is helping the hockey league save an average of $80,000 annually.

PROJECT DATA

LOCATION
Falmouth, MA

CONSTRUCTION DATES
Completed on time

SAVINGS
$1,600,000 over 20 years

TECHNOLOGY
Sharp NU-U240F1
Panels: 3,302

SYSTEM SIZE
.792 MW (DC)

ENVIRONMENTAL BENEFITS
CO_2 Offsets: 1,385,402 lbs. annually
CO_2 Equivalent: 121 cars removed from the road annually

ConEdSolutions.com • 844.896.2614

PROJECT DATA

LOCATION
Parsons, KS

CONSTRUCTION DATES
May 2004 to October 2004

CAPITAL COSTS
$2,014,326

ANNUAL SAVINGS
Energy Savings: $174,716
Non-Energy Savings: $12,560

ENVIRONMENTAL BENEFITS
2,539 tons of harmful greenhouse gas emissions reduced annually

Equivalent to:

- Preserving 16.1 acres of forest from deforestation* or
- Conserving 5,356 barrels of oil*

*Sources:

- Leonardo Academy's Cleaner & Greener℠ Emissions Reduction Calculator: http://www.cleanerandgreener.org/resources/pollutioncalculator.html
- U.S. Environmental Protection Agency, Greenhouse Gas Equivalencies Calculator: http://www.epa.gov/cleanenergy/energy-resources/calculator.html

Case Study profiles created by ConEdison. Profiles could be created by the City of Bellevue of successful examples where a businesses or buildings improved their energy performance and saved money (left). Alternatively, an even briefer profile could be created, with several facts of the success story (right) CONEDISON

Finding examples of success to promote may be challenging at the beginning of the program. The City of Bellevue could look at buildings and businesses that are currently ENERGY STAR certified, or past USB program participants if a building or business has made notable effort towards keeping their energy use low and their building performance high. In addition, the City of Bellevue could look to Seattle buildings and businesses as examples of success if not many strong examples in Bellevue can be found. However, the more local the example, the more likely it will resonate with Bellevue building stakeholders and the Bellevue community.

WORKSHOPS, TRAINING SESSIONS, AND ALTERNATIVES

Providing workshops and training sessions for energy benchmarking program participants has also been cited and recommended by many resources, industry experts the team interviewed, and the USB program report (Beddingfield 2017, Delgado 2018, Quigley 2018, Slobe 2015, C+C et al. 2018). Thus, it is strongly recommended that the City of Bellevue conduct workshops and training sessions as a part for their energy benchmarking program.

The most useful workshops and training sessions would likely be focused on introducing the general concept of energy benchmarking and performance—which could also be covered in an orientation session—and teaching building stakeholders how to use and navigate ENERGY STAR Portfolio Manager and PSE MyData. Due to the importance of ENERGY STAR Portfolio Manager and MyData in the process of energy benchmarking, it is critical that support be given to building stakeholders on how to use these programs. Other workshops that would also likely be considered helpful are ones that provide building stakeholders with resources or action items to improve their building performance, or help building stakeholders develop action items and action plans on their own.

Considering staffing limitations, the City of Bellevue may also want to connect building stakeholders to trainings and workshops not provided by the City of Bellevue—although we do recommend that the City of Bellevue host at minimum a few workshops per year to demonstrate its commitment to the program. The primary two sources of outside workshops and trainings are ENERGY STAR and the Northwest Energy Efficiency Council (NEEC).

It is strongly recommended that the City of Bellevue conduct workshops and training sessions as part of their energy benchmarking program.

ENERGY STAR Training Resources webpage, February 2019. ENERGY STAR provides a variety of different resources to support individuals in enrolling into, navigating, and utilizing Portfolio Manager. ENERGY STAR, US DEPARTMENT OF ENERGY

ENERGY STAR ONLINE WEBINARS AND VIDEO TUTORIALS

ENERGY STAR provides a variety of different resources to support individuals in enrolling into, navigating, and utilizing Portfolio Manager, including live online training webinars, a library of past recorded webinars, PowerPoint presentations, resource documents, and videos on how to set up and use different Portfolio Manager features.

These resources can be found at: https://www.energystar.gov/buildings/training/training

SMART BUILDINGS CENTER

The NEEC's Smart Building Center in Seattle hosts workshops and trainings for building owners and operators to learn more about energy benchmarking practices.
SMART BUILDINGS CENTER

NORTHWEST ENERGY EFFICIENCY COUNCIL RESOURCES

The Northwest Energy Efficiency Council (NEEC) hosts workshops that provide individuals with the opportunity to "ask the experts" about ways to more efficiently use energy and save money. NEEC workshops and trainings are often held at NEEC's Smart Building Center in Seattle, and thus are relatively accessible for building owners and operators who live in the Bellevue and greater Seattle area. Although these workshop topics can be relatively specific or specialized, there are also online resources that provide assistance in navigating ENERGY STAR Portfolio Manager on NEEC's Smart Buildings Center website (Northwest Energy Efficiency Council n.d.).

MARKETING MESSAGING AS ENERGY EFFICIENT

In messaging for outreach and engagement for an energy benchmarking and building energy performance program, the City of Bellevue could consider using messaging that focuses on how benchmarking and building performance improvements help achieve energy efficiency over or in addition to how benchmarking and building performance are linked to sustainability. Energy efficiency and reducing energy use have already been established as "common sense" for building owners and managers, as they are usually aware that it saves them money. On the other hand, sustainability is more of a "cherry on top" concept that can be used for good PR, but does not typically drive decisions to improve building performance or adopt practices like benchmarking that may improve performance. Furthermore, while not heavily controversial, sustainability does carry more of a politicized association than energy efficiency (Slobe 2015).

Energy efficiency and reducing energy use have already been established as "common sense" for building owners and managers.

COUPLING ENERGY EFFICIENCY WITH BENEFITS OTHER THAN MONEY

Although it is recommended that financial savings are the primary marketed incentive to adopt energy benchmarking and efficiency practices, other potential benefits of adopting energy efficient practices are also worth highlighting in marketing materials. Non-financial benefits of energy efficient practices could include improved occupant safety, such as better lighting; increased tenant comfort and, by correlation, fewer tenant complaints, after HVAC system improvements; and a marketable image of the building or business as more sustainable and energy efficient (Slobe 2015).

VISUALIZATIONS

Data visualization is the means by which complex data are represented in images, charts, graphs, or other diagrams so that the average consumer can easily digest complicated arrays of information. Optimally, data visualization should serve to identify relationships, recognize patterns over time, comprehend data quickly, and communicate a story to others. In terms of encouraging sustainability and energy benchmarking, practices that have combined art and science have been especially successful in driving elevated conservation behavior and environmental stewardship

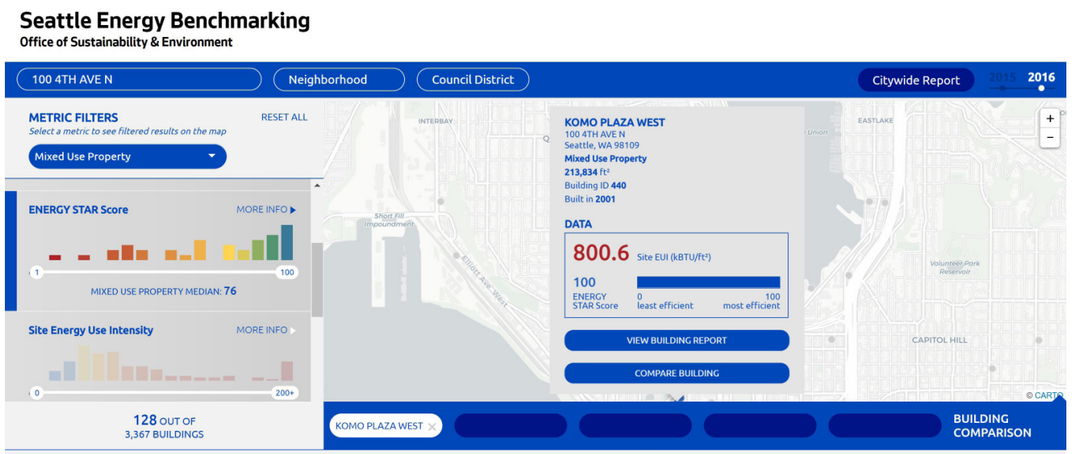
(Holmes 2007). Visualizing and displaying statistics that measure typically confusing data allows for building managers, owners, and tenants to more readily understand the scope of their energy use, which is the first step to mitigating it. Studies have also shown the relevance of real-time, dynamic data visualization as key players in changing perception and understanding of energy conservation. The ability to observe data inputs across time and on different time scales, such as monthly or yearly, allows for clearer communication and a better understanding of a building's energy performance (Lunga et al. 2014).

Example data visualization graphs for buildings in Bellevue, courtesy of the Smart Buildings Center. SMART BUILDINGS CENTER

KIOSKS AND DASHBOARDS

Front-facing visual cues such as kiosks with dashboards that show benchmarking efforts and energy-saving achievements are key to communicating a building's dedication to conservation and monitoring efforts. Kiosks in the downtown Bellevue core could be better utilized as a way to educate building managers, operators, tenants, and the general public about a building's energy use and performance. Currently, the kiosks serve as a source of news, weather updates, and office information, but their roles could be expanded to display information regarding building energy information and statistics.

In addition to communicating information through kiosks, dashboards could also be made available on a building's website or tenant portal. This could be considered helpful for tenants who are interested in leasing a space aligned with values of sustainability or who are interested in reducing their cost of living.



Example of a Seattle building's benchmarking results using the Seattle Benchmarking Dashboard. Front-facing visual cues like kiosks with dashboards are key to communicating a building's dedication to conservation and monitoring efforts. CITY OF SEATTLE

OTHER OUTWARD-FACING VISUALS

Other outward-facing visuals displayed on the window of building entrances or in other public-facing spaces, such as certification stickers or plaques, can also play important roles in increasing public awareness of building energy performance and basic energy literacy, as well as providing a building or business with a more positive, sustainable image. The brands of some certifications, such as ENERGY STAR, are well recognized, while others, such as LEED certification, are less well-known even though they also indicate a high level of sustainability and environmental stewardship. Interestingly, although LEED has various levels of certification, these differing levels are reported to have no impact on the outlook of the building, as different levels equally benefited building stakeholders (Christensen et al. 2018).

On this Bellevue Downtown multifamily residence building, the LEED certification symbol is displayed next to entrance doors. Outward-facing visuals, such as certification stickers or plaques, can play important roles in increasing public awareness of building energy performance, and providing buildings with more positive, sustainable images. LCY STUDENT

Societal awareness of certain energy performance and sustainability brands and logos impacts the adoption of the program they represent, as a building or business is less likely to work towards a certification or status that is not generally known or recognized by the public. Therefore, building the societal awareness of standards and certifications may be needed to best benefit the building stakeholders interested in applying for such certifications, which in turn will further incentivize joining the program.

COMMUNICATE KEY ENERGY BENCHMARKING DATA RESULTS THROUGH BENCHMARKING SCORECARDS AND REGULAR REPORTS

An important component of effective energy benchmarking and conservation programs is personalized energy data engagement and communication with building owners, operators, and managers. If building owners, operators, and managers are regularly updated with building energy usage and benchmarking data, they will be better informed and potentially more motivated to take action steps towards reducing their building's energy use and improving their building's energy efficiency.

Sending building owners, operators, and managers annual or quarterly messages outlining key data around their buildings' benchmarking performance could be very helpful in getting them more engaged and informed about their buildings' benchmarking data. Sending informational highlights about building energy benchmarking data directly can increase engagement by eliminating steps such as logging into web portals, clicking and following directed links, or having to look up or sort through databases, which may act as time or ease barriers for building owners, operators, and managers to learn about their buildings' energy benchmarking data.

ENERGY BENCHMARKING SCORECARDS

Also sometimes referred to as energy benchmarking profiles, energy benchmarking scorecards are brief one-to-two page documents that summarize a building's benchmarking results, provide information to help the scorecard reader understand and contextualize their results, explain and incentivize the significance of improving the results (e.g. financial benefits), and provide information on resources to take actions

The City of Bellevue could consider personalized energy data engagement and communication with building owners, operators, and managers. LCY STUDENT TEAM

to improve benchmarking results (Hart, et al. 2018). Energy benchmarking scorecards are used by several cities and energy benchmarking programs. Sending these reports to participants in an energy benchmarking program electronically, as well as physically, is one way through which jurisdictions can regularly update building owners, operators, and managers on their building benchmarking performance data and get them more engaged with the data.

Philadelphia: Sample 2016 Energy Profile—ENERGY STAR Score (2 pages)

BUILDING ENERGY PERFORMANCE PROFILE

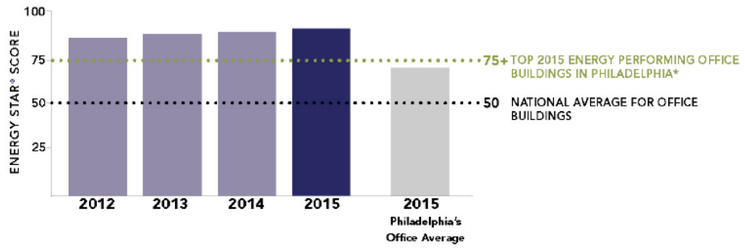
REPORTING YEAR 2015

ADDRESS: XXX MAIN STREET **OPA ID#:** 70000000

YOUR BUILDING'S ENERGY STAR® SCORE 2012 TO 2015

(1-100 Score, 100 is most efficient building)

85 87 88 **90** 69



*Buildings 75 or above are eligible to become ENERGY STAR® certified. See next page for more information.

YOUR 2015 RANKING FOR SIMILAR BUILDINGS IN PHILADELPHIA

Ranking is based on self-reported data provided by building owners and operators.

Your Building Ranks # **18** out of **133** similar **Office** buildings

YOUR BUILDING'S TOP ENERGY SOURCE(S) IN 2015

Electricity

YOUR BUILDING COULD SAVE

$96,445*

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BY REDUCING ITS 2015 ANNUAL ENERGY USAGE BY **5%**

**Utility cost data is based on EIA's estimated regional cost of energy for electricity, natural gas and fuel oil #2 in 2015.*

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This page and next: Example of an energy benchmarking scorecard from Philadelphia. Sending energy benchmarking scorecards to program participants is one way through which the City can regularly update stakeholders on benchmarking performance data. HART

A key component of the development of energy benchmarking scorecards is making them user-friendly.

KEY ELEMENTS FOR ENERGY BENCHMARKING REPORTS

- Introductory message
  - » Explain what the scorecard is
  - » Thank participant for program participation
- Key Logistical Details
  - » Timeframe data covers (e.g. one year, two years, three months)
  - » Property details (address, building category, etc.)
- Summaries of performance
  - » ENERGY STAR score and/or EUI score
  - » Comparison or ranking of energy performance compared to peers
  - » Comparison of building's current or recent energy performance compared to its past performance
- Resources for specific next steps and improving building performance

MAKE THE REPORTS USER-FRIENDLY

A key component of the development of energy benchmarking scorecards is making them user-friendly. Layperson language is preferred, along with graphs and easy-to-understand visuals summarizing building energy performance data. Combining multiple performance data results into a single graphic can allow for this single visual to be emphasized and stand out. Too many graphics can be visually overwhelming and confusing. Overall, text should be limited to only key information, with captions and phrases preferred over blocks of text. If detailed explanations are needed, the amount of text on the scorecard can be reduced by making such explanations available online with a link or QR code, which recipients can use or follow to learn of finer details, instead of these details being printed on and cluttering the report.

TAILOR REPORTS TO THE RECIPIENT

Research by the Institute of Market Transformation (IMT) and the American Council for an Energy-Efficient Economy (ACEEE) suggests that building owners and managers strongly prefer personalized information about their building's energy performance and savings opportunities over a comparison of their building performance to others. In general, tailoring messaging or including certain key elements for the building stakeholder receiving the report can increase the effectiveness of the report in motivating actions or investment decisions. For example, in a Chicago study by ACEEE, property managers were more interested in a building's ENERGY STAR score and wanted to know how to improve the it, while engineers were more interested in EUI and expressed skepticism about the ENERGY STAR Score and its peer comparison system (Jewel et al. 2016).

Tailoring messaging or including certain key elements for the building stakeholder receiving the report can increase the effectiveness of the report in motivating actions or investment decisions.

A key way to customize scorecards is to provide tailored information on how much energy reduction would need to be achieved in order to improve building performance to a specific level, for example, to achieve ENERGY STAR certification. This has already been cited by benchmarking program participants as a desired feature for energy scorecards (Jewel et al. 2016). Additional content, metrics, rebate information, or recommendations can also be included in certain reports depending on a building's type, use, or other features. For example, a tailored report may include energy usage per room, per night for hotel reports, resources about residential tenant engagement programs for multifamily housing reports, or specific rebate and financial information depending on building type or usage (Hart et al. 2018).

Creating different, customized messaging for buildings that have achieved good energy performance in comparison to buildings that have not

yet done so could also be considered. For buildings with good energy performance, messaging could be more congratulatory and resources could include opportunities to market and share their accomplishments and gain recognition. In contrast, buildings that are still working towards achieving good energy performance could have messaging more focused on taking action and improvement, with more resources focused on improvement rather than marketing (Hart et al. 2018). In this way, buildings that have achieved high energy performance can be acknowledged for their success.

The City of Bellevue could consider creating customized scorecard messaging for buildings that have achieved good energy performance in comparison to buildings that have not yet done so.
LCY STUDENT TEAM

USE COMPARATIVE MODELS

Comparing a building's performance to similar local buildings can increase motivation to improve if a building's performance is worse than other local, comparable buildings (Hart et al. 2018). However, at the same time, the City of Bellevue may want to be cautious in emphasizing ranking scores or placement, especially if a participant ranks low. For building stakeholders, rankings can seem "meaningless," as they cannot usually control their tenant energy use. Furthermore, comparisons that inform rankings may not be accurate enough, as they may not account for certain tenant habits, needs, and other factors, such as how seniors and retirees typically spend more time at home and thus will contribute to higher energy use in comparison to working individuals (Slobe 2015). Furthermore, if it displays very low rankings, the City could run the risk of unintentionally shaming building stakeholders and discouraging them from further program participation. Ranking display on scorecards could thus be another feature to consider that is customized by recipient.

BENCHMARKING VS. RANKING

Energy benchmarking metrics and ranking comparisons are both often used to encourage improvements in building energy performance. However, energy benchmarking and ranking energy performance involve different data sets and present energy performance data differently. Energy benchmarking data is focused on looking at one building's performance over time. Ranking compares a building's performance to other buildings' performance.

If ranking and comparison models between buildings are given, clarity and specificity about what determines "similar local buildings" or comparable buildings (e.g. use, size, or other factors) are important to building owners, operators, and managers (Hart et al. 2018). In addition, when showing changes in a building's energy performance over time, take care to make the date and time period the benchmarking data represents very clear (Slobe 2015).

SUBMETERING LIMITATIONS FOR COMPARISON IN MULTI-TENANT BUILDINGS

Another way in which comparisons can be motivating for neighborhoods like downtown Bellevue is comparison of energy performance between different businesses instead of by building size, type, and use. For buildings that only are occupied by a single tenant, a building's energy performance can be marketed and perceived as a reflection of the tenant or business's commitment, practice, and contribution to sustainability and green practices. Businesses could be motivated to improve building energy performance and engage in energy conservative practices if presented with comparison energy performance metrics between their performance and competing businesses' performances. For businesses, this approach could be much more motivating than a comparison of their building to similar size or type buildings, with which they are not in direct market competition.

This approach, however, has several limitations. The primary limitation is that this approach could only be most easily implemented for businesses that are the sole occupant of their building. Due to submetering limitations in most commercial buildings, this approach would be very difficult to implement for businesses that are tenants in buildings where they are not the only tenant, as their business's energy use and performance would be difficult to separate from the collective use and performance of all tenants in the building (Meek 2018). Thus, the individual business' energy use and performance would be difficult to compare with their competitors'.

INCLUDE FINANCIAL MOTIVATORS

Due to the general appeal of financial savings as motivators for many building stakeholders, providing estimates for potential financial utility savings—if certain energy improvements are made or potential financial loss incurred from energy inefficient practices or lost opportunity—can be potentially strong motivators for building owners, operators, and managers to consider improving their building energy performance. In addition, providing information about how energy efficient buildings can achieve higher net operating incomes, and thus have a higher value than less energy efficient buildings, is also likely to have positive effects on encouraging building owners to consider energy performance improvements. If an online calculator, which estimates financial effects on net operating income and building value if different potential energy efficient improvements are made, is available, reports that direct recipients to such a resource could be very powerful, useful, and valued tool to building stakeholders.

INFORM ACTION ITEMS AND NEXT STEPS TO IMPROVE BUILDING PERFORMANCE

Resources that can be included on a report to help building owners, operators, and managers take steps to improve their building performance could include aspects like information about utility incentive programs, web links to helpful resources, phone numbers to a help desk or local utility, dates for upcoming energy benchmarking workshops, or general improvement actions like installing LED bulbs and reducing indoor temperatures during the daytime.

Comparing benchmarking data between Bellevue businesses could encourage friendly competition and thereby innovation in building performance benchmarking strategies. LCY STUDENT TEAM

USING ADOBE INDESIGN TO CREATE BENCHMARKING REPORT TEMPLATES

Adobe InDesign is a graphics publishing and typesetting software that can be used to make visually sophisticated and spatially complex templates for customizable, personalized reports. It works in similar principle to creating a template using mail merge, in that it involves creating a template file with which placeholder fields can be filled in with data from a separate file utilizing the "Data Merge" feature.

Data Merge accepts the same types of data source files as the Microsoft Suite mail merge, allowing for different types of placeholders, including text, images, and QR codes, which in turn can be linked to text, web links, phone numbers and, email.

Report templates made in Adobe InDesign allow for more professional-looking reports. However, unlike mail merge, InDesign is not connected to mailing service and documents cannot be sent to recipients directly from the application. Thus, reports created with Adobe InDesign must be saved and sent through email or uploaded online and then later accessed by unique web links.

It also should be noted that Adobe InDesign is less intuitive to use than mail merge and simpler word processing programs. Despite this barrier, using Adobe InDesign is not an uncommon way to make templates for energy benchmarking reports, as it was used by Philadelphia City staff and by the Seattle consulting firm that the City of Seattle hired to create their energy benchmarking scorecards (Hart et al. 2018).

BENCHMARKING REPORTS - ELECTRONIC VERSUS PHYSICAL COPIES

There are advantages and disadvantages to favoring sharing data and reporting through either electronic or physical reports.

Electronic Reports	Physical Reports
Easier and more affordable distribution of reports. Allows recipients access to direct links, which they can click to access online resources.	Higher cost and time investment to distribute reports.
Reports are received by recipients much more quickly.	Physical reports and files are culturally perceived as generally more formal and official in comparison to electronic reports. Some psychological studies suggest that individuals tend to place larger inherent value in physical objects in comparison to their digital counterparts. This could suggest that recipients could potentially perceive physical reports as more impressive, important, or meaningful in comparison to digital reports.

In an energy benchmarking program, it is worth considering reporting results to participating buildings in both electronic and physical format, if time and staffing allow. Another possibility is to consider creating different templates for electronic and physical reports, with one containing more detailed information and results, and the other report being more of a brief summary. Creating two reports, however, is more time-consuming, as it requires two separate templates and could lead to less recipient motivation to review the secondary report.

BENCHMARKING REPORTS - POSTCARDS VERSUS SCORECARDS

In addition or as an alternative to more detailed energy benchmarking reports, like the energy benchmarking scorecards, the City of Bellevue could consider making shorter, more concise reports, similar in size and shape to postcards. For example, the City could send scorecards or more detailed reports electronically and send shorter, more concise "postcard" reports physically by mail, with a reminder to check one's email for the detailed, electronic report.

Scorecards	Postcards
Longer, able to fit larger amount of information. More formal presentation of benchmarking results data.	Concise and brief, not able to fit a large amount of information. More informal presentation of benchmarking results data, and thus could be perceived as less important, but also less intimidating, by recipients.
Takes a longer amount of time to read, and could be an interest barrier, especially if scorecard is text-heavy.	Quicker and easier to read, and thus could be more appealing to recipients who do not want to spend a lot of time reading and trying to understand the report.

USING UNIVERSITY STUDENTS AS A RESOURCE

Although several of the cities in the "Energy Benchmarking Scorecards: Sharing Data to Motivation Action" report hired design firms to develop their energy benchmarking scorecards, the City of Bellevue can look towards recruiting local graphic design students to design scorecard or reporting templates at a much lower cost. There are many graphic design and digital design programs at universities in the Puget Sound region with students who could be interested in developing a reporting template, especially considering the prestige of the City of Bellevue using the final design. This could be achieved through an internship position or even a through a graphic design competition open to local university students. In addition, student interns could be utilized to handle logistical work surrounding data organization, creating mail merges, and sending reports.

Bellevue College is just one of the many higher education institutions in the Puget Sound area through which students could be recruited to work on graphic design projects for an energy benchmarking program. BADAMS@BCC.CTC.EDU

APPLICATIONS OF BELLEVUE'S CULTURE AND IDENTITY TO ENGAGEMENT IN AN ENERGY CONSERVATION PROGRAM

Conservation programs can make outreach and marketing more effective if they are tailored to or incorporate the perceived culture and characteristics of the city. This strategy focused on making conservation part of city culture has been cited by the Phoenix Water Conservation program as a key element to its success (Phoenix Water Services Department n.d.). The City of Bellevue can thus potentially generate more interest and engagement in energy conservation and energy benchmarking programs if the City tries to align promotional, marketing, and branding of these programs with aspects of Bellevue that its community identifies with.

GENERAL PERCEPTION OF BELLEVUE CULTURE AND CHARACTERISTICS TAKEN FROM ONLINE REVIEW SITES

To gather a general perspective of aspects of Bellevue's culture and what characteristics locals associate with Bellevue, we analyzed reviews of the City of Bellevue from three different online review sites. Data charts and tables are available in Appendix B.

Niche The top eight characteristics that were mentioned the most often on Niche were safety, schools/education, beauty/scenery/nature, food, friendliness, diversity, family-friendliness, and good maintenance/cleanliness, respectively. Each of these characteristics were mentioned by at least 30% of the Niche reviewers on the site when the data was collected.

Yelp The top three characteristics that were mentioned the most often were shopping, parks/nature, and jobs/companies respectively. Each of these characteristics were mentioned by at least half of the Yelp reviews on the site when the data was collected.

Reddit The top seven characteristics that were mentioned the most often on the Reddit pages were safety, food (generalized), South Asian food, cleanliness, luxury/upscale quality, family-friendliness, and parks, respectively.

Based on online reviews, Bellevue is characterized by its safety, education, nature, shopping, and food, among other factors. LCY STUDENT TEAM

BELLEVUE DOWNTOWN ASSOCIATION (BDA)

Equally important to the perceived culture of Bellevue by the general public and residents is the culture and perception of which businesses in Bellevue wish to align and portray themselves. Promotional strategies that appeal to downtown Bellevue business values and image could help the City of Bellevue generate participation in energy benchmarking and conservation programs from downtown Bellevue businesses.

To get an idea of the characteristics and values that Bellevue downtown businesses embody, we analyzed the Bellevue Downtown Association website and Facebook page. Specifically, we looked for keywords, overarching themes, and values.

Bellevue Downtown Association

The BDA can be another source of information in understanding the cultural context of Bellevue that will inform a new benchmarking program. BELLEVUE DOWNTOWN ASSOCIATION

KEY WORDS AND PHRASES, VALUES, AND CONCERNS OF NOTE FROM THE BDA WEBSITE

Several notable words and phrases found on the website were used to describe and highlight positive aspects of Bellevue and Bellevue businesses. These can be grouped into several general categories:

- **Economic growth, innovation, and opportunity** in Bellevue was reflective from use of terms such as "growth," "economy," "innovation," "economic and cultural hub," and "center for creative global talent and innovative businesses."
- **Accessibility** of Bellevue was emphasized throughout the BDA website, including by calling the city a "transportation hub" and declaring that it had an "accessible city core."
- **Lifestyle was emphasized** through the promotion of "livability" and "safety."
- **Community support and partnership** seem to be important to the BDA, with the BDA calling downtown Bellevue a "vibrant partner" to surrounding neighborhoods with a "healthy and engaged residential community."

Facebook Branding The Bellevue Downtown Association Facebook page seems to be primarily family-oriented and event-oriented, with most of its posts advertising or informing the public about events targeted at families or the general public. The BDA also posts updates about the development of new spaces. The posts adopt a lighthearted tone, and some posts even incorporate emojis and personified language; for example, one post states: "Bellevue downtown is feeling inspired."

EnviroStars Although the Bellevue Downtown Business Association does not directly state support for environmental sustainability, it does advertise the EnviroStars program on its site. EnviroStars is a free Washington State Green Business Program that provides information, resources, and recognition for business that perform green practices (EnviroStars n.d.a). Resources include marketing opportunities; resource saving calculations; and information on rebates, incentives, and services (EnviroStars n.d.b). EnviroStars also links businesses to local environmental programs and incentives to encourage further green practices by businesses (EnviroStars n.d.a).

EnviroStars members display membership plaques. ENVIROSTARS

RECOMMENDATIONS BASED ON BELLEVUE'S CULTURE AND IDENTITY

- **The City of Bellevue can consider integrating and capitalizing on the values and pride of schools and family in Bellevue** in an energy conservation or energy benchmarking program by using students as resources and schools as opportunities for outreach, public support, and public energy literacy development.
- **Advertisement and promotion for an energy benchmarking program can focus on values and appeals around innovation and keeping Bellevue green and beautiful.** These values resonate with Bellevue residents and could increase appeal or support of the program.
- **In order to better engage businesses in downtown Bellevue, the City should collaborate with the Bellevue Downtown Business Association.** There are many potential opportunities Bellevue can leverage with the BDA, including using the BDA as a platform for outreach, promotion, participant cohort building, and even to form a business committee dedicated to supporting downtown Bellevue businesses in improving their building performance. This committee could be modelled after current BDA transportation and livability committees, and would support the BDA's values of promoting and supporting innovation and a livable city.
- **Consider partnering with EnviroStars program to engage with businesses in downtown Bellevue that** are already interested in sustainable practices and could be open to energy benchmarking and improving or supporting improvements of their building's energy performance.

The City could consider utilizing Bellevue's perceived culture to better engage with local stakeholders. LCY STUDENT TEAM

BUILD COMMUNITIES AND CONNECTIONS

Building a community around and within energy benchmarking program participants can be an important feature of engaging and maintaining commitment and interest in improving building energy performance and energy benchmarking.

In a focus group of Seattle building stakeholders on motivations for improving building energy performance, it was found that building owners and managers not only looked towards City staff, utility staff, and trusted vendors for guidance, but that they also looked for support and help from their peers. Many of these focus group participants shared that they wanted to learn about actions their peers were taking and seek recommendations from their peers on what programs, productions, and actions to take, but they did not know how or where to make these connections (Slobe 2015). The report emphasized that overall, "positive, productive, and personal" relationships were very important to building owners and managers, and that it was also important to build trust between City and utility staff and building owners and operators (Slobe 2015).

Similarly, in the Urban Smart Buildings program, one of the features of the program that was cited as popular by the program's "energy champions" was the opportunity to network with other energy champions and learn from peers during USB workshops (C+C et al. 2018). Networking and peer-to-peer learning are both forms of community building, which further supports the idea that community building could be a powerful engagement tool for a Bellevue energy benchmarking program.

COHORTS

Creating cohorts among participants by building type, business type, building size, or another metric, where participants can share advice, experiences, and ideas could be a relatively straightforward method for building community. To support cohorts, the City of Bellevue could facilitate cohort sharing sessions where participants exchange ideas and advice, as well as hold cohort coaching sessions where participants can be given advice collectively and discuss solutions together.

The City can build community within a benchmarking system by creating cohorts among participants by building type, size, or otherwise. LCY STUDENT TEAM

It was found that building owners and managers not only looked towards City staff, utility staff, and trusted vendors for guidance, but that they also looked for support and help from their peers.

MENTORS AND MENTEES

As an alternative to cohorts, the City of Bellevue could develop a mentor and mentee program, connecting building stakeholders and businesses who are more experienced with energy benchmarking and improving building energy performance, with building stakeholders and businesses who are interested in starting benchmarking and building performance improvements (Slobe 2015).

NETWORKING EVENTS

Networking and social events could be arranged, organized, and hosted by the City of Bellevue for program participants to further build community, as well as to provide a small form of recognition and reward. Separate from recognition ceremonies or celebrations, these events would be more relaxed and less formal, but still have food, drink, and some lighthearted, scheduled activities to encourage community-building.

ENERGY CHAMPIONS

Energy champions were key to successful programs in the Urban Smart Bellevue program (see Urban Smart Bellevue, previously discussed in Context section). Recruiting energy champions for each building or business involved in Bellevue's energy benchmarking program, especially if the building owner or property manager is not very interested in benchmarking, could be a strategy to maintain engagement. Instead of leading energy campaigns like in the USB program, energy champions for a benchmarking program could attend workshops, network with other program participants, and help the building owner and property owner navigate Portfolio Manager. Energy champions could also be asked what other programs, activities, and incentives they would like, in order to make their role more appealing to future potential energy champions.

THE DOWNTOWN BELLEVUE ASSOCIATION

The Bellevue Downtown Association could act as a platform and partner to help the City of Bellevue start forging connections among building stakeholders interested in energy benchmarking and forming cohorts among downtown businesses.

COMMUNITY BUILDING AMONG BUILDING TENANTS

Tenants not only influence their building operators, landlords, and building owners, but they also influence each other. Facilitating meetings where tenants come together and discuss the environmental performance of their building has been shown to potentially change the behavioral responses of the tenants in ways that improved the building's sustainability (Christensen et al. 2018). Encouraging tenant discussion and community building around building performance could thus help buildings improve energy performance by encouraging tenants to lower their personal energy use and advocate for their buildings to install energy efficient upgrades.

The City could consider facilitating building tenant meetings, so that tenants can come together and discuss the energy performance of their building, which can potentially positively alter their future behavior. LCY STUDENT TEAM

SCHOOLS AS A SOURCE FOR OUTREACH AND ENGAGEMENT

The educational system is a source of pride in the Bellevue community. Therefore, there is opportunity in using local schools as both resources to support an energy benchmarking program in downtown Bellevue, and as a platform to increase public support and understanding of energy literacy, energy benchmarking, building performance, smart buildings, and sustainability.

USE SCHOOLS AS AN OPPORTUNITY TO DEVELOP ENERGY LITERACY

This strategy has already proved effective with the City of Phoenix's water conservation program, where water conservation classes and visits to local schools are an important part of their outreach and education strategy. In order to get Bellevue families further involved and interested in building energy conservation, the City of Bellevue could consider organizing energy conservation challenges, competitions, or initiatives within or in partnership with schools, so students can take action towards energy conservation directly. This can also be considered a long-term initiative towards creating a citizenry supportive of an energy benchmarking program.

INTERNSHIP OR VOLUNTEER OPPORTUNITIES FOR HIGH SCHOOL OR COLLEGE STUDENTS

Educational opportunity is considered one of Bellevue's greatest strengths [use previous phrase as pull quote] and high school students interested in policy, city planning, sustainability, technology, and other topics could be very interested in working with the City through a free or low-cost internship to develop skills, literacy, and experience in the fields of government, energy, business, and policy. Potential areas of focus of these internships could include:

- Acting as liaisons between businesses and the City
- Leading or assisting energy literacy workshops
- Assisting in the outreach and promotion of an energy benchmarking program
- Developing ideas and/or providing assistance in organizing events, initiatives, or programs that support or encourage energy conservation or energy benchmarking participation
- Developing graphics for energy literacy materials
- Creating and distributing energy scorecards (see previous discussion in Energy Scorecard section for more details)

BELLEVUE SCHOOL DISTRICT CAREER AND TECHNICAL EDUCATION (CTE) PROGRAM

The Bellevue School District features a Career and Technical Education (CTE) program that offers students courses that prepare them with skills

Bellevue School District

The Bellevue School District could be an important source for student engagement in a new energy benchmarking system. BELLEVUE SCHOOL DISTRICT

and knowledge to help them gain a competitive edge for internships, apprenticeships, and industrial certification. The CTE program is advertised as a way to teach students how core subjects are used in real life by various professional fields, including architecture, engineering, and green technology. As a long-term strategy to help Bellevue become more supportive and engaged in energy benchmarking and improved building performance, the City of Bellevue could consider working with the Bellevue School District and its CTE program to develop courses, field trips, or programs on energy efficiency and smart building management, construction, and design. Current CTE course areas that such programs would fall under include architecture, business, STEM, and possibly Information Technology (IT) (Bellevue School District n.d.).

The City of Bellevue could consider working with the Bellevue School District and its CTE program to develop courses, field trips, or programs on energy efficiency and smart building management, construction, and design. CITY OF BELLEVUE

CONCLUSION

KEY FINDINGS

- **There are more than 25 city benchmarking programs in the United States,** one of these being in Bellevue's neighboring city of Seattle.
- **Benchmarking programs typically apply to buildings over 50,000 square feet or larger.** These can either be voluntary or mandatory programs, and some of these programs require building retrofits or tune-ups with a defined payback period, after a specified period of time.
- **Building energy benchmarking has been shown to result in average building energy savings of 2.4% per year,** according to a 2008 to 2011 study by the U.S. Environmental Protection Agency's ENERGY STAR program.
- **ENERGY STAR Portfolio Manager is the national standard for building energy benchmarking programs,** as it is both easy to use and well supported by numerous agencies and services, including Puget Sound Energy's MyData platform
- **The ENERGY STAR Score is the most commonly used system to communicate building energy use and performance, and is much easier to understand in comparison to other energy benchmarking metrics. Although energy use intensity (EUI) is the primary metric for reporting purposes used by cities, it does not resonate with the general public because it is too technical.** There are cases, however, where other systems have been used to simplify building energy use and performance further.
- **Comparisons using the ENERGY STAR score have the potential to be motivating if they are aligned by building type and use. At the same time, building stakeholders show strong interest in personalized benchmarking information and recommendations.** Over-emphasis on comparison, especially for lower-performing buildings, is not recommended, as such comparison can discourage stakeholders.
- **Building energy benchmarking programs are much more established in dense, urban regions and cities in comparison to suburban regions and cities.** However, successful urban benchmarking programs can affect surrounding suburbs' relationships with energy benchmarking and building performance.

Building energy benchmarking programs are much more established in dense, urban regions and cities in comparison to suburban regions and cities. LCY STUDENT TEAM

- **Different strategies, tactics, and messaging are more engaging depending on stakeholder group and on building size, use, and age. The primary market demographic for benchmarking is the commercial building sector of building owners, property managers, and reality brokers, however, all stakeholder groups generally respond well to benefits around energy savings and increased property value.** Other key tactics include leveraging brand recognition, sharing of best practices, and providing training, resources, and guidance.
- **Visualizations of energy benchmarking data can help building stakeholders better understand and utilize benchmarking data.** A common visualization used in benchmarking programs is an interactive dashboard.

- **Partnering with local and regional utility companies and other organizations can provide benchmarking programs with valuable benefits and support,** including the development and provision of incentive programs, outreach support, or special services that make the benchmarking process easier for stakeholders.
- **Primary barriers to engaging building stakeholders in energy benchmarking include a lack of understanding of energy benchmarking and its benefits, benchmarking process time requirements and learning curve, and slow return-on-investment.** Strategic and conscientious outreach, education, and customer support are all essential to overcome these challenges.
- Many of Bellevue's building owners and operators also own and operate buildings in Seattle or other markets, which have established building energy benchmarking programs. This means that some Bellevue building owners and operators who would be affected by or participate in a Bellevue energy benchmarking program may already practice or be familiar with building energy benchmarking practices.

The Puget Sound Energy (PSE) Building in downtown Bellevue. The City could consider partnering with PSE to develop a new energy benchmarking system. LCY STUDENT TEAM

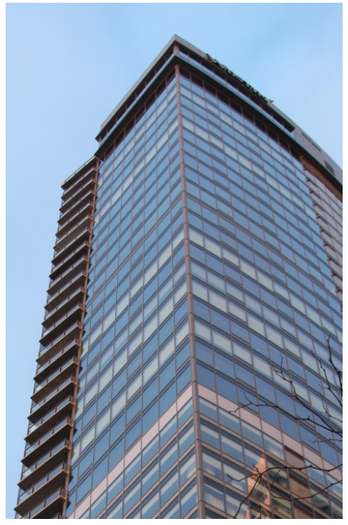
KEY RECOMMENDATIONS

Based on our team's research, we recommend the following actions for the City of Bellevue to consider in developing a building energy benchmarking program for downtown Bellevue:

- **Use ENERGY STAR Portfolio Manager for benchmarking.** Portfolio Manager is the benchmarking standard because it is low-barrier for building managers, well-supported, relatively simple for the public to understand, and customized by building size, use, and regional climate. In addition, PSE already automatically sends meter data to Portfolio Manager, so building stakeholders will not face a burden associated with inputting their own data.
- **Partner with Puget Sound Energy, Bellevue's local utility, in program development.** PSE can support building stakeholders with its MyData platform, and potentially provide aid in the development of building performance improvement incentive programs.
- **Establish strong public and private partnerships with local and national organizations, businesses, and community groups.** Organizations such as the Institute for Market Transformation (IMT) and the Northwest Energy Efficiency Council's Smart Building Center can provide policy support and guidance for a Bellevue program. The IMT in particular already acts as a policy advisor to local governments, federal agencies, and industry groups across the US. Additional partners to consider include King County, Microsoft, Tableau (a data visualizations company), EnviroStars, the Bellevue Downtown Association, nonprofits, universities, and property managers who are already known to be committed to sustainability, such as Unico Properties.
- **Look towards 2030 Districts as models for a building a benchmarking program for Downtown Bellevue.** 2030 Districts are not only voluntary programs, but they are focused on urban cores and businesses working with local government to lead sustainable and energy efficient practices. Looking further into what other strategies 2030 Districts have used to be successful could provide valuable insight and guidance for a downtown energy benchmarking program for Bellevue.
- **Incentivize participation in an energy benchmarking program and building performance improvements by**

emphasizing potential financial savings, increased portfolio value, and reductions in market risk through improved energy efficiency. Program marketing should emphasize that benchmarking can help building stakeholders improve their building efficiency, and thus reduce operation costs and diagnose facility improvements. Marketing should also highlight that ENERGY STAR certified buildings show benefits for building rental and occupancy rates, sales premiums, and net operating income. As business is of great importance to the City of Bellevue, it is important for an energy benchmarking program to market the economic benefits that benchmarking could bring to an individual business and the downtown district as a whole.

- **Use workshops, training sessions, webinars, and other instructional resources.** These will help to ease the onboarding process and help building stakeholders quickly learn the basics of energy benchmarking and how to benchmark their buildings' performances. This can be accomplished in partnership with the help of the Smart Building Center and PSE. Workshops also provide the opportunity to connect building stakeholders with each other and City staff. Having trusted, personal relationships with knowledgeable and helpful City staff can go a long way in helping building stakeholders feel supported and ensuring project success.
- **Keep it simple.** Simplify program onboarding and registration as much as possible, and look into working with PSE and other organizations and entities to make the benchmarking process as easy, quick, and simple as possible. Decreasing the time needed for building stakeholders to commit to the program, especially for tasks such as data input, as well as reducing the learning curve needed to understand and perform building energy benchmarking, can help maintain program commitment and interest. Similarly, visualizations and scorecards should be simplified to display only key elements.
- **Provide personalized building energy performance data and recommendations in addition to comparative building performance information.** Although comparisons of building performance between buildings of similar use and type can be motivating, research suggests that building owners and managers also want more personalized information about their specific building's energy performance and opportunities for savings. Stakeholders are less interested in how other buildings are performing, especially if they do not feel the comparative buildings are an accurate comparative representation of their building.
- **Communicate individual benchmarking results through energy benchmarking scorecards, and consider communicating benchmarking data through intuitive, interactive, and outward-facing technologies such as dashboard and kiosks.** Simple, standardized, and visually-pleasing templates for scorecards can be made simply with mail merge software or with more complexity with Adobe InDesign's Data Merge feature. Kiosks and public dashboards can be used to display benchmarking results and information in accessible public spaces or online to increase accessibility, recognition, and literacy around the benchmarking program.
- **When possible, use success stories as evidence of program benefits.** Overall, providing building owners with individual building energy performance data and targeted profiles is a good first step, but for the promise of energy savings to be believable to owners and managers, it needs to be backed up by examples of individuals like them actually saving money through benchmarking and building energy improvements.
- **Use messaging focused on loss aversion and energy efficiency that is generally positive, and acknowledges improvement made**. This is recommended over messaging focusing on sustainability, potential savings gain from building improvements, and comparison, which can indicate poor performance. Messaging around potential loss aversion is shown to be more motivating than potential savings gained, and energy efficiency generally is believed to receive a stronger response than calls towards sustainability. Emphasizing and acknowledging improvement in performance in addition to absolute performance is also encouraging, in that it recognizes efforts made by participants that may not be evident in absolute performance numbers.
- **Consider branding or framing building energy benchmarking initiative as a Smart City Building effort or program, rather than only or primarily an energy or environmental program.** Branding the program in this way could potentially draw support or interest from technology businesses.



The City could consider providing personalized building energy performance data and recommendations to program participants.
LCY STUDENT TEAM

The City of Bellevue could incentivize building energy performance improvements through increased zoning, height, and floor allowances, as well as through tenant improvement amenities.

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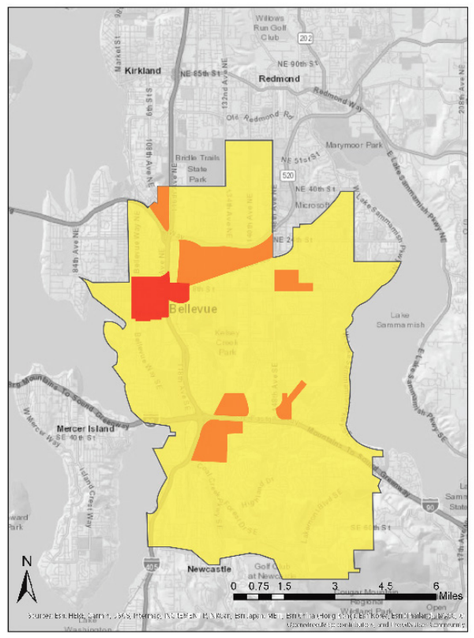
- **Incentivize energy performance improvements with increased zoning allowances, additional height and floor area allowances, and tenant improvement amenities.** Floor-Area-Ratio (FAR) incentives and tenant improvement amenities can be strong motivations for building developers and owners to increase and improve their building performance. These incentives could provide an indirect financial incentive for building owners and developers to improve building performance without requiring the City of Bellevue to directly provide businesses and developers with financial payment incentives. As it is less common for building owners and developers to add additional floor area after a building is constructed, these types of incentives may be more effectively targeted at those who are looking to construct new buildings and are willing to adopt energy benchmarking and improvement commitments.
- **Implement program elements in a multi-step or multi-phase sequence.** For example, first target large building sizes or more energy-intensive building types and uses before expanding the program. Program elements, such as benchmarking, reporting, ranking systems, and retrofitting and improvement targets, can also be phased in over time. This strategy is currently being employed in Boulder, and many cities around the US have similarly limited or are phasing in building benchmarking ordinance requirements by building size over time. Although this may result in slower results, this would help City staff adapt to new responsibilities, and also would allow for Bellevue building stakeholders to learn about and understand the process and benefits of energy benchmarking, without feeling from the onset that the program is a huge commitment or that they must make larger changes.
- **Increase building stakeholder engagement through connection and community building**. This can be accomplished through networking events, informal workshops, and group experience-sharing sessions, by partnering with the Bellevue Downtown Association, developing cohorts among benchmarking program participants, and establishing energy champions similar to those in the USB program. It has been found that building stakeholders can be keen to learn about what other building owners and managers are doing, and often seek each other's recommendations on programs, products, and vendors, but that many have little time to connect, or do not know when and where to make those connections. Establishing energy champions and cohorts will take time, but can be accomplished through positive marketing that could ultimately be key in increasing engagement and personal interest in a benchmarking program for building stakeholders.
- **Look towards students as a resource.** Local university students, and potentially high school students, could be utilized in internship positions to help the City of Bellevue ease staff responsibilities in implementing a benchmarking program. Employing student interns would also be a more cost-efficient alternative to hiring new employees to manage or support a benchmarking program. Interns could help with benchmarking scorecard development and distribution, event planning, workshop assistance, and other tasks.

LOOKING BEYOND THE DOWNTOWN CORE

Looking at Bellevue neighborhoods outside the downtown core, the approach of marketing economic savings and increased property value would likely remain a core focus. However, this approach would also have to be modified to fit the varying building typologies and building stakeholders present in different Bellevue neighborhoods. Bellevue's neighborhoods can be generalized into three main categories: the downtown urban core, mid-size commercial centers, and single-family residential areas. Each of these categories would require different approaches, marketing strategies, and program foci to best engage and suit the stakeholders of that area.



Generalized map of the three categories of building typologies in Bellevue, including the downtown urban core (in red), mid-sized commercial centers (in orange), and single-family residential areas (in yellow). LCY STUDENT TEAM

Although looking into residential benchmarking programs was not the focus on this project, it should be noted that single-family residential areas of Bellevue would require approaches and strategies that are quite different from those used for the downtown urban core and mid-sized commercial centers. Buildings in single-family residential areas are likelier to be owned and managed by landlords and homeowners rather than larger property owners and managers who predominantly work with properties in the urban core and commercial centers.

Different tactics that could be better suited to single-family residential areas include focusing more heavily on Puget Sound Energy's (PSE) resources and rebate programs. PSE has residential energy conservation behavior programs as well as window, appliance efficiency, and smart metering programs. PSE has already established a home energy assessment program where members can receive free home evaluations for home energy use, as well as free energy-efficient fixtures (Puget Sound Energy n.d.b) Rebates and incentives for energy efficient upgrades are also available. Furthermore, marketing and outreach strategies for residential neighborhoods in Bellevue would likely look different. For example, the City could partner with community groups, schools, and homeowner associations, instead of business associations. Furthermore, sending scorecards to individual homeowners and landlords for large areas of single-family residential housing could be extremely difficult and time consuming without increased staffing, and might require focusing on other strategies to easily communicate energy performance data.

In developing a complete, city-wide energy efficiency program, Bellevue may wish to consider single-family residential areas as the last phase of the program, due to the high number of single-family residential units in Bellevue compared to the number of buildings within the downtown core and mid-sized commercial centers.

The overall strategies and goals Bellevue will have for single-family residential buildings, however, will not be dissimilar to that of buildings in the downtown area. At its core, regardless of which Bellevue neighborhood or building type an energy benchmarking program is targeted towards, its success hinges on helping stakeholders understand the benefits of energy benchmarking and building energy efficiency, as well as supporting stakeholders with resources for a smooth transition. If a successful downtown energy benchmarking program can be implemented, it can serve as a foundation for the expansion of energy benchmarking into other areas and property types in Bellevue.

If a successful downtown energy benchmarking program can be implemented, it can serve as a foundation for the expansion of energy benchmarking into other areas and property types in Bellevue. LCY STUDENT TEAM

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APPENDICES

APPENDIX A: SUMMARIES OF INDUSTRY INTERVIEWS

UW INTEGRATED DESIGN LAB WITH CHRIS MEEK

Interview Date: October 19, 2018

Interview Type: In-person interview

Attendees: All members of the student team

Context: Chris Meek is a professor of Architecture at the University of Washington who works in the UW Integrated Design Lab. He worked closely with the design team for the Bullitt Center and is very knowledgeable in using the ENERGY STAR benchmarking program.

Keys Takeaways

- Mandatory benchmarking and disclosure ordinances have four to 16 times the impact of voluntary ones
- Disclosure laws send strong marker signals
- ENERGY STAR adds value to property

Meek emphasized the need for energy transparency, which would enable consumers to visibly see their energy consumption. The Bullitt Center is superior infrastructure, reducing its energy loss due to the simple inefficiencies of a typical building. Human behavior usually is only 25% of total energy consumed, but in the Bullitt Center, human behavior influences 50% of building consumption.

Benchmarking usually begins with large, institutional buildings and shows that there is a problem with their current energy consumption patterns. Within ENERGY STAR, differences are made between type, size/scale, and climate, normalizing buildings for certain conditions. Also the ENERGY STAR scores are all relative to the sales rental occupancy. For benchmarking to be viable, the databases must show the change in energy consumption overtime. Changing infrastructure or human behavior because of what is recommended by ENERGY STAR leads to a increase in savings of 7%. ENERGY STAR includes TargetFinder and Portfolio Manager, which organize information, but can require input of a lot of information, which could deter building owners or operators from entering the program.

Voluntary programs in Boston, Minneapolis, and Seattle reached a fraction of participation and success compared to mandatory programs.

In general, mandatory programs achieve four to 16 times greater floor area affects beyond the mandated area. This is because as energy-saving practices become adopted as a standard practice, areas around the mandated area also become affected. One reason this occurs is that property owners may implement energy-savings practices on their properties outside the mandated area.

ENERGY STAR labelled buildings have increased rental sales price, higher occupancy rates, and will help a building maintain competitiveness on the long term, when the market is less hot.

Engagement is extremely important in order to run a successful benchmarking program. The owner's building engagement is key as the owner is the only one with the power to change the infrastructure. Tune-up requirements every five years and special incentives, such as training programs, will be most successful in encouraging the owner to act. Gaining support from community is positive as tenant desires move to owner's actions. A community member involved spreads the outreach and helps to establish the norm of "you cannot manage what you do not measure." By establishing measuring or benchmarking as a market normal, ENERGY STAR Score and peer comparison with regional competitor companies becomes more prevalent. Whenever a building joins ENERGY STAR, if they are an outlier or having shocking data, their measurements motivate them to act.

2030 DISTRICT WITH JARED SILLIKER

Interview Date: November 9th, 2018

Interview Type: Phone Interview

Attendees: Christoph Strouse, Jasmine Leung, & Sophia Militello

Context: Jared Silliker is very experienced in the green buildings field and has worked with energy benchmarking, LEED, and the 2030 District program. He is currently a board member of the Seattle 2030 District and owner of Silliker + Partners, which works to advance green building and sustainable business practices.

Key Takeaways

- Make data visible, but it needs to be useful
- Target the right data to the right people
- Energy benchmarking as a gateway to other environmental actions

Stakeholders are not the same at every building, but rather, they are very site specific, meaning that outreach must vary within a city. Some stakeholders are at the edge of industry, which means they are not specifically tied to a building, but offer services that could help the City with with organization, project implementation, or program outreach for a benchmarking program.

The key is to make the invisible energy consumption easy to visualize for the general public. Sometimes the monetary benefit is smaller than it takes to see change, but then the focus can go to comfort, security, and reliability for the future by investing in energy infrastructure now.

Overall, the cities that do not use ENERGY STAR are not memorable in their successes with energy benchmarking. ENERGY STAR is a reliable national platform that can offer comparison across the country. The program helps introduce energy benchmarking to new participants and helps to improve energy literacy when opting into this program. The 2030 District relies on ENERGY STAR as it can offer a normalized comparison for their various programs across the country and is free and robust, meaning there is no program that has shown to be superior and more cost-effective.

The Seattle 2030 District was implemented at the same time as the City of Seattle created an energy benchmarking disclosure ordinance. The program has gained grants for funding and beginning in order to fund its startup within Seattle. For long-term funding, the program has begun to charge for membership to the program, in order for the funding to be substantial and incentives to be monetary. The building that shows the greatest improvements receives monetary benefits to continue on its path. As of now, only the City of Seattle has access to the energy benchmarking program, but this initial access will lead to furthering transparency in the near future, which will increase the appeal for property owners and improve the stakeholder experience. 2030 District focuses on only positively encouraging the private sector through group help and the formation of communities in order to share benefits of the program.

The City of Seattle views the 2030 District program as a gateway to lead the City to participate in more environmental programs. Beginning with a voluntary program, Seattle can more easily move into a mandatory program and increase disclosure levels over time. There is hope for greater market transactions, which will lead to investments in higher performing buildings, increased building sales and leases, and greater influence of public metrics on decisions. The City of Seattle wants its community to buy into energy efficiency assets, which could become a part of the City of Bellevue's values.

In order to present energy benchmarking as valuable, incentives and human understanding and awareness must be improved. The cheapest incentive is to highlight the idea that the market is not stable and investing now in energy improvements can only help in the near future. There is also the ability to give greater floor area ratio and building height to buildings, which is free to the city and is used for the 2030 District program, but may require policy changes. Incentives are usually limited in benchmarking, and more effective in utility conservation programs. Besides incentives, human behavior, understanding, and awareness greatly influence the success of an energy benchmarking program. People need to be spoon-fed data highlights, and topics covered need to be limited, appealing, and personalized to the particular stakeholder. If possible, automated alerts can be beneficial to increase interest and the number of people who look at the energy data.

NORTHWEST ENERGY EFFICIENCY COUNCIL SMART BUILDINGS CENTER WITH BRITTANY QUIGLEY

Interview Date: November 16, 2018

Interview Type: In-person Interview

Attendees: Christoph Strouse, Jasmine Leung, & Hanna Peterson

Context: Brittany Quigley works at the Northwest Energy Efficiency Council's Smart Buildings Center as its Project Director in Seattle. The Smart Buildings Center focuses on exploring ways through which energy data analytics and visualization techniques can be used to encourage and advance commercial and institutional building energy efficiency.

Key Takeaways:

- Provide training to engineers, architects, and managers to communicate value to owners
- Frame savings and appeal to loss aversion
- Sell sustainability to make building recession proof
- Use of strategic energy management to "keep tenants happy, healthy, and productive"

Quigley emphasized that there were common obstacles in the implementation of energy benchmarking, but they could be overcome with adequate training, clear communication, and thorough educational efforts. These educational efforts can take the form of energy workshops lead by the Northwest Energy Efficiency Council to an audience of building owners, operators, and managers, in addition to customers of local electric or natural gas companies. To begin providing this training, workshop leaders must first understand the general interests of these stakeholders: for all listed, the primary incentive is generally to save money. To appeal to this, the workshop is free and focuses on loss aversion, which is explained in depth in this report.

Another focus of the workshop is asset value: the monetary savings incurred by an energy benchmarking system can be communicated to building tenants who will in turn be more satisfied with the service provided. Tenants are especially important to impress, since their occupancy is continuous, compared to the high turnover of building owners. Tenant satisfaction improves buildings' reputations, thereby increasing their value. Workshops provide one-on-one training to develop a strategic process or plan for an owner's specific building, accounting for building size and typology.

Quigley also explained some common concerns that were raised during the workshops, and that the most significant barrier to benchmarking system implementation is the perceived difficulty of the process. The worries of intimidated stakeholders are typically assuaged with further education and deeper explanations of initially technical-sounding jargon. Training includes understanding metrics used and how to develop an energy plan. Once program participants have a deeper understanding of an energy benchmarking program, they are often more receptive to implementing it.

Effective social media platforms were also discussed. The Smart Buildings Center has a YouTube channel with clips of sustainability fairs and tabling events, and the platform could also serve as a tool for digital workshops or lectures. YouTube also allows frequent interaction with viewers who leave comments on the videos. The Smart Buildings Center also utilizes a blog that assesses traffic by counting the number of page visits. It is also able to track links that people click on, informing the development and production of future web content. It partners with Building Owners and Managers Association to use this product: partnerships and contracts with sponsors are also used as a funding source.

PHOENIX WATER RESOURCE SPECIALIST, CHRISTIAN DELGADO

Interview Date: November 14, 2018

Interview Type: Phone Interview

Attendees: Jasmine Leung & Viet Nguyen

Context: The City of Phoenix has maintained a very successful water conservation program over the past several decades. Despite a 30% increase in population between 1994 and 2013, the City of Phoenix has decreased its per capita water usage by roughly 25%. The City of Phoenix has managed to accomplish this level of water conservation without providing rebates to customers for reduced water use. In this interview, we asked Mr. Delgado about the City of Phoenix's water conservation outreach strategies to gain insight into what has made the City of Phoenix's water conservation program so successful, and whether any of its strategies can be applied to a energy conservation or benchmarking program in Bellevue.

Key Takeaways:

- Messaging must be positive, pushing for constant improvement, not guilt
- Limited applicability of Phoenix's water conservation marketing and outreach strategies to a Bellevue energy benchmarking program

In speaking with Delgado, it was learned that the City of Phoenix water conservation program mostly targets residential users, not commercial users. Furthermore, some of its strategies, such as water reuse, are not applicable or easily transferable to energy conservation or benchmarking. Thus, its strategies' applicability for an energy benchmarking and conservation program for downtown buildings in Bellevue, in which the target audience also comprises of building owners, operators, and managers, is limited.

Phoenix has been able to dramatically reduce water consumption by decreasing water usage outdoors, decreasing residential lawn and turf area, and reducing water leakages in homes. Bellevue can apply similar strategies in building energy conservation programs by trying to identify buildings' most energy consumptive features or user behaviors and heavily emphasizing or developing programs around those energy-

consumptive aspects.

Water conservation behavior is framed as “embracing the desert lifestyle” to Phoenix residents. Imitating such a strategy would be difficult in Bellevue as the need to conserve energy is less visible and intuitively important than the need to conserve water, especially in the context of a desert city such as Phoenix.

Delgado mentioned how water conservative behavior and its benefits are advertised and promoted on multiple platforms in Phoenix, including on social media, in news outlets, and even through standard advertisement channels in order to create an extensive water-conservative culture in Phoenix. Although such an extensive campaign would likely be logistically difficult and financially infeasible, especially in the near future, in Bellevue, the City of Bellevue could consider promoting energy conservation behavior on a larger variety of promotional outlets such as the city social media accounts, on smaller advertisement channels, or through signage and marketing materials at city-hosted events to create a larger awareness and support for energy conservation and benchmarking in Bellevue.

One key point emphasized during the interview was that in Phoenix, water conservation behavior is framed from a positive angle where water conservation behavior is praised, instead of water wasteful behavior being shamed. However, the concept of “there is always room for improvement” is also emphasized. This angle of promoting energy conservative and benchmarking behavior can be replicated in strategies by the City of Bellevue.

A large part of the City of Phoenix’s water conservation outreach is through child education and adult workshops. The City’s Water Services Department supports classroom presentations and career day guest speakers, provides educational materials, and leads STEM activities. For adults, they host workshops on water conservation landscaping, rain gardens, and how to locate and address water leakages. All of these education and outreach resources not only educate Phoenix residents about water conservation, but also continue to promote a water conservation culture in Phoenix. Such strategies could be replicated in Bellevue, though at a smaller scale. Considering the high quality and respect of the Bellevue School District, introducing students to concepts of energy literacy and conservation in schools could have long-term positive effects on energy literacy and perception of the importance of energy conservation in Bellevue.

The City of Phoenix works with other entities to decrease water usage in the city, such as partnering with the local Nurseries Association and working with local homeowners to develop a homeowners association program focused on water conservation. Considering the diverse variety of businesses and organizations in Bellevue, the City could consider partnering or collaborating on energy conservation and benchmarking promotional programs with other organizations based in downtown Bellevue.

The City of Phoenix works with the Water—Use It Wisely Campaign to promote water conservation behavior by cities, residents, and businesses on a regional scale. Creating such a campaign would have to be a long-term goal for Bellevue but could also encourage multi-city resource collaboration and frame Bellevue as a pioneer in city-collaborative, community-level energy conservation in the Pacific Northwest.

APPENDIX B: DATA TABLES AND CHARTS OF WEBSITE REVIEW DATA USED TO INFORM 'GENERAL PERCEPTION OF BELLEVUE CULTURE AND CHARACTERISTICS' SECTION

For each review post, any characteristic attributed or associated with Bellevue was tallied. Only positive characteristics or attributes were noted. Data was gathered November 3, 2018.

YELP (10 REVIEWS)

Yelp is a popular review website where users can locate, comment about, and rate the quality or experience of different restaurants, stores, entertainment services, and other places, including cities. Users of the site are relatively evenly split across age groups with roughly 35% between 18-34 years, 35% between 35-54 years, and 30% 55 years or older. Reviewers of Bellevue on Yelp were primarily former residents, residents of surrounding areas, or visitors of the city.

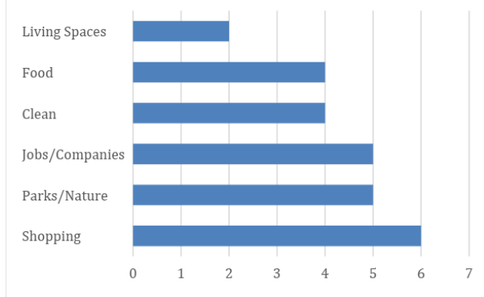
Link: https://www.yelp.com/biz/city-of-bellevue-bellevue-3

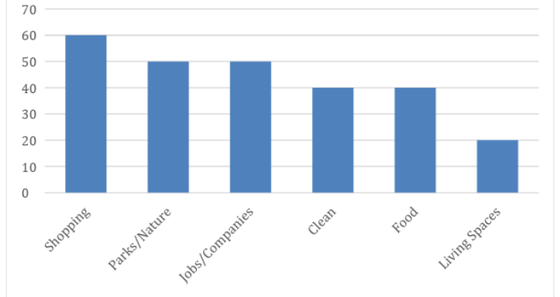
Yelp Data

- There were six distinct characteristics attributed to Bellevue, which were each mentioned more than once in different Yelp reviews.
- The top three characteristics that were mentioned the most often were shopping, parks/nature, and jobs/companies respectively. Each of these characteristics were mentioned by at least half of the Yelp reviews on the site when the data was collected.

CHARACTERISTIC OF BELLEVUE - YELP

Characteristic	Number of Mentions	Percent of Respondents who Mentioned this Characteristic
Shopping	6	60
Parks/Nature	5	50
Jobs/Companies	5	50
Clean	4	40
Food	4	40
Living Spaces	2	20





CHARACTERISTICS OF BELLEVUE - NICHE

Characteristic	Number of Mentions	Percent of Respondents who Mentioned this Characteristic
Safe	29	45
Schools/Education	22	34
Beautiful/Scenery/Nature	19	30
Food	15	23
Friendly	13	20
Diverse	12	19
Family Friendly	11	17
Well mainted/Clean	10	16
Shopping	8	13
Convenient/Accessible	8	13
Companies/Jobs	7	11
Entertainment/Stuff to do	7	11
Next to Seattle	6	9
Progressive	5	8
Construction/Industrialized	4	6
Rain/Weather	4	6
Population Growth	4	6
Services	3	5
Technology	3	5
Activities/Events	2	3
Luxurious Culture	2	3
Nightlife	2	3
Art	2	3
Quiet	2	3
Inclusive	2	3
Car-oriented	2	3
City in a Park	2	3
Outdoor and City Balance	2	3

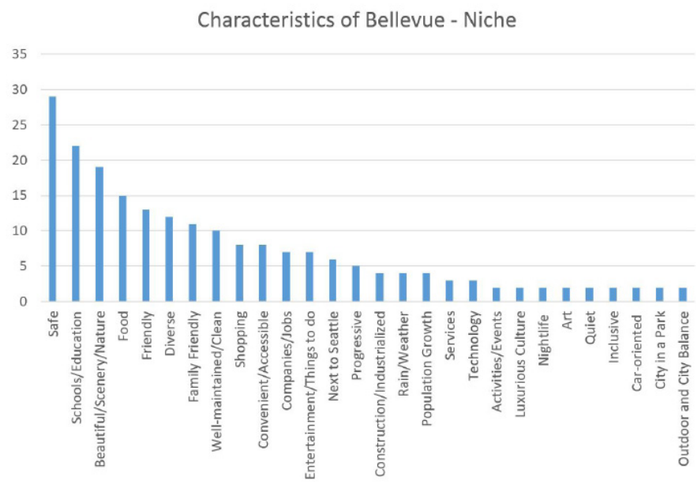
NICHE (64 REVIEWS)

Niche is a data, reviews, and ranking site that provides information about US schools, colleges, neighborhoods, cities, and companies. Users on the site can rate places between zero and five stars and share their thoughts about the city, similar to a typical review site format. Users who provided reviews on Bellevue on Niche were predominantly current residents, although a small number of nearby residents, former residents, and individuals who only work in the city also shared reviews on the site.

Link: https://www.niche.com/places-to-live/bellevue-king-wa/reviews/

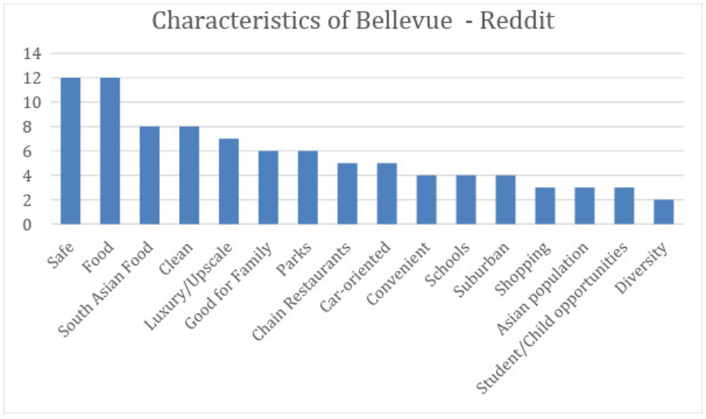
Niche Data

- There were 28 distinct characteristics attributed to Bellevue that were each mentioned more than once in different Niche reviews
- The top eight characteristics that were mentioned the most often on Niche were safety, schools/education, beauty/scenery/nature, food, friendliness, diversity, family-friendliness, and good maintenance/cleanliness, respectively. Each of these characteristics were mentioned by at least 30% of the Niche reviewers on the site when the data was collected



CHARACTERISTICS OF BELLEVUE - REDDIT

Characteristic	Number of Mentions
Safe	12
Food	12
South Asian Food	8
Clean	8
Luxury/Upscale	7
Good for Family	6
Parks	6
Chain Restaurants	5
Car-oriented	5
Convenient	4
Schools	4
Suburban	4
Asian Population	3
Student/Children Opportunites	3
Diversity	2



REDDIT (CHATROOM BULLETIN, MULTIPLE USERS)

Reddit is a social media bulletin site focused around sharing and discussing specific topics of interest. It is not a formal review site, although users often share their thoughts and opinions of certain topics on the site in a back-and-forth, comment-and-share, bulletin board style. In this format, Reddit can still provide insight into perceptions of Bellevue. It is the sixth most popular site in the world behind Google, YouTube, Facebook, Baidu, and Wikipedia (Sattelberd 2018). It is estimated that Reddit users are likelier to skew young, white, and male, with roughly two-thirds of Reddit users as male, an estimated 70% of users as white non-Hispanic, and 64% of users between the ages of 18 and 29, and another 19% of users between the ages of 30 and 49 (Sattelberg 2018).

Links:

- https://www.reddit.com/r/Seattle/comments/3xssqx/what_is_bellevue_like/
- https://www.reddit.com/r/bellevue/comments/4py5ca/moving_to_the_area_any_tips/
- https://www.reddit.com/r/bellevue/comments/7t9zy1/cultural_difference_between_eastside_and_seattle/

Reddit Data

- There were 16 distinct characteristics attributed to Bellevue that were mentioned more than once in different bulletin posts on the Bellevue Reddit pages that were reviewed
- The top seven characteristics that were mentioned the most often on the Reddit pages were safety, food (generalized), South Asian food, cleanliness, luxury/upscale quality, family-friendliness, and parks, respectively

TOTAL COMBINED DATA FROM YELP, NICHE, AND REDDIT

Characteristic	Number of Mentions
Safe	41
Food	31
Parks/Nature	30
Clean/Well-maintained	22
Shopping	17
Family Friendly	17
Diverse	14
Friendly	13
Jobs/Companies	12
Stuff to Do/Events	9
Luxury/Upscale	9
South Asian Food	8
Convenient/Accessible	8
Car-oriented	7
Next to Seattle	6
Chain Restaurants	5
Progressive	5
Construction/Industrialized	4
Rain/Weather	4
Population Growth	4
Suburban	4
Asians	4
Services	3
Technology	3
Student/Children Opportunities	3
Living Spaces	2
Nightlife	2
Art	2
Quiet	2
Inclusive	2
City in a Park	2
Outdoor/City Balance	2