

LLOYD ECODISTRICT ROADMAP

PROSPEROUS

EFFICIENT

BIOPHILIC

CONNECTED

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 portland
sustainability
institute

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Table of Contents

Foreword.....5

About the Lloyd EcoDistrict Roadmap.....7

EXECUTIVE SUMMARY

Lloyd Value Proposition.....9

Strategy + Goals Summary.....10

Recommended Strategies Matrix.....11

Immediate Actions + Investment.....12

THE LLOYD ECODISTRICT

Background + Overview.....15

Existing Policies + Plans.....16

EcoDistrict Roadmap: Big Ideas.....17

THE PROSPEROUS DISTRICT

Return on Investment.....21

Job Growth.....22

THE EFFICIENT DISTRICT

Energy.....26

Water.....30

Materials Management.....34

THE BIOPHILIC DISTRICT

Water and Habitat + EcoSystem Function.....40

THE CONNECTED DISTRICT

Access + Mobility.....46

IMPLEMENTATION MODEL

Investment Model.....53

Summary of Costs, Benefits and Investments.....54

APPENDICES

A: EcoDistrict Framework (PoSI).....56

B: Lloyd EcoDistrict Overview (Lloyd EcoDistrict).....57

C: Existing Policies + Plans.....59

D: District Organization.....60

E: Assumptions Summary.....62



The Lloyd EcoDistrict aspires to be the
most sustainable business district in North America.

-LLOYD ECODISTRICT VISION STATEMENT



Foreword

The Lloyd EcoDistrict is a place where businesses, residents, government agencies and nonprofits all share a vision: to build the most sustainable living-and-working district in North America. This vision defines sustainability as starting with a strong, vibrant and growing local economy.

The leaders behind the Lloyd EcoDistrict understand the importance of combining economic, environmental and social considerations in new ways – ways that benefit everyone who shares the District. We have come together to bring the concept to life, with a clear vision and concrete plans. By following that vision and implementing those plans, we will create a District that truly serves a triple bottom line: one that is good for the people who live and work there; good for the planet they share; and good for the profit businesses need to stay economically strong.

We define our focus on targeting the areas of transportation, water, energy and waste. We have identified ways we can put every available resource to work, as we strive to improve performance, create efficiency and make it possible for anyone to participate. We will communicate these ideas across the District, inspire people and build consensus, educate everyone who wants to be involved, and connect people and resources effectively. We will make sure lofty ideas translate to practical projects and partners we bring together will work hard to achieve these goals.

As the Lloyd EcoDistrict becomes an even better place to work, live, shop and visit, it will become a model for other forward-thinking neighborhoods. People will come and observe what is being accomplished here, and take ideas back to where they live and work. The Lloyd EcoDistrict leaders will freely share knowledge and experience with anyone who is interested.

The Lloyd EcoDistrict will continue to lead by example. We know there is no ending point to our effort, so we will keep looking for innovative ways to apply the principles behind what we have created. Meanwhile the merchants, the residents and people who work in the Lloyd EcoDistrict will relish their roles in a shared, widely recognized identity –the most sustainable living-and-working district in the country.

HOW WE WILL USE THE ROADMAP

The Vision of the EcoDistrict is to be the most sustainable business district in North America. What this means to us is that every goal we set in this Roadmap and every project identified must first satisfy an economic development and job creation threshold. First and foremost we see the Lloyd EcoDistrict as a new kind of economic development strategy.

The Roadmap is a guide to help the Lloyd EcoDistrict achieve a new vision for growth and economic development. We are committed to growing Portland, growing the Lloyd District; and know that creating an EcoDistrict will provide a huge advantage to do so. The Lloyd EcoDistrict is a new business plan for the Lloyd District that targets 20,000 new jobs, at least 4,000 housing units and 20 million new square feet of commercial, retail, institutional and residential development by 2030. We will monitor these goals on a quarterly basis and make the necessary adjustments to keep pace while never losing our commitment to People, Planet and Profit.

CONNECTED, AND MAKING A DIFFERENCE

Many booster organizations or cities also have audacious goals. What makes us different? The difference is that in the Lloyd EcoDistrict we have a uniquely powerful way to reach these goals. Through collaboration and interdependence, efficient scale, and invested private and public sector partners the Lloyd EcoDistrict is in a better position to reach these goals by following this Roadmap. That means the Lloyd EcoDistrict is structured to foster more development, lower overall costs, and increased value to buildings, businesses and individuals who invest in the District. We will do this through our business and public sector collaboration, and by understanding how to reap the rewards of high performance building and infrastructure. How do we back up these claims?

High Performance New Buildings (Energy Savings = \$16.5M/year) We assumed that all new buildings in the district will achieve LEED Gold. Through research of the industry and evaluation of current projects, we targeted a 50% energy reduction as both a reasonable and attainable goal. The annual costs savings for a 50% reduction in energy demand from new buildings is estimated at approximately \$16.5M/year based on 2012 energy costs.

Energy Retrofits (Energy Savings = \$6M/year) We assumed existing buildings could be retrofitted cost effectively to reduce energy demands by approximately 30%. LEED for Existing Buildings targets energy savings between 20-45% (USGBC LEED EB Rating System, 2009). We were conservative with an assumption of 30% energy savings through retrofits. Energy savings from a 30% reduction in energy demand from existing buildings will be about \$6M based on 2012 energy costs.

Stormwater Management Retrofits (Stormwater Savings = \$1M/year) Meeting stormwater goals for new buildings was assumed to have zero cost premium because that level of performance will be required to meet LEED Gold requirements (and evolving stormwater management manual requirements). We did assume existing properties would need to be retrofitted with stormwater management facilities. Based on Portland's current stormwater sewer charges and Clean River Rewards program, we estimated a stormwater savings of about \$1M for retrofitted properties.

Shared Thermal Energy Systems (Energy Savings = \$3M/year) Published district energy performance results are few and far between. As such, we looked at the information from the Corix Rose Quarter Shared Thermal Energy Systems (STES) feasibility evaluation combined with feedback from Arup (our cost estimator) to establish a 15% reduction goal. We also assumed that 100% of the savings will not be passed through to the property owner because the system will be developed and operated by a third party heating/cooling provider (such as Corix). As such, we assumed half the savings would be accrued by the property owners which is about \$3M/year based on 2012 current costs.

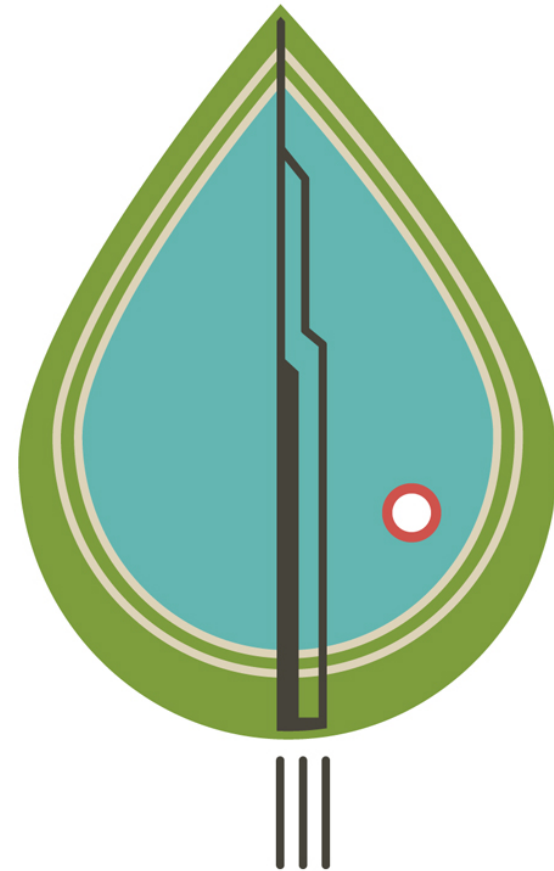
We know this is a challenging proposition. However, armed with this Roadmap, we can achieve these audacious targets, and prove that it is time to invest in the Lloyd District.

The interdependence of our partnerships is necessary to make this Roadmap a reality.

First, it is a public/private partnership in every sense. Success will not transpire without public investment in this plan. There must be a reorientation of public priorities related to infrastructure development and public resource commitments (particularly in EcoDistricts). On October 31, 2012 Portland City Council ratified a resolution which establishes formal recognition of the Lloyd EcoDistrict.

This formal status could allow us to collect a percentage of utility fees based upon higher performance and lesser impacts on the infrastructure. We also are working to establish and codify performance benefits which could accrue to development in EcoDistricts; i.e., development fee reduction, expedited permits, and a look at returning SDCs back to the district(s) from which they came. This ability to generate revenue and count on performance benefits will have real impacts in terms of the Lloyd EcoDistrict's viability, attractiveness to new development and will send a clear message that the advantages to doing business in the EcoDistrict are real.

Second, success is dependent upon private sector investment and leveraging. The private sector needs to engage in a new way of looking at investment, development and coordination of their business models to synergize with the public commitment. The goals in this Roadmap are bold, but with the right mix of private and public sector partners, they are achievable. For both the private and public sectors, the status quo has changed for the better in the Lloyd District.



LLOYD eco DISTRICT

IT'S BUSINESS FOR GOOD.



lloyd district



About the Lloyd EcoDistrict Roadmap

The Lloyd EcoDistrict Roadmap provides an assessment of baseline conditions, adopted performance goals, and recommended strategies to support the district's aspirations to become the most sustainable business district in the United States. The roadmap is intended to guide the Lloyd EcoDistrict Board through project implementation, with an emphasis on meeting ambitious goals in the areas of RETURN ON INVESTMENT, JOB GROWTH, WATER, ENERGY, MATERIALS MANAGEMENT, HABITAT + ECOSYSTEM FUNCTION, AND ACCESS + MOBILITY. The roadmap determines the current state of the EcoDistrict in these seven areas and proposes investment and partnership strategies to achieve these long-term goals. With funding support from the Portland Development Commission, this roadmap was completed by the Portland Sustainability Institute on behalf of the Lloyd EcoDistrict. It was informed by the City of Portland bureaus, Metro, the Lloyd EcoDistrict Board and was peer reviewed by key technical consultants.

Lloyd EcoDistrict Investment Goals

RETURN ON INVESTMENT

- Increase property values
- Capitalize on investments with returns in 10 years or less

JOB GROWTH

- Create 10,000 jobs by 2035

Lloyd EcoDistrict Performance Goals

ENERGY

Reduce energy demand by 60%

- Conserve energy use by minimizing demand and maximizing conservation
- Optimize infrastructure performance at all scales
- Use renewable energy

WATER

Meet both human and natural needs through reliable and affordable water management

- Reduce water consumption through conservation
- Reuse and recycle water resources wherever possible, using potable water only for potable needs
- Manage stormwater and building water discharge within the district

MATERIALS MANAGEMENT

Zero waste and optimized materials management

- Eliminate practices that produce waste wherever possible
- Minimize use of virgin materials and minimize toxic chemicals in new products
- Optimize material reuse and salvage and encourage use of regionally manufactured products or parts
- Where opportunities for waste prevention are limited,

- maximize use of products made with recycled content
- Capture greatest residual value of organic wastes (including food) through energy recovery and/or composting

HABITAT + ECOSYSTEM FUNCTION

Achieve healthy urban ecosystems that protect and regenerate habitat and ecosystem function

- Protect and enhance local watersheds
- Prioritize native and structurally diverse vegetation
- Create habitat connectivity within and beyond the district
- Avoid human-made hazards to wildlife and promote nature friendly urban design

ACCESS + MOBILITY

Provide access to clean and affordable transportation options

- Provide accessible services through mixed-uses and improved street access
- Prioritize active transportation
- Reduce vehicle miles traveled
- Use low and zero emission vehicles

EXECUTIVE SUMMARY

The Lloyd EcoDistrict Value Proposition

WHAT IS AN ECODISTRICT?

EcoDistricts are neighborhoods or districts where neighbors, community institutions and businesses join with city leaders and utility providers to meet ambitious sustainability goals and co-develop innovative district-scale projects. PoSI launched EcoDistricts in 2009—creating an implementation framework, toolkits, a local pilot program and capacity-building initiative to accelerate widespread deployment.

THE LLOYD ECODISTRICT

In 2009, Lloyd District leaders partnered with Oregon Solutions to develop a district-wide sustainability strategy. This led the Lloyd District to becoming one of five Portland pilot EcoDistricts for its potential to create a new model for sustainable neighborhood development. In 2010, a multi-sector working group developed a vision, performance goals and early project opportunities. The work culminated in the creation and signing of a Declaration of Cooperation, an agreement between public and private stakeholders to support and fund the Lloyd EcoDistrict over a three-year pilot period. The agreement called for the creation of a new governance structure to oversee all district-wide sustainability projects and the hiring of staff (including a director) to guide sustainability work in the district.

The Lloyd District has consistently been at the forefront of urban innovation. From the Lloyd Transportation Management Alliance (TMA), Lloyd Business Improvement District (BID), light rail and streetcar to Lloyd Crossing, Rose Quarter district energy and the Lloyd Superblock development, Lloyd has leveraged its unique public-private partnerships to consistently deliver value to district businesses and residents.

Through the creation of the Lloyd EcoDistrict, Lloyd continues a longstanding commitment to foster and build value for both its public and private partners. The economic benefits of sustainability investments create significant competitive and livability advantages while providing long-term value for existing business and creative job opportunities for residents.

VALUE PROPOSITION

Achieving the Lloyd EcoDistrict Vision of aspiring to be the most sustainable business district in North America will pro-

vide long-term value in the following ways:

Sense of Place

Both businesses and residents consistently commented on the need to create more of a sense of place and vibrancy in Lloyd. Enhancing Lloyd through a mix of new development, improved public infrastructure and community-led activities that emphasize sustainability will help Lloyd attract and retain new businesses and residents, and will support expanded retail and entertainment activities.

Green Brand

Infusing the value proposition in everything we do in the Lloyd EcoDistrict is in our DNA. As a corollary to that outlook, we want to understand and develop a marketing brand strategy that serves businesses in the district. This brand strategy will communicate the difference and market advantages to doing business in the Lloyd EcoDistrict. A formal brand strategy will be developed when we have a track record of successful initiatives. This brand strategy will:

- Define district identity through marketing and branding strategies and plans that reflect the sustainability goals of the Lloyd district and the City of Portland.
- Articulate the value proposition of the projects and programs we are involved with.
- Articulate the economic development advantages of the EcoDistrict: Job creation, tenant satisfaction, customer loyalty, place making (others?)

Cost Savings in Development, Operations and Maintenance

Green building and infrastructure and dedicated district-wide demand management program for transportation, waste, energy, and water will help drive down the average costs of building and infrastructure operations and maintenance, helping to make the Lloyd EcoDistrict one of the most cost-competitive business centers in the region.

Private Capital and Partnerships

The Lloyd EcoDistrict has the ability to attract new sources of private and public capital to build the buildings and infrastructure of the future, including eco-friendly district utilities, new forms of mobility options, and intelligent demand management technologies. This requires creating a climate of innovation.

Network of Support

The unique partnership between district stakeholders, the City and other public agencies to develop a shared sustainability roadmap creates market certainty for private and public sector investors. Such certainty allows for partnerships to deliver the innovative building and infrastructure solutions for the future—all while reducing and/or offsetting costs to local partners. It creates a community of support that eases the challenges to property owners and business owners as they collectively face a changing market. These benefits of the Lloyd EcoDistrict provide the district significant competitive advantage now and into the future over other regional business districts and across N. America.

Why EcoDistricts Matter

- **For Municipalities** Supports a neighborhood sustainability assessment and investment strategy to help meet broader sustainability policy and economic development goals
- **For Utilities** Creates a model for integrated infrastructure planning to guide development of more effective infrastructure investments over time and to emphasize resiliency and efficiency
- **For Developers and Property Owners** Creates a mechanism to reduce development and operating costs by linking individual building investments to neighborhood infrastructure while making investments more attractive to tenants and visitors
- **For Businesses** Provides a platform to deliver district-scale infrastructure and building products and services to market
- **For Residents and Neighbors** Provides a tangible way to get involved in improving and enhancing the neighborhood's economic vitality and sustainability, and a new form of local organization for meaningful actions

Strategies + Goals Summary

* Further detail on achievable performance range described within the Achieving Goals sections

	CITY GOAL	DISTRICT POTENTIAL	ECODISTRICT GOAL	RECOMMENDED STRATEGIES	RECOMMENDED GOAL*
prosperous district	NONE ROI	0-56 YEARS ROI	NONE ROI	All strategies of the Roadmap are recommended to achieve the full potential of the Prosperous District.	≤ 10 YEARS ROI
	10,000 NEW JOBS	10,000-50,000 NEW JOBS	NONE NEW JOBS		10,000 NEW JOBS
efficient district	45% ENERGY REDUCTION	45-63% ENERGY REDUCTION	100% ENERGY REDUCTION	- Existing Building Retrofit Program - High Performance New Buildings - Aggregate Renewable Energy Program - District Energy Utility - Energy Efficient Street Lights - District Dashboard and EcoDistrict Concierge - High Performance New Buildings - District Water Utility	60% ENERGY REDUCTION
	NONE WATER REDUCTION	44-77% WATER REDUCTION	NONE WATER REDUCTION		58% WATER REDUCTION
	93% WASTE REDUCTION	57-93% WASTE REDUCTION	100% WASTE REDUCTION		93% WASTE REDUCTION
biophilic district	80% SITE EIA	50-100% SITE EIA	WATER Meet both human and natural needs through reliable and affordable water management. HABITAT + ECOSYSTEM FUNCTION Achieve healthy urban ecosystems.	- Green Sites - Green Infrastructure Corridors - Greenstreets - Clackamas Park	
	40% STREET EIA	25-100% STREET EIA			10% DISTRICT EIA
	100% 100M TO NATURE	25-100% 100M TO NATURE			100% 100M TO NATURE
connected district	40% COMMUTE SOV	40-50% COMMUTE SOV	ACCESS AND MOBILITY Provide access to clean and affordable transportation options.	- Retail Commercial Streets - Boulevard Streets - Flexible Streets - Pedestrian Bridges - Bike Sharing - Car Sharing - District Dashboard - EcoDistrict Concierge	40% COMMUTE SOV
	100% ACCESS TO SHARING	0-100% ACCESS TO SHARING			100% ACCESS TO SHARING

Recommended Strategies Matrix

	PROSPEROUS DISTRICT	EFFICIENT DISTRICT	BIOPHILIC DISTRICT	CONNECTED DISTRICT
BUILDINGS	All strategies of the Roadmap are recommended to achieve the full potential of the Prosperous District.	Existing Building Retrofit Program	Green Sites	
		High performance new buildings		
INFRASTRUCTURE		Aggregate Renewable Energy Program District Energy Utility District Water Utility Energy Efficient Street Lights	Green Infrastructure Corridors Green Streets Clackamas Park Flexible Streets	Retail Commercial Streets Boulevard Streets Pedestrian Bridges
COMMUNITY ACTION + PROGRAMS		EcoDistrict Concierge District Dashboard District Zero-Waste Program		Building Character Car Sharing Bike Sharing

Immediate Actions + Investments

IMMEDIATE 2 year	SHORT-TERM 5 year	MID-TERM 10 year	LONG-TERM 10+ year
EXISTING BUILDING RETROFIT PROGRAM	HIGH PERFORMANCE NEW BUILDINGS	AGGREGATE RENEWABLE ENERGY PROGRAM	PEDESTRIAN BRIDGES
DISTRICT ENERGY UTILITY	DISTRICT DASHBOARD	RETAIL COMMERCIAL STREETS	CLACKAMAS PARK
DISTRICT WATER UTILITY	ECODISTRICT CONCIERGE	BOULEVARD STREETS	
GREEN STREETS	GREEN SITES	GREEN INFRASTRUCTURE CORRIDORS	
CAR SHARING	FLEXIBLE STREETS	BUILDING CHARACTER	
BIKE SHARING	ENERGY EFFICIENT STREET LIGHTS		
DISTRICT ZERO-WASTE PROGRAM			

Strategies outlined with a dotted line above and in lighter green text at right are prioritized in the City of Portland's N/NE Quadrant Plan. The EcoDistricts Roadmap considers these projects to be part of the base case district, but includes them because they are essential to meeting EcoDistricts performance goals.

Summary of Investments

PRIVATE

- Existing Building Retrofit Program
- High Performance New Buildings
- Green Sites
- Building Character
- EcoDistrict Concierge
- District Dashboard
- District Zero-Waste Program

PRIVATE 3RD PARTY

- District Energy Utility
- District Water Utility
- Aggregate Renewable Energy Program
- Car Sharing

PUBLIC

- Retail Commercial Streets
- Boulevard Streets
- Flexible Streets
- Pedestrian Bridges
- Green Infrastructure Corridors
- Green Streets
- Clackamas Park
- Energy Efficient Street Lights

PUBLIC-PRIVATE PARTNERSHIPS

- Bike Sharing



LLOYD



ECODISTRICT

Background + Overview

The Lloyd EcoDistrict is located just east of Portland's central business district across the Willamette River. The area includes over 400 acres and more than 16,000 employees, most of whom live outside of the district. The district consists primarily of commercial and institutional buildings (including the Oregon Convention Center, Lloyd Center Mall, and the Rose Quarter) with the majority of people traveling to the district for shopping, conferences, sporting (e.g., The Portland Trail Blazers) and other entertainment events. Residential land use is limited (the district averages one person per acre) while vacant parcels, surface parking lots and right-of-way round out the remaining land uses in the district.

EcoDistrict efforts began in Lloyd in 2004 with the creation of the Lloyd Crossing Sustainable Design and Development Strategy (Lloyd Crossing). Spearheaded by the Portland Development Commission, Lloyd Crossing sought to answer the question: "What's beyond green buildings?" Lloyd Crossing established a vision for urban sustainability based on green buildings, smart infrastructure, and collaborative governance.

Early in 2009, the Lloyd EcoDistrict formation process was identified as an opportunity for an Oregon Solutions partnership. Oregon Solutions is an initiative of the governor's office in partnership with Portland State University that aims to develop solutions to community-based problems that support economic, environmental and community objectives through collaborative efforts of business, government and nonprofit organizations.

Oregon Solutions created a task force to create the Lloyd EcoDistrict. Chaired by Mayor Sam Adams, Multnomah County Commission Chair Jeff Cogen and Metro President David Bragdon, members included Lloyd District stakeholders, City of Portland bureaus, and Metro, many of whom participated in Lloyd Crossing to draft goals and objectives, prioritize possible projects for the EcoDistrict and create a set of baseline metrics.

The Oregon Solutions process ended with the creation of a Declaration of Cooperation (DOC), a written document

outlining the commitments of District stakeholders. The signed DOC includes financial and in-kind commitments from many of the private and public sector partners of the Lloyd EcoDistrict task force.

As a result of these efforts, the Lloyd EcoDistrict has achieved a number of significant accomplishments:

- Established the first district-wide sustainability vision in the U.S. with Lloyd Crossing
- Established the first EcoDistrict Management Association in the US.
- Hired its first EcoDistrict Director
- Initiated the development of a neighborhood energy utility that is envisioned to ultimately serve a majority of the district

A FOCUS ON INFRASTRUCTURE

The Lloyd EcoDistrict Roadmap focuses on the following performance areas:

- Energy
- Water
- Materials Management
- Access + Mobility
- Habitat + Ecosystem Function
- Return on Investment
- Job Growth

The Lloyd EcoDistrict Roadmap refines and clarifies earlier-adopted Lloyd-specific goals as well as strategies to achieve them. The recommendations contain a set of high-impact strategies organized into three categories: building, infrastructure, and community-led actions programs. The strategy further identifies investments and specific actions to guide EcoDistrict implementation.

PLANNING HORIZONS

The planning horizons at right, including five-year implementation increments, were identified to guide Lloyd EcoDistrict development.

2010 BASELINE YEAR	EXISTING DEVELOPMENT The 400-acre Lloyd EcoDistrict includes the following existing development (by building area, SF): ▪ Ctommercial = 11,000,000 SF (92%) ▪ Residential = 800,000 SF (7%) ▪ Industrial = 100,000 SF (1%) ▪ Open Space = 0 ▪ Right of Way = 0 ▪ Total = 11,900,000 SF (100%)
2015	
2020	
2025	
2030	PORTLAND CLIMATE ACTION PLAN 40% below 1990 levels
2035 PORTLAND PLAN + N/NE QUADRANT PLAN GOALS	According to the draft N/NE Quadrant Plan, significant growth commercial growth is projected for the Lloyd EcoDistrict. In addition, residential growth is being encouraged to enhance district vitality and Central City goals. Overall by 2035, total development within the EcoDistrict will almost triple based on the following projections: ▪ Commercial = 30,700,000 SF (94%) ▪ Residential = 2,000,000 SF (6%) ▪ Industrial = 100,000 SF (0%) ▪ Open Space = 0 ▪ Right of Way = 0 ▪ Total = 32,800,000 SF (100%)
2040	
2045	
2050	PORTLAND CLIMATE ACTION PLAN 80% below 1990 levels
2055	
2060 ECODISTRICT GOALS	

THE LLOYD ECODISTRICT

Development

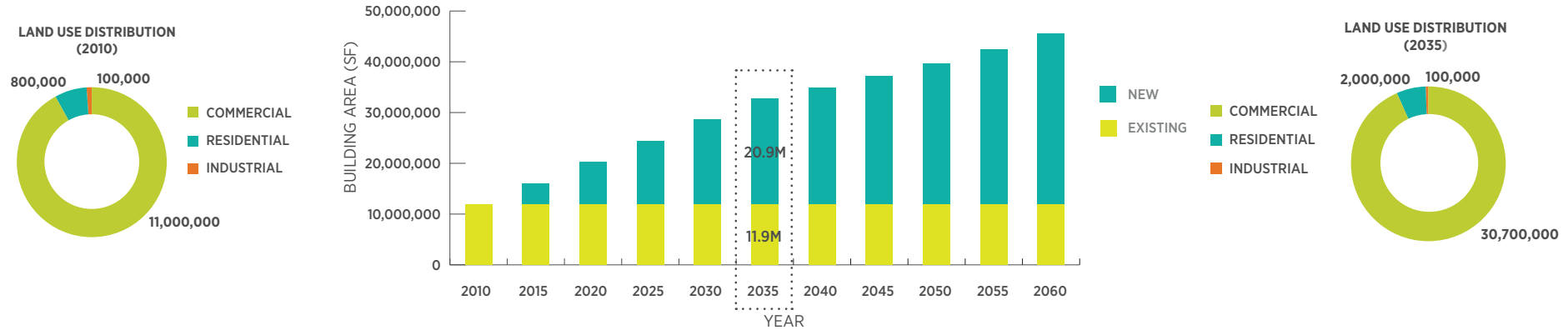
EXISTING (2010)



FUTURE (2035)

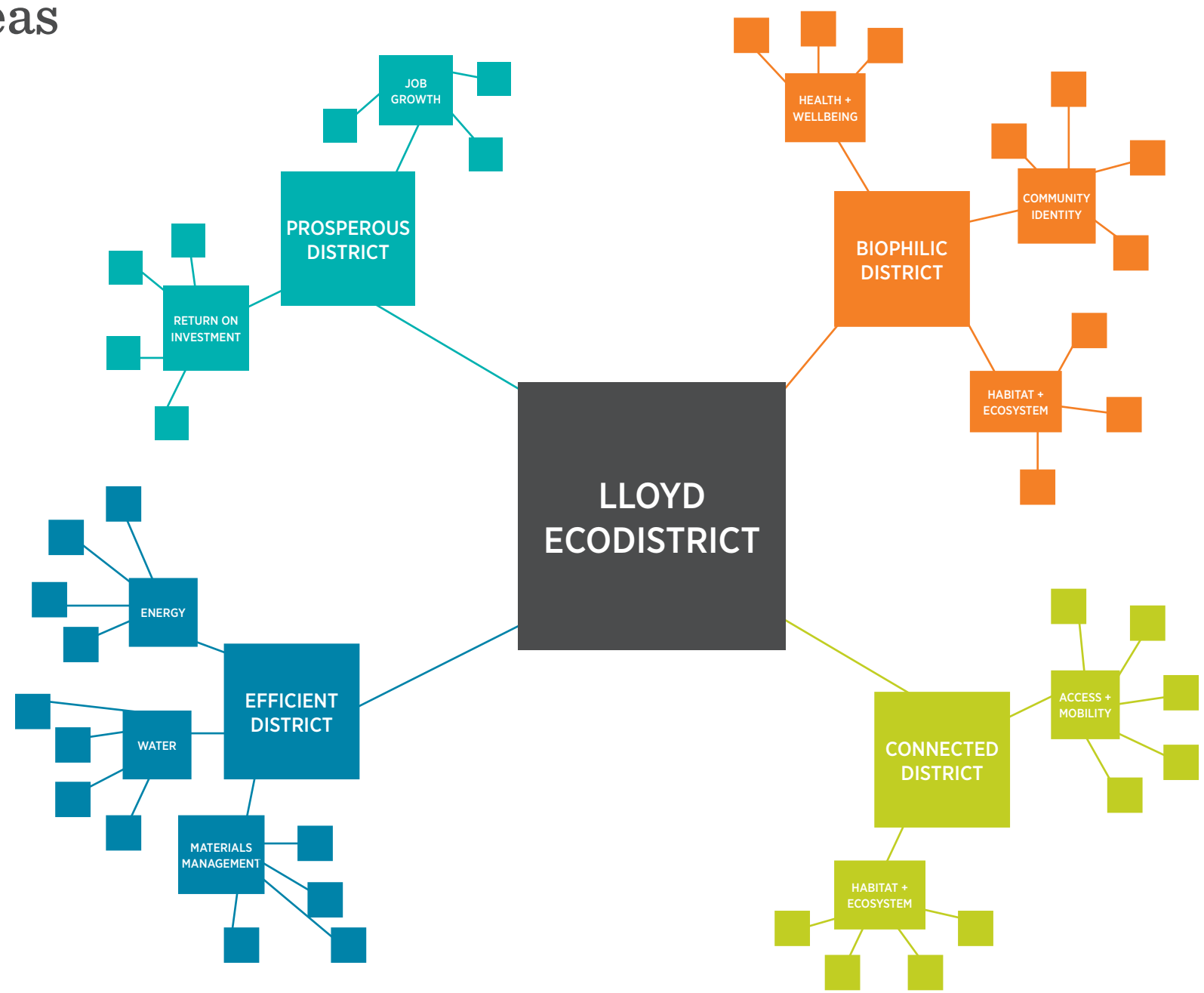


DEVELOPMENT ASSUMPTIONS



THE LLOYD ECODISTRICT

Big Ideas



Big Ideas

PROSPEROUS DISTRICT

The Lloyd EcoDistrict is within the N/NE quadrant of Portland's Central City, contains many of the region's significant attractors including major event, office and retail facilities, including the Oregon Convention Center, Rose Garden Arena and Lloyd Mall. While zoned for high density development, this area as a whole has not realized its full development or economic development potential. We see the Eco-

District framework as a new kind of business plan for the Lloyd District and a major driver for job creation and economy development.

New Development + New Jobs New commercial and residential development in the district will total over 22M sf by 2035. This development has the potential to increase not only property values for the private sector but also subsequent property taxes for the public sector. Moreover, by creating a unique place that engages businesses, residents and employees in a meaningful different way, the Lloyd EcoDistrict will set the agenda for creating and defining future prosperity for Lloyd. New development will generate thousands of construction jobs over the next 25 years and provide equitable access to employment opportunities.

EFFICIENT DISTRICT

The Lloyd EcoDistrict will set the standard for resource conservation and efficiency (energy, water and waste management), minimizing the district's impact on the environment while optimizing the use of existing public infrastructure investments and reducing private development costs and utility related expenses for local businesses and residents.

Existing Building Retrofit Program The strategy would result in a 10% energy reduction and 15% water reduction. Energy and water conservation retrofits should be combined into one program for existing buildings. The EcoDistrict should engage a private 3rd party energy services contractor to develop and deliver the program district wide.

High Performance New Buildings Assuming the additional cost of LEED Gold is \$0, based on Portland-market experience, this strategy would result in a 30% energy reduction and 30% water reduction. LEED Gold should be assumed the new business-as-usual for development in the Lloyd EcoDistrict.

Aggregate Renewable Energy Program 5% of district energy demand by 2035 should be supplied through on-site renewable resources. The Lloyd EcoDistrict should engage with a private 3rd party solar provider to develop and deliver the program district wide.

District Energy Utility A district energy utility truly makes the Lloyd district and EcoDistrict. The Lloyd EcoDistrict should continue to work with a third-party utilities company to implement and expand the Rose Quarter Shared Thermal Energy System. Moreover, Lloyd should work with Corix to establish new district energy nodes near the Lloyd Center Mall and central district. This strategy will help reduce district energy demand by 15%.

District Water Utility Similar to the district energy utility, the Lloyd EcoDistrict should work with a third-party utilities company to establish a district water utility to collection, treat and distribute treated wastewater and stormwater. This strategy would reduce district water demand by 13%.

EcoDistrict Concierge Like the Lloyd Transportation Management Association, the Lloyd EcoDistrict can uniquely provide education and support to local business and residents on how to help achieve EcoDistrict goals. This should include district dashboard.

Energy Efficient Street Lights Retrofitting existing streets to high-efficient LED lights would also reduce district energy demand. The City of Portland is currently considering a LED street light retrofit program beginning in 2013. Should the program succeed, the City will likely strive to retrofit all City-owned street lights. Street lights in Lloyd only consume a small amount of energy but extend the lifespan of lights by 2-3 times.

District Zero-Waste Program Lloyd EcoDistrict should establish a waste reduction working group that is driving the effort and able to make collaborative, binding decisions about priorities, investments, engagements, and outreach. Once committed to taking on the large and complex tasks of aggressive waste reduction at a district scale, it is important to first and foremost develop a very clear understanding of your priority goals, your waste stream and your resources. Like any major project, a waste reduction initiative should be developed through and follow a thoughtful and managed process.

BIOPHILIC DISTRICT

The Lloyd EcoDistrict provides a global example of how city and nature intertwine. Biophilia reinforces the Lloyd EcoDistrict brand by providing physical and visual cues of EcoDistrict systems as well as enhance "community health" of district residents and businesses.

Green Infrastructure Corridors Physically reinforcing the green brand of the Lloyd EcoDistrict, green infrastructure corridors also help achieve Biophilic district goals of Effective Impervious Area (EIA) and

human/nature connection and interaction. Holladay design is already underway by BES—Clackamas, Interstate, Lloyd, 2nd, 6th, and 15th should be considered next. The Lloyd EcoDistrict should work with BES to establish a green street master plan for the district.

Green Streets All streets in the Lloyd EcoDistrict should be greenstreets. To accomplish this, 900 greenstreet planters would need to be added. As BES would be responsible for this cost, the Lloyd EcoDistrict should work with BES to incorporate into the Lloyd greenstreet master plan.

Green Sites This strategy would achieve the 80% green infrastructure management requirement for private property.

Clackamas Park The Lloyd EcoDistrict needs more open space. This new neighborhood park at Clackamas and MLK would help to satisfy this need. Developed by PPR, the Lloyd EcoDistrict should work with them to better understand and move the park development process.

CONNECTED DISTRICT

The Lloyd EcoDistrict provides instruction to other business districts across North America of how transportation options should be provided to district residents and businesses. The Lloyd EcoDistrict provides efficient and affordable modal options (pedestrian, bike, transit and auto) and choice for all.

Building Character Supporting a active street environment and fostering of sense of place requires good building and street design. This strategy is assumed to be business-as-usual for new development.

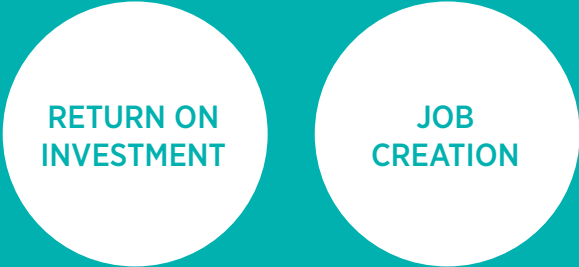
Retail Commercial Streets Rebuilding the core commercial streets of Broadway, MLK and Grand Avenue will strengthen transportation and urban character of the Lloyd EcoDistrict. As this is a public investment, the Lloyd EcoDistrict should work with PBOT to better understand project implementation timing and design.

Boulevard Streets Retrofit of 7th and Multnomah provides transformative opportunity in the district's core to create new community activity centers. This is a public investment and the Lloyd EcoDistrict should work with PBOT to better understand project implementation timing and design.

Pedestrian Bridges I-5 and I-84 provide significant barriers pedestrian and bike connections from and to the Lloyd EcoDistrict. Pedestrian and bike only bridges should be constructed to "bridge" these gaps and provide iconic "gateways" to the Lloyd EcoDistrict. The Lloyd EcoDistrict should work with PBOT to better understand bridge development feasibility.

PROSPEROUS DISTRICT

The Lloyd EcoDistrict is within the N/NE quadrant of Portland's Central City, contains many of the region's significant attractors including major event, office and retail facilities, including the Oregon Convention Center, Rose Garden Arena and Lloyd Mall. While zoned for high density development, this area as a whole has not realized its full development or economic development potential.



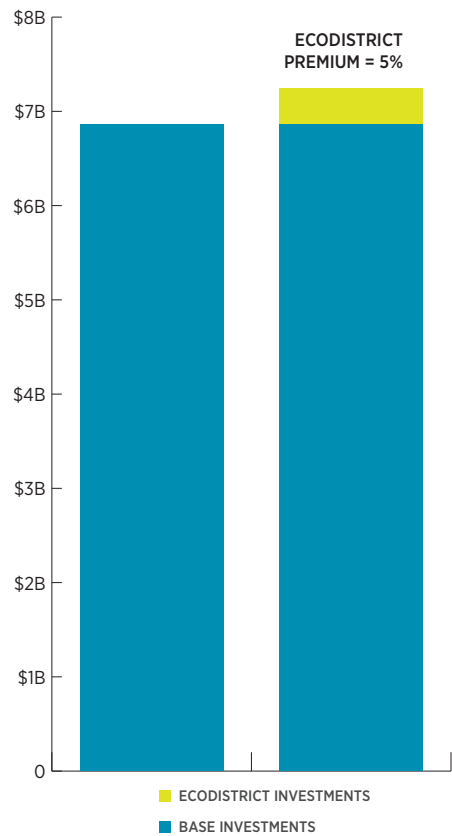
RETURN ON
INVESTMENT

JOB
CREATION

THE PROSPEROUS DISTRICT: RETURN ON INVESTMENT

Return on Investment

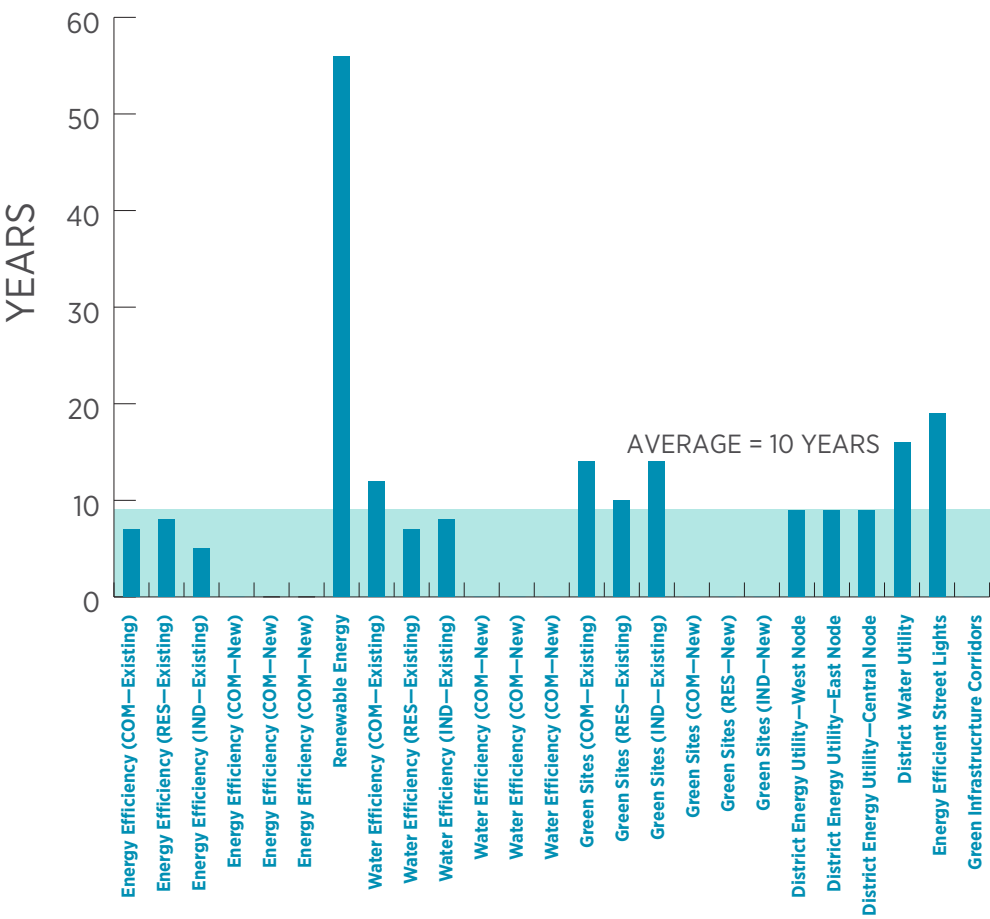
BASE DISTRICT VS. ECODISTRICT COST



ECODISTRICTS PROJECTED ANNUAL SAVINGS

\$38M

STRATEGY ROI



Baseline + Goals

The Lloyd EcoDistrict is within the N/NE quadrant of Portland's Central City, contains many of the region's significant attractors including major event, office and retail facilities, including the Oregon Convention Center, Rose Garden Arena and Lloyd Mall. While zoned for high density development, this area as a whole has not realized its full development or economic development potential.

MARKET CONDITIONS

Existing (2010) Per information from the Bureau of Planning and Sustainability's N/NE Quadrant Plan analysis, current use mixes in the district are 26% office use, 16% retail/major event entertainment and 14% in retail/shopping. Hotels make up about 10% and residential uses 8%. Another 10% is in parking structures (excluding surface parking). A 2007 study shows 70 acres of redevelopable land. The district was estimated to have about 16,800 jobs in 2010, accounting for approximately 14% of the total in the Central City. Some of the biggest employment sectors in 2006 were: services (30%); retail, arts, and accommodation (30%); and public sector (12%).

A 2012 Norris Beggs & Simpson quarterly market report indicates the Lloyd District/Central Eastside submarket, with 2.4 million square footage of office, has an 11.5% vacancy rate compared with a 13.7% vacancy rate in Portland's Central Business District. The district also has little tenant turnover and high retention rates; however, the district has also experienced no new office construction and has a negative absorption as compared to downtown.

VIBRANT REGIONAL CENTER

Future (2035) A 2007 study shows 70 acres of redevelopable land with enough development potential under current entitlements to nearly triple the amount of built space in the district. The most significant new development is projected to occur in commercial and residential uses:

- Commercial = 30,700,000 SF (94%)
- Residential = 2,000,000 SF (6%)

Lloyd District will continue to foster new growth to create a more intensely urban center; capitalize on the district's re-

gional attractions, high quality transit and connections; and leverage the district's strong employment base.

INVESTMENT GOALS

The Lloyd EcoDistrict will realize a competitive and sustainable return on investment on behalf of private development efforts and City development based revenue. Full cost analyses should be completed when feasible to assess both short term and long term investment and return. Specific goals would include:

Development and Operations & Maintenance Return Future development within the district to meet 2035 development projections is estimated to require approximately \$6.86B of investment. This investment would likely increase property value within the Lloyd EcoDistrict by \$1.7B, a 10% return on investment over the 25 year period.

Property Taxes In addition to the private return on investment generated through new development, public benefit would be generated through increased property taxes generated from the district. Based on the \$8.56B of property value in the district at 2035, annual property taxes generated would top \$125M.

EcoDistrict Strategy Return Each EcoDistrict strategy proposed also creates value for Lloyd. A simple return on investment (ROI)—in terms of number of years to payback—for strategies generating operational savings are shown on the previous page. ROIs range from from immediate to 56 years (solar PV) with a combined average of 10 years (which meets the 10-year ROI goal for the EcoDistrict).

Sense of Place Both businesses and residents consistently commented on the need to create more of a sense of place and vibrancy in Lloyd. Enhancing Lloyd through a mix of new development, improved public infrastructure and community-led activities that emphasize sustainability will help Lloyd attract and retain new businesses and residents, and will support expanded retail and entertainment activities.

Green Brand Infusing the value proposition in everything we do in the Lloyd EcoDistrict; is in our DNA. As a corollary to

that outlook, we want to understand and develop a marketing brand strategy that serves businesses in the district. This brand strategy will communicate the difference and, market advantages to doing business in the Lloyd EcoDistrict. A formal brand strategy will be developed when we have a track record of successful initiatives. This brand strategy will: define district identity through marketing and branding strategies and plans that reflect the sustainability goals of the Lloyd district and the City of Portland. articulate the value proposition of the projects and programs we are involved with and articulate the economic development advantages of the EcoDistrict: Job creation, tenant satisfaction, customer loyalty, place making.

Cost Savings in Development, Operations and Maintenance Green building and infrastructure and dedicated district-wide demand management program for transportation, waste, energy, and water will help drive down the average costs of building and infrastructure operations and maintenance, helping to make the Lloyd EcoDistrict one of the most cost competitive business centers in the region.

Private Capital + Partnerships The Lloyd EcoDistrict has the ability to attract new sources of private and public capital to build the buildings and infrastructure of the future, including eco-friendly district utilities, new forms of mobility options, and intelligent demand management technologies to name a few. This requires creating a climate of innovation.

Network of Support The unique partnership between district stakeholders, the City and other public agencies to develop a shared sustainability roadmap creates market certainty for private and public sector investors. Such certainty allows for partnerships to deliver the innovative building and infrastructure solutions for the future—all while reducing and/or offsetting costs to local partners. It also creates a community of support that eases the challenges to property owners and business owners as they collectively face a changing market. These benefits of the Lloyd EcoDistrict provide the district significant competitive advantage now and into the future over other regional business districts and across N. America.

THE PROSPEROUS DISTRICT: JOB GROWTH

Background + Overview

The Lloyd EcoDistrict is a significant employment center for the City, including housing the City's major regional attractions at the Rose Quarter and Oregon Convention Center.

Existing Jobs (2010)

A 2010 estimate from the Bureau of Planning and Sustainability indicates that there are approximately 18,000 jobs in the Lloyd District.

Future Jobs (2035)

The Lloyd District offers significant opportunity to grow Portland's employment base. New business that balance the episodic nature of the regional event centers, complemented with new high-density commercial development will support job growth and enliven the district. Given the density and mixed use character of the district, business growth can occur in a wide range of sectors from professional services to retail. Moreover, district development will also generate significant construction related jobs.

The goal of the Lloyd District is to add 10,000 new jobs, resulting in a total of 28,000 jobs or a 55% growth in jobs over 25 years.

Achieving Job Growth Goals

From construction to clean tech, development of the Lloyd EcoDistrict has the potential to generate well over the 10,000 job goal of the Lloyd District.

Jobs (including Clean Tech)

Development of new commercial space within the district supports a broad array of employment opportunities that provide living-wage jobs and equitable access to employment. Assuming an office efficiency of 80% and an employee space area of 200-225 sf per employee, new commercial development within Lloyd could provide space for over 50,000 employees.

Development of the Lloyd District as a center for innovation and application of sustainable business and development practices, provides direct investment and job opportunities for the clean technology industry.

Construction Jobs

Construction associated with development of the Lloyd EcoDistrict has the potential to generate over 25,000 temporary construction jobs over the next 25 years.







EFFICIENT DISTRICT

The Lloyd EcoDistrict will set the standard for resource conservation and efficiency (energy, water and materials management), minimizing the district's impact on the environment while optimizing the use of existing public infrastructure investments and reducing private development costs and utility related expenses for local businesses and residents.



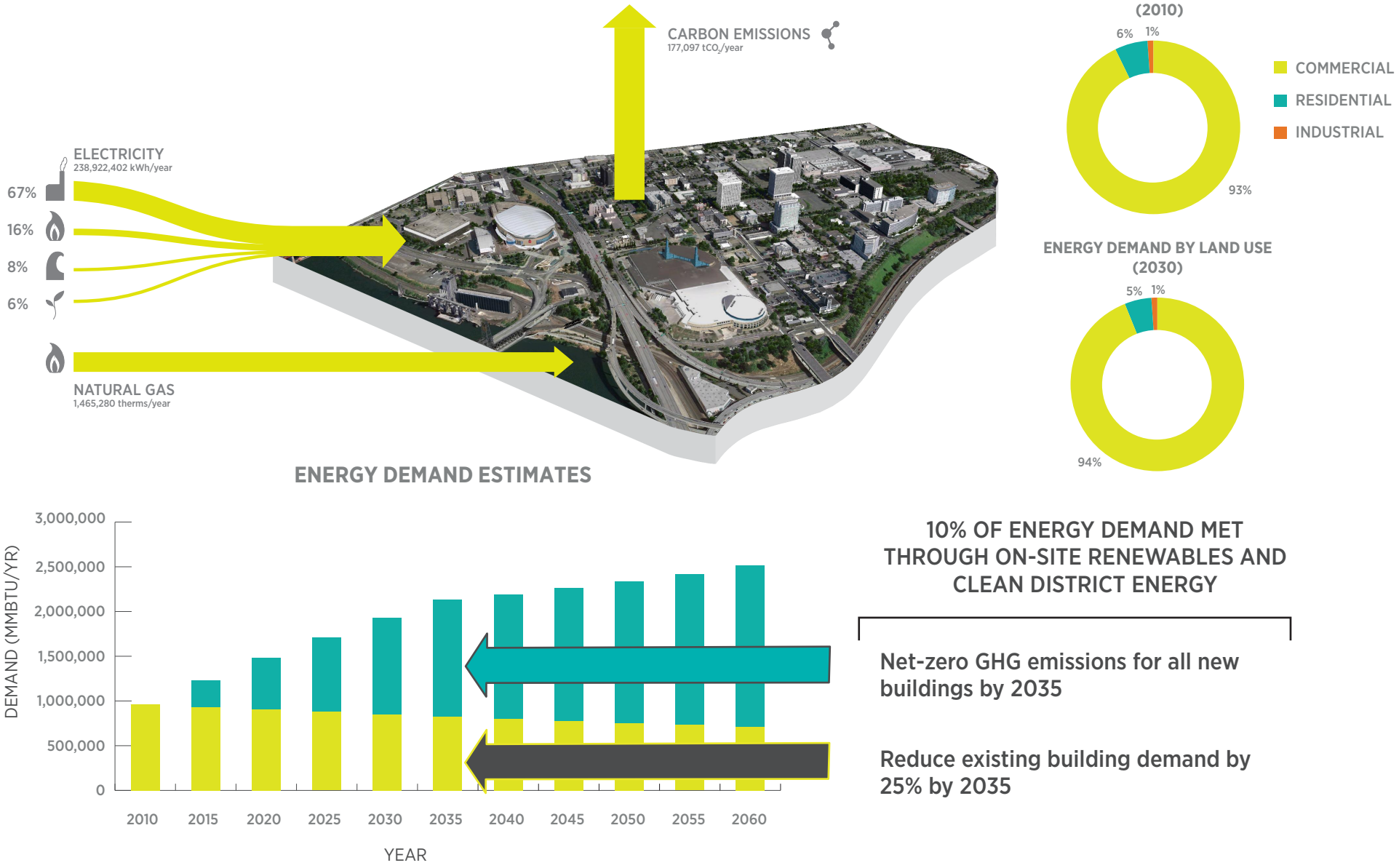
ENERGY

WATER

MATERIALS
MANAGEMENT

THE EFFICIENT DISTRICT: ENERGY

Baseline + Goals



Baseline + Goals

The Lloyd EcoDistrict is served by Pacific Power for electricity and NW Natural for natural gas. Pacific Power's generation mix is composed mainly of coal (67%), natural gas (16%), hydro (8%) and wind (6%). Electricity costs average \$0.08/kWh (commercial), \$0.9/kWh (residential) and \$0.06/kWh (industrial). Carbon emissions per kWh generated equals approximately 0.0007 tCO₂.

NW Natural costs average \$1.09/therm (commercial), \$1.14/therm (residential) and \$1.09/therm (industrial). Carbon emissions per therm generated equals approximately 0.0067 tCO₂.

ENERGY DEMANDS, COSTS + CARBON

Existing (2010) Building specific energy demand factors were established for the Lloyd EcoDistrict based on land use, building area, existing utility data for the district and Portland-specific building demand assumptions.

Based on these assumptions, annual district energy demand for 2010 was estimated to be:

- Electricity = 238,922,000 kWh/year
- Natural Gas = 1,500,000 therms/year
- **Total = 981,800 MM BTU/year**

The distribution of energy demand by land use type was estimated as follows:

- Commercial = 93%
- Residential = 6%
- Industrial = 1%
- Open Space = 0%
- Right of Way = 0%
- **Total = 100%**

Commercial buildings account for 93% of annual energy demand and residential buildings account for 6%. Energy demand from industrial, open space and right of way land use types are negligible (less than 1%). Approximately 85% of energy demand is supplied by electricity and 15% by natural gas. Total annual energy costs are estimated at \$20,725,000/year and carbon emissions at 177,000 t/CO₂.

ENERGY DEMANDS, COSTS + CARBON

Future (2035) Based on the building specific energy demand factors and assumed development projections of the N/NE Quadrant Plan, future energy demands for 2035 for estimated to be:

- Electricity = 530,477,000 kWh/year
- Natural Gas = 3,193,000,200 therms/year
- **Total = 2,129,000 MM BTU/year**

The distribution of energy demand by land use type was estimated as follows:

- Commercial = 94%
- Residential = 5%
- Industrial = 0%
- Open Space = 0%
- Right of Way = 0%
- **Total = 100%**

Even through the proportion of residential development within the district has increased from 2010, annual energy demand distributions remain similar. Total annual energy costs are estimated at \$53,340,000/year and carbon emissions at 392,800 t/CO₂.

ENERGY GOALS

Energy Use Reduction

Based on existing policies and plans for the Lloyd EcoDistrict, energy reduction goals range from 45-63%. PoSI EcoDistrict goals target net-zero energy by 2060. Energy-related goals in Portland's Climate Action Plan (CAP) include a 25% reduction in existing building energy demand by 2030, net-zero GHG emissions for all new buildings by 2030, and 10% of total energy met through on-site renewables and clean district energy by 2030. Achieving these three CAP goals in the Lloyd EcoDistrict would require an 45% reduction in carbon-based energy by 2035.

Energy Goals

EcoDistrict

- **Achieve net zero energy usage annually.**

City

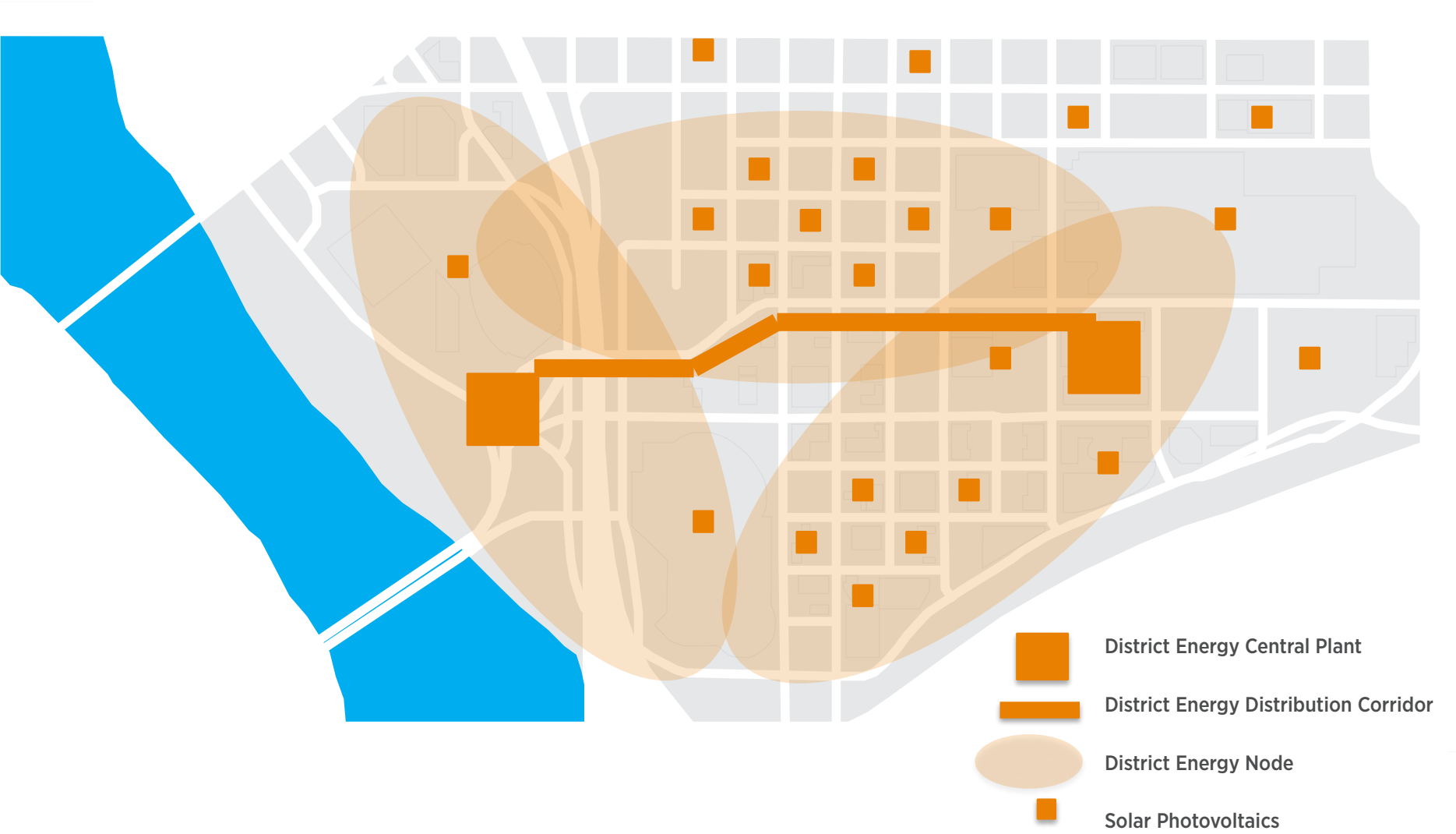
- **25% Energy Reduction for Existing Buildings by 2030**
- **Net-Zero GHG Emissions for New Buildings by 2030**
- **10% of Total Energy Met through On-Site Renewables and Clean District Energy**

Lloyd Recommendations

- **No increase in energy demand (60% energy reduction by 2035)**

THE EFFICIENT DISTRICT: ENERGY

Concept Plan



Achieving Energy Goals

Achieving an 60% reduction in energy demand by 2035 will require a comprehensive energy strategy for the Lloyd EcoDistrict based on the following areas of focus and reduction targets:

- Existing Buildings = 10%
- New Buildings = 30%
- Renewables = 5%
- District Infrastructure = 15%
- **Total = 60% Reduction**

BUILDINGS

By 2035, existing buildings will consume 36% of total annual energy. These buildings are primarily commercial. Aggressive, yet proven, building retrofit strategies could be utilized to reduce existing building energy demands by 20-40%. Assuming 100% of existing buildings are retrofitted to reduce energy demand, a 10% energy demand reduction would be achieved for the district.

64% of energy demand by 2035 will come from new buildings. Should new buildings achieve LEED certification, energy reduction benefits would range from 15-55%. Assuming all new buildings achieve LEED Gold, the overall energy reduction benefit would be around 30%.

A recent solar energy potential report for the Lloyd EcoDistrict estimated that 2% of annual energy demand could be satisfied through on-site solar PV installations. Future roof top area available for solar is estimated to be approximately 250 acres, which has the potential to generate at least 5% of the district energy demand through clean renewable energy.

INFRASTRUCTURE

Combined existing building, new building and renewables strategies will achieve a 45% reduction in carbon-based energy. To achieve the 60% reduction target, district infrastructure should be utilized. Converting building thermal systems to district thermal systems could reduce district energy demand by 10-30%. The overall energy reduction benefit of implementing a district energy system for Lloyd would be 13%.

In addition, street lights should be converted to high-efficiency LEDs to further reduce energy waste.

PEOPLE AND BEHAVIOR

To further minimize energy demands within the district, education supported through emerging technologies should be used within the district to educate and encourage energy reduction actions.

RECOMMENDED ENERGY STRATEGIES

To achieve the EcoDistrict energy goals based on the focus areas of existing buildings, new buildings, renewables, and district infrastructure, the following energy strategies are recommended:

Existing Building Energy Conservation Retrofit Program

Retrofitting existing buildings to reduce energy demand would cost approximately \$46,600,000, reducing energy costs by \$6.2M (ROI = 8 years). To reduce retrofit costs and drive adoption, the Lloyd EcoDistrict should engage with a private energy services provider (ESCO) to create an existing building energy retrofit program. This private 3rd party delivery program would reduce retrofitting costs to property owners up to 100%.

High Performance New Buildings (LEED Gold)

The current building marketing in Portland assumes no cost premium for LEED Silver and the more innovative developers are finding no cost premium for LEED Gold. As such, the addition cost of all new buildings in the Lloyd EcoDistrict achieving LEED Gold certification would be \$0.

Aggregate Renewable Energy Program

Maximizing solar PV installation on building rooftops would cost approximately \$238M, reducing electricity costs by \$4.2M annually (ROI = 56 years). To reduce solar costs and drive adoption, the Lloyd EcoDistrict should engage with a private solar energy provider to create a district scale solar PV program. The program would be offered to district property owners with financing, delivery, ownership and maintenance provided by the private solar provider.

Energy Efficient Street Lights

Retrofitting existing streets to high-efficient LED lights would also reduce district energy demand. The City of Portland is currently considering a LED street light retrofit program beginning in 2013. Should the program be successful, the City will likely strive to retrofit all City-owned street lights. Street lights in Lloyd only consume a small amount of energy but extend the life-span of lights by 2-3 times generating an investment payback within 8 years.

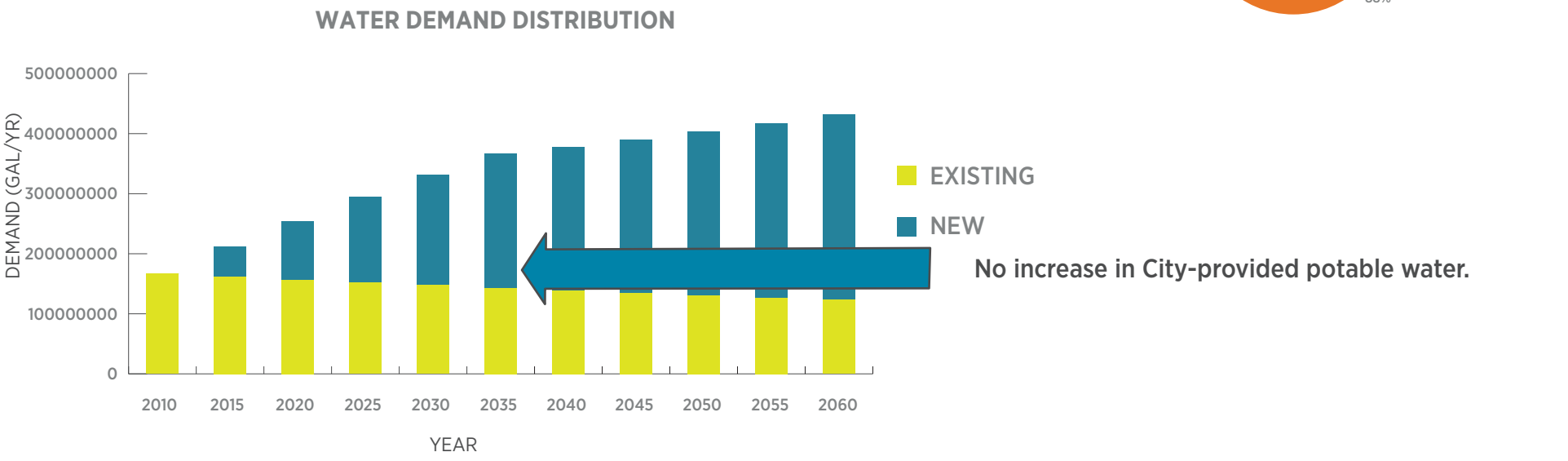
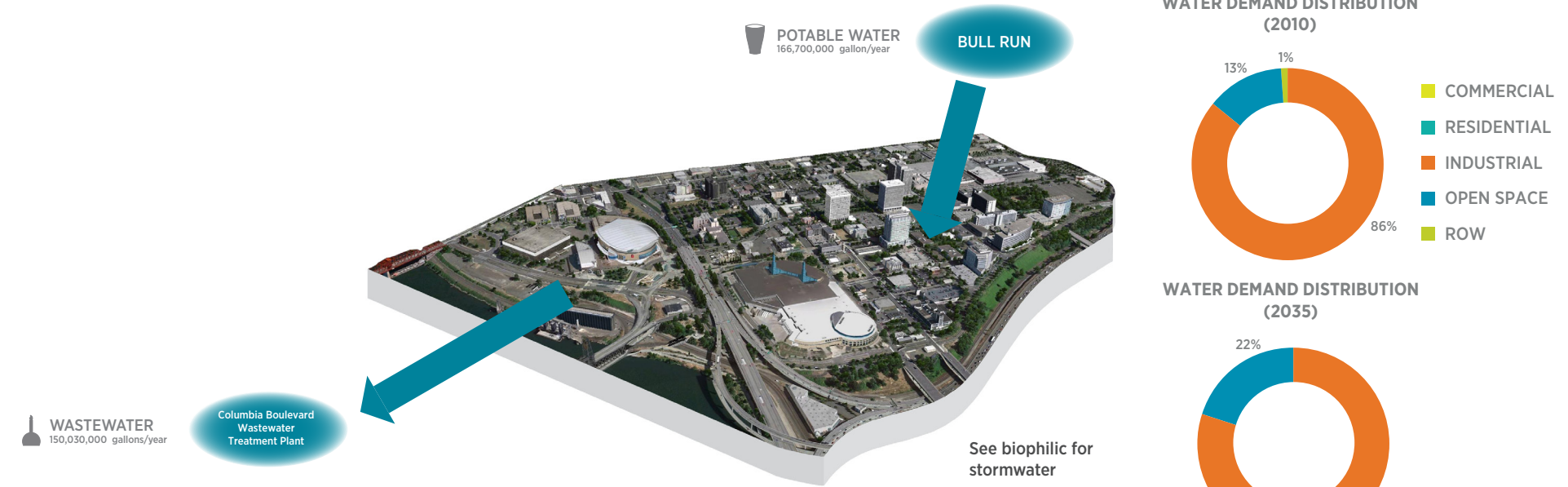
District Energy Utility

District energy development is already underway in the Lloyd EcoDistrict (Rose Quarter). The EcoDistrict should work with a third-party to establish a plan to expand the current Rose Quarter system. Potential DE nodes exist in the Rose Quarter (west node), Lloyd Center Mall (east node) and central district (central node). One district energy utility could develop and operate each node individually, potentially connecting all three together in the future.

Overall cost of district energy in Lloyd would top \$45M, generating over \$2.25M in annual energy savings (ROI = 20 years)

THE EFFICIENT DISTRICT: WATER

Baseline + Goals



Baseline + Goals

All water for the Lloyd EcoDistrict is currently supplied by the City of Portland. Portland's water supply is primarily served by the Bull Run Reservoirs on Mt. Hood with secondary water supply by groundwater wells within the City. Water rates average \$3.09/CCF.

Sanitary sewer from the Lloyd EcoDistrict is collected and conveyed by both combined sewer (east of I-5) and sanitary sewer (west of I-5) to the Columbia Boulevard Wastewater Treatment Facility in North Portland. Sanitary sewer rates average \$7.63/CCF (commercial), \$7.54/CCF (residential) and \$7.63/CCF (industrial).

WATER DEMANDS, SANITARY GENERATION, + COSTS

Existing (2010)

Building specific water demand factors were established for the Lloyd EcoDistrict based on land use, building area, existing utility data for the district and Portland-specific building demand assumptions.

Based on these assumptions, annual district water demand and sanitary generation for 2010 was estimated to be:

- Water = 166,700,000 gal/year
- Sanitary = 150,030,000 gal/year

The distribution of water demand by land use type was estimated as follows:

- Commercial = 86%
- Residential = 13%
- Industrial = 1%
- Open Space = 0%
- Right of Way = 0%
- Total = 100%

Commercial buildings account for 86% of annual water demand and residential buildings account for 13%. Water demand from industrial, open space and ROW land use types are negligible (less than 1%). Total annual water costs are estimated at \$3.5M (including water, sanitary, and stormwater).

WATER DEMANDS, SANITARY GENERATION, + COSTS

Future (2035)

Based on the building specific water demand factors and assumed development projections of the N/NE Quadrant Plan, future water demands for 2035 for estimated to be:

- Water = 427,430,000gal/year
- Sanitary = 377,429,000 gal/year

The distribution of water demand by land use type was estimated as follows:

- Commercial = 88%
- Residential = 12%
- Industrial = 0%
- Open Space = 0%
- Right of Way = 0%
- Total = 100%

Even through the proportion of residential development within the district has increased from 2010, annual water demand distributions remain similar. At 2035, total annual water costs are estimated at \$7.25M/year.

Water Goals

EcoDistrict

- **Meet both human and natural needs through reliable and affordable water management.**

City

- **None**

Lloyd Recommendations

- **No increase in potable water demand (58% reduction from 2035 demand)**

WATER GOALS

Water Reduction Based on existing policies and plans for the Lloyd EcoDistrict, clear water reduction goals do not exist. PoSI EcoDistrict goals target meeting both human and natural needs through reliable and affordable water management. Portland Water Bureau (PWB) policies do not identify water reduction targets for the City of Portland. Based on discussion with City staff, it was agreed that a goal of all new water demand within the district should be met through reclaimed water and water conservation.

Applying this "goal" to 2035 water demands for the Lloyd EcoDistrict would result in a 58% reduction in water demand from baseline 2035 demand estimates.

THE EFFICIENT DISTRICT: WATER

Concept Plan



Achieving Water Goals

Achieving a 58% reduction in water demand by 2035 will require a comprehensive water strategy for the Lloyd Eco-District based on the following areas of focus and reduction targets:

- Existing Buildings = 15%
- New Buildings = 30%
- District Infrastructure = 13%
- Total = 58% Reduction

BUILDINGS

By 2035, existing buildings will consume 37% of total annual water. Based on aggressive, yet proven, building retrofit strategies could be utilized to reduce existing building water demands by 20-50%. Assuming 100% of existing buildings are retrofitted to reduce water demand, a 15% overall district water demand reduction would be achieved.

63% of water demand by 2035 will come from new buildings. Should new buildings achieve LEED certification, water reduction benefits would range from 20-60%. Assuming all new buildings achieve LEED Gold, the overall energy reduction benefit would be around 30%.

INFRASTRUCTURE

Combined existing building and new building water conservation strategies will result in a 45% reduction. To achieve the district water goal of 58% reduction, district infrastructure in the form of sub-district-scale wastewater treatment and reuse will be required to provide additional water reduction. The overall water reduction benefit of implementing a district water system would be 143.

COMMUNITY ACTION + PROGRAMS

Education through a district dashboard could also help further reduce water demand.

RECOMMENDED WATER STRATEGIES

To achieve the EcoDistrict water goals based on the focus areas of existing buildings, new buildings, and district infrastructure, the following water strategies are recommended:

Existing Building Water Conservation Retrofit Program

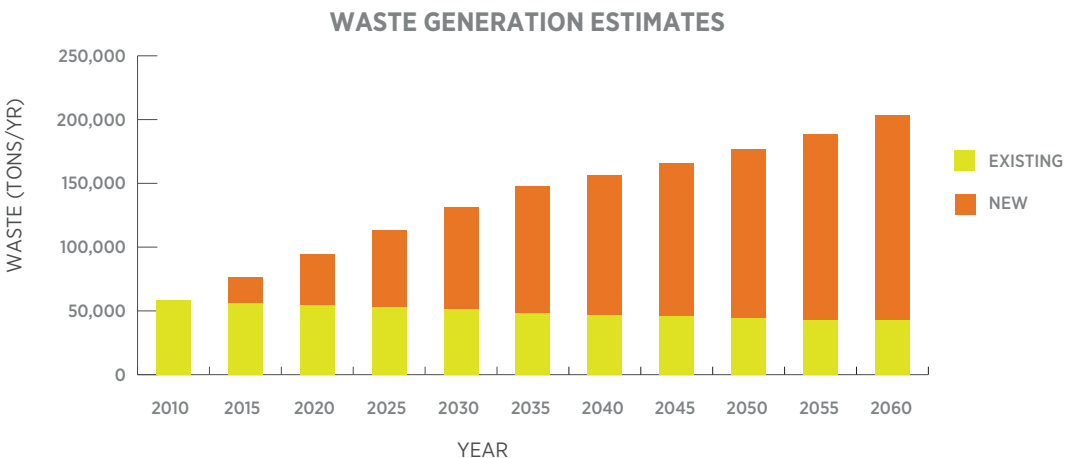
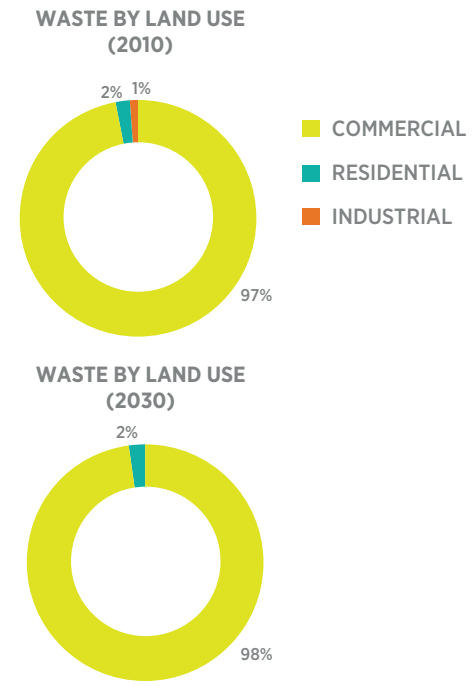
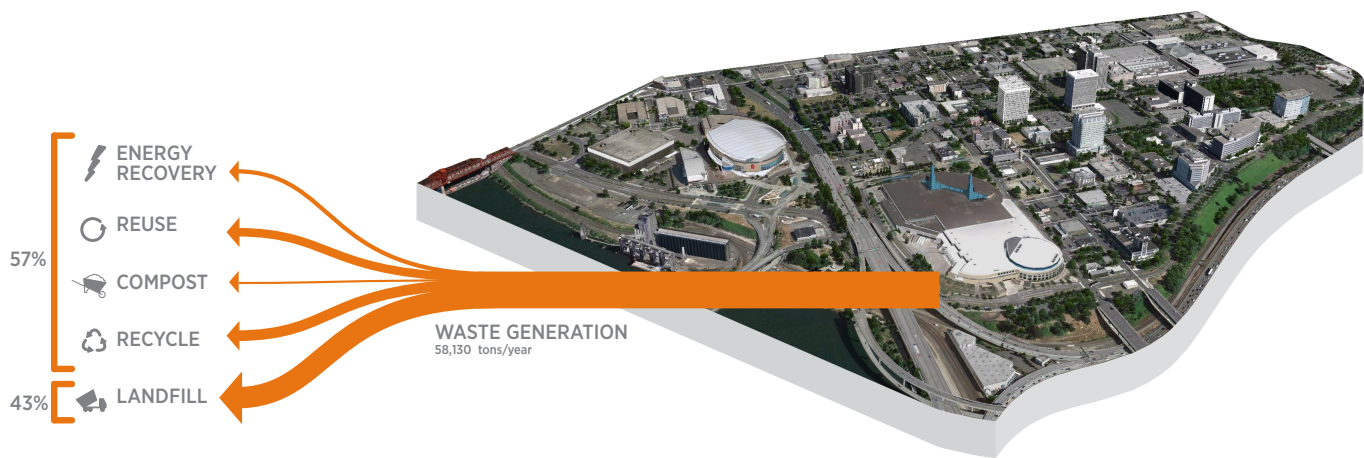
Retrofitting existing buildings to reduce water demand would cost approximately \$9,100,000, reducing water costs by \$831,000 (ROI = 11 years). To reduce retrofit costs and drive adoption, the Lloyd EcoDistrict should engage with a private energy services provider (ESCO) that also provides water efficiency services to create an existing building water retrofit program. This private 3rd party delivery program would reduce retrofitting costs to property owners up to 100%.

High Performance New Buildings (LEED Gold) The current building marketing in Portland assumes no cost premium for LEED Silver and the more innovative developers are finding no cost premium for LEED Gold. As such, the addition cost of all new buildings in the Lloyd EcoDistrict achieving LEED Gold certification would be \$0.

District Water Utility A district water utility should be established for the Lloyd EcoDistrict to provide a reclaimed water supply. Reclaimed water should be supplied to all new buildings development within the district. At least one third of the district will meet reduction goals through the use of treated wastewater. The Lloyd EcoDistrict should engage with a private third party water company to develop the system. Further study will be needed.

THE EFFICIENT DISTRICT: MATERIALS MANAGEMENT

Baseline + Goals



Baseline + Goals

The Lloyd District comprises of a total of 11,900,000 square feet of property, a vast majority of which (11,000,000 or 92%) is classified as commercial that includes commercial office, retail and hospitality. There is an additional 800,000 SF of residential and 100,000 SF of industrial. Based on baseline assumptions of waste production per square foot of property, the Lloyd District currently produces over 58,000 tons of total waste and sends over 25,000 tons of waste to landfills. Again, while this is an impressive diversion rate compared to the national average, it is regardless an unsustainable path in regards to expenses, municipal infrastructure, and environmental impact.

With the district projecting to grow to over 30 million square feet of property by 2035, if current practices were to remain intact, the Lloyd District would generate well over 150,000 tons of waste with roughly 54,000 tons going to landfill.

Related to the sheer volume and impact of the Lloyd EcoDistrict waste stream is the financial impact of that waste on the businesses and residents that occupy the district. Assuming an average collection cost of \$100 per ton of waste that goes to the landfill, Lloyd District currently spends in excess of \$2,500,000 per year on waste collection. Thinking of this expense in terms of business operations and living expenses, current waste expenses in the Lloyd District cost businesses and residents an additional \$0.19 per square foot.

This is a significant drain if the district practices were to remain intact, and recognizing the rapid increase of waste handling expenses, by 2035 that number could easily grow to over \$7,000,000. Even in current dollars, waste expenses are a large and unnecessary drain on the district that supports a significant business case for aggressive waste reduction strategies.

EXISTING WASTE GENERATION (2010)

Waste generation factors were established for the Lloyd EcoDistrict based on land use, building area, existing waste management data for the district and Portland-specific building waste generation assumptions.

Based on these assumptions, annual district waste generation for 2010 was estimated to be 58,130 tons based on the

following development:

- Commercial = 97%
- Residential = 2%
- Industrial = 1%
- Total = 100%

The distribution of waste generated was estimated as follows:

- Paper = 32%
- Glass = 2%
- Metal = 4%
- Plastic = 12%
- Organics = 41%
- C&D = 9%
- Hazard = 0%
- Special = 0%
- Mixed Residue = %
- Total = 100%

Of the waste generated in Lloyd, 97% comes from commercial properties, 2% from residential, 1% from industrial, and 12% from other sources. Recyclables (paper, glass, metal, plastics, and organics) account for over 90% of the waste generated within the district. The City of Portland does not have Lloyd EcoDistrict specific numbers for recycling but the City averages 57%.

FUTURE WASTE GENERATION (2035)

By 2035, waste generation will increase to 160,520 tons (98% commercial, 2% residential and 0% industrial) with a similar distribution:

- Paper = 32%
- Glass = 2%
- Metal = 4%
- Plastic = 12%
- Organics = 41%
- C&D = 9%
- Hazard = 0%

Materials Management Goals

EcoDistrict Goal

- **Zero waste and optimized materials management**

City

- **25% Waste Reduction by 2030**
- **90% Waste Recovery by 2030**

Lloyd EcoDistrict Recommendations

- **93% Total Waste Reduction by 2035**

- Special = 0%
- Mixed Residue = %
- Total = 100%

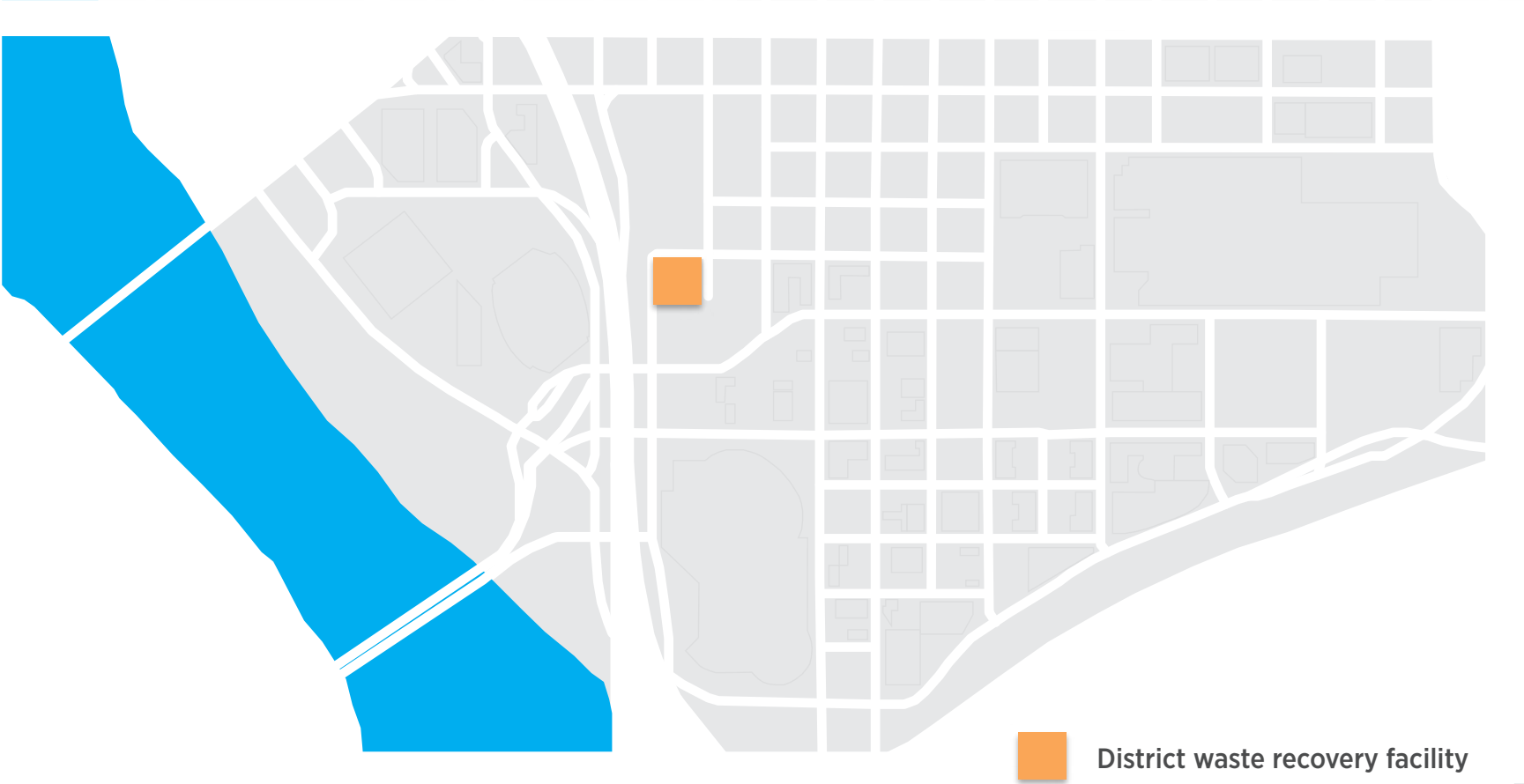
Given the large commercial development growth within the district by 2035, the commercial percentage of waste generation will increase to 98% of total waste generated, with residential and industrial decreasing to 2% and 0% respectively.

WASTE GOALS

Based on existing policies and plans for the Lloyd EcoDistrict, waste reduction goals range from 90-100%. PoSI EcoDistrict goals target net-zero energy by 2060. Waste reduction goals stated in Portland's Climate Action Plan (CAP) include a 25% reduction in total waste generation by 2035 and 90% recovery of all waste generated by 2035. Achieving CAP goals in the Lloyd EcoDistrict would result in a 93% reduction in waste generated by the district.

THE EFFICIENT DISTRICT: MATERIALS MANAGEMENT

Concept Plan



Achieving Materials Management Goals

Achieving a 93% reduction in waste generation will require a significant focus on commercial development which is projected to account for 98% of all waste generated in the district by 2035. Residential should not be ignored however it accounts for 2%. Specific waste reduction goals by development type include:

- Commercial = 90%
- Residential = 3%
- Industrial = 0%
- Total = 93% Reduction

To achieve a 93% reduction in waste will require the Lloyd EcoDistrict to truly work as a district. Working as a can district can lower fees, uncover market opportunities and expand access to services for all of the participants..

RECOMMENDED WASTE STRATEGIES

To achieve the Lloyd EcoDistrict waste reduction goals, the following strategies are recommended:

DISTRICT ZERO-WASTE PROGRAM

Lloyd EcoDistrict should establish a waste reduction working group that is driving the effort and able to make collaborative, binding decisions about priorities, investments, engagements and outreach. Once committed to taking on the large and complex tasks of aggressive waste reduction at a district scale, it is important to first and foremost develop a very clear understanding of your priority goals, your waste stream and your resources. Like any major project, a waste reduction initiative should be developed through, and follow, a thoughtful and managed process.

Specific actions to develop a Zero-Waste Program for the Lloyd EcoDistrict would include:

- **Zero-Waste Program Committee** Establishes an organized and committed group to champion efforts.
- **Program Scoping and Goal Setting** Builds common understanding of the parameters and drivers to zero waste efforts.
- **Waste Stream Mapping** Mapping would provide a

comprehensive picture of Lloyd's waste stream.

- **Refine Goals** (based on waste stream mapping)
- **Implementation Plan** (with benchmarks)
- **Program Implementation** (including monitoring)

As part of the District Zero-Waste Program, Lloyd should consider the following two opportunities:

- **District Rate Negotiation** The District should considering leveraging its large number of properties to potentially reduce hauler collection rates.
- **Recycled Resource Monetization** Based on the development of the District Zero-Waste Program, district scale collection of recycled resources (plastics, glass, paper, organics) could provide a revenue stream to the district. This revenue could be used to offset program delivery costs in addition to providing participating properties added revenue.

Overall, the creation of a district zero-waste program for Lloyd should create a self-funding and self-sustaining program that generates monetizable value back to the district.



BIOPHILIC DISTRICT

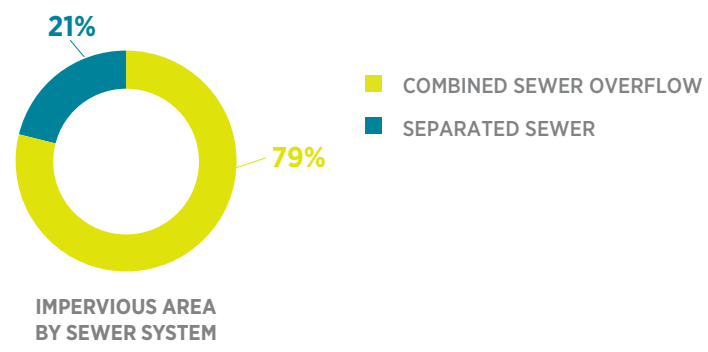
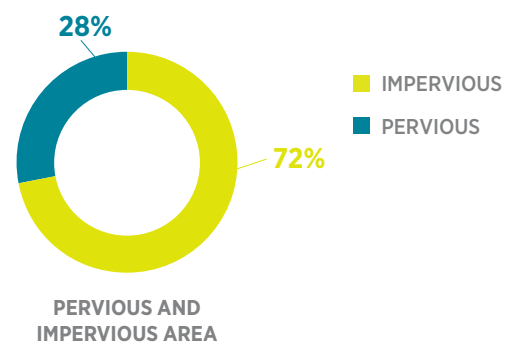
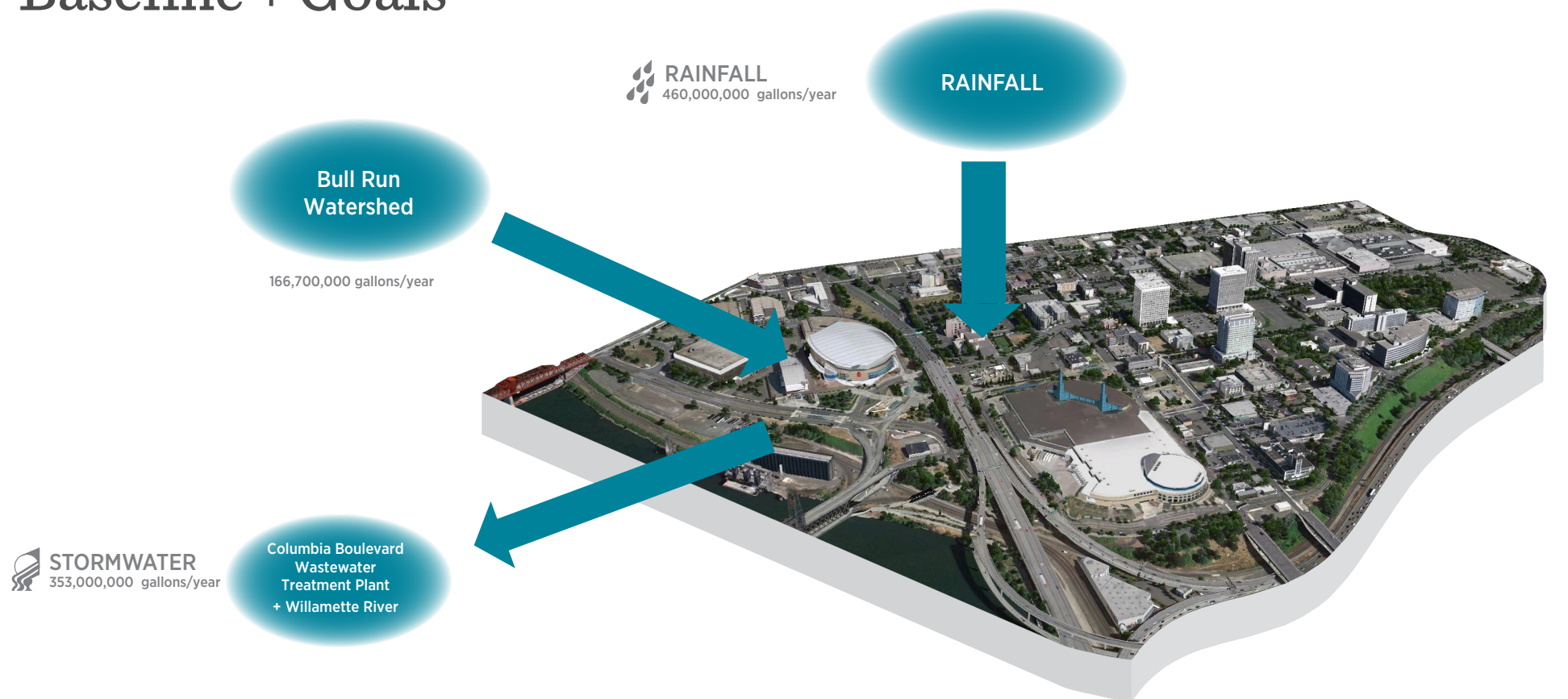
The Lloyd EcoDistrict has an opportunity to demonstrate the concept of biophilia, the instinctive bond between humans and nature, at a district scale. For Lloyd this means creating natural and native green spaces that foster health and wellbeing, community identity, and ecosystem health. The interplay between high performance buildings and infrastructure and these natural spaces transforms the place into a truly sustainable neighborhood where people want to live, work, and play.



WATER

HABITAT +
ECOSYSTEM
FUNCTION

Baseline + Goals



Baseline + Goals

Fostering Human Nature Connection and Interaction through Biophilic Design

Development within the Lloyd EcoDistrict provides opportunities for bringing nature back to the city through green infrastructure (green site, green streets and open spaces). Natural elements of the built environment provide environmental, human health and economic benefits. Vegetation, such as trees planted along streets, shrubs and grasses in swales, and ecoroofs, lowers ambient temperatures providing for cooler summers. Stormwater facilities manage stormwater runoff sustainably and provide a visual connection between people and nature. Corridors should be lined with trees and incorporate green street facilities. Nodes should provide open space and provide places for stormwater infiltration.

Effective Impervious Area (EIA)

Effective impervious area (EIA) is the impervious surface area that is directly connected to the stormwater management system (e.g., roof downspouts, parking lot inlets, or street inlets that are piped to a storm sewer or open channel). Impervious surface areas that flow onto pervious areas are considered “ineffective” (e.g., roof downspouts disconnected to landscaping, parking lots draining to swales, and streets draining to green streets). While they may generate runoff during very large events, greatly reduce runoff through detention and retention for the more frequent, smaller events that can be the primary cause of erosion and flashiness in streams.

Much research has been done investigating the impacts of impervious area on stream function. For developing areas, it has been established that effective impervious area of more than 10% in the drainage basin, leads to channel instability and reduced habitat value.

SYSTEM CHARACTERISTICS

The Lloyd EcoDistrict is served by the combined sewer system (areas east of I-5) and separated sewer system (areas west of I-5).

The Lloyd EcoDistrict covers approximately 377 acres with:

- Pervious Area = 106 acres (28%)

- Impervious Area = 271 acres (72%)
- Total = 377 acres (100%)

Of the impervious area, 39% is roof area (107 acres), 25% parking (70 acres), and 35% streets (94 acres).

As the district is served by both combined sewer for areas east of I-5 (discharging to the Columbia Boulevard Wastewater Treatment Facility) and separated sewer for areas west of I-5 (discharging directly to the Willamette River), impervious area can be further divided by discharge:

- Combined Sewer Overflow = 221 acres (79%)
- Separated Sewer = 56 acres (21%)
- Total Impervious Area = 277 acres (100%)

Existing EIA (2010)

There are currently public and private stormwater management facilities in the Lloyd EcoDistrict that manage about 2.71 acres of impervious area. With 271 acres of impervious area, that makes the current EIA = 71%.

Future EIA (2035)

As the Lloyd EcoDistrict develops, development density will increase greatly though pervious and impervious area will likely remain the same. As such, future EIA is assumed to be 71%.

BIOPHILIA GOALS

Effective Impervious Area (EIA)

EcoDistricts have the opportunity to strongly support of ecosystem health. Given the available information and the desire for EcoDistricts to truly be a stormwater showcase, this suggests that EIA equal to or less than 10% is a reasonable goal.

Corridors and Nodes

Providing the opportunity to connect EcoDistrict residents with nature on a daily basis is another important element of biophilia. Providing green corridors (i.e., street) and sizable open space (i.e., parks) for residents, employees and visitors of the Lloyd EcoDistrict will be an important goal.

Biophilic Goals

EcoDistrict

- **WATER** Meet both human and natural needs through reliable and affordable water management.
- **HABITAT + ECOSYSTEM FUNCTION** Achieve healthy urban ecosystems that protect and regenerate habitat and ecosystem function.

City

- **10% Effective Impervious Area (EIA)**

Lloyd Recommendations

- **Achieve 10% District EIA**
- **Achieve a green factor of 0.30 for commercial zones**

Concept Plan



Achieving Biophilia Goals

BUILDINGS

With effective impervious area just over 274 acres, management of an additional 236 acres will be required to push EIA under 10%. This represents 87% of the total impervious area in the basin. Even assuming 100% of the public right-of-way impervious area can be managed, this goal will still require management of 142 of the 177 acres on private property in the basin. This is equivalent to 80% management of all private impervious area.

INFRASTRUCTURE

With effective impervious area just over 274 acres, management of an additional 236 acres will be required to push EIA under 10%. This represents 87% of the total impervious area in the basin. In addition to management of private property, 100% of the public right-of-way impervious area will need to be managed. This should be accomplished by the creation of green corridors and greenstreets throughout the EcoDistrict.

The Lloyd EcoDistrict, like most central city areas, lacks open space for human recreation and human/nature connection and interaction. In addition to Holladay Park, a new district park should be created just east of the central district to serve growing populations.

COMMUNITY ACTION + PROGRAMS

None.

RECOMMENDED EIA AND GREEN INFRASTRUCTURE STRATEGIES

Green Sites

At a minimum, 142 of the 177 acres of impervious area on private property will need to be managed with green infrastructure (approximately 80%). All new construction will need to meet the requirements of the City of Portland's Stormwater Management Manual. As such, additional cost for this strategy is assumed to be \$0.

Greenstreet Corridors

100% of all streets within the Lloyd EcoDistrict will need to be green streets to achieve district EIA goals. Building on the N/NE Quadrant Street and Development Character Concept Plan, green corridors should be constructed along the following streets:

- Holladay (13 blocks) = \$7,500,000
- Clackamas (13 blocks) = \$7,500,000
- Interstate (10 blocks) = \$5,000,000
- Lloyd (12 blocks) = \$6,000,000
- 2nd (5 blocks) = \$2,500,000
- 6th (11 blocks) = \$6,500,000
- 15th (6 blocks) = \$3,000,000
- Total = \$38,000,000

Green corridors fully maximize and integrate green infrastructure into the street environment. Primary focus is on nature and pedestrian scale transportation. Motor vehicle and transit is not prohibited however.

Concept design work is already underway for the Holladay Greenstreet Corridor. To build on this effort, the Lloyd EcoDistrict should work with BES to create a greenstreet master plan for the entire Lloyd EcoDistrict.

Green Streets

All streets, in addition to green corridors, should be green streets. This would require the installation of approximately 900 green street stormwater planters at a cost of \$9M. As with the green corridors, the Lloyd EcoDistrict should work with BES to create a green streets master plan for the Lloyd EcoDistrict.

Clackamas Park

The Lloyd EcoDistrict should support PPR efforts to develop a new neighborhood park along Clackamas and MLK. Clackamas Park would likely cost around \$10M to construct.

See the Connected District for more Connectivity and sense of place strategies.



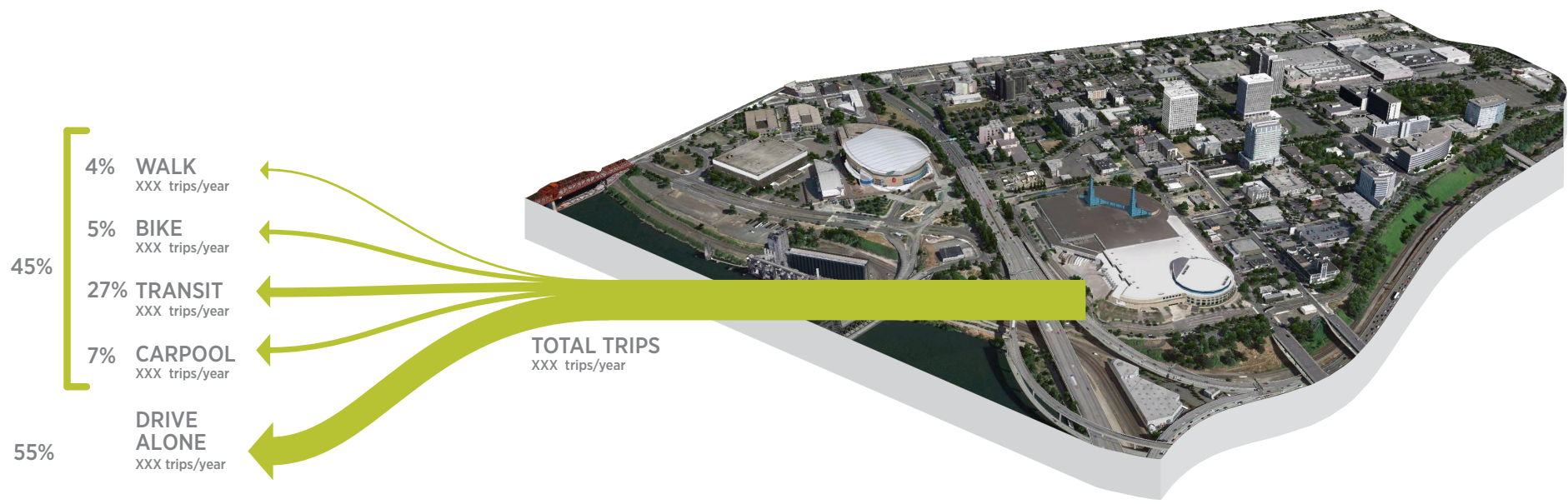
CONNECTED DISTRICT

The Lloyd EcoDistrict is a model for accessibility. It sits at the center of the region's major transportation infrastructure. The history of the Transportation Management Association (TMA) set the stage for the EcoDistrict, leaving it well-positioned to address other areas of environmental performance that also create a better place to live and work.



ACCESS +
MOBILITY

Baseline + Goals



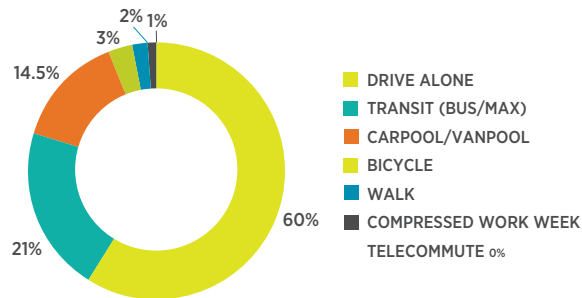
Baseline + Goals

MODE SPLIT

From bikes and pedestrians to cars and transit, the Lloyd EcoDistrict has emerged as one of the most well-served areas in Portland. Over the last decade, the Lloyd TMA has worked successfully with public and private partners to reduce single-occupancy vehicle (SOV) travel significantly. The City of Portland has made significant investment in public transit including bus, light rail and street car.

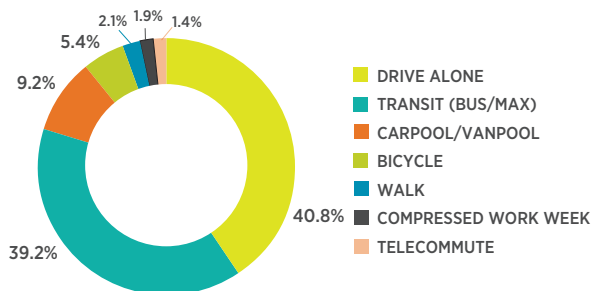
According to Lloyd TMA survey results, 1997 commute mode split was as follows:

COMMUTE MODE SPLIT (1997)



Where as in 2011, commute mode split was found to be:

COMMUTE MODE SPLIT (2011)



Over this period, commute SOV travel was reduced by a 20% while transit and bike/ped travel was increased by 25%. This shift in mode also resulted in a number of additional benefits to the Lloyd EcoDistrict including:

- SOV VMT Reduction = 4,418,870 miles
- CO2 Reduction = 4,468,895 lbs CO2
- Gas Reduction = 244,789 gals
- Fuel Cost Savings = \$2,040,353

Street Character and Sense of Place

According to the Lloyd TMA, maintaining the current commute mode split for the Lloyd EcoDistrict is a priority. They also see great value in enhancing the “sense of place” in the district through improving the street character and environment.

Through the work of the N/NE Quadrant planning efforts conducted by Portland Bureau of Planning and Sustainability, a Street and Development Character Concept Plan was established in 2012 to provide guidance on how to improve the street character and sense of place.

BPS noted that the experience of “place” is a combination of character of the street (function, streetscape design, etc.) framed by buildings along it (scale, setbacks, ground floor use etc.). Moreover, a cohesive set of street and development characters or street types that more directly links the design of both the public and private realms offers the greatest potential to create a set of new, distinct, and last public spaces in the quadrant.

Affordable Transportation Options

As both the residential and commercial populations of the Lloyd EcoDistrict grow, continuing to provide affordable transportation options will be important. In addition to existing fixed options such as transit and ped/bike, new “sharing” options are emerging in communities internationally as a reliable, and affordable, transportation solution. The two most prominent are car sharing and bike sharing.

Car sharing programs, through private companies like Getaround, are just beginning to be piloted in Portland. The City of Portland is currently looking to engage with a bike sharing program provider to develop a bike sharing system for Portland.

Access + Mobility Goals

EcoDistrict

- **ACCESS AND MOBILITY**
Provide access to clean and affordable transportation options.

City

- Retail Commercial Streets
- Boulevard Streets
- Flexible Streets

Lloyd Recommendations

- 40% single occupancy vehicle use (maintain existing)
- Implement car and bike sharing program (100% access to sharing)
- Implement N/NE Quadrant street plan

TRANSPORTATION GOALS

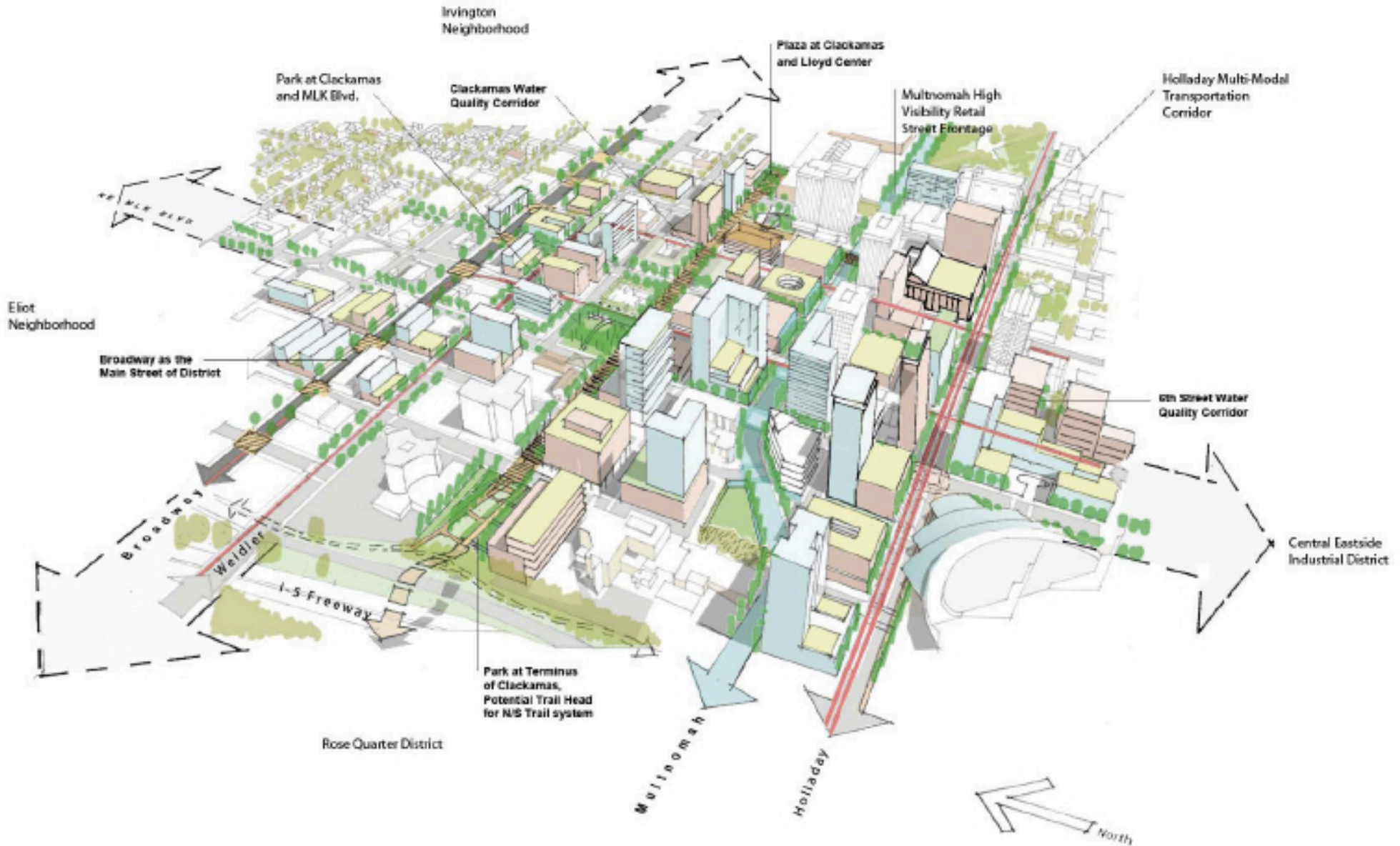
The Lloyd EcoDistrict should remain focused on continuing to reduce its commute mode split while exploring solutions to provide additional affordable transportation options like car sharing and bike sharing. In addition, N/NE Quadrant Street and Development Character Concept Plan should also be implemented to enhance the sense of place and vitality of the Lloyd EcoDistrict. Specific goals would include:

Mode Split Maintain 2011 commute mode split.

Street Character Fully implement the N/NE Quadrant Street and Development Concept Plan by 2020.

Transportation Affordability Launch bike sharing and car sharing in the district by 2013.

City of Portland N/NE Quadrant Plan



Achieving Access + Mobility Goals

Buildings The N/NE Quadrant Street and Development Character Concept Plan provides specific land use and form recommendations for buildings in the Lloyd EcoDistrict. These recommendations should be followed by future development within the district.

Infrastructure To support street character and sense of place goals, the N/NE Quadrant Street and Development Character Concept Plan calls for a minimum of twelve (12) major street improvements and two (2) pedestrian bridges.

Community Actions + Programs Provide car sharing and bike sharing opportunities throughout the EcoDistrict.

RECOMMENDED STRATEGIES

Retail commercial streets

These are the busiest streets in the EcoDistrict, with high volumes of motor vehicles, transit, bikes and pedestrians, consistent ground level retail storefronts, and “center” like character(s) for the community. They are where most of the Lloyd EcoDistrict’s residents, workers and visitors comes together and experience the urban character of the district.

Three types of Retail Commercial Streets are recommended in the Streetscape and Development Concept Plan: Civic, District and Neighborhood. Only Civic and District apply to the Lloyd EcoDistrict.

Civic Retail Commercial Streets are regional in nature and make big connections beyond the district. Specific streets include:

- Broadway (24 blocks) = \$24,000,000
- MLK (13 blocks) = \$13,000,000
- Grand Avenue (13 blocks) = \$13,000,000
- **Total = \$50,000,000**

District Retail Commercial Streets are central to the district and provide transformative opportunities for new community activity centers. Specific streets include:

- 7th (11 blocks) = \$8,800,000
- Multnomah (17 blocks) = 13,600,000

- **Total = \$22,400,000**

Boulevards Streets

Boulevard streets should be considered supportive to Retail Commercial Streets by offering a few different experiences in the district. They can be the “second” street of a couplet; they can create and define a district “edge”; or they can strengthen a local transportation and/or transit route within the district. They provide more landscaped, green character that is a distinct alternative to the more hardscaped and consistent retail storefront experience on the Retail Commercial Street.

Three types of Boulevard Streets are recommended in the Street and Development Character Concept Plan: Civic, District and Neighborhood. Only Civic and District apply to the Lloyd EcoDistrict.

Civic Boulevard Streets are regional and could be part of a couplet corridor. Specific streets include:

- Weidler (18 blocks) = \$10,800,000
- 15th/16th (7 blocks) = \$4,200,000
- Lloyd Blvd (12 blocks) = 7,200,000
- Interstate (10 blocks) = 6,000,000
- **Total = \$28,200,000**

District Boulevard Streets are central to the district, providing opportunity for distinctive corridors some of which offer specialized transit facilities. Specific street include:

- Wheeler (10 blocks) = \$6,000,000
- Holladay (13 blocks) = \$7,500,000
- **Total = \$13,500,000**

Flexible Streets

These streets and spaces make up a system of local connections through the entire district, linking different areas to each other and to the surrounding communities. An alternative set of routes to the busier street network, they generally provide more of a quieter, park-like character, offering local workers and residents additional opportunity for passive and active recreation.

Six types of Flexible Streets are envisioned: Woonerf, Festival Street, Strand, Pathway, Open Space and Bridge. Stand not applicable to the Lloyd EcoDistrict.

Woonerf Flexible Streets are typically curbless streets that purposefully blur the line between motor vehicle and pedestrian space. Specific streets have not yet been identified.

Festival Flexible Streets allow motor vehicle access and parking but can be closed off for events. Specific streets have not yet been identified.

Pathway Flexible Streets limit or prohibit motor vehicle access and parking, coordinate pedestrian links, provide access through superblocks, and could accommodate signature bicycle and/or transit facilities. Specific streets have not yet been identified.

Open Space Flexible Streets limit or prohibit motor vehicle access and parking allowing the street to provide open space and recreational functions. Specific streets have not yet been identified.

Bridge Flexible Streets provide primarily pedestrian and bicycle connections across major barriers like I-5 and I-84 to other places, districts and activity centers. Specific bridge locations include:

- 7th (11 blocks) = \$10,000,000
- Clackamas (13 blocks) = \$10,000,000
- **Total = \$20,000,000**

Bike Sharing

District cost \$0. PBOT is currently working to establish a bike sharing program in Portland.

Car Sharing

District cost \$0. The Lloyd EcoDistrict should work with a private company like Getaround to establish a Lloyd EcoDistrict Car Sharing Network.

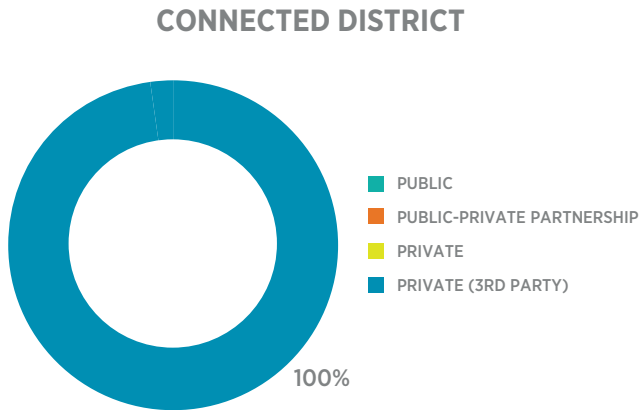
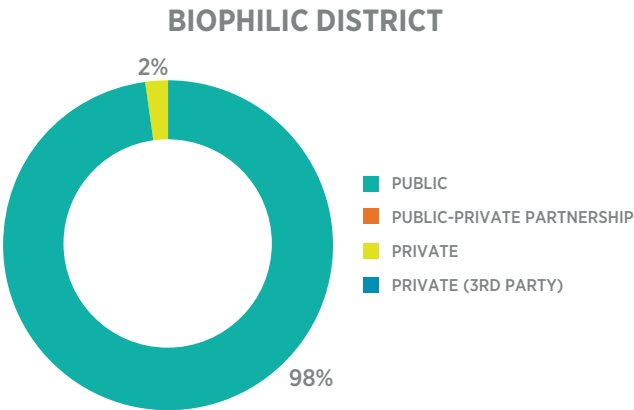
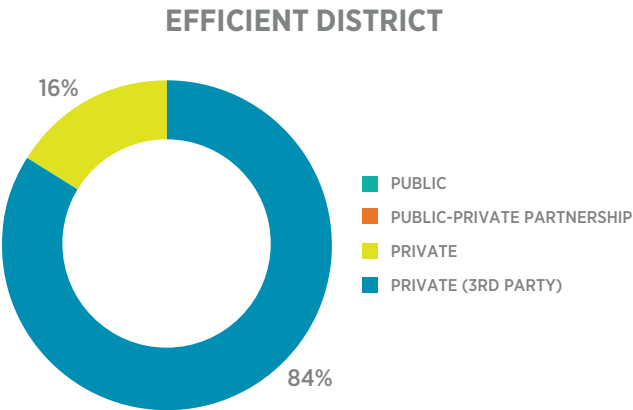
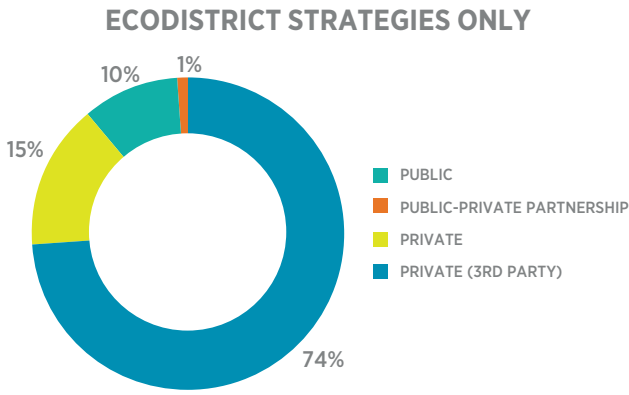
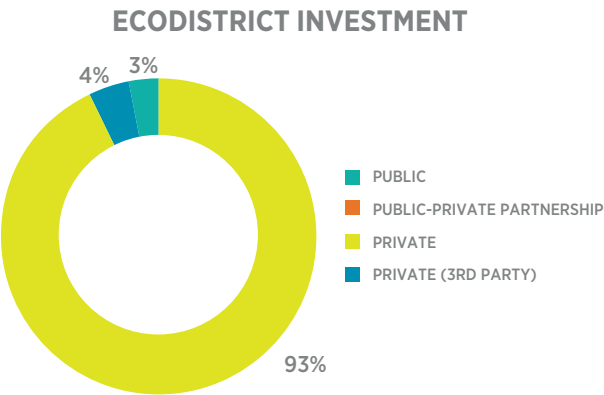
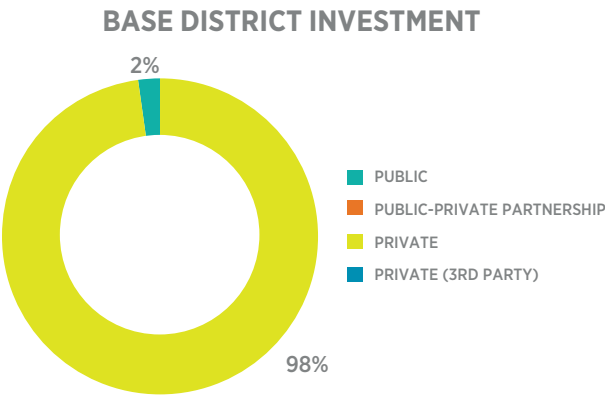




IMPLEMENTATION MODEL

The following section outlines a public-private partnership by which the strategies and benefits outlined in the previous sections could be realized.

Investment Model



Summary of Costs, Benefits and Investments

In the early days of green building, the question often asked was “what’s the cost premium for a green building over a conventional building?” As EcoDistrict development is in its infancy, the same question holds true: “What’s the cost premium of an EcoDistrict?”

Base District investments includes new buildings, streets and open space as follows:

- New buildings (building character + green sites) = \$4,480M
- New infrastructure (streets + parks) = \$6,717MM
- **Total = \$6.86B**

Of the Base District costs, 98% would be provided by the private sector for new buildings and 2% would be provided by the public sector for street and open space improvements.

ECODISTRICT COSTS + BENEFITS

EcoDistrict investments can be separated into the three big ideas as follows:

The Efficient District = \$358.2M

- Existing Building Retrofit Program = \$55.7M
- High Performance New Buildings = \$0
- Aggregate Renewable Energy Program = \$237.5M
- District Energy Utility = \$45M
- District Water Utility = \$20M

The Biophilic District = \$47M

- Green Infrastructure Corridors = \$38M
- Green Streets = \$9M

The Connected District = \$4.15M

- Car Sharing = \$0
- Bike Sharing = \$4M
- District Dashboard = \$0.1M
- EcoDistrict Concierge = \$0.05M

Based on these cost assumptions, the “cost premium” of the Lloyd EcoDistrict is estimated at 5%. The difference depends

on whether the solar energy strategy is implemented fully or not. This additional investment is projected to generate over **\$38M in operational savings** in addition to providing district enhancement and local economic development benefits (approximately 10-year payback).

Of the \$368M in EcoDistrict costs, 15% would be provided by the private sector through green building and 10% would be provided by the public sector for green corridors and greenstreets. In addition, public private partnership and private third party investment opportunities exist. As such, the following investment distribution could be achieved potentially reducing public and private investment requirements to achieve EcoDistrict goals:

- Public = 10% (26% w/o solar)
- Private = 15% (38% w/o solar)
- Private 3rd Party = 74% (34% w/o solar)
- Public Private = 1% (3% w/o solar)
- **Total = 100%**

Clearly, successfully partnering with the private sector, from developer to third party investor, is critical to catalyze EcoDistrict development. The Lloyd EcoDistrict should engage with investors as follows:

ATTRACTING DIVERSE INVESTMENTS PUBLIC INVESTMENTS

Retail Commercial Streets Work with City (PBOT) to plan an investment of \$72.4M to construct new retail commercial streets in the district.

Boulevard Streets Work with City (PBOT) to plan an investment of \$41.7M to construct new boulevards in the district.

Flexible Streets Work with City (PBOT) to implement a flexible streets plan.

Pedestrian Bridges Work with City (PBOT) to plan an investment of \$20M to construct new retail commercial streets in the district.

Greenstreet Corridors Work with City (BES) to plan an investment of \$38M to construct greenstreet corridors. Reduced cost if planned with PBOT work.

Greenstreets Work with City (BES) to plan an investment of \$9M to provide greenstreet planter facilities throughout the district. Reduced cost if planned with PBOT work.

Clackamas Park PPR to provide an investment of \$10M to build a new 4-acre park at Clackamas and MLK.

PRIVATE INVESTMENTS

New Buildings (including building character and green sites) Private developers to invest to develop new commercial and residential develop per the N/NE Quad Plan.

High Performance New Buildings (LEED Gold) Additional cost for this development is \$0 to build green.

PUBLIC-PRIVATE INVESTMENTS

Bike Sharing Work with City (PBOT) to help seed launch of Portland Bike Sharing Program. Operations will be self-sufficient based on sponsorships and donations.

District Dashboard Lloyd EcoDistrict to create partnership with technology provider to launch district dashboard solution.

EcoDistrict Concierge Work with City and PoSI to determine program opportunity.

PRIVATE THIRD PARTY INVESTMENTS

District Energy Utility Work with third-party utility provider to plan DE system for Lloyd EcoDistrict (\$45M).

District Water Utility Work with third-party utility provider to plan DW system for Lloyd EcoDistrict (\$20M).

Aggregate Renewable Energy Program Work with third-party utility provider to develop program (\$238M).

Car Sharing Engage Getaround for program solution.

APPENDICES

Appendix A
EcoDistricts Framework

Appendix B
Lloyd EcoDistrict Overview

Appendix C
Existing Policies + Plans

Appendix D
District Organization

Appendix E
Assumptions Summary

The EcoDistrict Framework



EcoDistricts are neighborhoods or districts where neighbors, community institutions and businesses join with city leaders and utility providers to meet ambitious sustainability goals and co-develop innovative district-scale projects. The Portland Sustainability Institute (PoSI) launched EcoDistricts in 2009 as an initiative to help cities remove implementation barriers and create an enabling strategy to accelerate neighborhood-scale sustainability. Success requires a comprehensive approach that includes active community participation, assessment, new forms of capital and public policy support.

Since 2009, PoSI has created an implementation framework, toolkits, a local pilot program and capacity-building initiative to accelerate widespread deployment. EcoDistricts are achieved through well-scaled projects—projects small enough to innovate quickly and big enough to have a meaningful impact.

District-scale projects, such as district energy, green streets, smart grid, demand management and resource sharing, are well known. However, the widespread deployment of these strategies has been slow to develop due to a lack of comprehensive policy or implementation frameworks at the municipal level.

EcoDistricts are distinct from most green development strategies that focus on brownfield or greenfield development and are led primarily by master developers or public agencies. Instead, EcoDistricts focus on existing neighborhoods as well as traditional development through the powerful combination of public policy, catalytic investments from local municipalities and utilities, private development and the participation of neighbors who are motivated to improve the quality of life and environmental health of their communities. EcoDistricts help neighborhoods achieve ratings like LEED-ND with a comprehensive set of tools and supporting strategies for community engagement, integrated performance assessment and project implementation.

EcoDistricts create a foundation for a range of strategies that can be applied at several different scales. Within an EcoDistrict, there will be catalytic projects at the site and block scale, as well as larger-scale infrastructure investments.

EcoDistricts bring together neighborhood stakeholders, property developers, utilities and municipalities to create neighborhood sustainability innovation with a range of outcomes, including improved environmental performance, local examples of emerging technologies, equitable distribution of investments, community participation, new patterns of behavior, economic development for local businesses and job creation.

Fundamentally, EcoDistricts are an effort to deploy high-impact, district-scale sustainable projects that drive experimentation and innovation. They are a replicable model for cities to accelerate neighborhood sustainability to achieve city-wide goals.

EcoDistricts are an effort to deploy high-impact, district-scale sustainable projects that drive experimentation and innovation. They are a replicable model for cities to accelerate neighborhood sustainability to achieve city-wide goals.

ECODISTRICT ASSESSMENT

PoSI developed the EcoDistrict Assessment to help guide community EcoDistrict development efforts. The assessment method identifies eight performance areas as well as goals, potential metrics and projects. To achieve the ambitious goals for each performance area, an EcoDistrict assessment is essential to determine the most effective project priorities for a unique district. An assessment enables districts to determine strategies of greatest impact and prioritize their most appropriate projects.

EcoDistrict Phases

1

DISTRICT
ORGANIZATION

2

DISTRICT
ASSESSMENT

3

PROJECT
DEVELOPMENT

4

DISTRICT
MONITORING

EcoDistricts Performance Areas

EQUITABLE DEVELOPMENT

Promote equity and opportunity and ensure fair distribution of benefits and burdens of investment and development.

HEALTH + WELL BEING

Promote human health and community well being.

COMMUNITY IDENTITY

Create cohesive neighborhood identity through the built environment and a culture of community.

ACCESS + MOBILITY

Provide access to clean and affordable transportation options.

ENERGY

Achieve net zero energy usage annually.

WATER

Meet both human and natural needs through reliable and affordable water management.

HABITAT + ECOSYSTEM FUNCTION

Achieve healthy urban ecosystems that protect and regenerate habitat and ecosystem function.

MATERIALS MANAGEMENT

Zero waste and optimized materials management.



Lloyd EcoDistrict Overview



LLOYD ecODISTRICT

VISION

The Lloyd EcoDistrict aspires to be the most sustainable living-and-working district in North America.

MISSION

We're striving to achieve our goal by working with businesses, residents and organizations in our district to collaborate on projects in the areas of transportation, water, energy and waste. We take a "triple bottom line" approach: Everything we do has to be good for people, planet and profit. And we want to lead by example, so others can emulate what we accomplish.

The Lloyd EcoDistrict is governed by a board of directors who are actively working on projects and programs to improve resource efficiency and economic vitality in the Lloyd District.

INFRASTRUCTURE

The Lloyd EcoDistrict commissioned a study to analyze district buildings and help us develop a baseline called the District Roadmap (i.e., this document). The Roadmap looks at the performance areas of Transportation, Water, Energy and Waste. The findings state where our infrastructure is today in these four areas, what our goals for the short, medium and longer terms should be, what strategies we can use to achieve those goals, and where the gaps are in terms of key priorities or projects to get us to our goals. Our District Roadmap is now complete, finished in November 2012.

ENERGY EFFICIENCY

In October 2012, the Lloyd EcoDistrict launched the first phase of our existing Building Efficiency program, focusing on Operations and Maintenance. Businesses in the EcoDistrict will be able to take advantage of several resources that will help them save money, target ways to reduce energy and water consumption as well as waste, and coordinate transportation needs for

employees, visitors and customers. The EcoDistrict has formed strategic partnerships with Northwest Energy Efficiency Alliance (NEEA), Pacific Power, Energy Trust of Oregon (ETO) and Sustainability at Work in these efforts.

1) Sustainability Review: The Lloyd EcoDistrict has partnered with Sustainability at Work to provide a free on-site review of a workplace's recycling, water, transportation and energy practices. The participating company receives customized recommendations to cut costs, gain efficiencies and create value with customers and employees. Sustainability at Work also provides follow-up resources and peer connections. Beginning in October 2012, Sustainability at Work will strive to meet with all the restaurants in the Lloyd EcoDistrict.

2) Energy Assessment and Large Facility Energy Audits: Working with Pacific Power, the Lloyd EcoDistrict is able to offer energy assessments to businesses that receive a Sustainability Review and would like a more in-depth energy review.

The Energy Assessment includes a review of lighting, heating/cooling and other major energy systems. Personalized low cost/no cost energy savings tips will also be provided. An energy advisor is available to walk the owner through the process of securing bids and identifying incentives available for a commercial energy efficiency project. Larger facilities may qualify for a more in-depth evaluation and recommended efficiency improvements.

As part of the EcoDistrict Building Efficiency program, we will also offer a Strategic Energy Management course and convene district business leaders to determine district energy goals and articulate the advantages of a Lloyd EcoDistrict location.

3) Small Commercial Energy Efficiency. We are work-

ing with the City of Portland, BOMA, NEEA, Portland Development Commission, ETO and Clark Public Utilities to promote a friendly energy efficiency competition known as "Kilowatt Crackdown". As part of the competition, commercial property (20,000sf and above) will have access to energy coaching, benchmarking and other forms of assistance. The EcoDistrict will also offer financial tools and networking opportunities to owners and commercial tenants throughout the district. This program will be launched in late 2012.

4) Hotel Roundtable. The Lloyd EcoDistrict is a destination for visitors from around the world who come to Portland for conventions and to enjoy our city. The hospitality sector plays a big part in this and the EcoDistrict intends to help them compete for hotel business. We will be working with hotels to offer energy benchmarking, energy coaching, financial tools and technical assistance, networking and best practices. We will launch this program in early 2013.

WASTE REDUCTION

We're working with Metro, Zero Waste Alliance, Portland State University, and Sustainability at Work on an initiative which will help businesses get ahead of the curve in terms of mandatory food waste separation. We have kicked this off in October 2012, integrated with our existing building initiative. In addition to that we are embarking on a comprehensive Zero Waste Strategy, beginning in late 2012.

DISTRICT HEATING AND COOLING

We're working with multiple partners, including the Rose Quarter and the Convention Center, on the first phase of a shared thermal energy system. One element of our initial Building Efficiency program is determining what improvements may prepare a building for a shared thermal system in the future. We're exploring the logistics and legal requirements involved in imple-



menting this type of system.

TRANSPORTATION

We're collaborating with the Lloyd Transportation Management Association (TMA) on street improvements for Multnomah Street, including improving the buffered barrier on Multnomah Street, offering a guided walking tour, and implementing a peer-to-peer car-sharing program, through GetAround. The Multnomah St redesign began construction in October 2012.

COMMUNITY

We've been working with Portland State University to provide interactive, practical experiences for business students who have a sustainability focus, including working on the finance and marketing of our commercial retrofit program. These students are also surveying and interviewing building owners and tenants in the district, developing recommendations for the second phase of our existing building retrofit program, which will help owners access program assistance and potential funding for retrofits.

POLICY

On October 31, 2012 Portland City Council ratified a resolution which establishes formal recognition of the Lloyd EcoDistrict. This formal status could allow us to collect a percentage of utility fees based upon higher performance and lesser impacts on the infrastructure. We also are working to establish and codify performance benefits which could accrue to development in EcoDistricts; i.e., development fee reduction, expedited permits, and a look at returning SDCs back to the district(s) from which they came. This ability to generate revenue and count on performance benefits will have real impacts in terms of the Lloyd EcoDistrict's viability, attractiveness to new development and will send a clear message that the advantages to doing business in the EcoDistrict are real.

IDENTITY CAMPAIGN

The Lloyd EcoDistrict recently completed the development of our brand and identity, including three main components:

1. Visual identity – Logo, color palette, fonts and accompanying design elements
2. Brand voice and copy – A manifesto/ “elevator speech”, tagline and website copy
3. Brand applications – Business cards, letterhead, website design and vendor oversight

With this initial brand work done, the EcoDistrict staff and our strategic partners will be able to convey to the district community who we are and what we hope to accomplish together with them as an EcoDistrict.

Lloyd EcoDistrict.

Connected, and making a difference.

FOR MORE INFORMATION

Visit our website at www.ecolloyd.org or contact the Lloyd EcoDistrict office: sarah@ecolloyd.org or ann@ecolloyd.org. Thank you!

Existing Policies + Plans

EcoDistricts require investment and support from both the public and private sectors. Many public sector priorities in Portland are documented in existing policies, plans and frameworks. The following documents provided context and informed the strategies recommended in this roadmap. In some cases a critical EcoDistrict strategy has already been adopted by the city but has not yet been implemented so is included here to reinforce its importance to achieving EcoDistrict performance goals and the opportunity for Lloyd stakeholders to ensure its success. A brief summary of referenced plans and policies is included here for reference.

A number of existing and current policies and plans shaped the development of the Lloyd Integrated Infrastructure Strategy. These documents included:

The Portland Plan

The result of more than two years of research, workshops and meetings, the Portland Plan is a 25-year strategic roadmap to help Portland thrive into the future. The plan's three integrated strategies and framework for advancing equity were designed to help realize the vision of a prosperous, educated, healthy and equitable Portland.

Portland Climate Action Plan

Portland's strategy to cut carbon emissions 40 percent by 2030 and 80 percent by 2050 (compared to 1990 levels). The plan builds upon a legacy of forward-thinking climate protection initiatives that have resulted in significant total and per person reductions in local carbon emissions. The Lloyd EcoDistrict Roadmap provides direction on how to achieve carbon, energy and waste goals at a district scale.

The Portland Economic Development Strategy

Focused on growing 10,000 jobs in the next five years, Portland's economic development strategy provides equal focus on job growth, innovation in sustainability and equality of opportunity to build the most sustainable economy in the world. The strategies identified in the Lloyd EcoDistrict roadmap will help achieve economic development objectives by stimulating neighborhood business vitality, maximizing competitiveness and driving urban innovation.

Central City 2035 Plan

Central City 2035 is a long-range comprehensive planning and district planning effort that will create a new plan for the Central City to guide development, decision-making and investment through the coming decades. The vitality of the Central City is key to state, regional and City policies for growth management and economic development, and for addressing new issues and directives, such as sustainable development and climate change, that have emerged since its last update in 1988.

N/NE Quadrant Plan

The first of four Central City 2035 district planning efforts, the N/NE Quadrant Plan addresses land use, urban design, transportation, public infrastructure and development entitlements in the Lloyd District. Building from N/NE Quadrant Plan objectives and development assumptions for Lloyd, the EcoDistrict Roadmap identifies public and private strategies, investments, timelines and responsible parties for implementation.

Portland Watershed Management Plan

Portland's Watershed Plan describes the approach the city uses to evaluate watershed conditions and implement projects to improve watershed health. The Lloyd EcoDistrict Roadmap identifies specific watershed and stormwater management strategies to help achieve Watershed Plan goals of protecting natural resources, restoring critical ecosystems, and implementing stormwater solutions that integrate the urban area with the natural environment.

Metro Regional Solid Waste Management Plan

The Regional Solid Waste Management Plan is a long-range plan that provides a framework for coordinating solid waste and recycling programs in the Portland metro region. The plan provides context for how waste is managed for the Lloyd EcoDistrict.

Portland Recycles! Plan

Focused on increasing Portland's recycling rate to 75% by 2015, reducing toxics and greenhouse gases, achieving zero growth in the waste stream and making the waste management system as a whole more sustainable, the Portland Re-

cycles! Plan provides clear goals for the Lloyd EcoDistrict achieve related to waste management.

Lloyd Crossing Sustainable Design and Development Strategy

More than any other past work, Lloyd Crossing set the vision for EcoDistricts and the value of focusing at the district scale to accelerate sustainability in cities. The strategy identifies the need for green building and sustainable infrastructure integration to achieve district goals. Moreover, Lloyd Crossing highlights the need for a resource management associations (RMA) to guide district actions and ensure implementation over time. The Lloyd EcoDistrict Roadmap provides implementation guidance for building and district scale projects, many of which were identified in the Lloyd Crossing strategy.

District Organization

The following institutional mechanisms will enable successful development of these proposed ecodistrict projects. Clarity and further refinement of these process tools will build on the last three years of Lloyd EcoDistrict work to formalize the role of the EcoDistrict and bring clarity on roles and responsibility for project development.

DISTRICT GOVERNANCE

The Lloyd EcoDistrict is pursuing 501(c)6 status to become a federally recognized non-profit that serves a business mission. After many discussions with board members, this governance and tax status was deemed appropriate for the current state of the EcoDistrict.

In the future, given the district already has a 501(c)6 in the Lloyd Transportation Management Association, district leadership should consider merging the two organizations into one that serves an umbrella function around broader goals—a Sustainability Management Association. This structure would facilitate a stronger and more united voice for the district and provide efficiencies as the leadership of both organizations are essentially the same.

As the priorities of the Lloyd EcoDistrict become clearer, this streamlined district governance would reduce create stronger unified leadership and coordinated funding approach.

CITY OF PORTLAND RELATIONSHIP

An immediate priority for the Lloyd District is clarity around ongoing City of Portland support for EcoDistricts. Essentially this conversation is about roles and responsibilities and negotiating what the EcoDistricts will do in exchange for city support and investment.

This strategy should include the following components:

Designation

Lloyd should work in partnership with the other four EcoDistricts and the City to develop official policy designation for EcoDistricts that includes codifying EcoDistricts as a neighborhood-based implementation strategy for Climate Action Plan, Economic Development Strategy, and Portland Plan and developing key performance metrics.

City Ownership The most significant recommendation to come from this EcoDistrict Roadmap process is that the Bureau of Planning and Sustainability should take responsibility for leading and managing the City's EcoDistrict program going forward. This role would include convening the other bureaus and PDC with a stake in EcoDistricts and providing a suite of support across all five EcoDistricts including acting as a voice for the EcoDistricts, technical assistance, and project development support. As the Portland Sustainability Institute transitions to a national EcoDistricts program model, it is essential that a City of Portland bureau take ownership of EcoDistricts going forward.

FUNDING (ORGANIZATION + PROJECTS)

Perhaps the most critical mechanism to support these Lloyd EcoDistrict strategies is stable funding for the newly formed EcoDistrict organization. Lack of resources for local staffing capacity and funding for project development poses a significant barrier to the development and implementation of the Lloyd EcoDistrict. The funding needs are two fold: 1) predevelopment finance – the district-scale funding mechanisms that fund staff, feasibility and organizational development; and 2) project finance – the capital dollars to fund major infrastructure and development.

Business Improvement District The primary opportunity within the district is renewed commitments for the Lloyd Business Improvement District (BID). In the next year, the BID will be re-evaluating its assessment and what programs the resulting resources fund. A renewed assessment will go into effect in 2014. BID leadership must vote to bring EcoDistricts into its funding priorities and then allocate a stable percentage of its tax assessment to EcoDistrict staff and project support. The BID should provide stable funding for the Lloyd EcoDistrict organizational operating budget at the current level. This would include staff, consulting and feasibility, but not capital improvement investments.

Resource consumption surcharges Collect percentage of utility fees based on high performance and reduced infrastructure impacts. These collected fees could support additional feasibility analysis, strategy development, and poten-

tially the deployment of small projects/programs for each area of focus. These surcharges produce predictable revenue streams that can be used by the district to fund additional feasibility studies and small-scale programs and projects for each functional area. Lloyd would want to fund a strategy that is inside the purview/mission of the collecting utility. For example, consider piloting water or waste surcharges in the district as additional complimentary revenue streams above the BID and TMA to complete water and waste management projects.

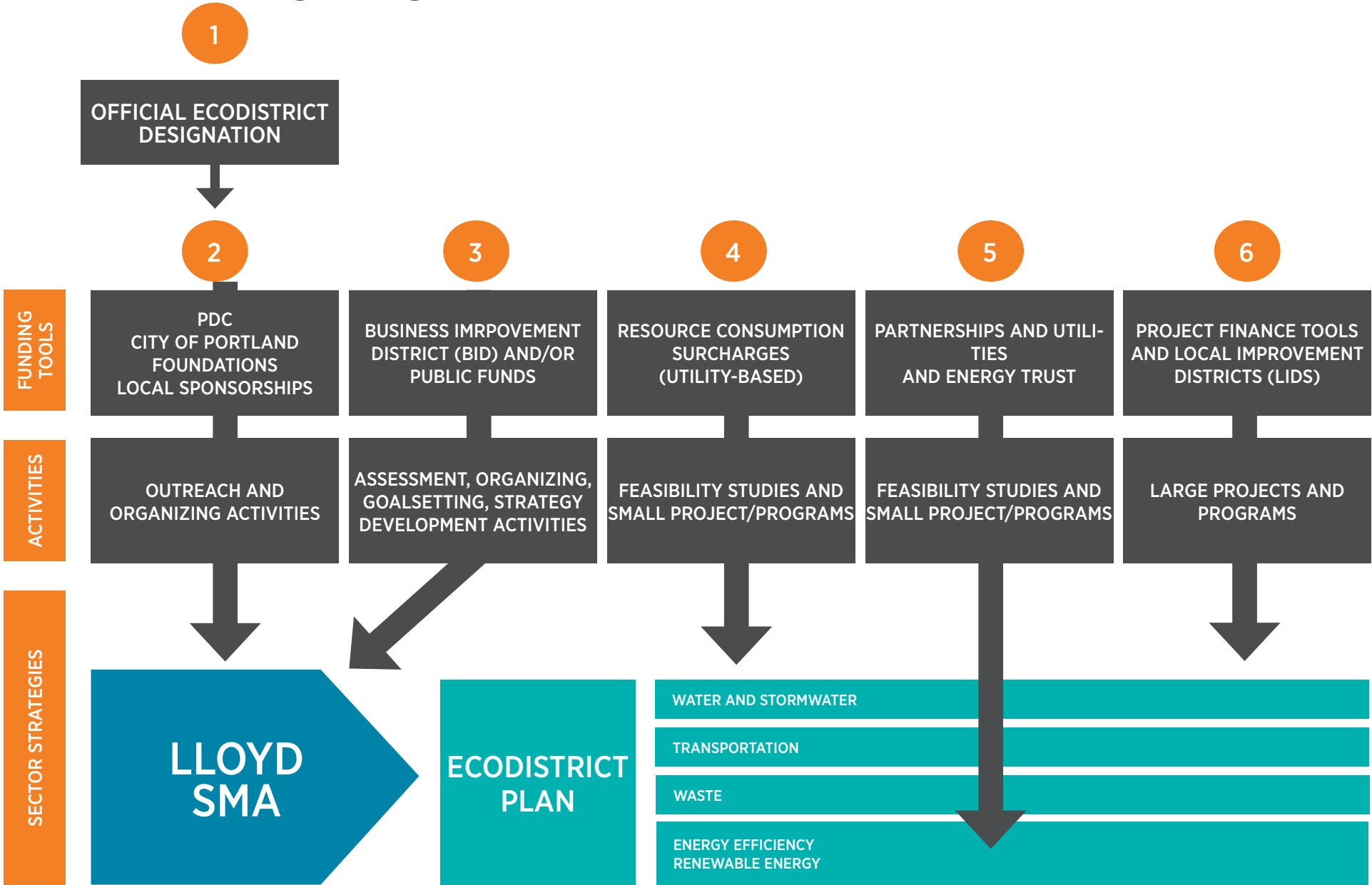
Parking Benefit District Build on the successful model in place in which the TMA receives a percentage of revenue from street meters. The EcoDistrict should consider creating a new fee for lots and monthly parking passes in the District to support transportation projects and related EcoDistrict goals.

Local Improvement District In scenarios where significant public infrastructure is required (e.g., district biomass heating solution), a Local Improvement District (LID) is likely a good strategy to use to help reduce project costs by leveraging LID funding to pay for the public infrastructure, like piping between buildings in the public right-of-way. LID funding is limited to public infrastructure. Lloyd should consider creating a LID to support public right-of-way infrastructure needed for district energy and district-wide stormwater improvements

System Development Charges Redirection As a longer-term strategy, Lloyd may consider working with the City to develop a policy that enables redirecting a portion of SDC's collected within their district back into projects within the district. The City determines the list of priority projects to be funded by SDCs through a planning process that sets a 10-year plan and list of priority projects. The next plan is due to be developed in 2013-2014. Lloyd could lead efforts to amend City SDC policies to enable a redirection of SDCs back into Lloyd District projects, especially given American Asset Trust (AAT) / Langley's planned mixed-use development.

Leverage URA funding Work with Portland Development Commission to creatively leverage URA funding to help the Lloyd EcoDistrict build an asset base that can support self-sustaining operations in the future.

APPENDIX D
EcoDistrict Funding Strategies Recommendations



Assumptions Summary—Energy

Lloyd EcoDistrict
Energy Assessment

Energy Demand

Development	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
Existing Commercial	894,488	867,653	841,624	816,375	791,884	768,127	745,083	722,731	701,049	680,017	659,617
Existing Residential	56,032	54,351	52,721	51,139	49,605	48,117	46,673	45,273	43,915	42,597	41,319
Existing Industrial	8,132	7,888	7,651	7,422	7,199	6,983	6,773	6,570	6,373	6,182	5,997
Existing Open Space	80	80	80	80	80	80	80	80	80	80	80
Existing ROW	3,071	3,071	3,071	3,071	3,071	3,071	3,071	3,071	3,071	3,071	3,071
New Commercial	0	279,700	542,618	789,509	1,021,098	1,238,081	1,321,033	1,409,542	1,503,981	1,604,748	1,712,266
New Residential	0	14,675	28,469	41,423	53,573	64,958	69,310	73,953	78,908	84,195	89,836
New Industrial	0	0	0	0	0	0	0	0	0	0	0
New Open Space	0	0	0	0	0	0	0	0	0	0	0
New ROW	0	0	0	0	0	0	0	0	0	0	0
Total	961,803	1,227,418	1,476,233	1,709,018	1,926,510	2,129,417	2,192,024	2,261,221	2,337,378	2,420,891	2,512,186
Total Commercial	894,488	1,147,353	1,384,241	1,605,884	1,812,981	2,006,208	2,066,116	2,132,273	2,205,030	2,284,765	2,371,883
Total Residential	56,032	69,026	81,190	92,562	103,178	113,074	115,983	119,226	122,823	126,792	131,156
Total Industrial	8,132	7,888	7,651	7,422	7,199	6,983	6,773	6,570	6,373	6,182	5,997
Total Open Space	80	80	80	80	80	80	80	80	80	80	80
Total ROW	3,071	3,071	3,071	3,071	3,071	3,071	3,071	3,071	3,071	3,071	3,071

Development	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
Existing	961,803	933,043	905,147	878,087	851,839	826,378	801,681	777,725	754,488	731,948	710,084
New	0	294,375	571,087	830,931	1,074,671	1,303,039	1,390,342	1,483,495	1,582,889	1,688,943	1,802,102

Carbon Emissions

Development	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
Existing Commercial	168,325	163,276	158,377	153,626	149,017	144,547	140,210	136,004	131,924	127,966	124,127
Existing Residential	6,595	6,397	6,205	6,019	5,838	5,663	5,493	5,328	5,169	5,014	4,863
Existing Industrial	1,530	1,484	1,440	1,397	1,355	1,314	1,275	1,236	1,199	1,163	1,128
Existing Open Space	16	16	16	16	16	16	16	16	16	16	16
Existing ROW	630	630	630	630	630	630	630	630	630	630	630
New Commercial	0	52,634	102,110	148,570	192,151	232,983	248,593	265,249	283,020	301,983	322,215
New Residential	0	1,727	3,351	4,875	6,305	7,645	8,157	8,704	9,287	9,909	10,573
New Industrial	0	0	0	0	0	0	0	0	0	0	0
New Open Space	0	0	0	0	0	0	0	0	0	0	0
New ROW	0	0	0	0	0	0	0	0	0	0	0
Total	177,097	226,165	272,129	315,133	355,313	392,799	404,375	417,168	431,246	446,681	463,554
Total Commercial	168,325	215,910	260,487	302,196	341,168	377,530	388,803	401,252	414,944	429,949	446,342
Total Residential	6,595	8,124	9,556	10,894	12,144	13,308	13,651	14,032	14,456	14,923	15,437
Total Industrial	1,530	1,484	1,440	1,397	1,355	1,314	1,275	1,236	1,199	1,163	1,128
Total Open Space	16	16	16	16	16	16	16	16	16	16	16
Total ROW	630	630	630	630	630	630	630	630	630	630	630

Development	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
Existing	177,097	171,803	166,669	161,688	156,857	152,170	147,625	143,215	138,938	134,789	130,765
New	0	54,361	105,461	153,446	198,456	240,628	256,750	273,953	292,307	311,892	332,789

Energy Costs

Development	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
Existing Commercial	\$19,585,621	\$19,567,994	\$19,585,621	\$19,532,787	\$19,515,208	\$19,497,644	\$19,480,096	\$19,462,564	\$19,445,048	\$19,427,547	\$19,410,063
Existing Residential	\$947,339	\$946,486	\$947,339	\$944,783	\$943,933	\$943,084	\$942,235	\$941,387	\$940,540	\$939,693	\$938,847
Existing Industrial	\$136,251	\$136,128	\$136,251	\$135,884	\$135,761	\$135,639	\$135,517	\$135,395	\$135,273	\$135,151	\$135,030
Existing Open Space	\$1,411	\$1,454	\$1,411	\$1,542	\$1,588	\$1,636	\$1,685	\$1,736	\$1,788	\$1,841	\$1,897
Existing ROW	\$54,000	\$55,620	\$54,000	\$59,007	\$60,777	\$62,601	\$64,479	\$66,413	\$68,406	\$70,458	\$72,571
New Commercial	\$0	\$6,308,010	\$12,604,665	\$18,889,981	\$25,163,974	\$31,426,657	\$34,538,211	\$37,957,839	\$41,716,045	\$45,846,350	\$50,385,597
New Residential	\$0	\$255,551	\$510,643	\$765,275	\$1,019,448	\$1,273,163	\$1,399,219	\$1,537,755	\$1,690,009	\$1,857,336	\$2,041,231
New Industrial	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
New Open Space	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
New ROW	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total	\$20,724,622	\$27,271,244	\$33,839,930	\$40,329,260	\$46,840,690	\$53,340,424	\$56,561,442	\$60,103,090	\$63,997,107	\$68,278,378	\$72,985,237
Total Commercial	\$19,585,621	\$25,876,004	\$32,190,286	\$38,422,769	\$44,679,181	\$50,924,302	\$54,018,307	\$57,420,403	\$61,161,093	\$65,273,898	\$69,795,660
Total Residential	\$947,339	\$1,202,038	\$1,457,982	\$1,710,058	\$1,963,381	\$2,216,247	\$2,341,454	\$2,479,142	\$2,630,548	\$2,797,029	\$2,980,079
Total Industrial	\$136,251	\$136,128	\$136,251	\$135,884	\$135,761	\$135,639	\$135,517	\$135,395	\$135,273	\$135,151	\$135,030
Total Open Space	\$1,411	\$1,454	\$1,411	\$1,542	\$1,588	\$1,636	\$1,685	\$1,736	\$1,788	\$1,841	\$1,897
Total ROW	\$54,000	\$55,620	\$54,000	\$59,007	\$60,777	\$62,601	\$64,479	\$66,413	\$68,406	\$70,458	\$72,571

Development	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
Existing	\$20,724,622	\$20,707,682	\$20,724,622	\$20,674,004	\$20,657,268	\$20,640,604	\$20,624,012	\$20,607,495	\$20,591,054	\$20,574,691	\$20,558,408
New	\$0	\$6,563,561	\$13,115,308	\$19,655,256	\$26,183,421	\$32,699,820	\$35,937,430	\$39,495,594	\$43,406,053	\$47,703,687	\$52,426,829

Assumptions Summary—Water

Lloyd EcoDistrict
Water Assessment

Water Demand

Development	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
Existing Commercial	143,000,000	138,710,000	134,548,700	130,512,239	126,596,872	122,798,966	119,114,997	115,541,547	112,075,300	108,713,041	105,451,650
Existing Residential	22,400,000	21,728,000	21,076,160	20,443,875	19,830,559	19,235,642	18,658,573	18,098,816	17,555,851	17,029,176	16,518,300
Existing Industrial	1,300,000	1,261,000	1,223,170	1,186,475	1,150,881	1,116,354	1,082,864	1,050,378	1,018,866	988,300	958,651
Existing Open Space	0	0	0	0	0	0	0	0	0	0	0
Existing ROW	0	0	0	0	0	0	0	0	0	0	0
New Commercial	0	44,715,060	86,747,216	126,217,200	163,240,912	197,929,606	211,190,889	225,340,679	240,438,504	256,547,884	273,736,592
New Residential	0	5,866,560	11,381,126	16,559,539	21,417,004	25,968,117	27,707,981	29,564,415	31,545,231	33,658,762	35,913,899
New Industrial	0	0	0	0	0	0	0	0	0	0	0
New Open Space	0	0	0	0	0	0	0	0	0	0	0
New ROW	0	0	0	0	0	0	0	0	0	0	0
Total	166,700,000	212,280,620	254,976,373	294,919,328	332,236,227	367,048,685	377,755,303	389,595,834	402,633,754	416,937,163	432,579,093
Total Commercial	143,000,000	183,425,060	221,295,916	256,729,439	289,837,784	320,728,571	330,305,886	340,882,226	352,513,805	365,260,925	379,188,242
Total Residential	22,400,000	27,594,560	32,457,286	37,003,414	41,247,563	45,203,759	46,366,554	47,663,231	49,101,083	50,687,938	52,432,199
Total Industrial	1,300,000	1,261,000	1,223,170	1,186,475	1,150,881	1,116,354	1,082,864	1,050,378	1,018,866	988,300	958,651
Total Open Space	0	0	0	0	0	0	0	0	0	0	0
Total ROW	0	0	0	0	0	0	0	0	0	0	0

	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
Existing	166,700,000	161,699,000	156,848,030	152,142,589	147,578,311	143,150,962	138,856,433	134,690,740	130,650,018	126,730,517	122,928,602
New	0	50,581,620	98,128,343	142,776,739	184,657,915	223,897,723	238,898,870	254,905,094	271,983,736	290,206,646	309,650,491

Carbon Emissions

Development	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
Existing Commercial	0	0	0	0	0	0	0	0	0	0	0
Existing Residential	0	0	0	0	0	0	0	0	0	0	0
Existing Industrial	0	0	0	0	0	0	0	0	0	0	0
Existing Open Space	0	0	0	0	0	0	0	0	0	0	0
Existing ROW	0	0	0	0	0	0	0	0	0	0	0
New Commercial	0	0	0	0	0	0	0	0	0	0	0
New Residential	0	0	0	0	0	0	0	0	0	0	0
New Industrial	0	0	0	0	0	0	0	0	0	0	0
New Open Space	0	0	0	0	0	0	0	0	0	0	0
New ROW	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0
Total Commercial	0	0	0	0	0	0	0	0	0	0	0
Total Residential	0	0	0	0	0	0	0	0	0	0	0
Total Industrial	0	0	0	0	0	0	0	0	0	0	0
Total Open Space	0	0	0	0	0	0	0	0	0	0	0
Total ROW	0	0	0	0	0	0	0	0	0	0	0

	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
Existing	0	0	0	0	0	0	0	0	0	0	0
New	0	0	0	0	0	0	0	0	0	0	0

Water Costs (water only, no sanitary or stormwater costs)

Development	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
Existing Commercial	\$589,932	\$589,401	\$588,870	\$588,340	\$587,811	\$587,282	\$586,753	\$586,225	\$585,697	\$585,170	\$584,644
Existing Residential	\$92,409	\$92,326	\$92,243	\$92,160	\$92,077	\$91,994	\$91,911	\$91,828	\$91,746	\$91,663	\$91,581
Existing Industrial	\$5,363	\$5,358	\$5,353	\$5,349	\$5,344	\$5,339	\$5,334	\$5,329	\$5,325	\$5,320	\$5,315
Existing Open Space	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Existing ROW	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
New Commercial	\$0	\$190,001	\$379,661	\$568,978	\$757,955	\$946,591	\$1,040,313	\$1,143,315	\$1,256,514	\$1,380,922	\$1,517,647
New Residential	\$0	\$24,928	\$49,811	\$74,649	\$99,443	\$124,192	\$136,488	\$150,001	\$164,853	\$181,175	\$199,113
New Industrial	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
New Open Space	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
New ROW	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total	\$687,703	\$902,014	\$1,115,938	\$1,329,476	\$1,542,629	\$1,755,397	\$1,860,799	\$1,976,699	\$2,104,135	\$2,244,250	\$2,398,299
Total Commercial	\$589,932	\$779,402	\$968,531	\$1,157,319	\$1,345,766	\$1,533,873	\$1,627,066	\$1,729,540	\$1,842,212	\$1,966,092	\$2,102,290
Total Residential	\$92,409	\$117,254	\$142,054	\$166,809	\$191,519	\$216,185	\$228,399	\$241,830	\$256,599	\$272,838	\$290,694
Total Industrial	\$5,363	\$5,358	\$5,353	\$5,349	\$5,344	\$5,339	\$5,334	\$5,329	\$5,325	\$5,320	\$5,315
Total Open Space	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total ROW	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
Existing	\$687,703	\$687,085	\$686,466	\$685,848	\$685,231	\$684,614	\$683,998	\$683,383	\$682,768	\$682,153	\$681,539
New	\$0	\$214,929	\$429,472	\$643,628	\$857,398	\$1,070,783	\$1,176,801	\$1,293,316	\$1,421,367	\$1,562,097	\$1,716,760

Assumptions Summary—Materials Management

Waste Summary

	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
Existing	58,130	56,386	54,695	53,054	51,462	49,918	48,421	46,968	45,559	44,192	42,866
New	0	19,864	39,727	59,591	79,455	99,318	109,250	120,176	132,193	145,412	159,953
	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
landfill	43%	36%	30%	23%	17%	10%	8%	6%	5%	3%	1%
recovery	57%	64%	70%	77%	83%	90%	92%	94%	95%	97%	99%
total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

