

# SPU's RISK AND RESILIENCY ASSESSMENT AND FRAMEWORK

## 2018 Status Report



Last Updated October 4, 2018



**Seattle  
Public  
Utilities**

## Introduction

Since the birth of the Seattle Water Department in 1889, Seattle's City leaders led the utility through change: A great fire, a gold rush, an economic depression, a recession, and many more.

Through forward thinking and investments, Seattle Public Utilities (SPU) has been a leader and partner in providing utility services and protecting public health and the environment. Barely one month after the Great Seattle Fire, the citizens of Seattle voted to make the water system public. Just 10 years later, Seattleites enjoyed a pure, stable, water supply from a source 28 miles from the city.

SPU continues to face persistent and emerging challenges: A changing climate, the threat of natural disaster, technological advances occurring faster than ever, inequity, economic distress, competition, an aging workforce, and others. We must be **resilient** to adapt, overcome, and successfully meet these challenges. While some of today's challenges are new, our storied tradition of looking to the future to keep Seattle the best place to live, is not.

Resilience is about looking to the future to understand what could be and be positioned to adapt to risks and opportunities when they arise. SPU has developed this Resilience Framework and Risk Assessment (Framework) to guide the organization on identifying risks or opportunities, as well as assessing and planning to address them and better serve the community. The Framework describes SPU's principles for being a resilient utility, identifies the focus areas of anticipated future risk, and provides the steps that business units should take when assessing and developing strategies to reduce risk. The Framework also provides a tool for evaluating the 'maturity' level of the SPU's current efforts on resiliency on any given area.

The Framework was developed through research and interviews with industry leaders, other government agencies (such as King County), and SPU staff. The intent of this work is that it will integrate with the City's and other regional resilience efforts. The Framework is the umbrella under which all planning efforts are made to ensure that the services we deliver can adapt to changes and risks as needed, and that those strategies are integrated into programs, policy decisions, and capital projects. In accordance with Seattle's Race and Social Justice initiative, SPU's resiliency strategies must address systemic and institutional racism to protect SPU's most vulnerable customers from disproportionate impacts.

With input from SPU's ESJE team, we will incorporate equity into the Framework by attempting to identify the disproportionate impacts risks pose and consider how SPU's response to risks may affect vulnerable communities.

Operationalizing and integrating the Framework requires Executive Sponsorship and Utility-wide engagement. To be successful, SPU's business units need to embrace the concepts of resilience and set out to assess the focus areas outlined in this document.



## Resilience

### What is resilience?

From the *July-September 2017 Advances in Water Research*, resilience can be thought of as:

- ✓ An ability to become strong, healthy, or successful again after something bad happens.
- ✓ The capacity to recover quickly from difficulties; toughness.

The Adrienne Arsht Center for Resilience's *Crafting a Resilient World: A Strategy for Navigating Turbulence* report describes resilience as:

- ✓ A roadmap to meet disruption, minimize damage, restore stability, and come back stronger.

### What do we (SPU) mean when we say, "resilience?"

SPU has combined these global definitions with its history of identifying and overcoming challenges to set its own resiliency vision, mission, and principles. At SPU, **resiliency is the capacity to recover in the face of sudden or gradual stressors that impact our business and customers.**

**Vision:** SPU is a forward-looking utility and plans and is adaptable to sudden and gradual impacts that affect our ability to serve our community.

**Mission:** To integrate a resiliency framework into our planning that addresses disruptions to our ability to provide critical utility services, minimizes impacts, maintains and restores stability, and allows us to adapt and recover.

**Principles:** As a resilient utility, we aspire to be:

- *Flexible* – Able to adapt actions to foreseen and unforeseen changes, which involves redeploying previously committed capacity quickly enough to be effective.
- *Redundant* – Having alternative capacity (e.g. backups) that can be used to replace those lost or diminished during disruption, thereby allowing vital functions to continue.
- *Agile* – Able to quickly respond to sudden or gradual changes in the business environment to continue to provide service to our community.
- *Collaborative* – Having close, complimentary planning and operations relationships with our partners so we can rely on each other. Collaboration occurs both internally across SPU's lines of business and corporate functions, as well as externally with the public and SPU's partners, in providing service.
- *Robust* – Enduring both foreseen and unforeseen changes in the environment without negative impacts to service delivery.
- *Diverse* – Having multiple options at hand to address disruptions to service delivery.
- *Equitable* – Leading with a racial equity lens to remove barriers for all communities, dismantling operating systems of power and historic decisions that make some communities vulnerable, and guarding against evolving conditions that create inequitable access and outcomes in regard to utility services.
- *Resourceful* – Quickly finding different and innovative ways to solve problems.

- *Community-Centered* – Strategically managing multiple feedback loops and listening channels so disruptions are managed, and systems are stabilized and improved.
- *Evolving* – Continuously testing and redeveloping plans and practices through innovation, updated business and cultural norms, and shared experience.

## Resiliency Framework

To become more resilient, SPU developed the Framework steps outlined below to guide business units on how to assess, plan, and implement resiliency efforts.

### Framework Steps and Sub-steps

#### 1. *Review existing work – Risk Identification*

Business units should first identify what has been done to assess risk and mitigate it, both within SPU and industry-wide within the focus areas and sub-areas as they affect their line of business. This research should include reviewing any plans, studies, modeling, capital projects, and any other work that informs resiliency or risk mitigation efforts. Existing work can then be revised, built upon, or used to guide the additional work to be done.

New risks can be identified as well by evaluating industry trends, data analysis, and benchmarking. All risks should be assessed using SPU's Risk Management Framework to determine current levels of impact and likelihood.

#### 2. *Identify possible futures – Future casting*

Planners should establish time frames to use for risk analyses and modeling of future impacts to their business. This should include a range of near-term (like the usual 5-6 year comprehensive planning horizon), mid-term (10 – 20 years), and long-term (50 – 100 year) horizons.

This also involves gathering additional information provided by scientists and long-term planning agencies (e.g. Puget Sound Regional Council) in the different focus areas (e.g. population density, climate, demographics, etc.) to develop visions of possible futures within the established time frames.

#### 3. *Identify increased risks – Scenario planning*

Staff should develop and use standard models depicting ranges of possible futures within the focus areas, identify the risks to the business (e.g. service, operations, staff, assets), and establish the magnitude and probability of the risks that are outcomes of the models.

It is important at this point, to also identify dependencies on other agencies, vendors, and companies we rely on that may be affected by the risks.

Data analysis and research needs to be evaluated to determine if there are disproportionate impacts to lower income or racial and culturally diverse communities.

#### 4. *Identify options – Strategic Planning*

Planning should then be conducted to identify potential mitigation strategies for reducing the risks. Developing options for mitigation should include a wide range of strategies including:

- Engineered solutions that enables our assets and facilities to better withstand stressors and disasters;

- Contracts or agreements for services that allow for sharing of risk, support in a time of need, or back-up services;
- Partnerships that can be built to develop a stronger base;
- Alternative methods for service delivery, adapting to the possible futures;
- Changes in policies, procedures, and rules that guide how we do business;
- Communication strategies to inform, train, coordinate, and update the workforce and the community; and
- Investment considerations

#### 5. *Develop cost-benefit analyses – Strategic Planning*

All options being considered should be evaluated for cost-benefit, including a thorough assessment of their impacts on affordability and potential disproportionate impacts. The benefits should be looked at from the long-term, not just the near-term rate cycle.

#### 6. *Implement and integrate – Implementation*

Solutions derived from resiliency assessments and planning are not intended to be stand-alone actions. Actions selected and approved to move forward, as with the assessment and planning cycles of this work, should be incorporated into existing and ongoing capital plans.

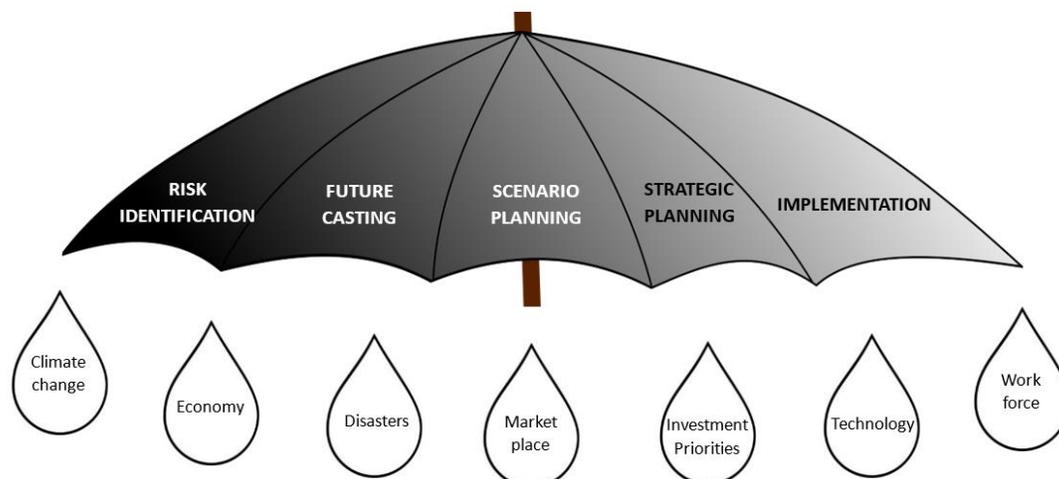
#### 7. *Monitor results and continue to adapt – Implementation*

Tracking the focus areas for changes in perceived risk or data should be an ongoing practice within each business unit. Resiliency models should be adapted throughout planning cycles and as identified indicators change.

## SPU's Resiliency Focus Areas

SPU looks to the future with an eye towards efficiency, value, and equity. The Framework has identified seven focus areas, with associated sub-areas of risk or opportunity that can affect SPU's business units. The diagram below depicts the Framework concept, highlighting the assessment and planning steps as well as the focus areas to evaluate.

Following the diagram, we describe the risks to SPU's business, customers, and employees that we have identified to-date for all of the focus areas and sub-areas.



Focus Area Sub-sets and Equity Impact

Climate Change	Economy and Affordability	Disaster Preparedness	Marketplace	Regional & City Investment Priorities	Technological Advancements	Workforce Availability & Capabilities
Sea level rise	Population boom	Earthquake	Ability to site facilities	Voter-led initiatives	Advancements that drive obsolescence	Skill availability
Extreme downpours	Bubble bust	Terrorism and vandalism	Recycling markets and revenue	Programs or projects initiated by other agencies	New H <sub>2</sub> O treatment techniques	Loss of institutional knowledge
Drought	Loss of customers	Cyberattack	Availability of raw materials for supplies	New regulations	Advancements that drive independence	Interest in govt sector
Air quality degradation	Affordability	Volcanic eruption	Cost of debt	Conservation impacts	Speed of tech change driving costs & resource needs	Speed of turnover
Temperature rise		Flooding	Funds availability		Robotics and electronics that change operations	Marketplace competition
Wildfires		High winds	Marketplace demand			
		Fires				
<b>Equity is impacted across Focus Areas due to historic and current racial and other socio-economic factors and conditions</b>						
Ability to adapt to a changing climate	A rapidly changing economy	Ability to prepare for disasters	Zoning, facility siting and the impact of a global market	Grassroots voters, other agency priorities, without a race and social justice lens	Access and Advantages of technological advancements	Skilled workforce availability

## Climate Change

Global climate change impacts include sea level rise and increased temperatures. More locally, climate patterns in the Puget Sound region are changing and we expect further change in the coming decades. Impacts to SPU business include:

**Sea level rise:** Climate Change is projected to increase Seattle's sea level by an average of two feet by 2100. Sea level rise affects the extent and frequency of coastal and low-lying area flooding through saltwater intrusion, corrosion, and loss of near-shore habitat.

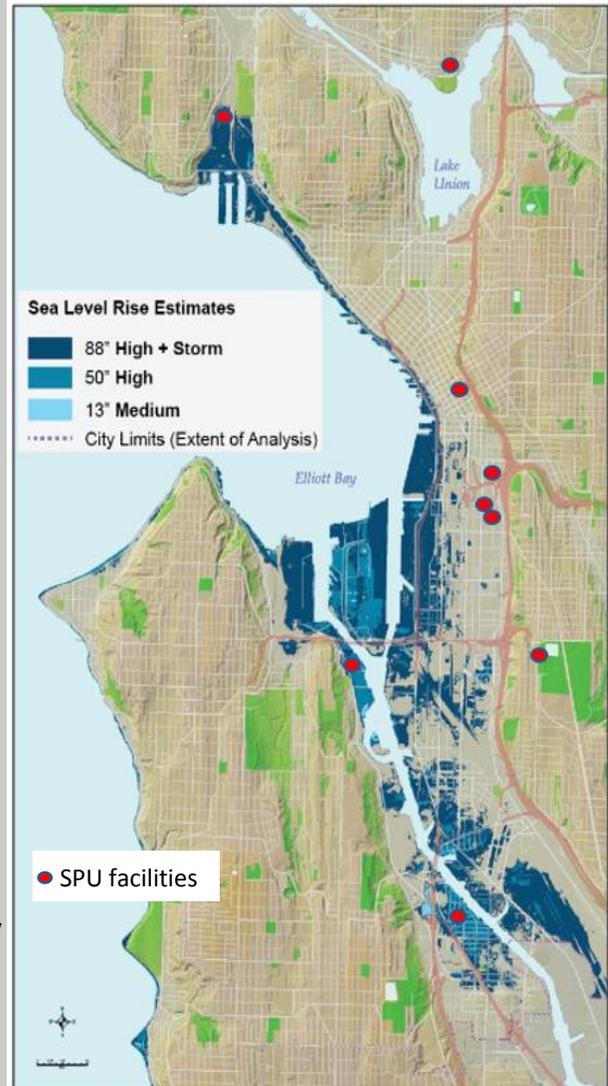
Seattle is already experiencing sea level rise impacts in the form of more frequent tidal flooding (NOAA 2018). When high tides coincide with extreme rainfall, our drainage system is briefly (up to two hours) not able to discharge properly and backs up, potentially flooding the area nearby.

SPU anticipates sea level rise will impact facilities, including the new Drainage and Wastewater South Operations Center. Facility site selection is also driven by limited industrial land and real estate costs. Therefore, mitigation actions like raising ground floor elevations are required and implemented for facilities in these areas.

There could still be impacts to transportation to and from the facilities, which requires coordination with SDOT.

Lastly, some transportation corridors will be affected by sea level rise during storm events making it difficult for staff to respond to emergencies for maintenance or repair.

Rising Sea Levels and Changing Flood Risks in Seattle



**Extreme downpours:** In the future, more frequent extreme precipitation will exacerbate existing drainage problems and increase landslide risk and seepage around retaining walls and underground structures. With combined storm and sanitary sewer systems, the City's ability to stay in compliance with CSO regulations will be increasingly challenging.

For the Water Line of Business, the protected Cedar water supply system is unfiltered can be impacted by extreme downpours that elevate turbidity in the Cedar River which requires shutting down diversion from Landsburg to Lake Youngs. An increase in frequency of these events could lower the elevation of Lake Youngs as the treatment facility pumps from the lake.

**Drought:** The West Coast has seen an increase in frequency and duration of droughts. Droughts generally result in lower levels of precipitation and warmer winters, resulting in reduced snowpack.



The water supply system historically relied on accumulated snow years as a means of additional storage to meet the demands of our dry summer months. Because snowmelt is more predictable than spring rains, drought years that produce little to no snow are a stressor for system operations, creating challenges in providing sufficient water for people and fish.

Drought conditions also increase the risk of wildland fire, which can have long term impacts on the water supply and water quality because of ash and erosion.

**Air quality degradation:** Air quality is expected to decrease in the region because of increased heat waves and wildfire smoke. Atmospheric warming is expected to intensify ground-level ozone, increase the prevalence of airborne allergens, and affect air pollutants. Decreasing air quality can negatively impact the health of SPU employees, particularly field workers and those with existing respiratory medical conditions (e.g. asthma). In addition, decreasing air quality can affect SPU's field work operations through an increased need for precautionary measures to protect employees.

**Temperature rise:** An increase in average temperature is expected year-round in Seattle. Rising temperatures increase the likelihood of water quality incidents, including bacterial outbreaks and algal blooms. These incidents impact food and water security, especially for communities made vulnerable by system inequities. Temperature increases also impact the productivity of field staff through heat stress. Facility equipment, like HVAC systems, can be strained by increased runtime and wear.



**Wildfires:** Increased frequency of droughts and rising temperatures at higher elevations make forests in the watersheds more susceptible to disease and pest infestations. Along with the dryness, the factors make the risk of wildfires greater each year. A wildfire in Seattle's two watersheds, as also described in the disaster section, risks SPU's drinking water quality and quantity.

## Economy and Affordability

Fluctuations in local, regional, and national economic conditions affect the growth and vibrancy of the city, the number of customers we serve, and our customers' ability to afford our services. Economic conditions impact revenue streams, rates, affordability, and ultimately the ability to reliably provide SPU services sustainably.



**Population boom:** The city of Seattle's population continues to grow rapidly. As our community grows, SPU's services play an increasing role in the city's livability. This growth creates an increased demand for SPU services, puts pressure on resources, and creates a burden on infrastructure that it may not be able to handle.

An influx of people from other parts of the country, or world, may mean they are not familiar with SPU's solid waste recycling practices, causing an impact to the waste stream. These impacts can be mitigated with increased communications and outreach.

The biggest impact to SPU from dramatic growth is the cost of housing and traffic congestion. Recent surveys found 75% of SPU field staff and 60% of office staff now live outside the city limits. Increased traffic congestion also makes it very difficult for staff to respond to emergencies in a reasonable time and to get around the City to do their jobs. Finally, the sudden growth in costs and demand for our services, increases our costs, and therefore our bills, making it harder for customers to be able to afford paying their bills.

**Bubble bust:** Rapid growth or strength for certain economic indicators/conditions can rapidly turn negative, resulting in a bubble bust. Seattle is only 10 years removed from the 2008 financial crisis and has experienced industry relocation and recession before. Any national or even global-scale bubble burst increases the risk of a widespread recession. Regional economic conditions can also oscillate between boom and bust. Both economic growth and recession impact revenue streams leading to rate increases, staff reductions, or reduced service to our community.

**Loss of customers:** Relatively high costs for utility services can drive customers to seek out other providers. Loss of wholesale, or major retail, customer base can have major financial impacts on SPU. For example, the loss of the Port of Seattle impacted the drainage rate base.

Reductions in revenue raises rates for remaining customers, which may result in more customers leaving the system. Competition from neighboring major water utilities can make their services more attractive than ours.

**Affordability:** The cost of living and the recent economic downturn have adversely affected many of our customers. SPU’s Strategic Business Plan details rate increases necessary to improve service delivery, perform system maintenance, cover inflationary costs, build new infrastructure, and meet regulatory requirements. The cost of service rises with the economy. Increased costs make finding the balance between quality service and affordability more challenging. Maintaining and improving affordability, especially for low-income customers is critical to maintaining public trust.

## Disaster Management

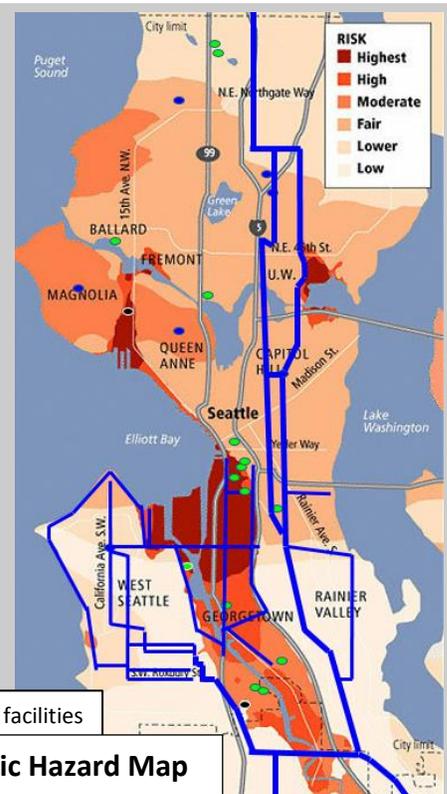
According to City Emergency Management, Seattle faces the highest number of hazard types of any major U.S. city. Disasters cause loss of life, public health impacts, and property and environmental damage. Disasters damage SPU assets and disrupt our service delivery which can impact other downstream systems, like firefighting capability in addition to basic life services for our customers. The number of hazard types and variability in magnitude yields a large degree of uncertainty on the impacts to our systems and the community.

**Earthquake:** The Seattle area is prone to multiple types of seismic events, ranging from local epicenters with severe shaking to large scale Cascadia Subduction Zone events. Impacts include significant ground movement, liquefaction, landslide, and potential tsunamis. Secondary impacts include fires, property damage, limited mobility, and lack of power.

The diagram to the right shows the areas anticipated to have the most impact in a moderate to strong earthquake.

General impacts to SPU include difficulty for employees to respond to repair broken assets due to disruptions in transportation corridors, concerns about property or families, and lack of visibility at night.

Damage to infrastructure will disrupt the water supply, disposal of wastewater, and the collection and hauling of solid waste.



**Terrorism and vandalism:** Any act that endangers human life to instill fear in a population and affect government policy can also impact SPU. SPU infrastructure and services, due to their critical and life-sustaining nature, are potential targets of attack. In the past few years, the greater risks are minor acts of vandalism and theft causing damage to SPU assets and requiring resources to respond, repair, and restore damaged systems.

**Cyberattack:** As technology advances, and we become increasingly reliant on networked computer systems for service delivery, security, and communications, we become more vulnerable to disruptions from cyberattack. A cyberattack involves a malicious, deliberate act that compromises data or critical infrastructure systems through disruption of systems, theft of private information, fraud, or extortion.

An attack aimed at SPU could cause unauthorized access of personally identifiable or sensitive information, which can cause of public trust, impacts to public health, and substantial legal costs for SPU. More importantly, cyberattacks could affect our operating systems which would put our water and drainage and wastewater systems at risk.



**Volcanic eruption:** Washington State is home to five active volcanoes located in the Cascade Range east of Seattle. Potential eruption impacts include, blast, lahar, and ashfall. Ashfall can impact water supply and quality, DWW collection, mechanical equipment, energy systems, transportation systems, and workforce. This results in widespread community impacts and huge financial costs for cleanup.

**Flooding:** SPU grapples with three flood types: major river flooding, coastal flooding, and urban and small stream flooding. Floods are widespread disasters that have life safety impacts and result in damage to SPU infrastructure and private property.

The increased frequency and severity of flooding due to climate change will lead to greater costs for claims, cleanup, repair of assets, and disruption to SPU's normal business operations.

**High winds:** SPU's systems can be impacted by sustained winds up to 70 mph and gusts to 90 mph. Winds of these intensities have become more frequent with the impacts of climate change. Power outages caused by high winds impact normal SPU operations through power outages and decreased mobility. High winds may also result in building, bridge, and other property damage increasing cost for cleanup/repair as well as creating hurdles for staff to respond to emergencies.

**Fires:** SPU is impacted by and responds to structural, vehicle, industrial, and wildland fires. Fires result in death, injury, property, and environmental damage. This damage also impacts SPU's ability to deliver services and SPU is responsible for supporting firefighting in Seattle through water delivery and direct firefighting in its watersheds. Climate change is expected to impact the frequency and expansion rate of fires, especially wildland fires.



## Marketplace

SPU is dependent upon and affected by market-based actions by other business, organizations, states, and countries. Our ability to site facilities, obtain raw materials, and sell commodities are examples of SPU marketplace connections.



**Ability to site facilities:** Due to land acquisition costs, densification, and zoning changes, future acquisitions for SPU facilities may have cost barriers, resulting in limited ability to site facilities or an increased need for condemnation, all of which create higher capital financing costs and impacts to SPU rates.

**Recycling markets and revenue:** Revenue from recyclable materials are subject to market fluctuations. In addition, the markets into which recyclable materials can be sold can change, having both a negative or positive impact on the SPU contractor's ability to sell processed materials. SPU has influence over these commodity markets, many of which exist off-shore and are subject to trade agreements and foreign relationships. Revenues received from materials collected for recycling help support on-going programs and keep customer rates down.

**Availability of raw materials for supplies:** Supply chains and availability of materials change with market conditions, foreign relations, government agreements, and wars. For example, sudden changes to the market for materials like steel prices which are needed to make pipes and valves can impact SPU's construction and maintenance operations.

## Regional & City Investment Priorities

SPU is one of many City of Seattle departments guided by the Mayor and City Council. We are affected by citizen initiatives and other governmental agencies like King County, Washington State, Sound Transit, the Port of Seattle, and Federal agencies. Major initiatives that these other agencies undertake may cause us to relocate our assets or prematurely replace an asset.

Programs, projects, regulations, and citizen initiatives can result in new requirements for SPU and create added costs for regulatory compliance and maintaining public trust.



**Voter-led initiatives:** Voter-led initiatives enable voters to propose or repeal legislation through ballot measures. While still resulting in new or enhanced requirements, there is variability in what could be passed by voter initiative versus other legislative bodies.

**Programs and projects (other agencies):** City, county, state, or federal agencies can adopt programs or projects that affect SPU's finances and operations. Future initiatives can force SPU to relocate or replace assets sooner than anticipated, resulting in unplanned costs.

**New regulations:** New regulations can result in new requirements for SPU and create added costs for regulatory compliance. For example, SPU entered into a consent decree with the Environmental Protection Agency, the Department of Justice, and Washington State Department of Ecology in 2013 to reduce sewer overflows (SSOs) and combined sewer overflows (CSOs) into Seattle's local water bodies. The Ship Canal Water Quality project resulted in an estimated \$572 million investment to maintain compliance with the consent decree.

**Conservation impacts:** SPU's water and species conservation efforts, the Saving Water Partnership, and Habitat Conservation Plan can be impacted by economic and political conditions. The availability of clean water affects every SPU customer. Political prioritization can affect SPU's ability to resource these efforts, impacting future generations' ability to access clean water, restore fish populations, and protect wildlife habitat.



## Technological Advancements

New and rapidly evolving technologies present opportunities and threats for SPU. Advancements can drive worker obsolescence or service independence that can cause a loss in customer-base. The rate of technological advancement can create a burden on SPU's ability to stay up to date and relevant related to its workforce needs and service delivery. On the other hand, new technologies can increase efficiency and their use can help recruit and retain employees.

**Advancements that drive obsolescence:** Emerging technologies can alter the way work is done, rendering certain tasks or systems obsolete. Technological advancements have the potential to drive greater efficiency within the Utility, but if technology drives SPU worker or system obsolescence, the livelihoods of SPU employees, SPU partners, and even customers may be impacted.



**New water treatment techniques:** Discovery of new contaminants, water quality standards, and treatment techniques may require SPU to adapt treatment or even build new treatment facilities and equipment. A sudden change in treatment techniques from an emerging technology can create unanticipated costs for SPU.

**Advancements that drive independence:** Technological advancements may lead to decentralized and independent systems for treating and collecting storm and wastewater, treating drinking water, and disposing of solid waste. Loss of customer-base to decentralized water systems may result in revenue reductions that can increase costs for remaining customers, however, the potential for lost revenue is relatively modest. In addition, decentralized solid waste systems (e.g. back yard composting) could decrease rates, since customers are not currently charged for food waste.

Technological advancements leading to decentralized systems have potential to yield opportunities for SPU. For example, the expansion of decentralized non-potable water could preserve potable water for potable needs, which could delay the need to develop costly new source supplies. Additionally, in response to major disaster events (e.g. earthquakes), well designed and maintained decentralized systems can be operationalized much faster than larger systems. Decentralized systems can also be leveraged to create additional co-benefits through reusing non-potable water for improving water quality and flood management.

**Speed of technological change driving costs and resource needs:** The rapid and increasing pace of technological advancement magnifies a need for SPU to make continued upgrades. These upgrades are expensive and can drive up costs for SPU due to licenses, training, and resourcing technology projects and initiatives. In addition, the increased speed and complexity of technological advancement can drive up demand for tech-related equipment replacement. With new technologies, there is also an increase the need for tech-savvy employees with a higher level of skills. All of these changes have associated costs, which can impact work efficiency, service quality, or affect rates.

## Workforce Availability & Capabilities

SPU employees are the organization's most important resource. Hiring and retaining employees with the right skills and protecting institutional knowledge is critical for executing SPU's Mission. Ensuring a ready pool of employees is available to fill vacancies created by turnover is essential to our ability to provide the services we do. Reduced skill availability in certain job categories, loss of institutional knowledge from retirement or departure, speed of turnover, and market competition all affect SPU's ability to deliver high quality service to the community. Staffing SPU's workforce in a competitive environment where many employees are of retirement age is a challenge, but also an opportunity to create a diverse, equitable utility that reflects the community we serve.

**Skill availability:** SPU positions are diverse, and many require highly technical skills or years of experience. We can be affected by a skills gap if there are not enough candidates, both internally and externally, in certain job categories (e.g. current shortages in accounting skills). This results in longer vacancies and a less skilled workforce. Competition can also push wages up and creating longer vacancy times, impacting SPU's rates.



**Loss of institutional knowledge:** Recent estimates indicate 51 percent of SPU employees are eligible for retirement within 5 years. As local government workers retire or leave for positions in other sectors, SPU loses the knowledge and history the employees take with them. In particular, as the 'boomer' generation enters retirement age, an increased institutional knowledge loss disruption is expected. Without sufficient transfer programs or succession planning, the loss of knowledge has the potential reduce the efficiency of our operations, which can affect service quality.



**Interest in the government sector:** While government has certain advantages over other sectors, there are also tradeoffs. Interest in public service fluctuates over time, and this impacts SPU's ability to hire a diverse and skilled workforce. SPU must adapt in areas like wage competitiveness, culture, and other trends in worker preferences and practices.

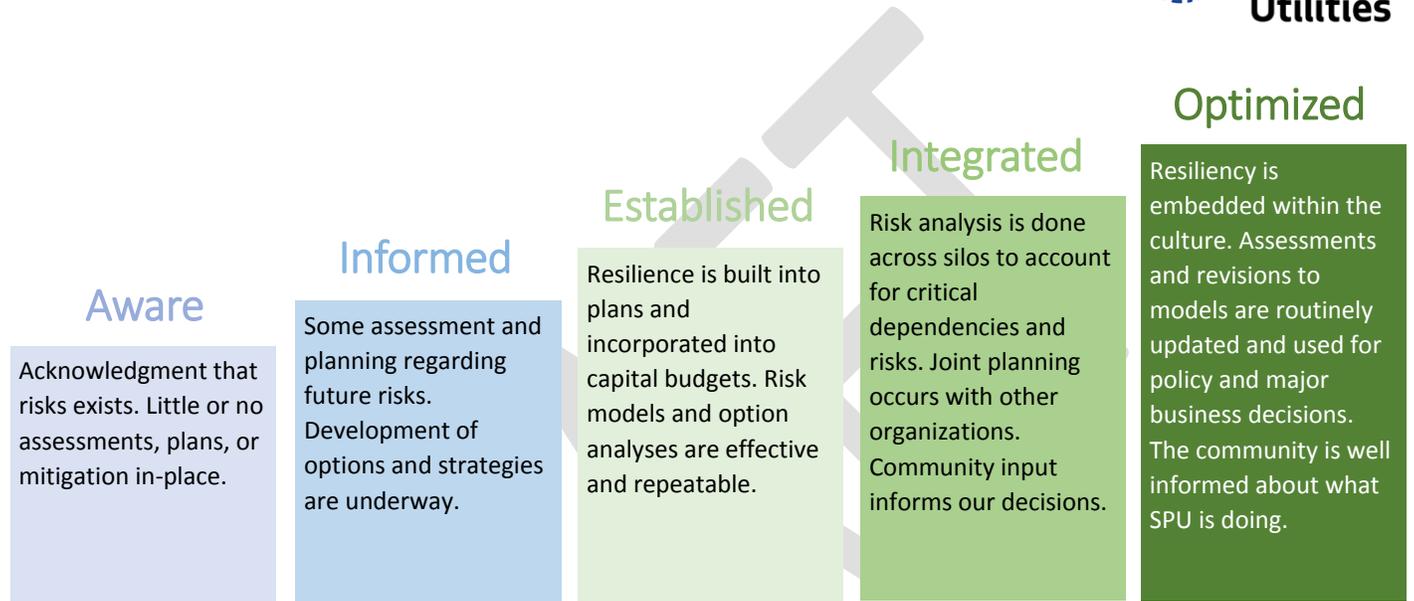
**Speed of turnover:** The rate at which SPU employees leave the organization and need to be replaced affects service delivery and costs. High turnover increases the need for training and leads to decreased knowledge and experience. Professional development opportunities, workload, performance management, independence, and employee selection methods can all impact an employee's decision to stay or leave. As the economy booms, the turnover speed increases.

**Marketplace competition:** The private and non-profit sectors as well as other public organizations are in competition with SPU for skilled candidates. Governments face stiff competition from the private sector's adaptability and work norms combined with the potential for greater long-term wealth. This impacts SPU's ability to hire the most skilled workers. It may also drive up wages for positions requiring specialized and in-demand skills. Factors like the ability to work with new technology and flexible workplace norms may make SPU more competitive. In addition, Seattle's mobility challenges may increase the cost of commuting to work and negatively impact employees' quality of life, creating more competition with other employers closer to workers' homes.

## Assessing SPU’s Resiliency

SPU has adopted a maturity model, with associated indicators, to assess the progress made within each focus area / sub-area. The Maturity Model is intended to provide guidance by describing milestones that resiliency efforts can strive to achieve.

### Resiliency Maturity Model

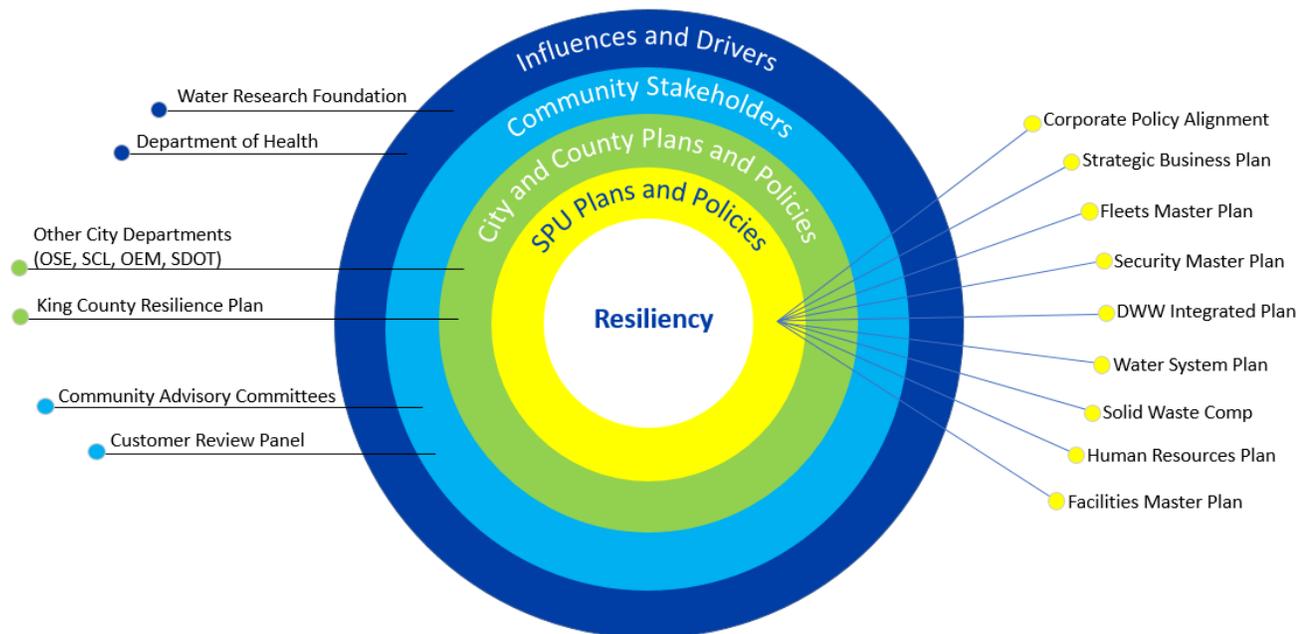


**SPU-Specific Resiliency Maturity Indicators include:**

<ul style="list-style-type: none"> <li>• Understanding of risks to the business</li> <li>• No master plans in place</li> <li>• Emphasis on compliance with regulations and laws</li> <li>• Reactive responses rather than proactive</li> <li>• Fragmented risk management practices in place</li> <li>• Major hazards are identified</li> </ul>	<ul style="list-style-type: none"> <li>• Risks have been identified, quantified</li> <li>• Some future risk modeling has been done (e.g. rainfall models)</li> <li>• Discussion regarding risks or resilience has begun to be incorporated into plans.</li> <li>• Some major hazard plans in high profile focus areas developed and being mitigated</li> </ul>	<ul style="list-style-type: none"> <li>• Models for Climate change, disaster risks, and economic variations have been developed over several long-term horizons and used to inform options analyses</li> <li>• Capital plans incorporate solutions to address risks identified in modeling</li> <li>• Hazard specific response plans are in place, trained, and tested. LOB and corporate functions have documented response</li> </ul>	<ul style="list-style-type: none"> <li>• Interdependencies of the business are understood and collaborative efforts are underway with those parties: i.e. King County and DWW’s plans for CSO solutions based on population growth; Mutual aid agreements with neighboring Cities for water supply; Backup agreements for solid waste services from other states</li> <li>• SPU’s resilience plans align with those of the City</li> </ul>	<ul style="list-style-type: none"> <li>• Planning routinely updated to account for changes in future scenarios</li> <li>• Corporate policy is aligned with operations</li> <li>• Innovative strategies are incorporated in to operational processes and SPU’s efforts lead industries or are considered “cutting edge.”</li> </ul>
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## Aligning Resiliency Planning

As SPU continues its resiliency planning efforts, we will connect our internal subject matter expertise with our customers, community, and regional and technical partners to ensure a thorough and community-centered approach to our work. This diagram displays how we see the coordination and integration of our resiliency work. As technical expertise and community inputs are connected to and viewed through a resiliency lens, we incorporate this into planning decisions, which yields a more resilient SPU.



## Next Steps

SPU's assessment efforts allow for continued progress that, in the end, enhance the Utility's long-range planning efforts and inform decision-making. The assessment results allow for an analysis, by focus area and line of business/corporate function, that identifies:

- Our critical interdependencies on other agencies/organizations
- Efforts and impacts that cross focus areas SPU can engage in to maximize resiliency
- Highest priority focus areas/subareas where SPU's risk is greatest, and where efforts should be concentrated now
- Cost impact and cost-benefit analyses
- Standardized data sets and science for SPU to use in resiliency planning for appropriate focus areas
- Communication and outreach strategy including: Sharing the Resiliency Framework development with our regional partners and customers (e.g. Community Advisory Council) (see Appendix A for communications plan)
- A complete inventory and assessment of existing work for high priority focus areas

SPU's lines of business will continue to assess their resiliency across focus-areas and sub-areas, adding subject matter expertise to prioritizing actions related to SPU's overall resiliency efforts. As our resiliency efforts continue, SPU will develop and implement a strategy to share our resilient history and how we are continuing our forward-looking tradition as we face tomorrow's challenges with our community, customers, and partners.