Section 7

Implementation, investments and financial outlook

Introduction

Implementing the 2040 vision of reliable, sustainable, and resilient ferry service will require broad commitment and strategic investments. These investments will be incremental over the approximately 20-year planning horizon in both capital and operating budgets. The Plan identifies strategies to address challenges such as the age of the fleet, changing technologies, and preservation in a maritime environment, which will require greater investment than the existing 16-year capital investment plan anticipates. The investment needs accompanying this Plan have been carefully conceived to meet the agency's objectives in a cost-effective and prudent manner, in keeping with WSDOT goals for Practical Solutions.

This section of the Plan focuses on the timing of proposed service enhancements and infrastructure projects, as well as the overall capital and operating investments needed to support the Plan.

Not all capital investments will result in easily measured benefits. For example, it is easy to quantify the immediate operating cost reductions expected once WSF converts current diesel propulsion vessels to electric propulsion. However, it is difficult to quantify the long-term effects of energy reduction on climate change, which is an equally important element of the Plan.

Service hour increases will alleviate some congestion, although this will impact vessel reliability. To ensure that the needed additional hours can be added without degrading the ability to provide service and maintain its fleet, WSF must first strengthen reliability by increasing the time dedicated for maintenance programs and expanding the size of the maintenance relief fleet.

The Plan's leading up to 2027 is to invest in the reliability of the system through the construction of new maintenance relief vessels, replacing retiring vessels and enhancing the recruitment and retention of the ferry workforce. This period also includes enhancements to terminal infrastructure and customer information that provide opportunities for customers to plan for and complete their ferry trip and connect to transit or other modes more efficiently.

The second decade of the Plan will shift its focus to easing congestion and increasing system capacity for both vehicles and passengers, while improving the customer experience through technology and terminal improvements. WSF will accomplish this goal through service enhancements throughout the system, continued vessel replacements, and continued terminal and information technology infrastructure investments. Although this Plan does not propose adding service hours to routes until 2028, it recommends applying strategies to promote mode-shift, spread peak ridership, and streamline operations throughout the planning timeframe from 2019 to 2040.

The Plan is not merely for the long term. It incorporates immediate goals to stabilize the fleet in the near term, followed by strategies to build infrastructure over the medium term (to 2027) and respond to growth overall in the long term (through 2040). In an effort to fully understand the level of investment necessary to meet the operating challenges, the Plan is not constrained to current, known revenue sources. Each timeframe, based on WSF's fiscal years rather than calendar years, is outlined in more detail in the following sections, which include:

- **Near term (0-2 years)—stabilizing the system.**
- **Medium term (3-7 years)—building the infrastructure.**
- **Long term (8-20 years)—responding to growth.**

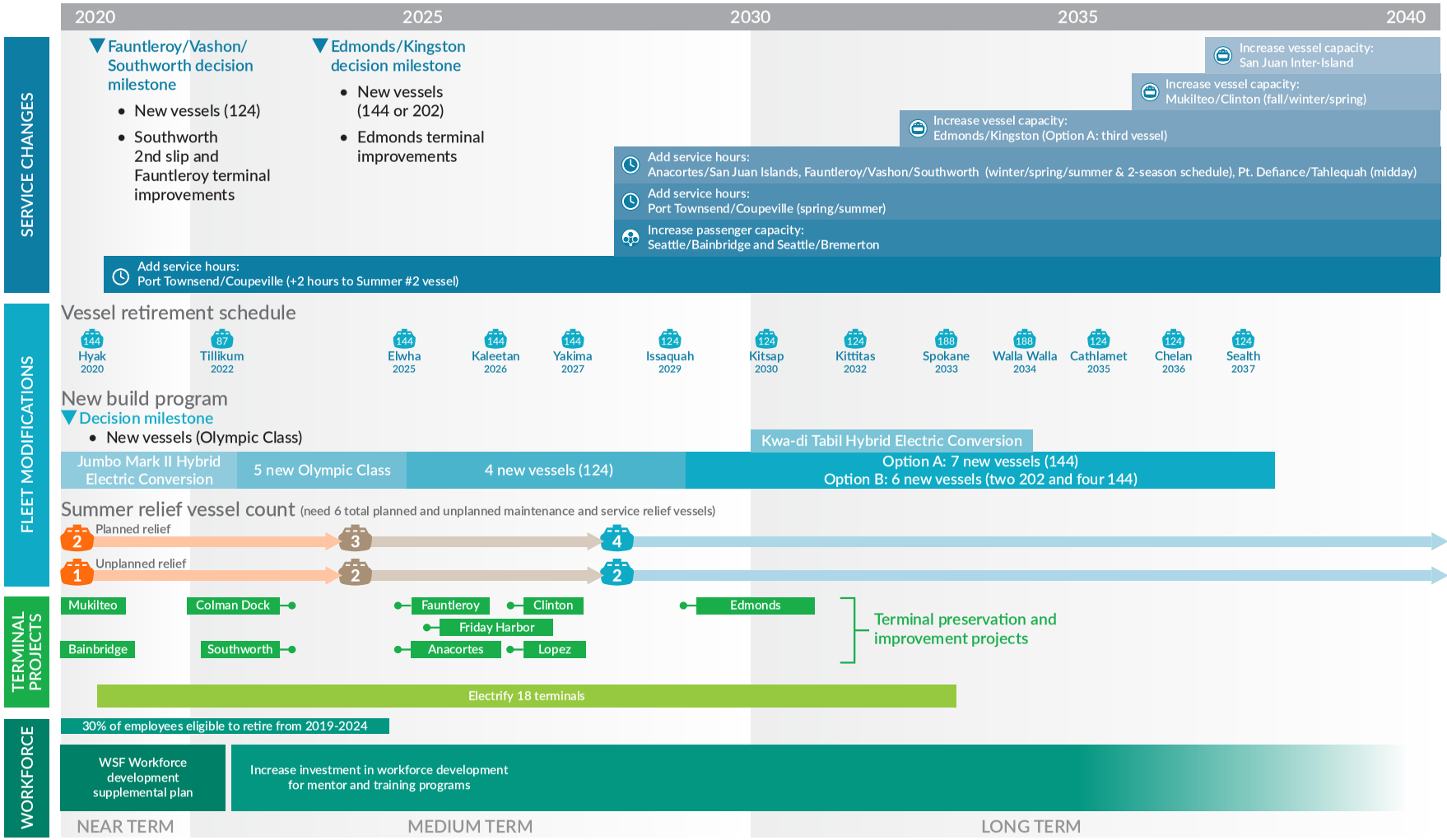
Each timeframe narrative includes a discussion of proposed investments by focus area:

- Vessels
- Workforce
- Service
- Terminals
- Technology

The Plan organizes system improvements by route for the medium- and long-term timeframes when vessel replacements, terminal improvements and service enhancements take place. The implementation timeline on the next page illustrates near-, medium- and long-term investments.

This section concludes with a financial outlook for both capital investments and operating costs throughout the 20-year planning horizon. The financial outlook identifies costs and revenues by biennium, which are the two-year fiscal planning periods used by Washington state.

2040 Plan implementation timeline



Near term (0-2 years)—Stabilizing the system

From 2019 to approximately 2021, the focus of the Plan is to guide key decisions about funding vessel construction to support service reliability and strengthen the attraction, promotion and retention of the specialized ferry workforce. Focusing on these critical needs will help stabilize ferry service by starting the construction of planned and unplanned maintenance relief vessels for delivery as early as 2022 and ensuring that WSF has the sufficiently trained and skilled workforce to operate the system.

Vessels

The Plan recommends that WSF's current open vessel construction contract for the Olympic Class vessels be amended to include the construction of five new vessels. Two of these vessels would be used for planned and unplanned maintenance relief, while the other three would replace retiring vessels within this 20-year planning period. Unfortunately, WSF's options for building new vessels are extremely limited: Delivery of new vessels within this timeframe is only possible through the extension of the existing Olympic Class vessel build contract. By any other current contracting means, it is estimated that bringing a new vessel online would take seven years.

In addition to funding and construction of new vessels, the first of three existing vessels, the Jumbo Mark II Class, will be converted to hybrid-electric propulsion, and the Bainbridge Island and Seattle terminals will be equipped to support electric charging.

One existing vessel, the *Hyak*, is currently scheduled for retirement in 2019 as it reaches 51 years of age. This vessel has not received the midlife refurbishment needed to meet a 60-year useful life and requires a high level of maintenance. There is no suitable replacement vessel to take the *Hyak's* place as a relief vessel for several years. During the next few years, the fleet size will be at 22 total vessels and at the greatest service reliability risk in the planning horizon. During this time, planned replacements have not yet been delivered, the existing fleet continues to age, and vessels are either retired or require higher levels of maintenance.

Workforce

The Plan calls for preparation of a workforce development plan over the next two years and recommends ongoing increases in the level of investment in training and outreach to attract and retain the operations, maintenance and administrative personnel that make ferry service possible.

Service

The Plan recommends minor service hour adjustments for 2021 on the Port Townsend/Coupeville route. Two additional trips will be provided daily, requiring some additional crew labor and fuel costs. These added sailings are the only proposed service hour adjustments until 2028 when the fleet is large enough to allow adequate maintenance time.

Terminals

Within the next two years, construction at the Colman Dock and Mukilteo terminals will be at or nearing completion. Other terminal preservation planning will be underway at Fauntleroy, and WSF will explore partnership opportunities with passenger-only ferries for the installation of a second slip at the Southworth terminal. Planned preservation projects occur throughout the system.

Technology

In the near term, WSF is working to enhance the existing ticketing and reservations systems. Potential updates include options for mobile ticketing and integration with vehicle reservations, and potentially acceptance of *Good To Go!* toll passes for payment. WSF has already planned for integration with the Next Generation ORCA system.

This timeframe represents a high risk in service reliability because of the limited availability of relief vessels to provide both planned and unplanned maintenance relief. Retirement of WSF personnel, specifically licensed positions also presents a risk to service reliability during this timeframe. The fleet and workforce investments proposed within this timeframe are intended to work toward stabilizing the fleet.

Medium term (3-7 years)—Building the infrastructure

In the medium-term planning horizon, from 2021 to approximately 2027, the Plan recommends that WSF focus on building the infrastructure needed to maintain reliable service. Vessel construction and delivery, as well as terminal preservation and electrification to support the vessels, will be ongoing during this timeframe.

Vessels

During these six years, the remaining two largest consumers of diesel—the Jumbo Mark II Class vessels—will be converted to hybrid-electric propulsion. The Plan recommends that six new vessels be built: five new Olympic Class vessels and one 124-car capacity vessel. The Olympic Class vessels will be delivered first: two to expand the maintenance fleet, and the remaining three and the 124-car capacity vessel to replace retiring service vessels. By the end of this time period, the overall fleet size will have increased from 22 to 25. With the increased relief fleet, there will be an increase in the level of maintenance each vessel can received, allowing approximately 10 weeks of out-of-service time per vessel. The recommended 12 weeks out of service time per vessel will not be attained until 2031.

Workforce

The supplemental WSF workforce development plan will be complete, with the realization and implementation of some workforce development strategies. To accomplish its workforce development goals, the Plan calls for an increased level of investment in training and outreach over the current 2019 programmed budget. The Plan carries this increased investment throughout the end of the 2040 planning period.

Service

The Plan does not propose service hour enhancements during this time because of fleet size constraints (lack of maintenance relief vessels). The Plan proposes adaptive management strategies that work to spread peak demand and encourage walk and bike-on passengers through technology and terminal preservation and enhancements.

Terminals

The Plan proposes terminal upgrades to support hybrid-electric propulsion vessels that enter into service. The Plan outlines improvements at Southworth and Friday Harbor to add or convert an existing slip to a second operational vessel slip. Overhead loading and park and ride improvements are planned at the Clinton terminal. A new terminal building at Anacortes is planned, as well as terminal enhancements

to accommodate reservations at Lopez Island. Improvements also include terminal charging infrastructure at the Eagle Harbor Maintenance Facility.

In addition to Plan recommendations, programmed preservation projects during this timeframe include upgrading the Fauntleroy terminal facility and preserving elements of the Bremerton, Kingston and Lopez Island terminals and other programmed preservation projects.

Technology

Medium-term IT investments focus on further improving the systems for fare collection, customer service and traveler information. The Plan recommends a website refresh, in coordination with WSDOT, to offer a more user-friendly interface that helps customers to easily find ticketing and travel information. Similar to the website refresh, a unified, multi-platform alerts system would automate the delivery of service alerts across multiple channels, such as the website, text alerts, email, social media and electronic signs, freeing up staff time that is currently required for manual processes and quickly informing customers of service changes.

The Plan also outlines opportunities for investment in other technology systems that can help increase operational efficiencies and provide enhanced information to customers. These improvements include automated queue detection, electronic signage at the terminals, ship-to-shore communications system, common schedule database upgrade and real-time parking availability around terminals.

Stable service reliability means having a larger, more maintained fleet. The investments proposed in the Plan would achieve this stability at the end of this timeframe, increasing service reliability and laying the foundation for expanding service for the growing projected demand.

Long Term (~10-20 years)—Responding to growth

The long-term timeframe spans from 2028 to 2040. Once the fleet is stabilized with replacement and relief vessels to achieve needed maintenance time for each vessel, service enhancements can occur. The Plan's proposed enhancements are in many ways the restoration of hours cut in the past, and therefore fit well within existing schedules and crew labor windows. These proposed additional service hours will bring some congestion relief to routes that have shown they are maximizing their utilization, through the Level of Service metric.

During this time, the long-term focus of preservation and improvement projects shifts to managing forecasted growth through vessel capacity modifications, service enhancements, and investing in technology for more efficient operations and a better customer experience.

Vessels

Over the long term, vessels will continue to be retired and replaced as they reach the end of their service life; eight vessels are scheduled to be retired and replaced from 2028 to 2040. In the early years of this planning period, an additional two new vessels will enable WSF to increase the relief fleet by one vessel and allow service enhancements on many routes. This timeframe includes a total vessel delivery of 10 vessels, one every year from 2028 through 2037. Because of vessel replacements or modifications, many routes will experience improvements through more sailings or increased capacities for vehicles, passengers and sometimes both depending on the demands of the route and desires of the local communities.

The Issaquah Class vessels are programmed for retirement around the age of 50 years, a decade short of the 60-year lifespan that is WSF's current standard. As noted in previous sections of the Plan, the condition of these vessels continues to deteriorate, and out-of-service time is insufficient to provide the maintenance needed to reach the 60-year mark. Retiring these vessels at 50 years of age will reduce reliability risks as they continue to age. Mechanical and other systems are currently issues for these vessels and will continue to be until retirement.

If the Plan's recommendations are adopted, WSF's fleet will consist of 26 vessels by 2031 and throughout the rest of the 2040 planning horizon. In the peak summer season, 20 of these vessels would be in service if a three-boat operation moves forward on the Edmonds/Kingston route in 2031 (Option A), with six vessels reserved for planned and unplanned maintenance in the summer and eight vessels in the winter. Each vessel in the fleet would have the required 12 weeks of maintenance, made possible by continuing to fund maintenance vessels prior to retirement.

Service enhancements

By 2028, the intent of the Plan is that fleet reliability will have improved, paving the way for service enhancements that address capacity constraints and growing ridership demand. Overall service will be augmented by approximately 12,000 service hours, or nearly 11 percent during this planning period.

Terminal improvements

Over this timeframe, the Plan proposes additional terminal upgrades to support hybrid-electric propulsion vessels that enter into service. The Plan outlines improvements at the terminal facility at Edmonds and converting the tie-up slip to a slip with vehicle access at the Eagle Harbor Maintenance Facility.

In addition to Plan recommendations, programmed preservation projects during this timeframe include preserving elements of the Orcas Island, Friday Harbor, Coupeville, Anacortes, Kingston, Fauntleroy, Vashon, Southworth, Point Definance, Tahlequah, Bremerton, Eagle Harbor, Bainbridge, Seattle and Clinton terminals. These preservation projects are based on the condition of terminal assets.

IT investments

The Plan recommends additional IT investments for consideration as suitable technology becomes available in the long term. These investments include automatic vehicle length detection and automatic vehicle passenger counting systems that would automate pieces of the fare- and data-collection process and reduce the time required for vessel loading.

Operating expenses will increase during this long-term timeframe because of service hour and capacity enhancements that rely on added crew and fuel costs. Additionally, the fleet will be at its largest size in the planning horizon (although not yet at the largest historically). Operating costs will increase at the greatest amount in the 2027-2029 biennium (8.5 percent), related to proposed service enhancements programed in 2028. Operating costs related to service enhancements again will increase in 2033 with programmed enhancements on the Anacortes/San Juan Islands and Edmonds/Kingston routes.

Route-by-route breakdown

The following list details vessel, service, and terminal enhancements or changes outlined in the Plan, separated into medium-term (2021 to 2027) and long-term (2028 to 2040) categories. Capacity enhancements are also outlined in the Manage growth section of the plan. New terminal enhancements proposed in the Plan are identified first, followed by already programmed preservation projects.

Seattle/Bremerton

The following improvements are included in the Plan for the Seattle/Bremerton route:

Medium term

- **Vessels:** Replace the existing diesel Olympic Class with a new hybrid electric Olympic Class (144-car) vessel in 2026. This change will allow the existing diesel vessel to serve in the maintenance relief fleet and realize fuel cost savings and reduced carbon emissions.
- **Service enhancements:** None are proposed in the medium term.
- **Terminals:** Modifications for vessel hybrid-electric plug-in capability at Bremerton in 2025. Seattle terminal electrification is planned in two phases, both the near term and mid term

  The Colman Dock preservation project in Seattle will be completed in 2023 with on-going preservation needs in the medium term. Preservation for terminal elements are planned at Bremerton in the medium-term.

Long term

- **Vessels:** Replace existing vessel with plug-in hybrid Olympic Class vessel in 2034. Increase passenger capacity from 1,500 passengers to 1,800 passengers by 2028 through the addition of life rafts to add capacity and enclosure of vessel deck space.
- **Service enhancements:** Make passenger capacity improvements, allowing more passengers to be carried within the same service hours.
- **Terminals:** No additional improvements are proposed in the Plan. Preservation projects for terminal elements are planned for Bremerton and Seattle in the long term.

Seattle/Bainbridge Island

The following improvements are included in the Plan for the Seattle/Bainbridge Island route:

Medium term

- **Vessels:** Convert the current Jumbo Mark II Class vessels to hybrid-electric propulsion in 2021 and all-electric operation in 2022.
- **Service enhancements:** None are proposed in the medium term.
- **Terminals:** Terminal electrification at Bainbridge Island in 2021 and Seattle in phases in both the near and medium term.

  The Colman Dock preservation project in Seattle will be completed in 2023. Bainbridge Island terminal preservation projects for overhead loading is planned in the near term, and parking lot are planned in the medium term.

Long term

- **Vessels:** Increase passenger capacity from 1,800 passengers to 2,400 passengers by 2028 through addition of life rafts and enclosure of deck space.
- **Service enhancements:** Make passenger capacity improvements allowing more passengers to be carried within the same service hours
- **Terminals:** None are planned for this timeframe.

Fauntleroy/Vashon/Southworth

The following improvements are recommended for the Fauntleroy/Vashon-/ route as part of this Plan:

Medium term

- **Vessels:** In 2027 the route will receive the first of three new hybrid-electric propulsion, 124-car vessels.
- **Service enhancements:** None are proposed in the medium term.
- **Terminals:** Electrification at the Fauntleroy, Vashon and Southworth terminals is planned by 2024. The Southworth second slip project is programmed for completion in the medium term.

  Additionally preservation projects are programmed at the Fauntleroy and Vashon terminals in the 2025-2027 biennium.

Long term

- **Vessels:** Replace remaining two Issaquah Class vessels with hybrid-electric 124-car vessels in 2028 and 2029.
- **Service enhancements:** Add summer and winter service hours with 124-car/variable passenger capacity vessel.
- **Terminals:** None are planned in this timeframe.

Point Defiance/Tahlequah

Improvements to the Point Defiance/Tahlequah route include:

Medium term

- **Vessels:** None are proposed in this timeframe.
- **Service enhancements:** None are proposed in the medium term.
- **Terminals:** No additional improvements are proposed in the Plan.

  Trestle and terminal building preservation projects are programmed for Point Defiance in the medium to long term. At Tahlequah, trestle preservation projects are programmed for the medium term.

Long term

- **Vessels:** Existing vessel will be converted to hybrid-electric propulsion in 2031.
- **Service enhancements:** Add one additional roundtrip per day.
- **Terminals:** Electrification to accommodate vessel plug-in planned in 2030.

  Trestle and terminal building preservation projects are programmed for Point Defiance in the medium to long term. At Tahlequah, trestle preservation projects are programmed in the long term.

Edmonds/Kingston

Improvements to the Edmonds/Kingston route include:

Medium term

- **Vessels:** One of the two service vessels, the *Puyallup* will be converted to hybrid-electric conversion and will operate all-electric in 2023.
- **Service enhancements:** None are proposed in this timeframe.
- **Terminals:** Vessel plug-in capabilities at both the Edmonds and Kingston terminals are planned by 2022.

  Preservation projects are planned for the trestle, bridge, landing aids and restrooms at Kingston from 2019 to 2027. Preservation is also planned at the Edmonds terminal in the medium term.

Long term

Scenario A

- **Vessels:** Replace two existing (202-car and 188-car) vessels with three hybrid-electric propulsion vessels to operate all-electric 144-car vessels in 2031, 2032 and 2033.
- **Service enhancements:** Increase service frequency to 30-minute headways, served with three vessels.
- **Terminals:** Edmonds multimodal terminal improvements are proposed in the long term.

  Additionally, preservation is planned for the Kingston terminal in the long term.

Scenario B

- **Vessel capacity modifications:** Replace the two existing vessels with two 202-car capacity hybrid-electric vessels.
- **Service enhancements:** No change proposed.
- **Terminals:** No change from Scenario A.

Mukilteo/Clinton

Improvements recommended for the Mukilteo/Clinton route include:

Medium term

- **Vessels:** None are proposed in this timeframe. In 2019, the route will experience vessel replacement, which will increase vehicle capacity.
- **Service enhancements:** in 2019, vessel replacement will increase vehicle capacity on the route, expanding from 124-car capacity to 144-car capacity during the peak season. No additional enhancements are proposed in this timeframe.
- **Terminals:** Construction of overhead loading is proposed at the Clinton terminal in the 2025-2027 biennium. Expansion of park and ride facility is proposed in 2027-2029.

  The new Mukilteo terminal is expected to be operational by 2020.

Long term

- **Vessels:** Replace the two existing 144-vehicle diesel vessels during the peak season and one 144-car and one 124-car Issaquah Class vessel during the off peak season with two 144-car capacity hybrid-electric propulsion vessels year round, to operate all-electric in 2034 and 2035.
- **Service enhancements:** Increased off-peak season capacity due to vessel assignment.

- **Terminals:** Installation of utility infrastructure to support all-electric vessels is planned for 2034 at the Clinton and Mukilteo terminals.

Port Townsend/Coupeville

The Port Townsend/Coupeville route improvements include:

Medium term

- **Vessels:** None are proposed in this timeframe The addition of one summer round trip is proposed in 2020.
- **Service enhancements:** None are proposed in this timeframe.
- **Terminals:** No additional improvements are proposed in the Plan.

  Preservation projects associated with the trestle and bridge structures at Port Townsend are planned for the 2027-2029 biennium.

Long term

- **Vessels:** Convert the existing vessels to hybrid-electric propulsion to operate all-electric in 2032 and 2033.
- **Service enhancements:** Add service hours and extend the spring season in 2028.
- **Terminals:** Terminal electrification improvements are planned for 2031 at the Port Townsend and Coupeville terminals to support hybrid-electric vessels.

Anacortes/San Juan Islands

The Anacortes/San Juan Islands route includes the following improvements:

Medium term

- **Vessels:** Two of the vessels serving this route will be retired and replaced with two hybrid-electric, international certified (SOLAS) Olympic Class vessels (144-car) in 2022 and 2023.
- **Service hour enhancements:** None are proposed in the medium term.
- **Terminals:** Terminal electrification is planned at Orcas Island, Friday Harbor and Anacortes in 2022. Construction of a new terminal building at Anacortes and expansion of vehicle holding at Lopez Island to accommodate reservations is planned for the 2025-2027 biennium. Construction of overhead loading and converting second slip at Friday Harbor is planned for the 2025-2027 biennium.

  Preservation of the trestle and bridge structures at Orcas and Lopez Island is planned in the medium term.

Long term

- **Vessels:** Replace the 90-car capacity vessel with a 114-car capacity all-electric vessel in 2036. Then replace two additional vessels with 144-car capacity hybrid-electric vessels in 2037.
- **Service enhancements:** Extend the summer service schedule into May and October in 2028 and then make winter enhancements in 2033, adding an additional 2,160 hours. Restore weekend interisland service in 2033 in the winter season for an additional 480 service hours. This increase in service hours also represents opportunity to restore winter service to Sidney (cut in 2005), but is not currently included in this Plan operating costs and recommendations.
- **Terminals:** No additional improvements are proposed in the Plan.

  Preservation of the trestle and transfer span structures at Orcas Island continue in the long term. Additional preservation occurs at Shaw and Lopez in the long term.

Anacortes/Sidney, B.C.

Improvements to the Anacortes/Sidney, B.C. route include:

Medium term

- **Vessels:** See Anacortes/San Juan Islands vessel program.
- **Service enhancements:** None are proposed in the medium term.
- **Terminals:** Construction of a new terminal building at Anacortes is planned for the 2025-2027 biennium.

Long term

- **Vessels:** See Anacortes/San Juan Islands vessel program.
- **Service enhancements:** Expand summer service into May and October in 2028.
- **Terminals:** None are planned for this timeframe.

2040 financial outlook

Capital program costs

To accomplish its goals, the Plan proposes new investments that are not currently included in WSF's 16-year capital improvement and preservation plan for fiscal year (FY) 2018 through FY 2033. Washington State agencies prepare a capital investment plan to support decision making about how to allocate limited funding. The WSF capital improvement and preservation plan is reviewed each biennium, with investments projected out 16 years. The costs identified in these plans are based on comprehensive information about an asset's condition and replacement needs.

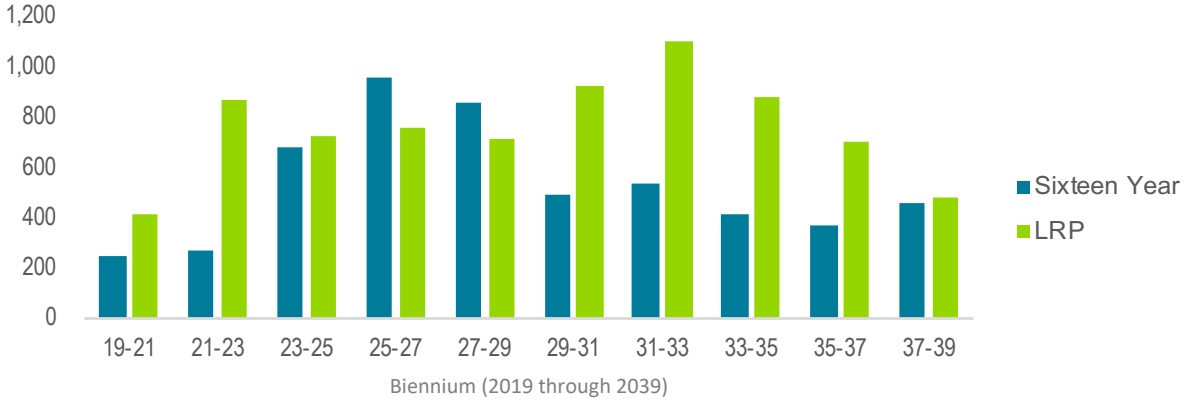
Using the information in the 16-year plan, the state Legislature allocates funding for the first six years of the plan. In most cases, the funding allocated does not fully meet the projected need. This trend can be observed in the charts below; investments appear lower in the remaining four years of the six years (biennium 2019-2021 and 2021-2023), suppressed by available funding, and are higher after this timeframe when spending is not constrained to existing sources.

The current 16-year improvement and preservation plan, projected out to 2040, identifies investments of $5.3 billion in vessels, terminal and technology improvements over the next 20 years. This 2040 Long Range Plan includes these costs and adds further investments where the current 16-year plan level of investment is not enough to meet the reliability, customer experience, growth management and sustainability needs of the system. Total capital investments outlined in this Plan are $7.6 billion.

The greatest capital investment and difference from the current 16-year plan to the investment proposed in this Plan is new vessel construction. The Plan looks past the current 16-year plan, whose planning horizon ends in 2033. The 2040 Plan proposes six additional vessels above the current 16-year plan estimates. The six additional vessels include three for the service and maintenance relief pool, one to support a three-vessel service plan on the Edmonds/Kingston route, and two to begin replacing the Issaquah Class vessels at approximately 50 years of age. This comparison is shown in the chart on the next page.

The investments proposed in the Plan over the 20-year planning horizon ramp up quickly

Comparison of 16-year and Long Range Plan investment levels *($ in millions)*



in the next few years due to the immediate need of new vessels to sustain reliable service. This investment in vessel replacement and terminal and technology enhancements continues until the end of the planning period.

Near term (2019-2021)

At nearly $410 million, investments in the first biennium of the planning horizon are 60 percent higher than the level identified in the current 16-year capital plan. Initiation of the vessel electrification program will begin with the first of three Jumbo Mark II Class vessels, the *Tacoma*, serving the Bainbridge Island and Seattle terminals. Technology improvements to improve customer experience and information account for $3.5 million of investments.

Medium term (2022-2027)

During this time period, electrification of the remaining two Jumbo Mark II Class vessels will continue, along with installation of the terminal charging infrastructure to support the vessel electrification at the Eagle Harbor Maintenance Facility, Edmonds, Kingston, Bremerton, Fauntleroy, Vashon, Southworth, Anacortes and three interisland terminals. The five new Olympic Class vessel will be built and construction will begin for the first of the new 124-car capacity vessels, which will replace the retired Issaquah Class vessels.

Over the six-year, medium-term period, total planned capital investment, including preservation and improvements, is projected at $2.4 billion. Technology improvements, to improve ticketing and reservation systems, among other preservation costs, amount to $39.3 million of investments.

Long term (2028-2040)

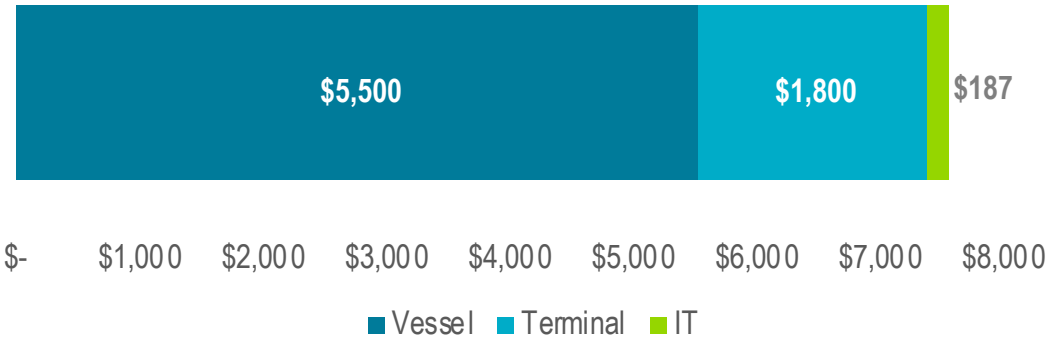
By 2028, the new vessel construction program will be complete. Four 124-car capacity vessels, six new 144-car vessels and one 114-vehicle vessel will be delivered within this timeframe. The electrification program will also be complete with conversion of the three Kwa-di Tabil Class vessels and installation of shoreside charging infrastructure for the final six terminals. Nearly $4.8 billion will be invested during this period. Technology improvements, to improve fare collection and customer information, amount to $144.4 million of investments.

Capital investments

The capital investments to implement this 2040 Plan can be classified into three primary categories: vessels, terminals and IT. The costs associated with these three types of investments encompass environmental review, design, construction, construction management and program support. As noted above, capital investment for the 20-year period totals $7.6 billion. New vessel construction and preservation of existing vessels accounts for the largest investment at nearly $5.5 billion, or 73 percent of the total investment. Terminals accounts for 25 percent of the total at approximately $1.8 billion. Electrification of terminals accounts for $175.6 million of total terminal investments. Improvements in IT account for 2 percent of total investment, at $187 million over the 20-year planning horizon. The graphic below shows this breakdown of investment needs over the 20-year planning period.

The costs and funding shown over time are escalated to account for inflation and predicted revenue growth.*

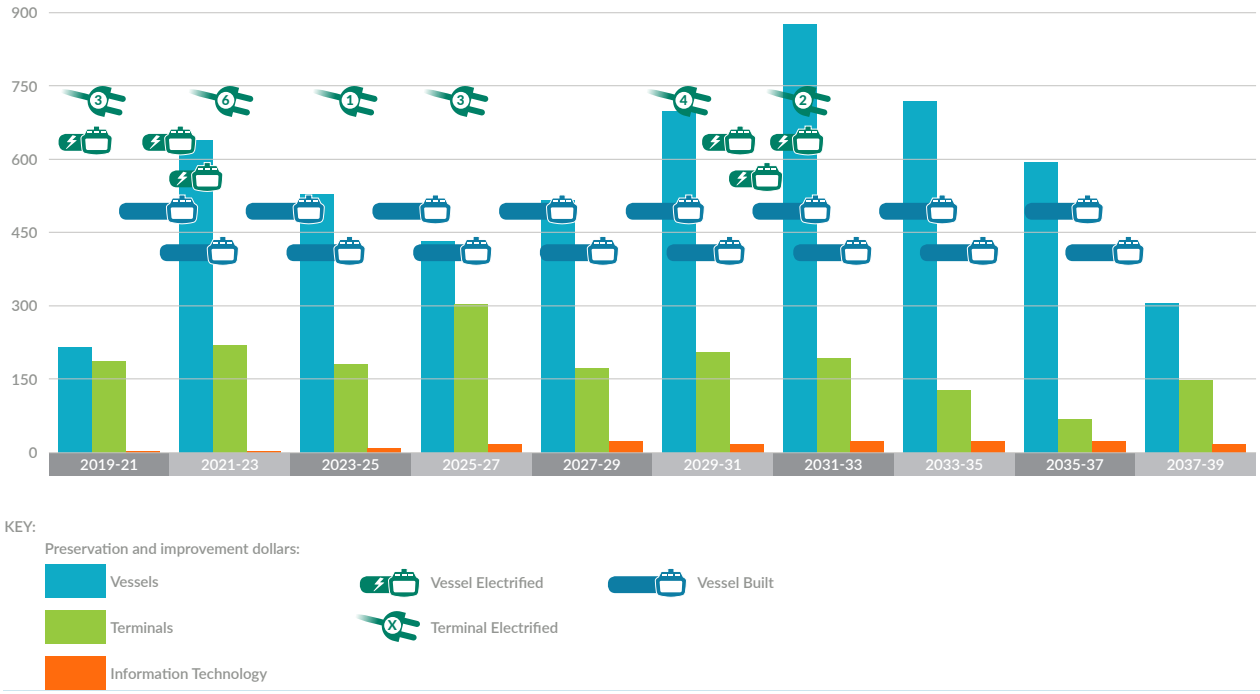
2040 Plan capital investments *($ in millions)*

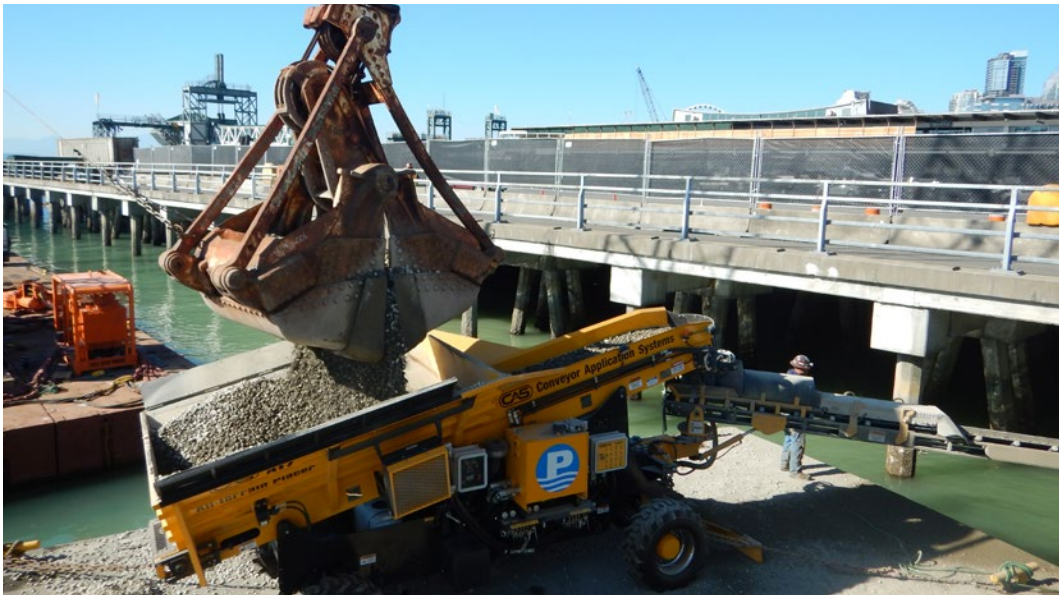


Expenditures inflated annually at predicted price escalation rates. Annual price escalation is on average about 2 percent over the planning period.

Capital costs are outlined below, with vessel delivery, electrification and terminal projects identified by biennium.

Capital investments *($ in millions)*





Vessels

A major focus of the Plan is new vessel construction to replace retiring vessels and build the relief vessel capacity required to promote reliable service. The Plan recommends the construction of 16 new vessels with delivery between 2022 and 2037 and electric conversion of six existing vessels:

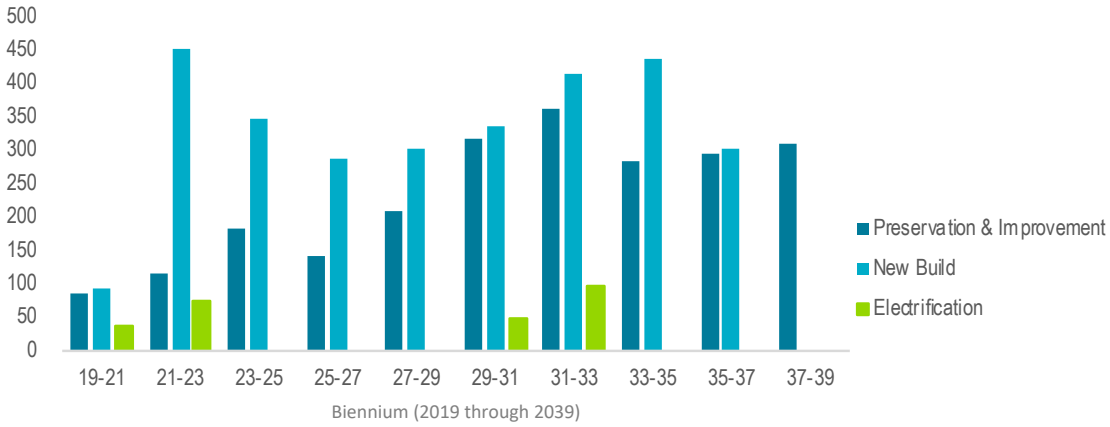
- Five new Olympic Class vessels (144-vehicle capacity).
- Four new 124-car capacity vessels.
- Seven new 144-car capacity vessels.
- Three hybrid conversions (Jumbo Mark II Class).
- Three hybrid conversions and propulsion system upgrades (Kwa-di Tabil Class).
- The modification of four existing vessels to carry additional passengers.

All new constructed vessels would rely on hybrid-electric propulsion and would operate at either full electric power—or on routes where the distances are too great, hybrid electric propulsion. As discussed further in the operating costs section, electric or hybrid-electric operations will reduce the reliance on diesel fuel and produce fuel savings over the next 20 years.

The first step in vessel investment is the proposed extension of the Olympic Class contract to build five new vessels by 2026. The vessel capital investment needs grow quickly in the 2021-2023 biennium to support this proposal. As the final Olympic Class vessel is delivered, construction would begin on the four new 124-car capacity vessels between 2026 and 2030, followed by seven 144-car capacity vessels by 2037.

Preservation and improvement investments rise as the remaining fleet ages and more vessels approach either mid-life refurbishment or retirement. New vessel investment needs start to decrease in 2035 once the replacement program is completed. These investments will increase the size of the fleet from the current 22 to 26, allowing an additional vessel to be deployed in regular service (on the Edmonds/Kingston route) and increasing the relief fleet to enhance reliability through both planned and unplanned service disruptions. The new vessel investments are shown graphically on the next page, along with the planned preservation and conversion of remaining fleet to hybrid-electric propulsion.

Vessel capital investment *($ in millions)*



In addition to new vessels, the Plan also identifies costs required to preserve and improve the fleet as prescribed in the life cycle cost model. This model is an estimation tool used to project maintenance costs over time. Currently, the fleet size is so low that WSF is not able to perform all the maintenance required and projected. By 2040, with the investments identified in this Plan, each vessel will have the out-of-service time needed to maintain and preserve its systems. Once this time is available and utilized, WSF can work toward extending the life of vessels to the planned 60-year life expectancy.

Terminals

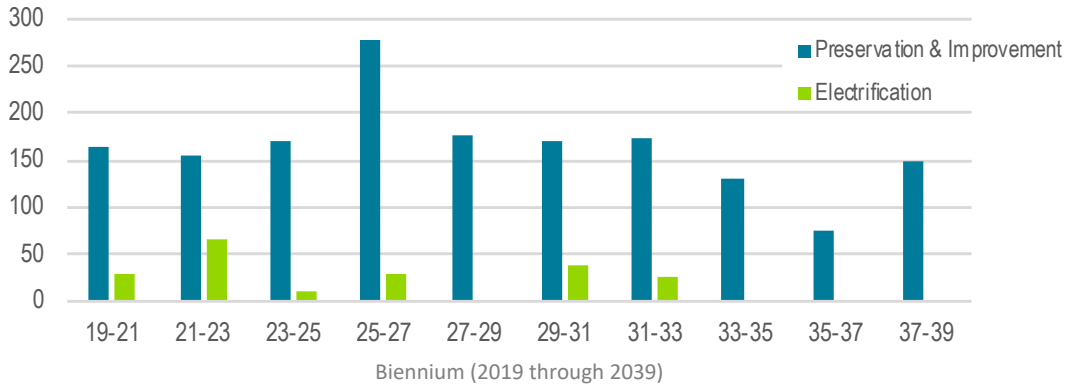
The Plan recommends investment in terminal infrastructure to support electrification of the fleet, improve passenger and vessel queuing and loading, and accommodate expansion of the reservation system to additional routes. The investment category of Terminals also includes the Eagle Harbor Maintenance Facility, which plays a critical role in the reliability of the system. The terminal investments in the Plan include:

- Modification of 18 terminals and Eagle Harbor to support hybrid-electric vessels.
- Enhancements of passenger processing at six terminals.
- Enhancements of vehicle queuing and loading at three terminals.
- Expansion and enhancement of holding lanes to accommodate reservations at one terminal.

The investment Plan also identifies costs required to preserve and improve the fleet as prescribed in the asset management model for terminals. This model is an estimation tool used to project maintenance and preservation costs over time. This includes costs for in-water and landside work to replace aging assets such as piles used to aid in landing, paving of loading areas, painting and other maintenance needs.

Terminal capital investments for preservation and improvements stay relatively constant over the next 20 years, with a small decrease in the near term due to the completion of two major terminal projects at Mukilteo and Colman Dock. Preservation and improvement costs become less detailed over time and are expected to remain somewhat constant. The Plan terminal investments over the planning horizon are shown in the chart below.

Terminal capital investment *($ in millions)*



Information technology

Investments in information technology (IT) are recommended to expand or replace the existing core systems and to respond to evolving advancements and customer needs and expectations. Key projects include:

- Next-generation ticketing and reservation system including next generation of *Good To Go!* fare payment.
- Next generation regional fare integration (ORCA).
- Terminal queue detection and wait times.
- Automated passenger counting.
- Real-time information systems.

Overall the Plan calls for a capital investment in IT of nearly $190 million over the 20-year planning period.

Capital program funding

Funding for WSF's capital program comes from a combination of sources. Many of these funding sources are statutorily defined, such as distributions from the state's fuel tax, periodic special transportation funding packages such as the 2015 Connecting Washington package, transfers from other state transportation accounts, and federal grant programs. Known revenue sources to WSF for capital investment fall far short of the identified need. Over the 20-year planning horizon, predictable funding is estimated to total nearly $1.3 billion. This predictable funding is more than $6 billion short of the $7.6 billion in capital investments called for in this 2040 Plan.

Twenty-year projectedcapital funding sources *($ in millions)*

Federal funds	793
Local funds	1
Fuel tax distribution	402
Connecting Washington	98
Transportation Partnership	23
Treasury earnings	1
Less debt service	(34)
	$ 1,284

Historically the legislature has provided additional funding for WSF's capital program through transfers from existing broad purpose transportation revenue accounts and through special funding packages. Two past transportation funding initiatives, Transportation Partnership (2005) and Connecting Washington (2015), while not sufficient to cover all future capital investment requirement, are anticipated to fund some level of WSF's capital requirements beyond the current biennium. Although an additional special funding package was not assumed in the financial outlook of this Plan, it is possible that WSF could benefit from this type of funding source in the future.

Operations

WSF is a major component of the state's transportation system, expending hundreds of millions of dollars each year to provide critical public transportation across the Puget Sound. Operating costs, like most public transportation systems, are subsidized, with fare revenues accounting for a large portion of operating costs. Fares and other operating revenues currently recover more than 75 percent of the costs of operation. The remaining operating costs are funded through tax revenues. The Plan identifies capital improvements in vessel and terminal electrification that will reduce operating costs and service enhancements that will increase labor and energy requirements. The costs and revenues over time are escalated to represent inflation.

Operating costs

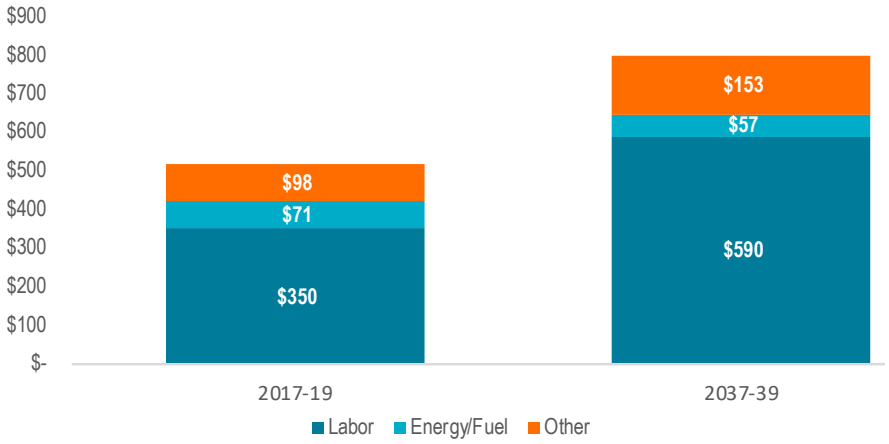
This Plan promotes operating strategies to sustain current service, manage growth, and enhance the customer experience while at the same time controlling or reducing costs. In addition to sustaining current service levels, the forecasted costs for the 20-year planning horizon include:

- Additional costs associated with the proposed service level enhancements.
- Costs of operating the expanded service and maintenance relief vessel pool.
- Expanded workforce development programs.
- Reduction and stabilization of energy costs due to fleet electrification.

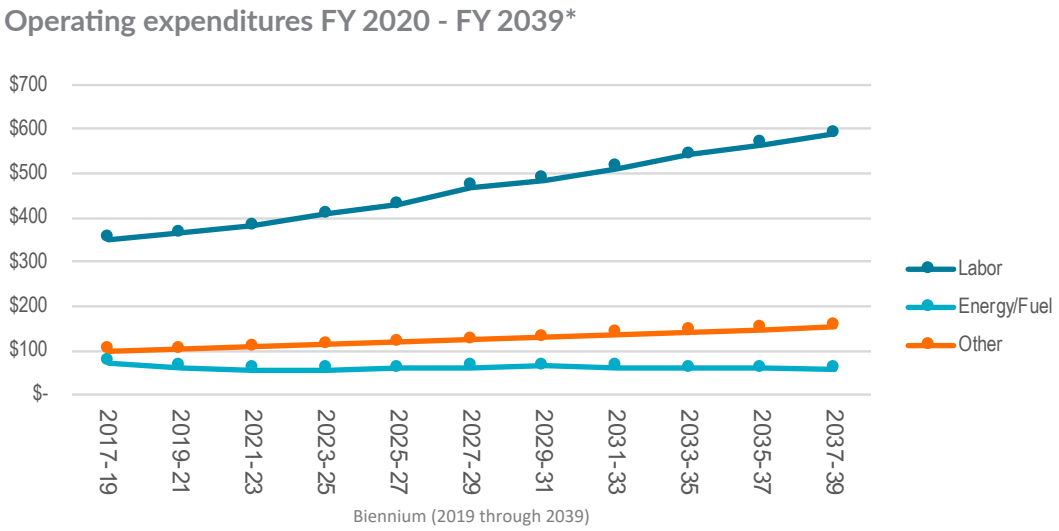
Operating costs can be classified into three primary categories: labor, fuel/energy, and other operating expenses, such as insurance and other costs that directly relate to the number of staff and vessels in operation. These "other" operating costs change slightly due to the increase in fleet size from 22 vessels in the 2017-2019 biennium to 26 vessels in the 2037-2039 biennium. Another "other" operating cost is the leased office space for WSF headquarters in downtown Seattle. As part of this Plan, the Legislature instructed WSF to evaluate leased and state-owned property locations outside of downtown Seattle for its headquarters. This evaluation is underway as part of the Office of Financial Management's Six-Year Facilities Plan. Labor, which includes wages for vessel crew, engineering, maintenance, and administrative and management personnel, accounts for nearly 68 percent of operating expenditures the 2017-19 biennium. This trend continued over the planning horizon, accounting for nearly 74 percent of expenses in the 2037-2039 biennium.

Energy and fuel expenditures will decrease due to the investments in electrification of terminals and new hybrid-electric fleet. This is a dramatic change from the past where fuel prices can be volatile. The operating costs today, as compared to 20 years from now, are shown in the graph comparison below. Although this is not an apples-to-apples comparison due to the cost inflation represented in these costs, it shows the general trends in the primary cost categories. What is notable is the decline of fuel/energy costs from today's condition to 20 years from now, even with a larger fleet and more service hours provided. This change results from the capital investments in electrification of vessels and terminals described earlier in this section and in more detail on the next page.

Operating expenditures for 2017-19 compared to 2037-39 *($ in millions)*



The proposed conversion to electric propulsion will lead to considerable cost efficiencies. Despite an increase in service hours of nearly 11 percent, the energy/fuel expenditures in the last biennium of the planning periods will be nearly 50 percent lower than what costs would be if all vessels continued to operate with full diesel propulsion. Labor is expected to increase at the highest rate, due to increased service hours proposed for 2028 and the increase of the relief fleet. WSF maintains a 24-hour engine room crew on vessels and that are in-service or in maintenance relief. Although labor costs increase, cost efficiencies associated with crewing requirements on new vessels as part of more cost-efficient vessel design have been factored into the operating costs of the future fleet. Other costs are expected to increase at a slow rate, and fuel and energy costs are projected to be overall less in 2040 than today. The graph on the next page shows these trends.



**Expenditures inflated annually at predicted price escalation rates. Annual price escalation is on average about 2 percent over the planning period.*

Near term

Labor costs are expected to grow at a slightly lower rate than inflation in the 2019-21 biennium due to the retirement of one maintenance relief vessel because the engine room crew assigned to that vessel will no longer be required. As stated above, this timeframe presents a high risk in service reliability due to the undersized fleet because of the limited availability of relief vessels to provide both planned and unplanned maintenance relief. Fuel/energy costs are expected to decrease during this period because of lower predicted fuel prices and the first electrification-related energy savings in 2021.

Medium term

Labor costs are expected to grow beginning in 2023 when the size of the relief vessel fleet increases. Fuel/energy costs will continue to decrease despite increases in the price of diesel because of the to completion of the Jumbo Mark II electrification project.

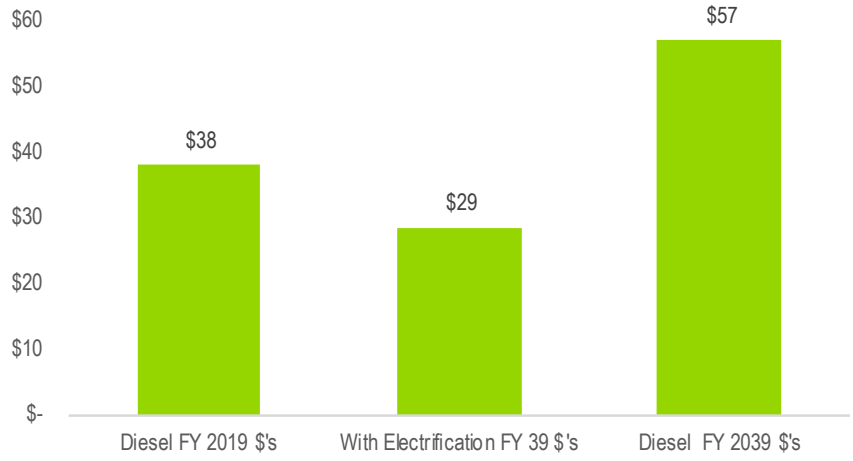
Long term

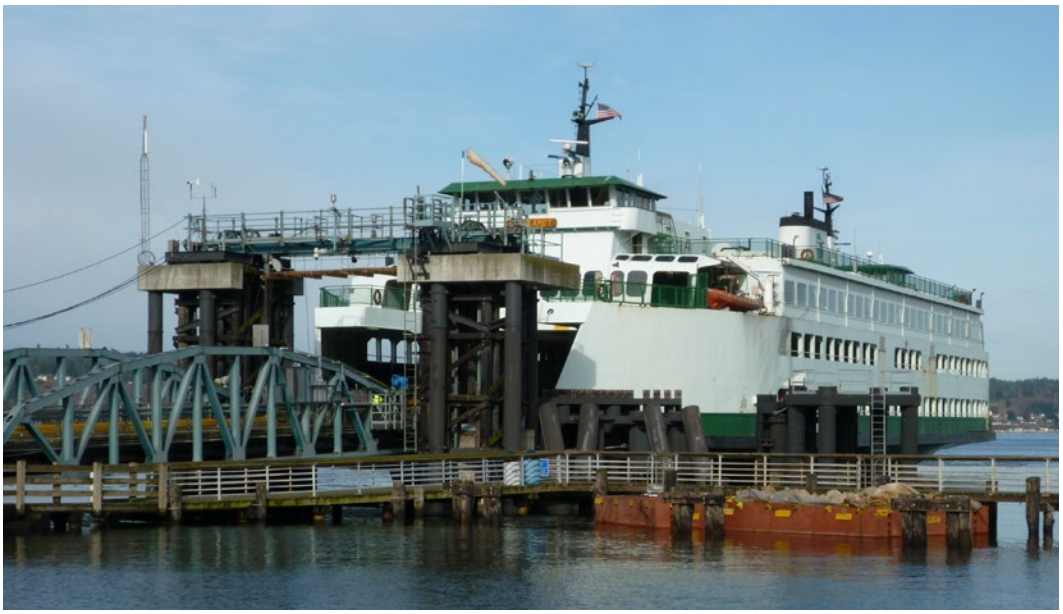
Labor costs are expected to continue to increase as the relief fleet grows and more engine rooms are staffed. Deck crew labor costs will grow first in 2024 as additional crew is added to support passenger capacity increases on two central sound routes. Once service hour increases are implemented on four routes in 2028 and again in 2033, 2035 and 2037 as the service hours on more routes are expanded. In 2033 the Edmonds/Kingston route will be served by three new 144-vehicle capacity vessels leading to increases in both deck and engine room labor costs. These costs will be offset to a small degree by fuel savings associated with the more fuel-efficient, electrically powered vessels.

Fuel/energy savings (green dividend)

The capital investment in electric propulsion leads to long-term fuel savings. The State estimates diesel cost over time. Although costs are relatively low today, they can be quite volatile and are projected to rise over time. Despite the expansion of service hours by 11 percent over the planning horizon, fuel/energy costs are expected to decrease by $9 million or about 25 percent due to more efficient vessel deployment and increased reliance on electric propulsion. Without electrification, diesel fuel costs are estimated to grow nearly 50 percent by 2039.

Cost of proposed service plan *($ in millions)*

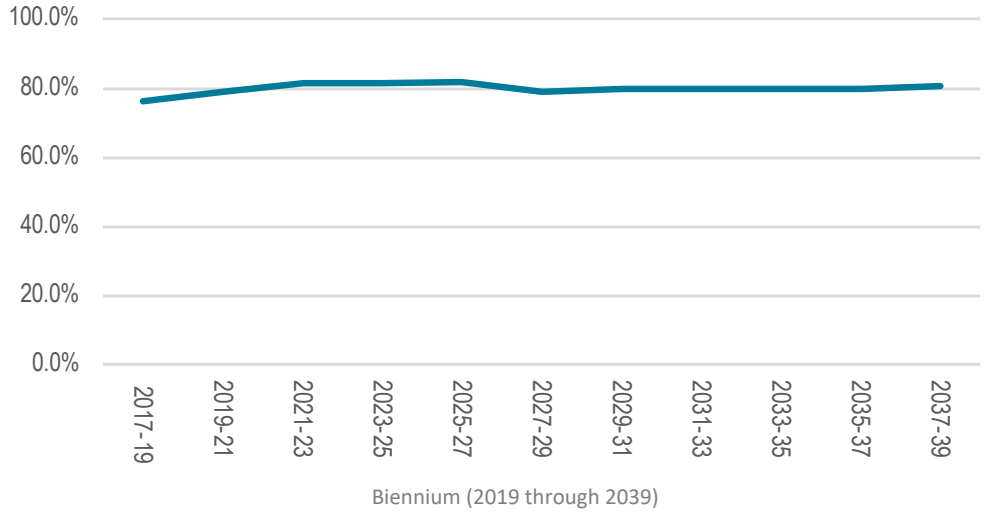




Operating revenue

Currently, WSF recovers 76 percent of operating costs through fares and other operating revenues. This trend is projected to see a slight increase over the next 20 years. Farebox recovery is projected to be between 79 and 82 percent, which is above the range of what WSF has experienced over the past 20 years.

Projected operating revenue recovery



The operating revenue recovery ratio is expected to increase in the next biennium, 2019-21, to over 79 percent. This timeframe is the identified point of highest service reliability risk, when the fleet is down to 22 vessels total, and many will be close to retirement with heightened maintenance needs and not enough relief fleet to support this maintenance. This is also the period of time when maintenance and preservation needs grow and yet there are not enough vessels to allow this maintenance to occur while maintaining service reliability.

The operating revenue recovery is projected at 80 percent by the 2037-39 biennium. This timeframe is projected to bring high service reliability, a well-maintained fleet and increased service hours on many routes. This relates to a subsidy-level growth from $124 million in 2017-2019 to $158 million in 2037-2039. This projection takes into account anticipated growth of currently dedicated tax revenue, which is expected to generate $5.5 billion over the 20-year period. The service level proposed in this Plan is estimated to cost more than $6.5 billion over the 20-year period, leaving a shortfall of about $378 million dollars.

Twenty year operating and tax revenue *($ in millions)*

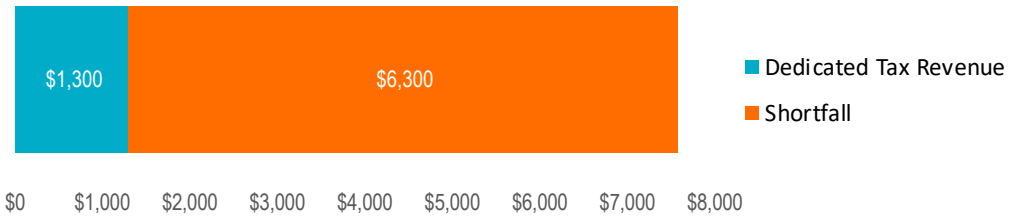
Fares	4,433
Miscellaneous operating revenue	154
Gas tax distribution	599
License fees & permits	218
Federal funds	107
Local funds	2
	$ 5,513

Financial overview

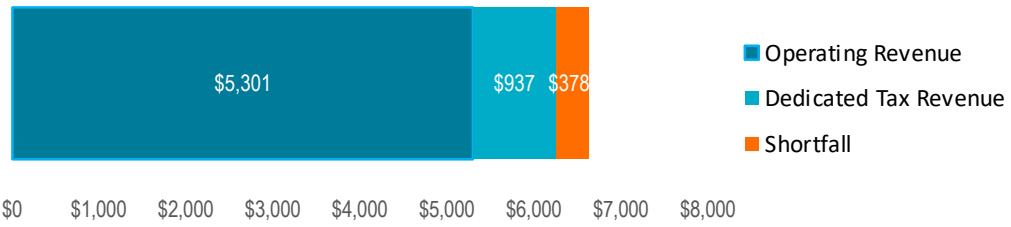
Like any transportation operator, WSF's financial plans must address both the costs of ongoing operations and the level of investment required to build and preserve the required capital infrastructure. The financial overview below projects operating costs and capital investment embodied in the Plan along with anticipated revenues over the 20-year planning horizon.

As noted earlier, historically the Legislature has appropriated additional revenues to cover the shortfall between dedicated WSF revenues and WSF operating and capital funding needs. The financial overview identifies those short falls by biennium and cumulatively. Over the 20-year planning horizon, WSF's total funding needs exceed dedicated revenue by a combined capital and operating amount of $6.7 billion.

Funding capital investments *($ in millions)*



Funding operations *($ in millions)*



The Plan's proposed capital investments will benefit the ferry system through both improving reliability and constraining operating cost growth, or in the case of fuel/energy, reducing operating costs. Investment in electric propulsion for vessels and terminals allows WSF to realize operating expenses savings as early as 2021. Expansion of the fleet will allow WSF to stop the current decline in the condition of the fleet, improve reliability and support service level enhancements to meet rider demand and grow ridership.

Improving reliability and enhancing service levels will cause operating costs to grow, primarily through increased fleet labor costs. Operating revenue recovery ratios are projected to increase over the next 20 years and remain relatively consistent. The Plan makes no recommendations about fare stucture or fare levels but assumes fares will increase at approximately the rate of inflation.