

Purpose of Checklist: The State Environmental Policy Act (SEPA), chapter 43.21C RCW, requires all governmental agencies to consider the environmental impacts of a proposal before making decisions. An environmental impact statement (EIS) must be prepared for all proposals with probable significant adverse impacts on the environment. The purpose of this checklist is to provide information to help the District's Responsible Official and any other agencies with jurisdiction to identify impacts from a proposal (and to reduce or avoid impacts from the proposal, if it can be done) and to help the District decide whether an EIS is required.

A. BACKGROUND

1. Name of proposed project, if applicable:

This is a non-project action, known as the 2023 Update to the 2021 Integrated Resource Plan (2023 Update).

2. Name of applicant:

Public Utility District No. 1 of Snohomish County

3. Address and phone number of applicant and contact person:

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4. Date checklist prepared:

November 7, 2023

5. Agency requesting checklist:

Public Utility District No. 1 of Snohomish County (the "PUD")

6. Proposed timing or schedule (including phasing, if applicable):

The 2023 Update was presented to the PUD's Board of Commissioners (the "Board") on November 21, 2023 and will be the topic of future discussion by the Board at a publicly noticed meeting or meetings, with planned adoption before the end of December, 2023.

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

The draft 2023 Update is a non-project action. Because state law provides that utilities such as the PUD prepare a comprehensive IRP every four years and/or a progress report every two years, the PUD anticipates that it will prepare and adopt future IRPs along that schedule. However, they will consist of new analyses rather than expansions of these analyses. The scenarios and options set forth in the draft 2023 Update are not binding upon future analyses.

As required by statute, the 2023 Update establishes a long-term resource strategy describing the mix of supply side generating resources and demand side resources that will meet current and projected needs at the lowest reasonable cost and risk to the utility and its ratepayers, and a near-term action plan that describes actions to be taken by the utility to implement that plan.

The activities described in the 2023 Update refer to future, programmatic activities in pursuit of additional data, study and evaluation of certain technologies.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

The draft 2023 Update collects some generally available

information about the general characteristics associated with the types of resources discussed within the document (see Section 5 – Resource Options for the list of supply-side and demand-side resources considered in the IRP analysis). In addition, this checklist collects additional generally available and published information, including information identified in environmental documents by others. No other environmental information or documents are known or expected directly related to the draft 2023 Update. The IRP update does not result in specific new construction activities and therefore does not include new environmental studies.

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.

N/A – This is a non-project action that does not contemplate the use of specific property.

10. List any government approvals or permits that will be needed for your proposal, if known.

The draft 2023 Update has been submitted to the PUD Board of Commissioners for consideration and adoption and will be submitted to the State Department of Commerce to demonstrate compliance with RCW 19.280.030 and 19.280.050 by December 31, 2023. Portions of the document related to the PUD's 10-year conservation potential estimate for the 2022 through 2031 period, are located in the Executive Summary and in Section 5. The 10-year conservation potential estimate of 81.84 annual aMW for the 2024-2033 period demonstrates compliance with the Energy Independence Act, chapter 19.285 RCW and WAC 194-37-070(3). The PUD's 10-year conservation potential (81.84 annual aMW) was informed by the draft 2023 Update proposed Long Term Resource Strategy and demonstrates compliance with the Energy Independence Act, chapter 19.285 RCW and WAC 194-37-070(2). The PUD's 2024-2025 biennial conservation target will be informed by the 10-year conservation potential and considered by the PUD Board of Commissioners by December of 2023. After the 2024-2025 biennial conservation target is adopted by the Board it must be filed with the State Department of Commerce by December 31, 2023.

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)

The IRP Update is

intended to establish a long-term resource strategy to meet projected utility needs and a near-term action plan that implements the Long-Term Resource Strategy. To achieve this objective, a range of alternatives is considered. This requires a set of plans that are flexible for the utility and can adapt to changing circumstances without adverse financial impacts or other risks.

The PUD's Board of Commissioners has provided clear policy direction that the utility will use integrated resource planning standards that:

- a) *Consider the long-term costs and risks associated with greenhouse-gas-emitting generation sources and*
- b) *Consider a diversity of resource options that provide the optimum balance of environmental and economic elements.*

The supply-side resources evaluated in the draft 2023 Update include Biomass, Geothermal, Run-of-River Small Hydro, Wind, Utility-scale Solar, collocated renewable plus storage, various energy storage types by dispatch duration, and a variety of short term (five year) capacity products available in the wholesale energy market. Cost and planning assumptions for resources evaluated in the 2023 Update, are located in Section 5 - Supply-Side Resources.

For those resources identified in the various portfolios and in the long-term resource strategy, the draft 2023 Update does not consider specific projects, but rather only the general characteristics of the type of resource modeled in development of portfolios for each scenario. Therefore, the general characteristics of the types of resources discussed in the draft 2023 Update are described in Section D below.

The draft 2023 Update sets forth a number of possible or potential load and resource "futures" or scenarios, which represent a wide range of possible: regional economic factors, wholesale market

energy prices, environmental factors, regulatory factors and uncertainties, customer electricity usage patterns, resource adequacy, impacts of previously acquired conservation, and other factors.

For conservation or demand-side resources, the Northwest Power and Conservation Council drafted its 2021 Power Plan. This plan provides the Bonneville Power Administration and others with guidance about the best ways to economically and reliably meet the region's future energy needs. The analysis in the 2021 Power Plan addresses climate change issues, uncertain fuel prices, resource adequacy, integration of variable energy sources, renewable portfolio standards and other regulatory factors, and fish recovery and protection. While the Council identified energy efficiency, also termed conservation, as the most cost-effective and lowest risk resource, the 2021 Power Plan also calls for a very large-scale deployment of renewables throughout the Pacific Northwest region.

The degree to which the PUD can rely on demand-side programs to achieve energy and/or cost savings depends on how customers currently use energy, the availability and cost of energy efficient technologies and practices, and customers' willingness to adopt them within the PUD's service territory.

The PUD contracted with Lighthouse Energy Consulting, to conduct a comprehensive assessment of energy efficiency potential ("Conservation Potential Assessment" or "CPA") and demand response ("Demand Response Potential Assessment" or "DRPA") in PUD's service territory of Snohomish County and Camano Island. These studies considered available technologies, distribution system efficiencies and early-stage energy efficiency technologies and demand response and smart rates programs that are likely to become available in the marketplace over the next 20+ years. These reports included estimates of the achievable technical conservation potential and demand response potential available to the PUD. The IRP then identified what level of conservation and demand response was economic for the range of scenarios; the level of conservation and demand response that was economic is outlined in Section 1, where a detailed description is located in Section 5 of the draft 2023 Update document.

For supply side resources, the draft 2023 Update used a resource screening criteria that was based on objective and subjective criteria. The screening's objective criteria included costs, capacity factors, contribution to winter and summer peak load and energy needs, cost of delivery, emissions factors as applicable, REC attributes, and project life. The screening's subjective criteria include non-quantifiable environmental considerations, location and deliverability relative to the PUD's service area, the dispatchability or flexibility, and the commercial availability of the resource type in the Pacific Northwest region.

Simultaneous with identifying the cost-effective conservation for each scenario, portfolio resources were identified that could meet shortfalls, if any, between the PUD's existing resources and the future demand, less the cost-effective conservation, identified in that scenario.

For each scenario staff used an optimization model to develop portfolios using lowest reasonable cost criterion and selected from demand and supply side resources that could satisfy the PUD's future energy needs, monthly on-peak energy and peak week planning standards (see Section 5 - Planning Standards for a description of these standards), and comply with applicable Board of Commissioners' policies, regulations, and state laws. The details of the new resource additions proposed for each portfolio for the range of scenarios are outlined in Section 6 - Portfolio Development, of the draft 2023 Update document.

The draft 2023 Update proposes a long-term resource strategy for consideration by the Commission. The 2023 strategy is comprised of supply-side and demand-side resources to meet the PUD's future needs and its various planning standards. Section 7 discusses the Long-Term Resource Strategy in detail.

The Long-Term Resource Strategy is nonbinding, and the PUD and the Board of Commissioners retain full discretion to add or delete potential resource types from the plan or adjust the quantities and timing of acquisition of resources, to adapt to changing circumstances. In addition, as stated in Sections 1, 6, and 7, since supply-side generating resource acquisition is not

anticipated to occur until the mid to late 2020's, and is wholly dependent on the scenario and rate of load growth, the PUD has many opportunities to re-evaluate its future resource need and revisit the Long-Term Resource Strategy as it gains more information about environmental and regulatory policies and learns more about resource availability and costs.

As required by chapter 19.280 RCW, the draft 2023 Update sets forth a proposed action plan (see Section 1), which consists of a number of general strategies to ensure the PUD is well positioned to serve the electricity needs of its customers into the future, as follows:

- 1) Actively engage with BPA's post-2028 contract process and analyze new power products
 - a) The PUD's BPA Power contract accounts for roughly 85% of the PUD's current power supply. Our current BPA contract expires in 2028, and the PUD expects to be able to sign a new contract in the fall of 2025. Negotiating the new BPA contract, and fully evaluating all BPA Power Product offerings is essential to understanding future resource needs.
- 2) Acquire not less than 10.54aMW of cost-effective conservation by 2025
 - a) The 2023 IRP Update sets a biennial conservation target of 10.54 cumulative annual aMW for 2024-2025. Conservation remains a critical resource for meeting future load growth as it has in previous IRP cycles. The acquisition of conservation savings reduces the demand for electricity, delaying the need to acquire or develop and more expensive and/or less effective new resources, which can reduce the overall cost of energy and capacity, including deferral for additional transmission and distribution capacity upgrades. If the PUD can cost-effectively acquire more than 10.54aMW of conservation in this time period, it should identify the needed resources to accomplish this, in order to accelerate portfolio benefits.
- 3) Continue planned development of additional Time of Day Rate options for customers, and explore additional demand response programs that have been identified as cost-effective
 - a) The PUD will leverage Advanced Meters to provide additional rate options for customers to choose from. Time-of-Use and Critical-Peak-Pricing programs were successful in shifting customer demand from high-cost periods to lower cost periods in PUD pilot programs. The PUD should continue plans to offer these programs at scale to customers.
 - b) The PUD should also explore programmatic demand response

programs that appear to have potential for cost-effectiveness. These programs include customer-owned battery programs, and commercial and industrial space heating incentive programs.

- 4) Develop low-cost, locally sited energy storage, and perform due diligence for future projects
 - a) The 2021 IRP targeted 25MW of energy storage for 2024, and PUD staff are currently pursuing procurement that would add 25MW in 2025. Staff should continue current efforts to acquire this resource for that time frame.
 - b) The 2023 IRP identifies additional energy storage (up to 50MW by 2033, and 175MW by 2045) as helping meet portfolio flexibility needs, dependent on the Post-2028 Contract and Power Product. PUD staff should undertake due diligence on the siting, development structure, and technology type for future energy storage investments, in order to be ready to act once BPA contract and product parameters are known - likely 2024. This due diligence should include leveraging Energy Storage Department staff, collaboration with PUD system planning and substation engineering staff, and evaluation of multiple sites for potential development. Site analysis should include analysis of the Jackson Hydrogeneration campus as a potential site for short-duration and long-duration storage with the Generation Department.
- 5) Perform due diligence on regional renewable energy projects, and prepare for potential procurement activity
 - a) 200MW of new renewables are identified in Years 1-10 of the Resource Strategy, dependent on the BPA Power contract and product. This volume of new renewables would replace aging, retiring renewables with more efficient newer technology. Renewable resources take time to develop and in order to be prepared for potential renewable additions, staff should start due diligence activities now and make flexible procurement plans. Due diligence activities includes but aren't limited to evaluating the potential to access existing projects, monitoring regional RFPs and announced contracts for best practices and price points, evaluating transmission needs, talking with regional peers to identify partnership opportunities, and contacting regional developers to understand what projects are furthest in the development pipeline.
- 6) Acquire 50MW of short-term market contracts
 - a) The 2023 IRP identifies a need for a total 50MW of market-sourced energy and capacity which serve to augment the portfolio until additional physical renewable resources can be developed or acquired. PUD will perform due diligence on the best fit

market products, including consideration of specified clean energy contracts that may be available and contribute to Renewable Portfolio Standard goals.

- 7) Ensure continued compliance with state clean energy mandates
 - a) The PUD is committed to meeting or exceeding clean energy and carbon regulatory requirements. The PUD forecast the need to acquire Renewable Energy Credits (RECs) in the near-term in order to meet Renewable Portfolio Standards due to growing loads, retiring wind contracts, and pause in new renewable development and acquisition anticipated as a result of waiting for Post-2028 BPA Power contract clarity. PUD staff should continue to established plans for this budgeted expense. The PUD continues to plan to add only clean energy resources to its long-term portfolio.
- 8) Continue commitment to best-practice rooftop solar customer processes, and continued evaluation of Community Solar project opportunities
 - a) Customer feedback has consistently indicated a desire for more customer rooftop solar in partnership with the PUD. The resource plan evaluated additional incentives for customer rooftop solar based on feedback from the initial Clean Energy Open House, but found that additional incentives would have the effect of raising overall costs for customers. While PUD staff will continue to evaluate incentive opportunities, until such time as new incentives are found to be cost-effective for all customers, PUD staff will focus on continuing to offer best-practice processes for customer rooftop solar interconnection.
 - b) The PUD has been successful in developing cost-effective and inclusive Community Solar projects. PUD staff should continue to explore project opportunities with the potential to develop local low-cost renewables in partnership with customers, including through Community Solar offerings.
- 9) Perform due diligence on local hydro capacity uprate projects
 - a) A hydro capacity uprate project considers adding a small variable height weir at run of river hydro projects which provide run of river hydroelectric projects limited energy shaping capability. This project enhancement could potentially add low-cost capacity to existing PUD projects. PUD staff should perform due diligence on the technical feasibility, costs and prudence of capacity uprate projects at PUD operated sites.
- 10) Develop and enhance local partnerships for fusion energy
 - a) Snohomish County is home to an exciting fusion energy sector and the PUD is well positioned to develop relationships with local

fusion energy developers. The PUD will support local fusion companies and continue to follow advances in this sector. Future IRP's will have more confident timing for delivery.

- 11) Continue participation in regional forums on climate change modeling, resource adequacy development and organized market formation
 - a) The PUD will continue to participate in regional forums and assess impacts associated with climate change, reduction in greenhouse gas emissions, clean energy policy compliance, and regional power and transmission planning efforts. Staff will continue to participate in the development of a regional resource adequacy program, in order to further limit reliability risks to customers. The district will continue to participate in regional forums discussing the formation of organized markets in the Pacific Northwest in order to ensure hydropower is appropriately valued, that the economic opportunities and risks of planned dispatchable resources are accounted for, and to appropriately forecast future cost of service.

As with the Long-Term Resource Strategy, this list represents non-project actions, the general characteristics are discussed in Section D below, as appropriate.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

The 2023 Update is a non-project action that does not involve specific locations or projects. There are several reasons why no specific projects are identified and analyzed in this document. First, the primary purpose of identifying a type of project is to set out general characteristics of this type of resource for purposes of prioritizing it as compared to other types of resources. For example, wind or solar compared to biomass or small hydro. Second, in the context of the integrated resource planning process, each of the resource type components of the resource portfolios for each future scenario could be met by any of that resource type, not necessarily a specific project. Finally, if a particular project were to be pursued, it would entail a separate, project-specific level of environmental review.

B. ENVIRONMENTAL ELEMENTS

Given that the 2023 Update is a non-project action that does not involve specific locations or projects, staff has determined that it is appropriate to exclude the questions for Part B because they do not contribute meaningfully to the analysis of the non-project action.

Instead, the typical characteristics and impacts associated with the types of resources included in the 2023 Update are described in Part D.

C. SIGNATURE

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: _____

Name of signee Garrison B. Marr

Position and Agency/Organization Senior Manager Power Supply, Snohomish PUD

Date Submitted: November 07, 2023

Part D - Supplemental Sheet for Non-project Actions

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?

Typical Construction Activities and Common Operational Impacts

There is the potential for a similar set of construction related impacts with many different types of power generation facilities and associated infrastructure that would be common to the generation resources described in this analysis, including but not limited to: clearing, grading, vegetation removal, excavation, operating heavy equipment that compacts soil, drilling or blasting, construction of access roads, and installation of utilities.

In addition, common impacts associated with operation of many types of facilities include road maintenance, additional impervious surface, occasional additional vehicle traffic to and from the site, vegetation management and tree trimming, and the use and operation of electric transmission and distribution equipment, such as transformers, circuit breakers, poles and wires.

Operation of equipment and construction activity could lead to release of hazardous fluid (fuel and hydraulic oils, etc.) to ground or surface water.

Clearing and grading can expose soil and lead to erosion, or turbidity.

Noise could be produced during construction activities, from operation of equipment, drilling or blasting activities.

There would be temporary emissions from the exhaust of construction equipment, including Carbon Monoxide (CO), Carbon Dioxide (CO₂), sulfur oxides (SO_x), particulates, oxides of nitrogen (NO_x) and volatile organic hydrocarbons (VOCs). Exposed soil and heavy mobile equipment could generate fugitive dust emissions.

There is equipment used in the operation of the facilities, powerhouse and switchyard that contains potentially hazardous materials, such as batteries (acids) and, circuit breakers (SF₆ gas).

Many construction-related impacts in this category are likely to be temporary and mitigated by the use of the use of Storm water Pollution Prevention Plans (SWPPPs), Spill Prevention, Containment, and Countermeasures Plans (SPCCs), Temporary Erosion and Sediment Control Best Management Practices (BMPs), water quality BMPs, and by compliance with noise ordinances, clearing and grading ordinances, water quality-related permits. In addition, temporary impacts can be mitigated in part by appropriate siting for energy projects, scheduling construction during the dry season, ensuring proper disposal of spoils and waste products.

In operations, mitigation can include the use of SWPPPs, SPCCs and BMPs, NPDES industrial permits, relevant air quality permits, and good maintenance of vehicles and equipment. The IRP assumes that any new resource or plant would acquire all necessary air quality, siting and other operating permits, and meet all state and federal environmental standards.

Use of resources described in the IRP may include release of greenhouse gases, including annual CO₂ output, known SF₆ releases from any sources, and other greenhouse gases from ongoing operations. Currently, the PUD is below the 25,000 metric ton threshold.

Small Run-of-River Hydro

Hydroelectric power is a renewable energy derived from the generation of electric power from the flow of water, from a reasonable height of fall, called the head, through a penstock into a turbine. For purposes of this analysis, conventional hydro technology is assumed, with a capacity of approximately 7.5 MW or less. PUD small hydro facilities are assumed to be primarily run-of-river projects, which

divert a portion of the water to a pressurized pipeline that delivers it to a turbine downstream for energy production. In addition, this analysis assumes projects consistent with PUD criteria. These criteria include: 1) located to the extent possible outside of sensitive areas such as designated wilderness lands, 2) in the upper reaches of creeks above anadromous fish populations, and 3) in or near the PUD's service area to reduce the need for new transmission lines and to minimize line losses and environmental impacts.

Operation of small hydro projects can typically alter the timing and rate of water flow in the streams or rivers on which they operate. Changing flow rate of water can affect water quality, including turbidity and temperature.

Air emissions are negligible because no fuels are burned, however if a large amount of vegetation is growing along the riverbed and not removed prior to when a dam or weir is built, it can decay in the impoundment or lake that is created, causing buildup and release of methane, a powerful greenhouse gas.

Protection, mitigation, and enhancement measures (PM&Es) for construction and/or operational impacts associated with small hydro are addressed in the FERC license and other permits required for a project. These PM&Es can often be in excess of the impacts; thereby, providing a net benefit.

Geothermal

Geothermal is a renewable energy derived from the natural heat in the earth's crust. As groundwater is heated, geothermal energy may be produced in the form of hot water and steam. Steam from the geothermal reservoirs is used to spin turbine generators and produce electric energy. The geothermal water is then returned down an injection well into the geothermal reservoir to maintain pressure, sustain the reservoir, and eventually reheated. For purposes of this analysis, conventional binary cycle technology is assumed, in which the geothermal liquid is brought to the surface through wells, passed through a heat exchanger, and the cooled geothermal liquid is re-injected to the reservoir.

Emissions associated with generating electricity from geothermal technology are negligible because no fuels are combusted. (EPA: Non-

hydroelectric Renewable Energy/Clean Energy). Geothermal steam can also contain hydrogen sulfide gas, which has a rotten egg smell, but usually it is below the level that most people would be able to detect.

Geothermal plants using binary technology with air-cooling use minimal fresh water, but may affect groundwater if large amounts of steam are extracted before being reinjected.

Depending on the geothermal site, groundwater may contain solids that must be filtered before steam is sent to the turbines. Byproducts of filtering would be appropriately disposed of depending on their composition, and may go back into the well, may be disposed of in a landfill, or may be alternately disposed of as appropriate.

Wind

For wind projects, a renewable energy derived from wind, electricity is generated when air flows through a wind turbine, producing mechanical or electrical power. The wind turbine is typically mounted on top of tubular steel tower supporting a nacelle (the housing for an enclosed generator that is connected by a gearbox to the rotor) and a three-bladed rotor. Cables carry the generated electricity down the tower to a ground level base panel, then to a pad-mounted transformer located adjacent to the tower that steps up voltage, then to a power collection system that connects groups of wind turbines to a project substation. The substation equipment steps up voltage and feeds it to the transmission line to the regional grid. Modern wind turbines are large structures that range from 240 to 350 feet in height. Wind projects of 100 MW typically encompass a total project area of several thousand acres or more, though the permanent facilities only utilize 5 to 10% of the total acreage.

Emissions associated with generating electricity from wind technology are negligible because no fuels are combusted. (EPA: Non-hydroelectric Renewable Energy/Clean Energy) Wind project impacts are almost entirely dependent on siting considerations, and careful choice in appropriate site selection and project design in the early project stages would ensure impacts from these projects are avoided and minimized. There is a potential for noise impact/disturbance to humans and migrating birds associated with the rotating blades.

Short-Term Market Capacity Product

The Short-Term Market Capacity Product is intended to be a short-term (no more than 5 years) structured capacity contract purchased from the market from a known generating resource. This product would reserve firm capacity and energy for delivery from a third party supplier to the PUD during the winter months of November through February. Staff have assumed this capacity product could be procured from the wholesale market, and that said product or contract could require the seller to specify what specific generator or resource type would provide the firm energy and capacity. A third party supplier is assumed to be another utility, an independent power producer or other merchant with a broader resource portfolio. Staff have assumed that this capacity product would likely be provided from an existing generating resource within the region, and until the product is procured, it is not known what resource type would supply this short-term contract. Therefore, staff have assumed the product would have emissions and environmental characteristics consistent with the regional energy market mix.

The Short-Term Market Capacity Product will be procured from an existing generating resource; as such, all environmental requirements will already have been met and mitigated.

Biomass (wood)

For purposes of this analysis, a wood biomass facility produces electricity by directly combusting waste wood. The heat from combustion turns water into steam, which drives a turbine. The analysis assumes that the biomass plant will be a cogeneration facility, at an existing wood processing facility, that jointly produces electricity thermal energy using the one primary fuel. The thermal energy can be used for a variety of purposes, including steam production, space heat, hot water, drying, and cooling.

Biomass operation can generate ash from wood combustion.

Biomass plants emit NO_x, a small amount of sulfur dioxide, and CO₂. The amounts emitted depend on the type of biomass that is burned and the type of generator used. The estimated NO_x emission rate for a biomass cogeneration facility is 2.2178 pounds per MWh. The CO₂ emissions from burning biomass may not result in a net increase in carbon emissions if the biomass resources are managed sustainably,

but it cannot be presumed that biomass power plants are carbon neutral. Biomass contains much less sulfur and nitrogen than coal; therefore, when biomass is co-fired with coal, sulfur dioxide and NO_x emissions are lower than when coal is burned alone. (EPA: Non-hydroelectric Renewable Energy/Clean Energy; SCL.)

Available technologies include combustion process modifications such as staged combustion, and post-combustion controls such as catalytic and non-catalytic reduction.

Ash handling in biomass plants is regulated to prevent releases to surface waters or ground waters.

Solar - Utility-Scale

Solar energy is a renewable energy derived from the sun, and generated by two basic technology alternatives, solar thermal and photovoltaic (PV). Only PV is assumed herein. PV devices use a semiconductor device, called solar cells, to convert light from the sun to electricity. Energy from the sunlight displaces electrons from their normal atomic orbits, a grid structure on the surface of the semiconductor collects these electrons and makes them available to be used in an external circuit. The semiconductor material can be crystalline or thin film. Crystalline cells are usually made from silicon, thin film can be amorphous silicon, copper indium diselenide, or cadmium telluride. For utility-scale solar, PV cells are connected as a module, modules are combined to make solar panels, and solar panels are grouped into arrays. The amount and timing of solar power production depends upon the location of the generation source. A utility scale solar project of 5 megawatts with fixed mount panels would require approximately 50 acres of land.

Emissions associated with generating electricity from solar technologies are negligible because no fuels are combusted. (EPA: Non-hydroelectric Renewable Energy/Clean Energy)

Proper operation of the solar facility requires regular cleaning of the panels, which uses small amounts of water.

Depending upon the location, solar facilities may use large amounts of dust suppressants because dust can affect panel performance. These suppressants may contain brines and salts, organic non-petroleum

products, and other constituents.

Pumped Storage Hydro

Pumped Storage Hydroelectric Storage or Pumped Hydro, is a mature energy storage technology. Electric energy is converted to potential energy and stored in the form of water at an upper elevation. Pumping the water uphill for temporary storage refills or recharges the reservoir so that during periods of high electricity demand, the stored water can be re-released through the turbines and converted back to electricity like a conventional hydropower station.

New pumped hydro likely faces similar environmental siting issues as small hydro projects, including mitigation for effects on the upper and/or lower reservoirs, particularly if they do not already exist. Pumped hydro in its generating electricity mode has no direct emissions; however, the utility may not be able to identify emissions associated with the energy required to refill or recharge the reservoir through its pumping operations.

Battery Storage

Energy storage with batteries is a modular and flexible resource considered in the IRP. In the most basic sense, a Lithium-Ion battery refers to a battery where the negative electrode (anode) and positive electrode (cathode) materials serve as a host for the lithium ion. Ions move from the anode to cathode during discharge, and reverse direction during charging. An electrolyte composed of an organic solvent and dissolved lithium salt provides the media for lithium ion transport. A variety of safety mechanisms are typically included in the design of battery systems, such as current interruption devices, fire suppression, and temperature alarms.

Batteries are generally sited at locations that already contain utility infrastructure such as at generation sites or substations. This mitigates the impacts on surrounding areas. Battery storage as an energy storage technology is a net energy consumer. It takes more energy to recharge the battery than the battery can generate. Energy storage projects are assumed to have no direct emissions, but the utility may not be able to identify if there are emissions associated with the energy required to recharge the battery.

Local land use and construction permitting typically requires that

containment be installed to prevent the release of hazardous substances from utility scale batteries and requires consultation with local fire authorities to ensure an adequate fire response plan is in place.

Simple Cycle Combustion Turbine

Simple Cycle Combustion Turbines (SCCTs) are a mature fossil fuel generation technology used in the power industry as a seasonal load and peak matching resource. SCCTs were modeled as price proxies for larger-scale dispatchable capacity resources. For power generation applications, investment costs for this peaking resource are cheaper than combined cycle combustion turbine plants but they operate less efficiently. SCCTs can be scaled to generate small or large amounts of power. These plants are typically designed and permitted to combust natural gas, distillate or a combination of the two to generate electricity.

In the 2023 Update, staff modeled the cost and operating characteristics associated with dispatching a SCCT no more than 10% of the hours in a year, fueled by natural gas with distillate as the emergency backup fuel source. The combustion of natural gas produces carbon dioxide and nitrogen oxides, and the associated emissions are based on the efficiency of the plant since the carbon content of natural gas is fairly uniform at 117 lbs/MMbtu.

Demand Response and Smart Rates Programs

The 2023 Update used the results of the 2021 Demand Response Potential Assessment conducted by Lighthouse Energy Consulting that identified demand response and smart rates programs' potential by products and levelized cost to inform the demand side resource options evaluated in the 2023 Update analysis. Product/Program types and potential included:

1. Electric Vehicle (EV) charging
2. Various seasonal residential water heating
3. Various seasonal residential and/or commercial space heating
4. Industrial demand curtailment

5. Various seasonal residential, commercial, and/or industrial Time-of-Use (TOU) rates

6. Various seasonal residential, commercial, and/or industrial Critical Peak Pricing (CPP) rates

Conservation Measures

Conservation resources include a wide range of methods to reduce energy use by customers. Conservation measures are typically grouped into programs based upon target customer groups, delivery methods, and funding sources. Conservation programs offer incentives, technical assistance, and/or loans to incent building to more efficient standards than are required by energy codes and appliance standards.

Typical residential energy efficiency measures include wall, floor and ceiling insulation, windows, lighting, refrigerators, freezers, clothes washers, and ductless heat pumps.

Typical commercial measures include lighting, HVAC systems, refrigeration, building envelope (doors, windows, insulation, etc.), equipment, and appliances.

Conservation in the industrial sector focuses on increasing the efficiency of energy use in industrial processes and systems, and can include motors, pumps, heating, cooling, fluid handling, ventilation, lighting, controls, and space and material heating.

Energy efficiency measures such as insulation, windows, weather stripping and caulking can reduce air circulation and may reduce indoor air quality without proper ventilation consideration and implementation.

Compact fluorescent lightbulbs (CFLs) are historically considered an energy efficient lightbulb, but contain hazardous materials such as mercury, and must be properly disposed of. This is not an issue with modern light emitting diodes (LEDs), which are also significantly more energy efficient than CFLs.

Transmission

New or upgraded transmission facilities may be required to deliver

electricity from new generation facilities to the PUD service area, or to improve the reliability, redundancy or otherwise increase the capacity of the system in a manner that could reduce or defer the need for new generation facilities. The PUD contracts for firm transmission with the Bonneville Power Administration to deliver energy from generating resources or the wholesale energy market and does not intend to construct any new transmission. Transmission lines are suspended on either lattice steel towers or wood or steel single-pole structures. Designs vary, but often towers can be over 100' high. Transmission lines require access roads for construction and maintenance, and transmission line corridors must be kept clear of vegetation that could contact the lines and cause outages. The clearance distances are set by national standards and vary with the voltage and design of the transmission system. Vegetation removal can be managed through physical removal or with herbicides, or a combination. The PUD has vegetation management standards that minimize the use of herbicides and pesticides.

Vegetation removal can have impacts on soil.

The scientific agencies that have considered health and safety impacts associated with electromagnetic fields have concluded that the extensive body of research shows that EMF from electric power transmission and substation equipment are not an established cause of any long-term adverse health effects (Seattle City Light, 2012 IRP). The PUD continues to monitor research into EMF, and staff responds to concerns with information and assistance when requested by customers.

Electric fields and magnetic fields (EMF) are associated with every power delivery system and electrical device. Possible effects upon human health from electric and magnetic fields continue to be investigated, with emphasis directed primarily at magnetic fields. The Snohomish PUD looks to the research community for guidance and continues to monitor the research for definitive answers concerning EMF and human health. Current research findings are inconclusive. There are no established or known levels of human exposure to power line magnetic fields which have been determined to be harmful. Neither Washington State nor the Federal government regulates exposure to EMF.

2. How would the proposal be likely to affect plants, animals, fish, or marine life?

As a non-project action, no direct impacts to plants, animals, fish or marine life will result from this IRP. Any projects that are undertaken in support of the IRP will be evaluated for their impacts in a separate, project-specific SEPA analysis. The following are typical characterizations and impacts associated with the types of resources included in the 2023 Update.

Typical Construction Activities and Common Operational Impacts

Removing plants, soil, and disrupting biological, physical and chemical functions can reduce productivity and displace habitat at the locally affected site. Habitat for animals could be disturbed by vegetation removal and plant construction.

Aquatic habitat can be degraded by runoff, dust, and exposure to contaminants through spills and by loss of adjacent vegetation, which provides filtering, nutrient uptake and output, and temperature mitigation functions.

Many streams, rivers and waterbodies in the state contain important habitat for anadromous fish and other aquatic species protected under the Endangered Species Act and state laws, and many forested areas contain habitat for terrestrial species protected under the ESA and the Migratory Bird Treaty Act.

Many construction-related impacts in this category are likely to be temporary, but some are unavoidable. These impacts can be mitigated by careful project siting, use of careful design and planning and use of best management practices. Best management practices used in PUD projects would include: avoiding or minimizing work in critical areas and buffers, conducting construction during dry season, use of in-water windows for work, establishing buffers, covering and stabilizing exposed soil areas, compliance with federal, state and local permits, including consultation under the ESA and preparation of biological opinions, and providing mitigation for impacted or lost habitat.

Increases in carbon emissions as a result of use of coal or other fossil fuel based generation can lead to a number of other impacts associated with climate change, including more severe weather events, changes in ocean and waterbody chemistry and temperatures.

In operations, mitigation can include the use of SWPPPs, SPCCs and BMPs, NPDES permits and air quality permits, and best management practices for maintenance. The IRP assumes that any new resource or plant would acquire all necessary air quality, siting and other operating permits, and meet all state and federal environmental standards.

Small Hydro and Pumped Hydro

Depending on the type of project, small hydro and pumped hydro facilities can affect fish populations. Impacts are almost entirely dependent on siting considerations, and careful choice in appropriate site selection and project design in the early project stages, as recommended by the fish and wildlife agencies, would ensure impacts from these projects are avoided and minimized. As such, these impacts are typically addressed in the planning and licensing of such projects, and include consultation with state and federal agencies to determine the appropriate PM&E conditions. PM&Es could include requirements to: develop habitat improvements; purchase, protect and enhance land; add river channel improvements; and other requirements designed using the latest scientific information to protect specific species and habitats.

Geothermal

Typical construction and operational impacts.

Wind

Wind facilities can result in collision hazards for birds and bats, electrocution hazards, and potential interference with migratory behavior; however, the impacts can vary widely. U.S. Fish & Wildlife Service in 2012 issued "Final Land-Based Wind Guidelines" to address siting, construction, operation and decommissioning of wind farms, to mitigate impacts. Washington Department Fish & Wildlife issued similar guidance in 2009.

Wind project impacts are almost entirely dependent on siting considerations, and careful choice in appropriate site selection and project design in the early project stages, as recommended by the guidance documents above, would ensure impacts from these projects are avoided and minimized.

Short-Term Market Capacity Product

The Short-Term Market Capacity Product is intended to be a structured capacity contract that could be purchased from the wholesale energy market. The regional energy market mix consists of the types of resources described in this Part D, with the addition of a small amount of coal fired electric generation and nuclear energy. Increases in carbon emissions as a result of use of coal or other fossil fuel based generation can lead to a number of other impacts associated with climate change, including more severe weather events, changes in ocean and waterbody chemistry and temperatures. In addition, impacts to the resources identified in this question would generally consist of typical construction and operational impacts.

Biomass (wood)

Typical construction and operational impacts. If the fuel is logging residue, effects on plants and animals may be positive or negative, or both.

Noise during operation might impact sensitive wildlife species, however because biomass facilities are most often co-located with lumber or wood product facilities, impacts specifically attributable to the biomass may be far less than stand-alone power generation facilities of types which are not co-located with already existing facilities or industrial activity.

Solar - Utility-Scale

Solar could require removal of vegetation from a large area. Roads associated with power plants have the potential to fragment habitat and displace local populations.

Depending upon the location of a potential resource, there may be protected desert species affected as well.

Battery Storage

Typical construction and operational impacts.

Simple Cycle Combustion Turbine

Typical construction and operational impacts.

Transmission

Transmission corridors require removal of vegetation within the corridor, and maintenance of clearances for lines. Transmission lines

can result in bird collisions and electrocution.

3. How would the proposal be likely to deplete energy or natural resources?

As a non-project action, this proposal will not use or affect environmentally sensitive areas or areas designated (or eligible or under study) for environmental protection. Any projects that are undertaken in support of the IRP will be sited to avoid environmentally sensitive areas to the maximum extent practical and evaluated for their impacts in a separate, project-specific SEPA analysis. The following are typical characterizations and impacts associated with the types of resources included in the 2023 Update.

Typical Construction Activities and Common Operational Impacts

Construction activities consume gas and other fuels for construction equipment, vehicles, and operations.

Any new construction requiring development in forested or rural lands could fragment habitat, increase road travel to the site, and otherwise locally impact the pattern of land use and temporal human activities locally. These impacts sometimes open the door to future development by providing access (via new roads) and basic services where these may have not been available, or were unapparent previously. Natural resources such as forest plant communities, water quality, and wildlife habitat can be impacted through fragmentation, increased weed intrusion, water runoff issues related to roads, etc. These impacts are especially apparent cumulatively as these changes happen over time, and project impacts may not rise to significant levels individually but can cause changes over time that may be significant in scope and impact.

Careful site selection, taking any long-term cumulative impacts into account, and energy siting policies that encourage urban or co-located energy facilities over new facilities in rural or otherwise undeveloped areas would mitigate some of these impacts. For example, policies that encourage facilities such as biomass, to the extent they are economically feasible, would minimize some of the impacts associated with new energy development.

Biomass and conservation measures exemplify the kind of power developments that avoid and mitigate additional energy or natural resource impacts that would be caused by more traditional power plant siting.

Small Hydro, Pumped Hydro, and Geothermal

Generating electricity from renewable energy sources reduces the use of other forms of energy such as fossil fuel and may reduce impacts on energy and natural resources.

Wind

Generating electricity from renewable energy sources reduce the use of other forms of energy such as fossil fuel, and may reduce impacts on energy and natural resources.

On the other hand, because wind is an intermittent resource with a great deal of volatility, it requires additional energy generation, or reserves in order to mitigate the volatility of energy production.

Short-Term Market Capacity Product

To the extent that the resource type used to supply the short-term market capacity product is coal-fired or nuclear generation, these resources consume coal and nuclear fuel.

Biomass (wood)

Biomass plants rely upon variable supplies of forest and agricultural residues, and generation requires large quantities of biomass. However, the assumption is that feedstock is from mill waste or logging residue and not a dedicated crop.

Energy would be consumed in transporting and processing wood fuels, but these have relatively low impacts when compared with other forms of generation, taking into account avoided waste streams and the potential for co-location or lower impact siting.

Solar - Utility Scale

Generating electricity from renewable energy sources reduce the use of other forms of energy such as fossil fuel, and may reduce impacts on energy and natural resources.

Pumped Storage Hydro and Battery Storage

Unlike conventional resources, energy storage resources are net energy consumers. It takes more energy to fill the project than the project will be able to generate. The utility may not always be able to identify the source of the energy used to charge the battery.

Simple Cycle Combustion Turbine

Reciprocating engines and simple cycle combustion turbines are designed and permitted to burn natural gas, distillate oil, or a combination of the two to generate electricity.

Demand Response and Smart Rates Programs

Shifting energy consumption from one period to another period or reducing energy consumption during periods of peak demand can reduce the use of other forms of energy such as fossil fuel, may reduce emissions and impacts on energy and natural resources.

Conservation Measures

Reducing energy consumption through the use of conservation reduces the use of other forms of energy such as fossil fuel, and may reduce emissions and impacts on energy and natural resources.

4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, flood plains, or prime farmlands?

As a non-project action, this proposal will not use or affect environmentally sensitive areas or areas designated (or eligible or under study) for environmental protection. Any projects that are undertaken in support of the IRP will be sited to avoid environmentally sensitive areas to the maximum extent practical and evaluated for their impacts in a separate, project-specific SEPA analysis. The following are typical characterizations and impacts associated with the types of resources included in the 2023 Update.

Typical Construction Activities and Common Operational Impacts

Clearing, grading, excavation, access road construction and other construction activities could result in disturbances to sensitive areas such as wetlands, streams and buffer areas, as well as surface

and subsurface disturbances to soil and geologic formations.

Power plants are generally not considered aesthetically pleasing and can be perceived as creating a negative aesthetic impact. Any new construction requiring development may have the potential to create impacts to environmentally sensitive areas, wetlands, floodplains or historic or cultural resource sites. Additionally, most surface waters in Washington are subject to Critical Areas codes that include floodplains protections, protections for adjacent wetlands, and protection for agricultural areas designated under the Growth Management Act rules. Each of these designations and regulations have associated requirements that would be considered in combination as part of the planning process for any specific project.

Careful site selection, taking any long-term cumulative impacts into account, and energy siting policies that encourage urban or co-located energy facilities over new facilities in rural or otherwise undeveloped areas would mitigate some of these impacts. For example, policies that encourage facilities such as biomass, to the extent they are economically feasible, would minimize some of the impacts associated with new energy development.

The IRP assumes that any new or additional plant would acquire all necessary air quality, siting, and other operating and construction related permits.

Many construction-related impacts are likely to be temporary and mitigated by the use of Storm water Pollution Prevention Plans, SPCCs, Temporary Erosion and Sediment Control BMPs, water quality BMPs, and by obtaining and complying with applicable permits, including critical areas permits, clearing and grading permits, NPDES and Waste Discharge Permits, Hydraulic Project Approvals, Section 404 permits and 401 Water quality certifications. Additional impacts can be mitigated by scheduling construction during the dry season or in water work windows.

Small Hydro and Pumped Storage Hydro

Several rivers in the State of Washington are listed on the State's list of Scenic Rivers pursuant to Chapter 79A.55 RCW, that may limit the development of small hydro resources. There is a federal listing of designated Wild and Scenic Rivers that prohibits development.

Where small hydro projects or pumped storage hydro projects are licensed, the licensing and permitting processes typically require conditions, as appropriate, to preserve, mitigate, restore or create recreational, cultural, historic, or aesthetic resources.

Geothermal

Geothermal plants can only be located where the resource is located. It is possible that the most likely location for geothermal resources could be in close proximity to areas such as Forest Service lands, National Parks, or Wilderness lands. These designations might prohibit or restrict development of the geothermal resource.

Wind

Impacts to environmentally sensitive areas are highly dependent upon where the project would be located. Given the size of the turbines and the amount of land needed for a wind generation facility, there likely would be impacts to aesthetic resources, and the turbines can be seen from great distances.

FAA requirements may also necessitate safety lighting, which has additional aesthetic impacts.

These impacts would be addressed during the planning and siting process.

Short-Term Market Capacity Product

To the extent that the resources that supply this product include coal-fired or nuclear generation, the impacts would be generally those described as common above.

Biomass (wood)

Depending upon where the original facility is located, there might be additional impacts to environmentally sensitive areas such as wetlands and streams. In addition, there may be potential to affect the visual quality of the setting. Site-specific considerations would dictate options for minimization and mitigation of additional or cumulative impacts.

Solar - Utility Scale

Given the size of the facility, a utility-scale solar plant can

substantially change the visual quality of the setting.

Battery Storage

The IRP assumes that battery storage would be sited at locations that already contain utility infrastructure such as at generation sites or substations. To the extent that a battery storage project expanded the infrastructure on a given site, the impacts would be those generally described as common above.

Simple Cycle Combustion Turbine

Impacts to environmentally sensitive areas are highly dependent upon where the project would be located. Power plants are generally not considered aesthetically pleasing and can be perceived as creating a negative aesthetic impact. These impacts would be addressed during the planning and siting process.

Transmission

Due to vegetation clearing, or access road operation and maintenance, transmission facilities may have impacts to sensitive areas such as wetlands, streams, buffer areas, that are generally mitigated through the permitting process with federal or state agencies.

5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?

As a non-project action, no direct impacts to land or shoreline use will result from this IRP. Any projects that are undertaken in support of the IRP will be evaluated for their impacts in a separate, project-specific SEPA analysis. The following are typical characterizations and impacts associated with the types of resources included in the 2023 Update.

Typical Construction Activities and Common Operational Impacts

Depending upon the type of project, construction activities might require temporary changes to shoreline or land uses for staging areas.

All local jurisdictions (and the states) have planning laws that regulate where various land uses may be developed, including a process for administering the siting of essential public facilities.

Construction of generation plants often requires long-term displacement of existing land uses, the impact is highly dependent on project location, size and type of facility, the amount of land it displaces, and the character of the surrounding area.

Small Hydro and Pumped Storage Hydro

Because they are typically located on streams or rivers, small hydro and pumped storage hydro projects typically have unavoidable impacts to shorelines and shoreline buffers. However, impacts are commonly addressed during the licensing and permitting process for such facilities. A consistency determination with the Coastal Zone Management Act is a part of the licensing process. Additionally, public access enhancements to waterways are considered during the licensing process.

Geothermal

Geothermal resources are more likely to be found in natural areas and forests, and the industrial nature of a plant might contrast with its surroundings.

Geothermal energy production generally uses less total land in comparison to other types of energy facilities.

Wind

Development of a large wind project requires temporary displacement of a large quantity of land, but after construction the amount used is primarily turbine foundations, access roads, substations and maintenance facilities.

Much of the land can continue to be used for farming without much impact to farming operations.

Biomass (wood)

Adding a wood burning facility would require long-term displacement and conversion of existing uses within the site, though co-location results in fewer impacts because the use is compatible.

Solar - Utility Scale

Utility-scale solar requires large amounts of land that would be precluded from other uses.

Battery Storage

The IRP assumes that battery storage would be sited at locations that already contain utility infrastructure, such as generation sites or substations. To the extent that adding battery storage to such a location increases its footprint, the impacts are consistent with those described as common above. Development of a battery storage project may require temporary displacement of land, but after construction the amount used is primarily building foundations, access roads, substations and maintenance facilities. Since battery storage projects tend to be co-located with existing generation or transmission infrastructure much of the land can remain unaffected.

Simple Cycle Combustion Turbine

Development of a simple cycle combustion turbine project may require temporary displacement of land, but after construction the amount used is primarily building foundations, access roads, substations and maintenance facilities. Impacts are commonly addressed during the licensing and permitting process for such facilities.

Transmission

Transmission lines require wider rights of way than distribution lines. Often land uses can continue after construction of transmission lines through agricultural or rural areas, so the displacement is temporary. Where transmission lines go through forest lands or built-up environments, they displace existing land uses.

6. How would the proposal be likely to increase demands on transportation or public services and utilities?

Typical Construction Activities and Common Operational Impacts

Construction activities could lead to temporary increases in utilization of roads and bridges for construction equipment and vehicles, or material handling trucks.

Common operational impacts could include minor to moderate use of additional utilities such as power, water, wastewater and waste disposal. The impacts are minor compared to other types of development as the facilities are not typically used to house full time personnel, and require periodic site visits for maintenance and repair activities.

Wind and Utility Scale Solar

Because these plants require a great deal of land, and must be located in areas with an adequate supply of wind or sunshine, plants would likely be located in Eastern Oregon or Washington, and require long transmission lines for operation. The PUD contracts for firm transmission with the Bonneville Power Administration to deliver energy from generating resources or the wholesale energy market and does not intend to construct any new transmission.

Simple Cycle Combustion Turbine

These plants are usually located close to existing gas pipelines and transmission lines. However, depending on the location they may require long transmission lines or pipelines for operation. The PUD contracts for firm transmission with the Bonneville Power Administration to deliver energy from generating resources or the wholesale energy market and does not intend to construct any new transmission.

Battery Storage

The IRP assumes that battery systems are co-located with substations or other utility infrastructure sites. They may require quick access to emergency services and special restrictions for entry and use, similar to the way substations are managed. While a minor impact, large battery arrays have special emergency services considerations to protect human and environmental health in the event of a disaster or error that could cause a spill release of battery contents (acids, electrolyte components). Continuing to carefully plan the siting & design of these systems will help ensure that they are in places with appropriate access to emergency services, meet state and local standards for siting of power infrastructure, and are constructed to contain spills and avoid public exposure to potentially harmful components through isolation within a substation fence or other protective barrier.

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.

Potential projects developed for supply-side resources are anticipated to obtain all applicable federal, state and local permits and to undergo appropriate environmental review. Accordingly, no

possible conflicts have been identified.