Goose Prairie EFSEC review – Data Requests, Questions, Notifications to Applicant

Note: Information requested for SEPA purposes is often also needed for a SCA decision. However, because the timing for SEPA comes first, that is the only category identified so that the applicant understands the time sensitivity of the request.

Comment Category[1]	ASC Section	Item	Question or Information request.	Applicant Response
SEP-1	1.B Project Summary	The document mentions "flow battery technology".	There did not appear to be any other discussion explaining what flow battery technology is. Please provide a little more info so we can understand how it might differ from regular battery storage (e.g., indicate what amount of hazardous/ dangerous chemicals or materials are involved and whether the housing for this technology is any different than for regular battery storage).	An industrial-scale flow battery system is an electrochemical energy storage system that can utilize one of several electrochemical systems in which two electrolyte solutions, one with positive ions and the other with negative ions, are contained in separate tanks and the migration of electrons from one solution to the other, typically through a membrane, creates electricity. Each class of flow battery includes a variety of chemistries with different characteristics. Some examples of battery chemistries are Vanadium Redox; Iron-Chromium; and Zinc-Bromine. In each of these systems, energy is stored in liquid electrolyte in two electrode chambers. The chambers are separated by a membrane that selectively allows protons to pass between the cathode and anode sides of the battery. The electrolyte solutions are recovered and reused during the recharging process. The chemicals used are generally not highly reactive or toxic substances. Flow batteries have been commercialized by several companies, each of whose specific technology and solution

[1] **SEP** – Info needed for SEPA determination; **SCA** – Info needed for SCA decision; **Pre-C** – Info needed prior to construction, **CLA** – Clarification information, **INF** – Information for the applicant

				chemistry is proprietary. Examples include CellCube, Sumitomo Electric,and Primus Power. Flow batteries typically have a life span of 10 to 20 years, and do not degrade over time like conventional batteries. However, the volumetric energy density of a flow battery is lower than other battery designs, so they have a larger footprint, and their energy storage and discharge characteristics are not well suited to applications where rapid/short-duration discharge is required. Like lithium-ion systems, flow battery systems are often placed in standard-sized shipping containers on a concrete slab. The containers hold the electrolyte solutions pumps, cell stacks, and a supervisory and power management system, and would be electrically connected to each other and to the power generation source and to the project substation. By connecting multiple containers, the battery storage system can be scaled to the desired capacity. Containers may be stacked up to two levels with an estimated maximum height of approximately 40 feet. While not considered an extremely hazardous material, electrolyte solution would be contained within the BESS and secondary containment would be installed to contain any leaks in the unlikely event that these may occur.

SEP-2	2.A.2.f Major equipment – Solar Modules	"This increases the output of each module by capturing additional energy from sunlight reflected off the ground to the back of the module."	Please provide a little more information on how this works. Does it affect heating of the earth or solar rays potentially absorbed by vegetation on the ground?	There is little literature available on how solar panels affect vegetation on the ground under or near the panels; there is even less literature available on how these impacts might differ between bifacial and mono-facial (traditional) panels. However, bifacial panels are unlikely to significantly alter the heating of the earth or solar rays that might be absorbed by vegetation on the ground compared to traditional panels, because the bifacial panels do not actively alter the amount of sunlight that reaches or reflects off the ground, and instead passively gather sunlight that has already been reflected off the ground. The amount of sunlight reflected (and then absorbed by the underside of the bifacial panels) differs based on the albedo of the ground surface, so a light-colored surface will reflect more light than a dark surface would; but the bifacial panel passively absorbs however much light is reflected and does not alter the albedo of the ground surface beneath it.
SEP-3	2.A.2.g Construction	Once the facility construction begins, the onsite head count would begin to increase and peak at approximately 300 workers. Vehicle traffic for onsite personnel is expected to be at a ratio of 0.5 vehicles per worker.	How much acreage and what surface area type is planned to be used for construction parking and construction laydown? This temporary disturbance should not occur on any high value difficult-to- restore-habitat.	The staging/parking area is currently designed to be approximately 92,328 sq ft (2.12 acres). Construction laydown may require additional acreage, estimated at up to two acres, for storage of panels and other equipment as deliveries are made. These will both occur in the CRP area on the Meacham Property. Short-term laydown

				areas throughout the Facility Area may be necessary as construction progresses.
SEP-4	2.A.5 BMPs – Noise	Limit use of major excavating and earth-moving machinery to daytime hours.	What are considered daytime hours? How will that be monitored?	Loud machinery will be limited to the hours of 7am to 6pm, which will be the normal working hours. These work hours will be set in the construction contracts and will be enforced by the general contractor. In accordance with WAC 173-60-050, sounds originating from temporary construction sites as a result of construction activity between the hours of 7am and 10pm are exempt from the provisions of WAC 173-60-040 (except insofar as such provisions related to the reception of noise within Class A EDNAs).
SEP-5	2.A.5 BMPs - Noise	To the extent practicable, schedule construction activity during normal working hours on weekdays…. Some limited activities such as concrete pours, would be required to occur continuously until completion;	“To the extent practicable” is not a commitment that can be monitored or tracked. What other limited activities would need to occur continuously? What is the definition of continuously? How do you define normal working hours, 7 a.m. to 5 p.m.? How loud would those activities, that needed to occur continuously, be at the property boundary? Please provide additional information addressing these concerns.	The term “to the extent practicable” is often used to reflect goals that are not necessarily required in all cases. It is the functional equivalent of the term ‘where feasible’, which is used in several places in Yakima County codes and policies. For example, Policy NS 20.3 states that the county would ‘Encourage, where feasible, the undergrounding of electrical utilities’. In this case it is in both the construction crew’s best interest and the best interest of the neighbors to schedule construction activity during normal working hours, which will be from 7am to 6pm. After further review with engineering, procurement and construction (EPC)

				contractors, it has been determined that a concrete batch plant will not be necessary. This was the only activity that would need to occur continuously. The ASC will be updated to remove the optional concrete batch plant.
SEP-6	2.A.5 BMPs – Noise	Limit possible evening shift work to low noise activities such as welding, wire pulling, and other similar activities, together with appropriate material handling equipment;	Is this the criteria that would be used to limit evening shift work?	Evening shift work, between the hours of 6pm-10pm, would be limited to electrical work such as welding, wire pulling and making electrical connections. No construction work will occur between the hours of 10pm and 7am.
SEP-7	2.A.5 Mitigation Summary – Habitat – Activities in the draw	The only Facility components in this area will be the collector electrical infrastructure and civil road infrastructure necessary to connect the Facility.	Provide additional detail on proposed stream crossing construction, location, and potential impacts to wildlife, water quality, and wetlands. Include info about the civil road infrastructure near the draw. Could there be a road crossing over the draw? If yes, it may be important to avoid using a culvert in the draw in order to retain the current functions of the corridor.	OneEnergy is further investigating the options for the stream crossing with WDFW and EFSEC and will provide additional detail as it is resolved.
SEP-8	3.2, 4.2 Air emissions	Information in Section 4.2.C.1 does not include any quantification of expected emissions during construction. This information is required by WAC 463-60-225 (1).	Please provide calculations and quantitative summary of expected emissions during construction associated with all expected air emission sources including construction	OneEnergy is calculating the construction emissions and will provide those results when they are completed. As noted above, a concrete batch plant will not be necessary for this project.

			equipment, fugitive dust and concrete batch plant[2].	
SEP-9	3.3,4.3, Attach. O Wetlands	The provided wetland report did not identify any wetlands located within the project limits. Several areas of interest were identified on aerial imagery.	Ecology field visit required to field verify application information will need to be conducted in April or early May.	Noted. OneEnergy is planning on joining Ecology for this site visit.
SEP-10	3.3,4.3, Attach. O Wetlands	The Goose Prairie Solar Project Wetland Delineation Report (Tetra Tech 7/2020) identifies soils pits.	Provide a map or aerial images showing the location of the soil pits identified in the report.	We are unable to locate mention of soil pits in the WDR. No wetlands were identified, and no hydrophytic plants or areas where hydrology indicated potential wetlands were located during the surveys; therefore, no soil pits were excavated during the wetland delineation surveys. There is mention of a soil type listed as “93:Pits” but this is just the name of a soil type (based on NRCS this consists “primarily of gravel pits, areas used for sanitary landfills, and areas used as a source of clay”).
SEP-11	3.4, 4.4 Water Quality wastewater discharges, 3.7 Water Quantity	Section 2.B.8.e. references washing solar panels two to four times per year, requiring 250,000 gallons of water each time. The area is listed as an aquifer recharge area.	Section 3.4 does not address how this water would be disposed of or discharged after use. Please provide information regarding disposition of wash water and potential impacts including but not limited to;	The estimate of 250,000 gallons likely overstates water demand for panel washing but is provided as a conservative estimate. On average, panel washing requires approximately 0.5 gallon per panel, or approximately 125,000 gallons per wash. Panels are washed primarily to remove dust

[2] The application provides very little to no information about a concrete batch plant. Several data requests ask for information about the concrete batch plant.

			erosion, water quality, stormwater management, vegetation management, and the aquifer recharge area.	and pollen, and no solvents or other additives are used or needed. Potable or deionized water is applied with a pressure washer. Water drips onto the ground and generally infiltrates immediately or evaporates. Ponding of water is rare because of the small localized amounts of water that fall to the ground. Erosion or release of wash water to nearby surface water bodies does not occur. As a point of comparison, even with the conservative assumption that 250,000 gallons of water would be used each time the panels are washed, this quantity amounts to 0.77 acre-foot of water. Spread over the more than 500-acre project site, this quantity of water would reach a depth of less than 0.02 inch. Although the water dripping off panels would be concentrated over smaller areas, the concept demonstrates the relatively small quantity of water involved in this process relative to the size of the site. This amount of water would rapidly evaporate as well as infiltrate into the ground. There would be no impact on water quality and no need for additional stormwater management. Any water that infiltrates into the ground would likely be taken up by vegetation under the panels. Because panel washing would only occur a few times per year, the additional water is not likely to significantly alter vegetation growth patterns. There would not be sufficient water infiltrating into the ground

				to reach groundwater and therefore there would be no impact to aquifers.
SEP-12	3.4, 4.4 Water Quality wastewater discharges	Section 2.B.8.e references washing solar panels two to four times per year, requiring 250,000 gallons of water each time.	Section 3.4 does not address the composition of wash water. Please provide information regarding the composition of the wash water and any additional detergents, additives, or other substances to be used during panel washing. Include information on any potential impacts these substances may have relating to but not limited to water quality, vegetation management, and the aquifer recharge area.	Water for washing the solar panels will not have any cleaning solvents, detergents, or other additives in it.

SEP-13	3.9,4 4.9, Attach. G Wildlife	Additional information is needed to aid in evaluating and calculating impacts to existing shrub-steppe and CRP habitat.	Please provide the following information: row spacing, panel height at solar noon, the size of a panel, and the number of panels in each of the three project area fenced polygons.	OneEnergy has provided additional information to WDFW regarding acreages of impacts in a letter dated April 13, 2021.
SEP-14	3.11.a Waste Management	Depending on the battery system technology selected for the Facility, batteries would need to be replaced every 5 to 20 years and would follow specific protocols for disposal of battery components at an approved facility for disposal or recycling.	Please describe in further detail lifecycle of battery and battery disposition. Include information as to capacity of disposal facilities to accept battery waste, options for disposal vs. recycling, and which protocols for disposal are proposed.	Lithium-ion batteries will need to be changed out periodically (estimated at approximately every 5-10 years, on average). Flow batteries have a lifespan of approximately 10 to 20 years and will need to be replaced at least once during Facility operation. With either Li-ion or flow battery technologies, self-contained battery components will be removed and disposed of or recycled by a licensed vendor. Li-ion battery modules will require replacement periodically because the modules lose their effectiveness through repeated charge/discharge cycles. The frequency of replacement will depend on operational parameters that are not yet fully designed, but it is conservatively assumed that batteries will require replacement on average

				every 7 years, or four times over the 35-year life of the Facility. At present, the need for recycling facilities for lithium-ion batteries is limited, because these batteries have long lives and have only recently come into broader industrial-scale usage. Even when an industrial lithium-ion battery is no longer useful for its initial purpose, it may be repurposed for other uses where the charge retention specifications are lower (e.g. residential use). However, it is anticipated that recycling requirements will increase significantly over the next 10 years, and recycling companies are currently ramping up capacity and improving recycling technologies to meet the anticipated demand. Currently, about a hundred companies worldwide recycle lithium-ion batteries or plan to do so soon (https://circularenergystorage.com/analysis), including several dozen in North America and Europe. Specific technologies vary between recycling companies but a general example is seen in technologies used by American Battery Technology Company (https://americanbatterytechnology.com/) or Li-Cycle (https://li-cycle.com/). Once the batteries have been discharged at their location and disconnected from the energy facility, they are transported to the recycling company, where they are

				disassembled and their contents are removed. Using a closed system of chemicals to prevent releases to the environment at the recycling location, the metals in the battery are separated and purified. The resulting purified metals are then resold to manufacturers for reuse. Recovered metals may include aluminum, calcium, lithium, and a metal alloy comprising cobalt, copper, nickel, and iron. Because of the anticipated continued demand for lithium-ion batteries and the limited supply of new raw materials, there is expected to be a high demand for such recycled metals that will continue to drive development of recycling technologies and development of additional plants. In the event that small quantities of batteries need to be replaced earlier than the typical lifespan, the applicant may resell functional batteries with reduced charge retention for alternative uses. Nonfunctional lithium-ion batteries can be disposed in Washington as universal waste (Batteries - Washington State Department of Ecology). Numerous facilities are authorized to handle universal waste in the event this becomes necessary, such as the Safety-Kleen facility in Pasco, Washington (https://www.safety-kleen.com/services/waste-services/universal-waste).

SEP-15	3.16, 4.16, Attach. J Noise, Glare, Aesthetics	Key observation point visual impact simulations are provided for KOP #1 and KOP #6	Please provide either; simulations available for other KOPs, or a rationale for these not being provided.	KOPs were selected to provide the range of potential views of the Facility representing each side of the Facility Area from publicly accessible areas. Simulations were prepared only for a subset of KOPs where the Facility might have the greatest visual impact, as described in the analysis. KOP 1 represents the closest view of the Facility Area. From KOP 6, the view of the Facility Area has the highest visibility from a publicly accessible area due to elevation and viewpoint orientation. Preparation of simulations from other locations would not alter the conclusions of the visual impact analysis that contrast and visual impact from the facility would be weak to moderate.
SEP-16	3.16, 4.16, Attach I Noise, Glare, Aesthetics	Noise impacts from construction were calculated at varying distances from the equipment, but with no calculated impacts at receptors.	Calculate noise levels and impacts during construction using receptors identified in noise impact analysis for operation outlined in Appendix I.	The Applicant has calculated the noise impacts at the various Noise Sensitive Receptors (NSRs) as shown in Attachment 1 to this data request submittal. The composite noise levels remain well below the maximum allowable noise levels in the WAC as further described in section 4.16a of the ASC.
SEP-17	3.16, 4.16, Attach. K Noise, Glare, Aesthetics	Anti-reflective measures identified in application (4.9.C.1, 4.16b.D) do not appear to be reflected in Attach. K	Please clarify if the anti-reflective measures identified in the application were incorporated into the analysis in Attach. K.	Yes. As noted in Attachment K, under the description of the PV Array on pages 4, 14 and 22, the panel material selected for the analysis was a light textured glass with anti-reflective (AR) coating.

SEP-18	3.20, 4.20 Traffic and Transportation	Section 4.20.C.1 references a temporary concrete batch plant and directs the reader to Section 2.B.8.d. There is no discussion of water use for a temporary concrete batch plant in Section 2.B.8.d.	Identify the possible locations for the temporary concrete batch plant on the site map provided in Appendix B and discuss the water use or wastewater disposal considerations covered in Section 3.4.	As further discussed in the response to SEP-5, a concrete batch plant will not be necessary for construction of the Facility.
CLA	2.A.2.f Inverters and Transformers	The inverters and step-up transformers are mounted on concrete pads through the Facility.	Please provide approximate number of inverters and step-up transformers.	As currently designed, the Facility includes 27 inverters with integrated medium voltage step-up transformers located throughout the Facility Area. Additionally, there is the main step-up transformer at the Facility Substation for interconnection to the grid.
CLA	2.A.2.i Site Restoration	"Due to the…anticipated benefits to local soil quality.."	Describe and provide support for anticipated benefits to soil quality. Please describe or provide reference to where information can be found in application materials.	Soil in areas that have been used for crops or otherwise disturbed benefits from a period of lying fallow. The details and magnitude of such benefits depend on current agricultural practices and the proposed construction and revegetation procedures. If the area was previously undisturbed and contained native vegetation, there would not be a benefit to local soil quality, but if the area has been heavily disturbed, revegetation and a long fallow period may enhance soil fertility and soil structure. Such benefits accrue over the life of the Facility and may include: • Reduction in soil erosion when the soil is not plowed over the life span of the Facility (Beatty et al., 2017)

				• Increased potassium and phosphorus in shallower levels; nitrogen fixing and increased organic matter, improving moisture holding capacity and increasing beneficial microorganisms in soil (Nielsen and Calderon, 2020) • When revegetated, a study in Oregon found that areas under solar panels maintained higher soil moisture and were more water-efficient (produced greater biomass for the same amount of water input) (Adeh, Selker, and Higgins, 2018)
CLA	2.A.5 Mitigation Summary	Column 3, Expert agency participation	Does the information in this column indicate agency participation that has occurred?	No, it does not necessarily mean that it has already occurred. In some cases, engagement of the expert agencies has already begun but not in all cases. The format for this section is directly taken from Part 4 of the streamlined form provided by EFSEC. The column is meant to show which expert agencies would be involved for each mitigation measure.
CLA	2.A.6 Project Plans and Submittals	Operations Phase Health and Safety Plan – The Construction Phase Health and Safety Plan….	Please verify and correct if needed: It appears this sentence should be corrected to say "The Construction Phase Health and Safety Plan…"	Yes, confirmed that the description for the last row on page 48 should read "The Operations Phase Health and Safety Plan…"
CLA	2.B.1.a Soils and Slopes		Is the information provided 2.B.1.a. for the soils and slopes within the survey area or the facility area extent?	The information provided is for the area within the Facility Area Extent.

CLA	3.18, 3.19, 4.18, 4.19 Attach. H Archaeological, Historical, and Cultural Resources	Application and Attach. H do not accurately reflect criteria for requiring site protection	Application and Attach H (Cultural Resources Survey Report) need to be amended to reflect requirements for site protection specifically in relation to RCW 27.53.	OneEnergy will provide an updated ASC and Attachment H with the corrected criteria for protection of cultural resources.
INF-1	2.A.5 Mitigation Summary – BMPs Fire Prevention	Additionally, the Applicant would provide training to fire responders and construction staff on a recurring basis during the life of the Facility.	Is there a proposed frequency of recurring training? This will be a required component of any training plan developed.	Frequency of training would be developed in collaboration with the Yakima County Fire Marshal and the East Valley Fire Department as part of the development of the Construction Phase Fire Control Plan and the Operations Phase Fire Control Plan. The frequency will depend on their specific needs and may depend on frequency of staff turnover and nature of other training the department undergoes and how it relates to the selected technology.
INF-2	3.16, 4.16, Attach. J		Minimal mitigations are provided related to visual impacts. Additional best practices are available to address the visual impacts of solar facilities based on the BLM Best Management Practices for Reducing Visual Impacts of Renewable Energy Facilities (2013). The identification and application of relevant mitigations may further reduce the Project-related visual impact predicted in the analysis (e.g., vegetation screening, color treatment of surfaces).	OneEnergy reviewed the BLM document and notes that the solar section includes best management practices for both concentrating solar power (CSP) and PV systems. The document notes that PV systems "are visually simpler… and generally are associated with lower visual contrasts." As noted in the ASC and the Visual Impact Assessment (Attachment J), the Facility would create minor to moderate contrast and visual impacts. Additional mitigation is not proposed at this time.