

**EXHIBIT V**  
**WASTE MINIMIZATION**  
 OAR 345-021-0010(1)(v)

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**INTRODUCTION:**

Archway Solar Energy LLC (Applicant) proposes to construct the Archway Solar Energy Facility (Facility) in Lake County, Oregon, with generating capacity of up to 400 megawatts (MW). The Facility may also contain a battery energy component with storage capacity of up to 400 MW and discharge capacity of up to 1,600 megawatt-hours. This Exhibit V presents Waste Minimization information as required by OAR 345-021-0010(1)(v).

**OAR 345-021-0010(1)(v)** *Information about the applicant's plans to minimize the generation of solid waste and wastewater and to recycle or reuse solid waste and wastewater, providing evidence to support a finding by the Council as required by OAR 345-022-0120. The applicant shall include:*

**Response:** This Exhibit demonstrates how Applicant will minimize solid waste and wastewater generated during construction and operation of the Facility. The Applicant will recycle and reuse solid waste, as outlined in the Applicant's solid waste and wastewater plans that are described in this Exhibit. In addition, the Applicant will manage solid waste in a manner that will result in minimal impacts on surrounding and adjacent areas.

**OAR 345-021-0010(1)(v)** requires that the site certificate application for the Facility address waste minimization in accordance with OAR 345-022-0120, which states the following:

*(1) Except for facilities described in section (2) and (3) To issue a site certificate, the Council must find that, to the extent reasonably practicable:*

*(a) The applicant's solid waste and wastewater plans are likely to minimize generation of solid waste and wastewater in the construction and operation of the facility, and when solid waste or wastewater is generated, to result in recycling and reuse of such wastes; [and]*

*(b) The applicant's plans to manage the accumulation, storage, disposal and transportation of waste generated by the construction and operation of the facility are likely to result in minimal adverse impact on surrounding and adjacent areas.*

The information presented in this Exhibit is generally organized in accordance with OAR 345-021-0010(1)(v) and provides evidence needed to support a finding by the Council (as required by OAR 345-022-0120).

**V.1 MAJOR TYPES OF WASTE PRODUCED WITH QUANTITY ESTIMATES**

**OAR 345-021-0010(1)(v)(A)** *A description of the major types of solid waste and wastewater that construction, operation and retirement of the facility are likely to generate, including an estimate of the amount of solid waste and wastewater.*

**Response:** The major types of solid waste and wastewater likely to be generated by the Facility are nonhazardous construction or demolition debris, construction and operation-related wastewater, and office waste. The following sections provide additional details of the major types of waste generated and volume estimates.

**V.1.1 Construction**

As presented in Exhibit G, nonhazardous construction waste will be generated. Primary sources of waste include general construction debris such as scrap steel, waste concrete, and excavated soil. Other materials such as packaging from the installed solar photovoltaic modules and associated electrical equipment and erosion control material (e.g., silt fencing and straw wattles) may also be generated during construction. The nonhazardous waste produced during construction will be accommodated by a local solid waste hauler. Estimated volume of construction waste will be one 40-cubic-yard roll-off per week during active construction, which is estimated to span 24 months.

Wastewater generated during construction will result from portable toilets. Portable toilets will be managed by a local contractor and wastewater will be disposed of in accordance with state law. An average of 15 portable toilets will be onsite during construction, including 40 portable toilets during peak construction.

**V.1.2 Operations**

During operations, the primary waste generated will be office waste in the operations and maintenance building. Office waste will be solid waste primarily composed of paper, packaging, and food scraps. Disposal of materials for routine maintenance and housekeeping, such as lubrication oils and cleaning supplies, will be managed according to the pertinent regulations and the guidelines outlined in Exhibit G. An estimated 2 yards of solid waste will be generated per month.

Depending on the effects of solar module dust and dirt on energy production (referred to as soiling), the solar module will be washed. For the purpose of this analysis, it is conservatively assumed that they will be washed twice a year and require 250,000 gallons per wash, for a total of 500,000 gallons per year. A worst-case analysis assumes panel washing three times per year, using a total of 750,000 gallons per year. Water will be applied via tanker truck and will not have any cleaning solvents in it. Washwater will be discharged by evaporation and seepage into the ground and will be covered under an Oregon General Water Pollution Control Facilities Permit, WPCF-1700-B, Washwater Discharge from Equipment Cleaning.

Waste such as universal waste (for example, lightbulbs) and batteries will be recycled according to applicable regulations.

Battery components will be recycled and disposed of at a permitted facility during operation and at Facility retirement/decommissioning, as applicable.

**V.1.3 Retirement**

When the Facility is retired, aboveground equipment will be removed and sold for scrap, reused, or disposed of at a local landfill. Aboveground and underground electrical cables will be rendered inert and underground electrical cables will be left in place. To allow for agricultural activities, concrete foundations will be removed, recycled, and replaced by suitable clean fill. Table V-1 describes the major types of waste materials associated with retirement of the Facility. The table provides an inventory of estimated waste stream quantities and proposed disposal methods.

**Table V-1. Inventory of Waste Materials Associated with Facility Retirement**

<b>Material/Chemical</b>	<b>Description</b>	<b>Estimated Quantity Used During Operation</b>	<b>Disposal Method</b>
Buildings	O&M and Control House	Two buildings	Recycle materials, if feasible, then dispose of in landfill
34.5-kilovolt electrical cable	Solar photovoltaic underground collection cables	280 miles	Render underground cables inert and leave in place
Solar photovoltaic modules, steel mounting racks, and steel trackers	105 module blocks for solar power generation. Each module consists of 72 cells and 370-570 watts of polycrystalline on a steel mounting rack and single-axis steel tracker.	~150,000 steel mounting posts	Recycle
500-kilovolt electrical cable	Overhead transmission line	One 5-mile-long overhead transmission line	Recycle
Transmission poles and associated structures	Connection of the Facility substation to the point of interconnection	1.6 miles of transmission line with 400-foot spacing (25 poles)	Reuse materials, if feasible, or dispose of in landfill
Concrete	Foundations for O&M building and control house building (240 cubic yards)	240 cubic yards (maximum)	Recycle materials above 3 feet below ground; leave other material in place
Rock/gravel aggregate	Road construction material	80,000 cubic yards (approximately 90,000 tons)	Recycle
Battery Storage Enclosures	Enclosures for lithium ion batteries	Up to 3,400 modular enclosures	Discharge stranded energy. Decommission the battery racks in accordance with manufacturer’s instructions and determine scope of recyclability. Package battery modules in accordance with regulations and best practices. Using a certified hazard waste transporter, transport batteries off site to be disassembled and recycled to the greatest extent possible. Utilize an approved storage industry lithium-ion recycling company to recycle the battery cells. Parts not able to be recycled will be disposed of in accordance with the solid/lithium ion waste disposal rules applicable at that time at an appropriate location.

**V.2 STRUCTURES, SYSTEMS, AND EQUIPMENT TO MANAGE AND DISPOSE OF WASTE**

**ORAR 345-021-0010(1)(v)(B)** *A description of any structures, systems and equipment for management and disposal of solid waste, wastewater and storm water.*

**Response:** Construction waste minimization practices will be implemented to minimize the amount of solid waste generated. The practices will include implementing a detailed material usage estimating and procurement system to minimize the amount of excess materials ordered. In addition, a general procedure will be implemented to separate recyclable material from solid waste. Solid waste and recyclables generated during construction will be handled by local commercial haulers (see Exhibit U).

Recyclable materials consisting of scrap steel, cardboard, general packaging materials, and wood will be segregated from solid waste and transported to a recycling facility. Waste concrete and hardened concrete from concrete washout areas will be incorporated into the foundation excavations, or transported offsite and disposed of at a landfill. Solid waste that is not recyclable will be collected, sorted, and transported offsite for disposal at a landfill.

Solar panels that are nonfunctional or are retired will be recycled to the maximum extent feasible through the Solar Energy Industries Association (SEIA) National PV Recycling Program (SEIA, 2017). The purpose of this program is to combine services offered by recycling partners in order to provide cost-effective and environmentally responsible. SEIA is sponsoring this program and research and development that could make the entire industry landfill free. Ultimately, it is the Applicant's goal to achieve a zero waste to landfill standard.

#### **V.2.1 Construction**

During construction, several structural and nonstructural best management practices (BMPs) will be implemented to prevent erosion and control sedimentation. As described in Section I.4 of Exhibit I, construction of access roads, foundations, and other facilities will be regulated by an erosion and sediment control plan and a 1200-C Construction Stormwater NPDES Permit (see Attachment I-2 to Exhibit I) that will require BMPs to minimize possible impacts from erosion or other impacts to soils.

#### **V.2.2 Operations**

During operations, a small amount of office waste will be produced. Solid waste generated during Facility operations will be disposed of through local haulers, and will ultimately be disposed of at a landfill. Solid waste during operations will likely consist of paper, packaging, and food scraps. To the extent feasible, recyclable material will be separated for disposal at a recycling facility.

#### **V.2.3 Retirement**

Waste minimization during Facility retirement will consist largely of the same measures employed during Facility construction. To the extent practicable, Facility components will be sold for reuse or scrap, which will minimize the amount of waste requiring disposal at a solid waste facility. Similar BMPs will be implemented to protect stormwater quality.

### V.3 WATER USE REDUCTION

**OAR 345-021-0010(1)(v)(C)** *A discussion of any actions or restrictions proposed by the applicant to reduce consumptive water use during construction and operation of the facility.*

**Response:** Water use reduction actions will be implemented during construction and operation of the Facility. The following sections provide additional details.

#### V.3.1 Construction

Water will be used on an as-needed basis to construct concrete foundations, suppress dust on the roads (and other areas disturbed as a result of grading). To reduce the water used for dust suppression during construction, stabilization materials such as mulch, soil tackifiers, and soil binders may be placed on exposed soils to minimize dust generation without the use of daily water.

#### V.3.2 Operations

During Facility operation, water will be trucked to the Facility and held in a water tank or obtained via an onsite well. Water minimization practices and devices will be implemented in order to conserve water, such as installation of low-flow toilets and faucets.

### V.4 PLANS FOR RECYCLING AND REUSE

**OAR 345-021-0010(1)(v)(D)** *The applicant's plans to minimize, recycle or reuse the solid waste and wastewater described in (A).*

**Response:** Waste generated during construction will be minimized by implementing efficient construction practices and detailed estimates of material needed. Waste generated through construction, operation, and retirement of the Facility will be recycled as appropriate and feasible. Waste that can be recycled includes metals, glass, paper, and yard debris. Recyclable waste will be sorted, stored in dumpsters or other suitable containers, and then transported to a local transfer station or other recycling facility for recycling.

Wastewater generated during construction within the portable toilets will be regularly pumped and sent to a treatment facility. Wastewater generated during operation will be disposed of and treated using an onsite septic system and drain field.

### V.5 ADVERSE IMPACTS OF WASTE DISPOSAL

**OAR 345-021-0010(1)(v)(E)** *A description of any adverse impact on surrounding and adjacent areas from the accumulation, storage, disposal and transportation of solid waste, wastewater and stormwater during construction and operation of the facility.*

**Response:** Adverse impacts on surrounding and adjacent areas are not anticipated during Facility construction and operation. A minimal amount of solid waste, wastewater, and stormwater is anticipated to be accumulated, disposed of, and transported during construction and operation. Additionally, a hazardous material spill prevention program will be implemented, as described in Exhibit G. Solid waste disposed of at landfills will be minimized through recycling and waste minimization practices employed during construction. The Facility will generate approximately one 40-cubic-yard roll-off per week during construction and one 8-cubic-yard dumpster per month during operation. Therefore, the solid waste generated will not adversely affect the capacity at landfills.

Wastewater will be captured and treated using an onsite septic tank and drain field during operation of the Facility. Therefore, no aboveground accumulation or transportation of this waste will be needed. During construction, portable toilets will be serviced a minimum of once per week. Wastewater generated during construction will be transported via trucks by a local contractor to a treatment facility. Water used for dust suppression will percolate into the ground.

Stormwater generated onsite during construction and operation is expected to be minimal. Stormwater controls will be implemented onsite as needed. During operation, the stormwater will infiltrate into the ground.

## V.6 EVIDENCE THAT ADVERSE IMPACTS WILL BE MINIMAL

**OAR 345-021-0010(1)(v)(F)** *Evidence that adverse impacts described in (D) are likely to be minimal, taking into account any measures the applicant proposes to avoid, reduce or otherwise mitigate the impacts.*

**Response:** The Applicant's proposed measures to avoid, reduce, or otherwise mitigate any possible impacts on the site or surrounding and adjacent areas (as discussed in this Exhibit and in Exhibit G) will result in minimal impacts caused by the construction, operation, and retirement of the Facility. Examples of such measures include a hazardous materials spill prevention program and recycling measures that will be implemented to minimize the amount of waste that is disposed of as landfill waste. Furthermore, waste will be disposed of at a properly licensed facility by a licensed contractor.

Solid waste that is generated during construction, operation, and retirement of the Facility will be sorted for recycling and then transported offsite for disposal. Wastewater generated during construction will be pumped from portable toilets and removed regularly. Wastewater generated during operation will be disposed of and treated using an onsite septic tank and drain field.

## V.7 PROPOSED MONITORING PROGRAM

**OAR 345-021-0010(1)(v)(G)** *The applicant's proposed monitoring program, if any, for minimization of solid waste and wastewater impacts*

**Response:** Given the minimal generation of solid waste and wastewater, and proposed recycling measures and waste minimization practices, the Facility is not expected to incur significant effects onsite or on surrounding and adjacent areas. Therefore, no monitoring program is proposed. Waste management practices will comply with applicable regulations and will be inspected periodically by the Applicant.

## V.8 SUMMARY

The evidence provided in this Exhibit demonstrates that the Council's waste minimization standard (OAR 345-022-0120) is met because waste will be minimized, reused, or recycled where feasible and because minimal adverse impacts on the surrounding or adjacent areas will result from the management of waste related to the Facility.

## V.9 REFERENCE

Solar Energy Industries Association (SEIA). 2020. *SEIA National PV Recycling Program*. <http://www.seia.org/seia-national-pv-recycling-program>. Accessed October 5, 2020.