Through the years, The Burning Man Organization has brought so much to the art world by allowing so many artists dreams to become reality. It would be a dream come true to have my project selected as a recipient of the art grant for the newest Land Art Grant Installation.

 My concept proposal for the LAGI is a green house featuring a self sustaining water cycle system, as well as a fully functioning power generator that utilizes specialized glass that collects solar energy that converts it into power.

 My inspiration for this project was to explore the relationship between the stark beauty of the Blackrock Desert and its unique landscape, alongside the physical presence of the art, making the greenhouse and garden cohesive and complementing, rather than competing with the environment.

 The greenhouse will collect the water into the pond that is within the solar garden, which will provide the water needed to sustain plants. The steel art to make the solar stations will be in harmony with the live vegetation. The pond under the cherry tree will be beneficial not only to the design but to the greenhouse being a source of water that is collected to be reused, providing the plants the hydration they require to thrive, with the remainder filtered back to the pond. This mirroring of the water cycle will keep the balance and sustain the system--using the form and function of the natural world. By recycling everything, the whole project would be fully self sustaining and functional without being a strain to the environment.

 Materials used in the design include recycled glass, steel, and solar voltaic cells that would be obtained from the local businesses or individuals that have the required materials needed-either by donation or at low cost. There are several metal dump sites that could be investigated for free materials, which will allow us to take some of the burden off the land owner and the environment. When all parties benefit, there is more excitement and involvement, and would allow us to give back and not just take.

 The main greenhouse structure would be 67.08 ft x 67.08 ft. The adjacent solar garden would be 100ft x 435.6 ft, and the pond would be 18.52 ft x 37.8 ft and 6 feet at deepest point. This would accommodate 31,418.52 gl of water to be stored for irrigation of the surrounding gardens. The system would require minimal maintenance of a yearly deep cleaning of the outer structure, and ensuring the power storage system is functioning at its optimum level.

 The environmental impact from the greenhouse and solar garden would be minimal. The plan includes reusing materials such as glass bottles to make new glass and old steel structures repurposed into the frame. Resources used will be very minimal, the structure itself will be made out of LSC glass for the main four windows and potentially the roof to allow maximum exposure from the sun which will intern charge the Solar Batteries. The garden itself will be compiled of two main power sources, a 10’ x 12’ x 7’ tall arbor covered in glass that’s been repurposed to look like wisteria. The other structure will be 10‘ x 10‘ x 15‘ that is shaped into a blossoming cherry tree. Both main structures will be built from recycled steel and glass from local sources and melted down to produce the structure frame and solar garden. The solar flowers would include tulips, daisies, sunflowers, irises, and lilies. These are made of glass and recycled steel or iron combined with the solar and thermal kinetic power strips. The goal and focus of the greenhouse and solar garden is to be as eco-friendly as possible while staying in OSHA guidelines of safety and compliance.

 The pond will be a closed system for the first year. When the plants in the pond mature, they will provide the nourishment that the fish will require and will also produce oxygen necessary for a healthy aquatic environment. Educational outreach could also be offered to local school districts by allowing classes to be taught how to utilize a space where they can grow their own garden. The site staff could provide updates on the stages of their garden, as well as providing the fruits of their labor with the harvest produced. There could also be opportunities to have relaxing art classes in the gardens for people that come to the ranch to visit.

Materials

 **Thermoelectric systems** convert heat (temperature differences) directly into electrical energy, using a phenomenon called the “Seebeck effect” (or “thermoelectric effect”). This describes why an electric current is

created between two different metals that are at different temperatures.

The voltage generated can be as high as 41 microvolts per degree kelvin difference using the right combination of metals.

Thermoelectric cooling takes advantage of the reverse effect, wherein an electric current is provided to a similar device, thus creating a difference in temperature between the two sides of the device. Known as the Peltier effect, this can be used to remove heat from an object or space.

Thermoelectric systems have the potential to increase the overall efficiency of photovoltaic panels by harnessing the heat energy that would otherwise be wasted, and at the same time increasing the operating efficiency of the PV panels.

Aaswath Raman, an assistant professor of materials science and engineering at the University of California, Los Angeles, has demonstrated the production of electricity from the thermal difference between radiative bodies (like buildings) at night and the cold of outer space by using a thermoelectric device. It generates 25 milliwatts of power per square meter of area.

PEC are solar cells that transform solar energy directly into electrical energy. Instead of using a solid-state semiconductor as the light absorbing material, PECs use an electrolyte material, which can be fluid (dye-sensitized solar cell) or solid (solid state PEC).

 A circuit is created via a semiconducting anode and a metal cathode which are both in contact with the electrolyte.

Other types of PEC can be used to harness solar energy directly for purposes of electrolysis to create hydrogen—a stored fuel. In this system, water acts as the electrolyte solution. Hydrogen and oxygen form around the anode when exposed to sunlight. The resulting hydrogen can be stored and used to generate electricity in a hydrogen fuel cell where the only by-product is water.

One of the technical obstacles to greater proliferation of PEC-type electrolysis for hydrogen generation is the corrosive effect of the electrolyte solution on the semiconductor anode.

Sometimes you may hear this technology referred to as “artificial photosynthesis.”

 **LUMINESCENT SOLAR CONCENTRATOR (LSC)**

The application of special dyes to the surface of a pane of glass or plastic can cause a certain spectrum of light to be diverted at concentrated levels directly to the edges of the glass,
where it can then be collected by a solar cell that is calibrated specifically for that wavelength. All other light wavelengths continue uninterrupted through the glass pane, which appears almost completely transparent.

As of 2018, ClearVue® PV—based in Perth, Australia—is bringing this technology to market with functioning installations of up to 70% clear PV glass in buildings and
bus shelters. 90% of UV and IR radiation is captured by the spectrally-selective film, which reduces the solar heat gain within the building, leading to lower air-conditioning load. ClearVue® also offers imaging on the glass in partnership with Zurreal. The result is akin to a stained glass artwork that also generates electricity with a rated output of 30 watts per square meter (3% conversion efficiency).

 **THIN-FILM NON-SILICON**

As an alternative to silicon (Si), other semiconductor materials can be used for thin-film solar cells. They have been proven to have greater efficiency than thin-film amorphous silicon. To achieve their high performance they rely on multiple semiconductor materials. Each captures light energy most efficiently across a limited wavelength spectrum.

Copper indium gallium selenide (CIGS) has a conversion efficiency of about 20%. It can be manufactured to be very thin due to its high absorption coefficient, and can be printed onto thin foil substrates with nanoparticle inks and roll-to-roll manufacturing. Cadmium telluride (CdTe) has a conversion efficiency of about 16% and potentially offers cost advantages over CIGS. Copper zinc tin sulfide (CZTS) is the most environmentally-friendly thin-film (only uses abundant and non-toxic materials), and has an efficiency of nearly 12%. The levelized cost of energy for non-silicon systems when compared to silicon-based PV depends greatly on the global market cost of silicon at the time of manufacture.