***LUMEN AURA***

***PROJECT DESCRIPTION***

ENERGY IS PRODUCED ON A DAILY BASIS FOR SMALL DAY TO DAY NEEDS TO LARGE SCALE NECESSITIES. WHILE PRODUCING THIS ENERGY, A LOT OF IT GETS LOST IN THE PROCESS. ENERGY EFFICIENCY PLAYS A KEY ROLE IN TODAY’S ECONOMY. THE RISING RATES IN CLIMATIC CRISIS SUCH AS GLOBAL WARMING, UNETHICAL WASTE DISPOSAL, USE OF PLASTIC, CARBON FOOTPRINT, BURNING OF FOSSIL FUELS, DEPLETION IN RESOURCES ALL ACT AS A FORCE PUSHING ON A BUTTON URGING US TO EXTINCTION. THIS REVELATION OF HOW WE ARE A BIG CAUSE TO THE HOSTILITY OF THE PLANET HAS LED TO RISE OF CLIMATE ACTIVISTS AND ENVIRONMENTALISTS EDUCATING AND CREATING AWARENESS ON THE HARSH SIDE EFFECTS OF METHODS AND MATERIALS WE USE TODAY.

THE SUN IS APPROXIMATELY 93 MILLION MILES FROM THE EARTH AND YET IT PROVIDES THE HEAT AND LIGHT FOR LIFE TO THRIVE. THE SAME HEAT AND LIGHT WHICH CAN BE USED TO RUN THE WHOLE PLANET IF INCORPORATED IN THE RIGHT MANNER. A SMALL STEP TOWARDS THIS DEVELOPMENT IS BEING PRACTICED BY SCIENTISTS, ARCHITECTS, ENGINEERS, FARMERS AND PEOPLE FROM ALL BACKGROUNDS BY REPLACING PLASTIC WITH BIODEGRADABLE MATERIALS OR CONSTRUCTING ZERO-WASTE BUILDINGS OR REPLACING FOSSIL FUELS WITH RENEWABLE ENERGY SOURCES. LUMEN AURA FOCUSES ON JUST THAT. IT CAPTURES THE SUN’S RADITION AND ABSORBS HEAT AND LIGHT IN ORDER TO PRODUCE SOLAR ENERGY REQUIRED TO CREATE AN ENVIROMENT WHERE PEOPLE CAN PARTAKE IN THE VARIOUS ACTIVITIES TAKING PLACE ON AND OFF SITE.

***CONCEPT AND TECHNOLOGIES***

LOOKING OUT INTO THE VAST OPEN BARREN LANDS CAN EVOKE DIFFERENT FEELINGS IN THE EYES OF THE BEHOLDER DEPENDING ON WHAT YOU CHOOSE TO SEE. WHAT LIES BEYOND?

FLY RANCH BEING SEEN AS THIS BARREN DESERT OF A LAND, HAS AN ASTONISHING AMOUNT OF BIODIVERSITY BACKED UP BY ONE OF THE LARGEST WATER RESERVOIRS IN NORTHERN NEVADA. THAT VARIETY IN FLORA PRESENT IN FLY RANCH ACTS AS THE MAIN SOURCE OF INSPIRATION TO THIS STRUCTURE.

THE **SMOOTHSTEM BLAZING STAR** OR THE **MENTZELIA LAEVICAULIS** IS A BEAUTIFUL PERENNIAL WILDFLOWER NATIVE TO NORTH AMERICA AND A SIGNIFICANT PART OF FLY RANCH BEING ONE AMONG THE VARIOUS PLANTS ADDING TO THE DIVERSITY IN FLORA PRESENT ON SITE.

THE STRUCTURE HAVING A HEIGHT OF 15M IS DERIVED FROM THE SHAPE AND FORM OF THE BLAZING STAR. THE PETALS OF THE STRUCTURE FORM A SLOPE WHICH ALLOWS FOR SNOW AND RAIN WATER TO FLOW INTO THE CYLINDRICAL STEM. THE STEM ACTS AS A STORAGE UNIT FOR THE SNOW/RAIN WATER FROM WHICH IT CAN BE FILTERED AND USED FOR IRRIGATION AND OTHER DOMESTIC PURPOSES.

BETWEEN THE PETALS ARE LONG THIN SEPALS WHICH IN TURN ACT AS SPOTLIGHT WITH LEDs AT THE TIP. THE BODY OF THE SEPAL IS COATED WITH ORGANIC PHOTOVOLTAIC SHEET. OPV OR OSC (ORGANIC SOLAR CELL) ABSORB SUNLIGHT AND TRANSMIT ELECTRICAL CHARGES. IT CAN BE PAINTED, PRINTED OR ROLLED ONTO ANY SURFACE MAKING IT A VERY VERSATILE MATERIAL.

THE STAMEN OF THE FLOWER IS DEPICTED BY THE SOLAR CELLS PRESENT IN THE CENTRE ON THE FLOWERE WHICH ARE CONNECTED TO AN INNER CYLINDRICAL ROD WHICH TRANSPORTS THE SOLAR ENERGY UNDERGROUND FROM WHERE IT CAN BE STORED OR DISTRIBUTED.

PATHWAYS CONNECTING ONE STRUCTURE TO ANOTHER ARE UNDERLINED WITH PIEZO ELECTRIC CELLS.

***TECHNOLOGIES***

* *PHOTOVOLTAIC SOLAR CELLS*

PHOTOVOLTAIC CELL IS A DEVICE WHICH CONVERTS SOLAR ENERGY INTO ELECTRICAL ENERGY. SUNLIGHT IS ABSORBED BY THE PV CELLS WHICH CHANGE ANGLES AS THEY FOLLOW THE SUN PATH FOR MAXIMUM ABSORPTION OF LIGHT.

* *OPV*

ORGANIC PHOTOVOLTAIC IS A TYPE OF SOLAR CELL WHICH HAS AN OUTER LAYER OF POLYMERS WHICH ABSORB SUNLIGHT AND INTURN CONVERT IT INTO ELECTRICAL CHARGES.

* *SNOW/RAIN WATER HARVESTING*

SNOW IS COLLECTED IN WINTERS IN THE FORM OF SNOWBALLS OR A PIT IS DUG INTO THE GROUND WHERE SNOW GETS ACCUMULATED. THE PIT IS LAYERD WITH A PLASTIC TARPAULIN SHEET WHICH PREVENTS IT FROM SEEPING INTO THE SOIL AFTER MELTING. A SIMILAR MECHANISM IS USED HERE WHERE IT IS STORRED INSIDE THE HOLLOW STEM IN ROOM TEMPERATURE.

* *PIEZO ELECTRIC CELLS*

MECHANICAL ENERGY IS CONVERTED INTO ELECTRICAL ENERGY WITH THE USE OF CRYSTALS. WHEN PEOPLE WALK ON THE PATHWAY, THAT MECHANICAL ENERGY IS ABSORBED BY THE PIEZO CRYSTALS WHICH IS THEN CONVERTED TO ELECTRICAL ENERGY.

***ENVIRONMENTAL IMPACT SUMMARY***

THE STRUCTURE CONSISTS OF RENEWABLE AND EASILY SOURCED MATERIALS. THE MAIN BODY OF THE STRUCTURE IS MADE OF ALUMINIUM. ALUMINIUM IS A LIGHTWEGHT, STRONG AND HIGHLY RECYCLABLE MATERIAL. IT REFLECTS AROUND 95% OF SUNLIGHT WHICH DRASTICALLY INCREASES ENERGY EFFICIENCY OF THE STRUCTURE. ALUMINIUM HAS HELPED REDUCE CARBON EMISSIONS UPTO 40% IN COMPARISON TO USAGE OF OTHER MATERIALS LIKE CONCRETE. ALUMINIUM BEING 1/3RD THE SIZE OF STEEL, HAS BEEN PROVEN TO BE STRONG AND DURABLE AND AT THE SAME TIME IS ACCOUNTABLE FOR 1% OF GOBAL CARBON EMISSIONS WHEREAS STEEL IS RESPONSIBLE FOR 8%.

THE CURVED PETAL LIKE FORM HAS A SLOPE WHICH ALLOWS FOR SNOW AND RAIN TO SEEP INSIDE THE HOLLOW STEM OF THE STRUCTURE. THIS CAN THEN BE STORED IN THE FORM OF WATER AND USED TO DOMESTIC OR IRRIGATION PURPOSES. SNOW HARVESTING IS A RELATIVELY NEW IDEA WHICH ALLOWS WINTER SNOW TO BE REPURPOSED DURING SUMMER.

AROUND THE MAIN STEM OF EACH STRUCTURE IS A SEATING PROVIDED. EACH OF THESE SEATINGS ARE MADE OF STRUCTURAL LUMBER WHICH USES RECYCLED PLASTIC AS THE MAIN INGREDIENT. USING PLASTIC INSTEAD OF WOOD COMES WITH ITS OWN SET OF INDISPUTABLE ADVANTAGES AS IT DOES NOT NEED PRESERVATIVES TO PROTECT IT FROM THE WEATHER AND INSECTS WHEREAS POLYETHYLENE IN RECYCLED PLASTIC DOES THE SAME. IT IS AN INGENIOUS, NONTOXIC MATERIAL INVENTED BY THOMAS NOSKAR. HE FOUND THE ONE MAIN CON OF PLASTIC (DOES NOT DEGRADE) AND USED IT TO HIS ADVANTAGE. THIS MADE IT STRONGER AND MORE DURABLE.

***ENERGY PRODUCTION***

* *PHOTOVOLTAIC SOLAR CELLS*

AREA OF ONE PHOTOVOLTAIC CELL:

1. DIAMETER= 0.45M

AREA= 0.16 SQ.M

1. DIAMETER= 0.37M

AREA= 0.11 SQ.M

1. DIAMETER= 0.30M

AREA= 0.07 SQ.M

1. DIAMETER= 0.22M

AREA= 0.04 SQ.M

SURFACE AREA:

1. (20x 0.16) = 3.2 sq. m 🡪 **3200 WATTS**
2. (20x 0.11) = 2.2 sq. m 🡪 **2200 WATTS**
3. (20x 0.07) = 1.4 sq. m 🡪 **1400 WATTS**
4. (20x 0.04) = 0.8 sq. m 🡪 **800 WATTS**

NUMBER OF PHOTOVOLTAIC CELLS IN ONE STRUCTURE= 80

ENERGY PRODUCED BY 80 PHOTOVOLTAIC CELLS= (3200+2200+1400+800)

= **7600 WATTS** PER STRUCTURE

EFFICIENCY IS 40% BASED OF THE FIELD GUIDE

TOTAL ENERGY PRODUCED BY ONE STRUCTURE= 40% OF 7600 WATTS

=3040 WATTS

TOTAL NUMBER OF STRUCTURES ON SITE= 50

TOTAL ENERGY PRODUCED= 50 x 3040

= **1,52,000 WATTS**

**=152 KW**

* *ORGANIC PHOTOVOLTAIC (OPV OR OSC)*

AREA OF ONE PETAL= 2x 4= 8 sq. m

NUMBER OF PETALS IN ONE STRUCTURE= 6

NUMBER OF PETALS IN 50 STRUCTURES= 6x 50= 300

AREA OF PETALS IN 50 STRUCTURES= 8 x 300

=2400 sq. m 🡪 **2400 KILOWATTS**

EFFIENCY IS 20%

TOTAL ENERGY PRODUCED= 20% OF 2400

= **480 KILOWATTS**

* **PHOTOVOTAIC CELLS + OPV** = 152+480 KILOWATTS

**632 KILOWATTS** PRODUCED IN A DAY

*ENERGY PRODUCED ON AN ANNUAL BASIS*

TOTAL ENERGY PRODUCED IN ONE DAY= 632KW

TOTAL ENERGY PRODUCED IN A YEAR= 632 x 365

= 2,30,680 KW per year.

*MATERIALS AND COST:*

* ***ALUMINIUM***

THIS SUSTAINABLE AND RECYCLABLE PRODUCT IS COST EFFECTIVE AND EASY TO MAINTAIN. IT COSTS AROUND 1800 USD PER TON.

* ***PLASTIC LUMBER***

IT IS MADE OF 100% RECYCLED PLASTIC AND IS BUDGET FRIENDLY FOR THE SAME REASON. IT ALSO CUTS DOWN PLASTIC WASTE. THE PRICING VARIES FROM 10-100 USD PER PIECE DEPENDING ON THE SIZE.

* ***PHOTOVOLTAIC CELLS***

THE PRICE OF PHOTOVOLTAIC MODULES IS AT AN AVERAGE OF 0.21 USD PER MODULE.

* ***PIEZOELECTRIC DISCS***

THESE DISCS START FROM A PRICE RANGE OF 12 USD.