**WINDCATCHER PROJECT**

Inspiration for this design is extracted from windcatchers in warm and desert areas.

Due to extreme differences in temperatures in night time and daytime windcatchers in these areas are used to regulate temperature indoors both during day time and night times , in which during day time warm airflow is cooled via pools of underground waters and in night time cold airflow is regulated via the same pools which absorbed heat during the day and now act as heaters in regards of temperature control and create warm airflow inside the building. Also during winter these windcatchers are closed to lower the energy waste. Suggested material for building such design is clay for it has been used in previous old windcatchers talked about before . In flying ranch project the method of construction is via 3d printing.

This design serves as both long term stay and short term stay solution.

It can also be used in other facilities such as labs , classes , work places and etc.

As a result of the direction of dominant wind pattern being north-westward , windcatchers are faced in this direction for optimal performance and reduction of required HVAC systems.

In this design pattern each building is considered a module and 6 of these modules are placed together to form a hexagon which gives room to crate gardens and vegetation areas in the middle of this hexagon enhancing the preferable weather condition. Watering these gardens are conducted via underground water resources.

**STONE MOTHER**

Project outlook is not long termed.

Inspiration behind this project was stone mother basket which i located in the museum and in remembrance of it the project was named after it.

In this project a central tower is needed which the drones are installed on.

In this tower is used highly polished parabolic reflecting surfaces that focus sunlight onto a highly-efficient Striling engine which converts heat into mechanical energy with high efficiency. The mechanical energy is converted to electricity with a permanent magnet generator.

This type of concentrated solar thermal electricity installation rivals the best efficiencies of concentrator photovoltaic systems per similar land area and relies on simple mechanical technologies as opposed to semiconductors and microelectronics. The Stirling engine is a type of external combustion engine of the reciprocating piston variety. The engine works on the principle that gas expands as its temperature increases. Expansion and contraction cycles will move a piston back and forth within a closed chamber. A magnetic piston moving through an electromagnetic field becomes a linear alternator, thus producing an electric current.

Purpose of this central tower is not only to create energy but to conserve energy which leads to recharging of drones and fulfillment of water depots in the same place.

Water resource need for this project are refined underground waters which later on are transported into the drones.

Later on these drones , once fully charges and filled with water , in the time of needs are detached from the central tower and take the responsibility of watering the area and after doing so then they return to the tower.

CONVERSION EFFICIENCY = power out = 32% electrical energy

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 solar power in

**WHEEL OF NATURE**

The circular form of this project is taken from life cycle that explains energy comes from nature and return to it .

In this system is used PVT technology .

This design not only is used for creating energy but it also is considered as an artwork and is seen as an element in the flying ranch project in which via PVT technology maximum usage of solar panels is achieved.

In the design of this artwork and energy tower pipes have structural values and add to the stability of the solar panels which create electricity as well as heating the water depots.

these integrated systems capture the waste heat energy generated from the inefficiency of the photovoltaic energy conversion process, and store it in a heat transfer fluid such as water for direct use. PVT systems help to cool the operating temperature of the PV cell (which increases its conversion efficiency to electrical power) while providing hot water for domestic consumption at temperatures of approximately 80 °C. This water would otherwise require external energy (most likely derived from fossil fuels) to heat it. Combined heat and power (CHP) systems use concentrated solar power, which can be achieved by various methods described in the pages above such as parabolic trough, parabolic dish, or linear Fresnel reflector. Heated water can be used directly in domestic systems or can be heated again to produce steam (lowering the input energy required of the parallel system).

CONVERSION EFFICIENCY = power out = UP TO 80% (20% electrical energy + 60% heat energy )

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 solar power in

**PEACE FOOTPRINT**

This design can be used in different variety of social and gathering facilities such as art galleries , performance institutes , restaurant , cafés and etc .

The technology used on the shell of this project is Crystalline silicon .

There are two type of crystalline silicon (C-Si) :

monocrystalline (mono-Si) and polycrystalline, also known

as multicrystalline (multi-Si).

Monocrystalline is expensive to manufacture because it requires cutting slices from cylindrical ingots of silicon crystals that are grown with the Czochralski process, but it is the most efficient crystalline silicon technology in terms of energy conversion. Polycrystalline is easier to manufacture and can be cut into square shaped slices, but has slightly lower efficiency (approximately -5%). It is comprised of small crystals or crystallites.

Since monocrystalline types are the more expensive option and are required in more quantities they are not economically desirable. Therefore in this design multicrystalline types were used to reduce the cost and achieve the required energy levels.

In order to construct lower crust level 3d printing technology is used with the usage of low carbon concrete as the main material .

CONVERSION EFFICIENCY = power out = 18%–23% electrical energy

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 solar power in