11th EUSCIAN Science & Technology Fair 2018

Engineering University School & College, BUET Campus, Dhaka-1000

Presenting an Exceptional Electricity Power-Plant Model on,

Solar Energy

A Hopeful Aspect of Our Future Energy Source

Solar or Nuclear ?

What will be energy source of the future world – nowadays it is a great question to us. Can we think about a solar power plant instead of our traditional Uranium-based nuclear power plant?

Unbelievably it is true that, a solar plant can produce almost same amount of electricity to a nuclear plant.

Overview of the Project

Apart from our traditional solar-panel, we would like to introduce a new formula to generate AC electricity. We calculated that about half of nuclear energy, are gotten from every 314.15 square meters in this way.

We will place this plant in the cost area of the Bay of Bengal, and will not get only electricity, but will also get pure drinking water and salt.
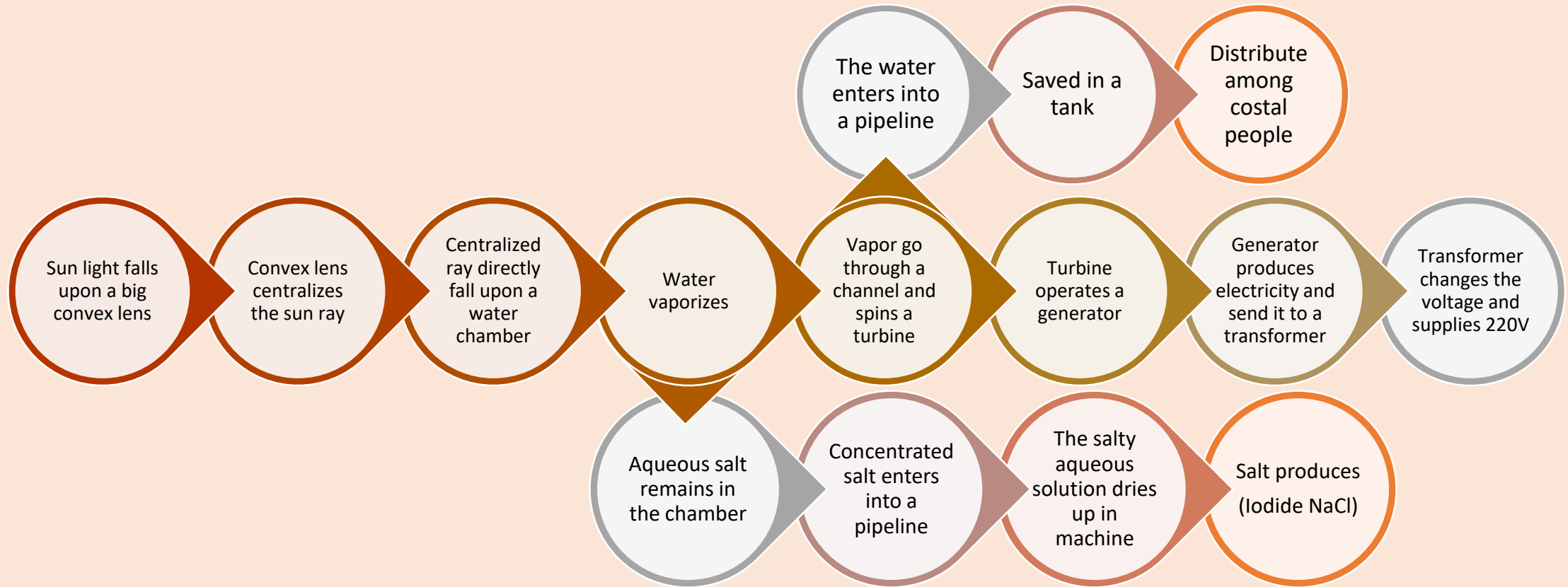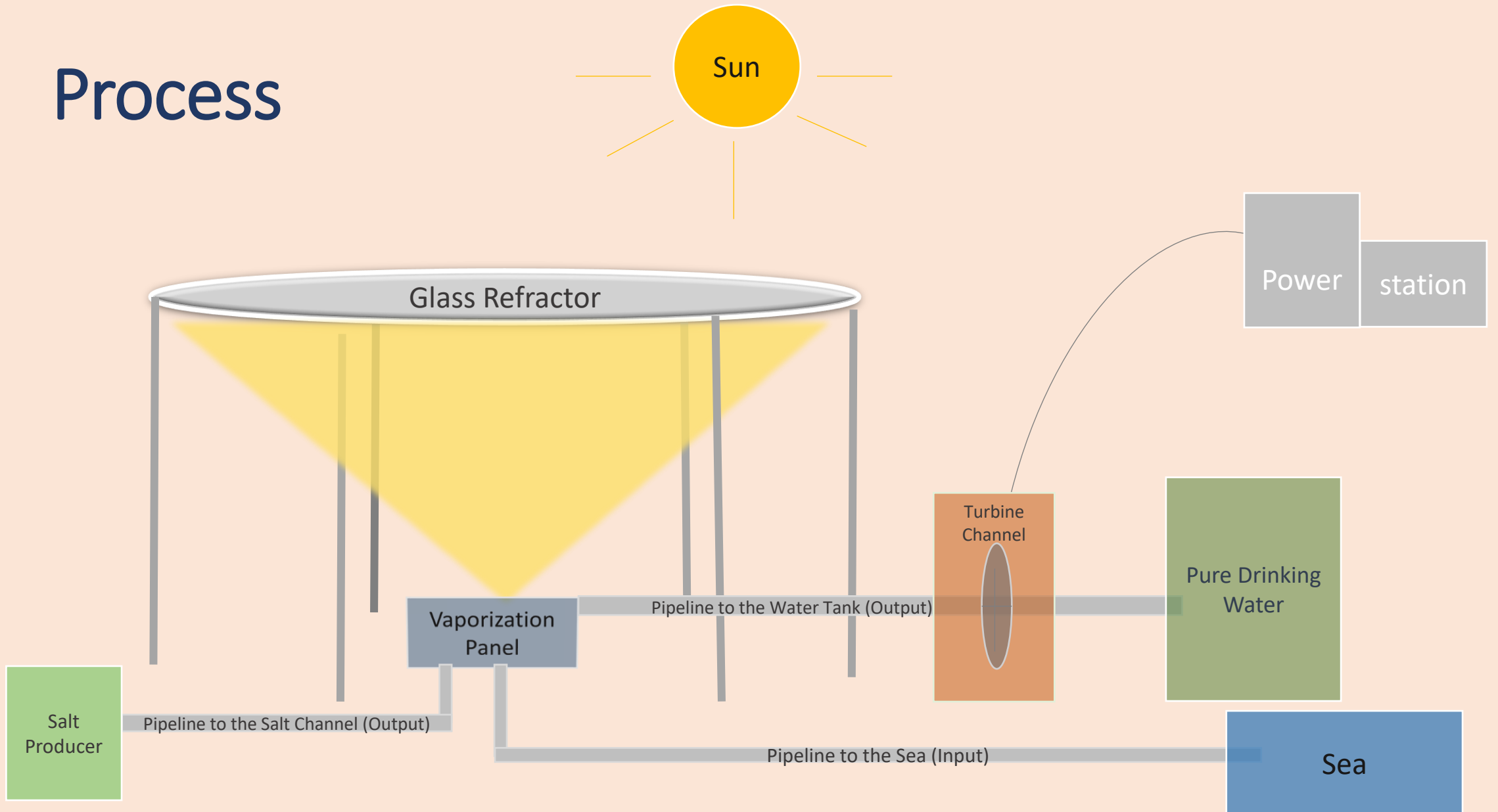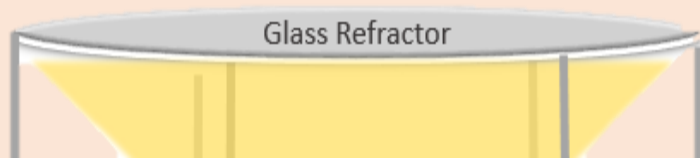
Procedure

Sun light falls upon a big convex lens → Convex lens centralizes the sun ray → Centralized ray directly fall upon a water chamber → Water vaporizes

Water vaporizes → The water enters into a pipeline → Saved in a tank → Distribute among costal people

Water vaporizes → Aqueous salt remains in the chamber → Concentrated salt enters into a pipeline → The salty aqueous solution dries up in machine → Salt produces (Iodide NaCl)

Vapor go through a channel and spins a turbine → Turbine operates a generator → Generator produces electricity and send it to a transformer → Transformer changes the voltage and supplies 220V

Diagram: Procedure of the plant

Process

Diagram: The Initial Process of the Plant

How it works?

Glass Refractor

Vaporization Panel
Pipeline to the Water Tank (Output)
tput)
Pipeline to the Sea

We will use a Convex lens, radius of 10 meter, which will be the major instrument of this process. It will capture photon particles of $100\pi \approx 314.16$ sq. meters.

As sun delivers about 1000 J energy per square meter per second, the lens will centralize $1000 \times 314.16 = 314160$ J at "Vaporization Panel".
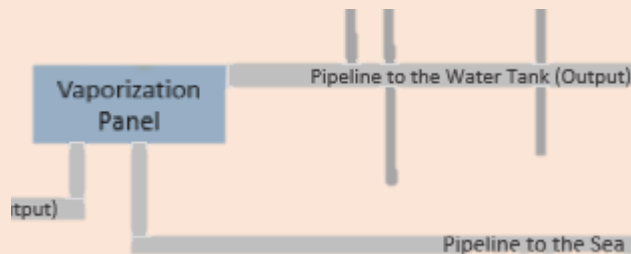
1 kg 30ºC water needs $4200 \times 70 + 2268000 = 520800\ J$ energy to be vaporized. So, 314160 J can vaporize $\frac{314160}{520800} = 0.60$ kg water

The Turbine Mechanism
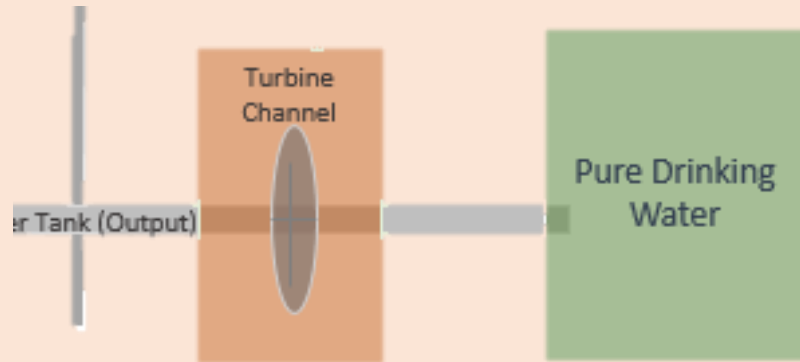
About 0.6kg vapor comes from the chamber and then enters into turbine channel. 0.6kg vapor = $\frac{0.6}{0.032}$ =19 mole vapor.

The turbine rotor will be 0.4m in radius. So there will pass $\pi 0.4^2 \times .04 = 0.2 \; m^3$ vapor in a second. Now applying, PV=nRT implies that we have to put 286708 Pa = 2.9 atm pressure on the vapor to rotate the rotor at maximum speed. If we use a 600MW rotor. We'll obtain 600× 85% = **510MW** electricity per second which occupies about half of a nuclear plant.

Output Processing

Electricity

Outputs

Drinkable Water

Salt
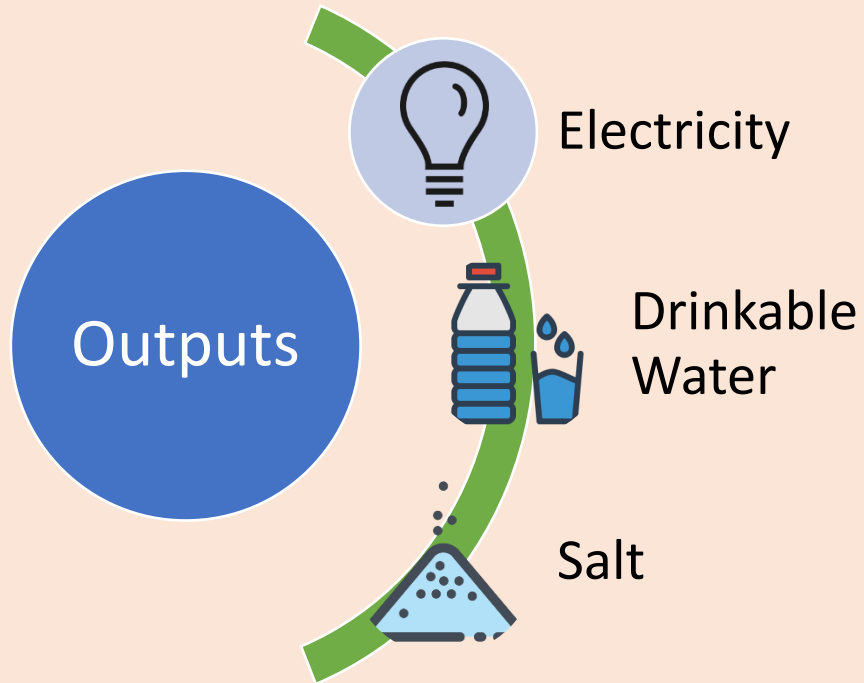
Our main output is electricity, which will be sent to power station, will go through a 440V transformer to supply it in consumer stage.

Coastal area suffers much in a lack of water. Vapor starts loosing their heat after passing through turbine. This water is safe, and can be stored in a tank.

Semi-crystalized salt can be collected by a duct and which can meet our salt demands.

Why Solar, not Nuclear?

The more amazing fact is that, we can use it in rural area for household purpose, as salty water is not mandatory for this project !
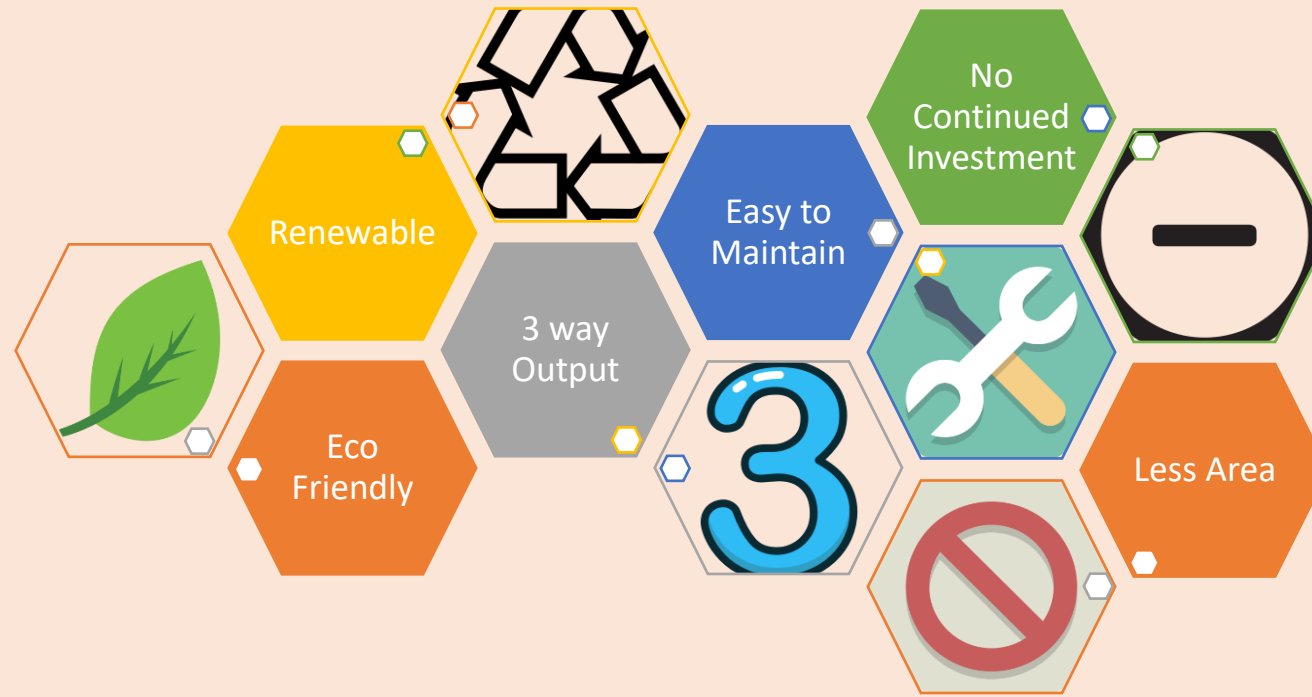
With Special Thanks

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