OSMO-E: 24/7 clean energy power source adaptable design to serve as individual household power source or as community based power source depending on its size.

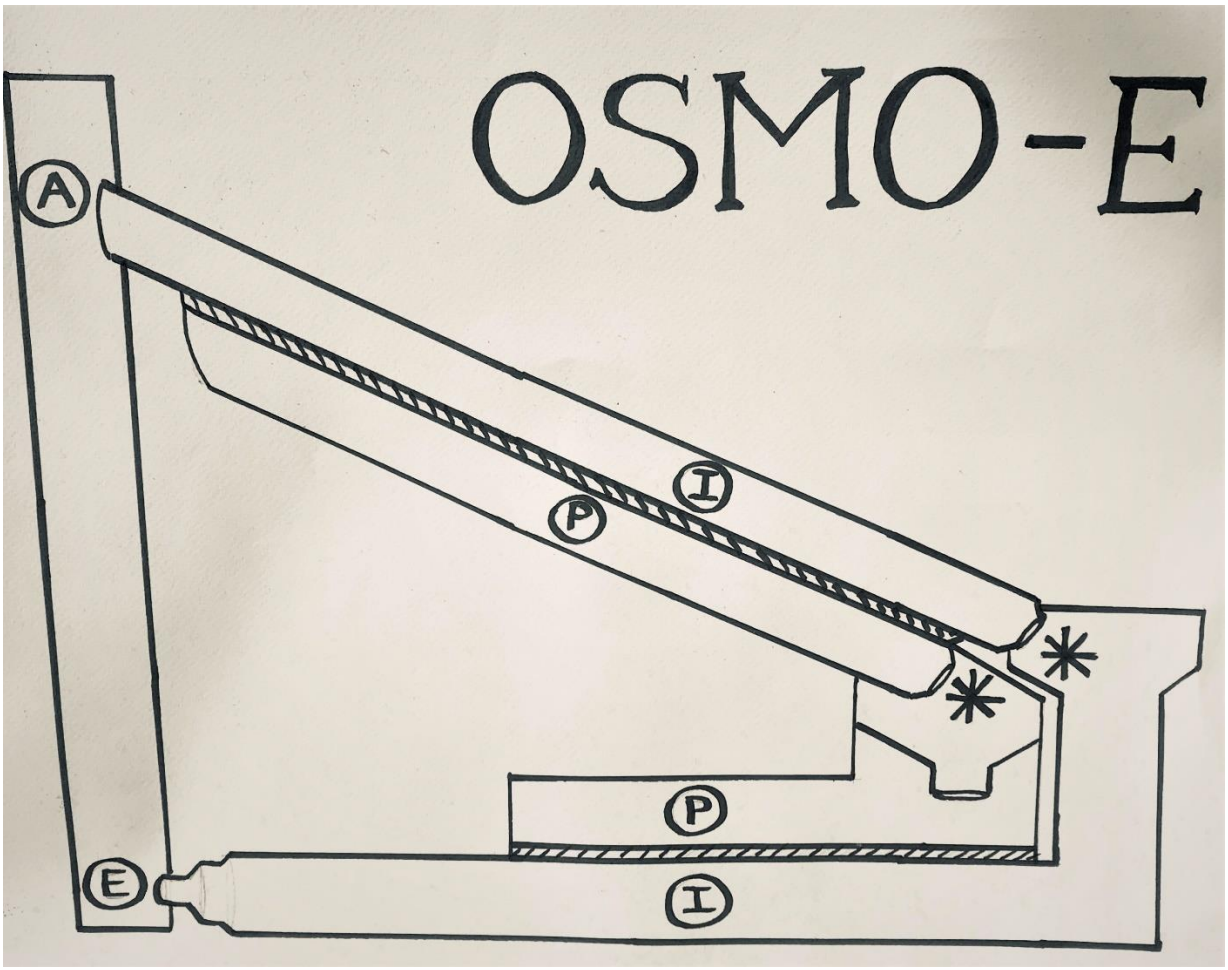
Abstract:

Clean renewable energy available so far have the limitations of not being available 24 hours a day 7 days a week. The innovative concept I have called “Osmo-E” works like a mini-hydroelectrical plant without the need of bodies of water as its source of running water. Water instead is cycled through pipes with the help of a little laws of physics such as gravity, osmosis, reverse osmosis and Poiseuille's Law. In theory Osmo-E is capable of running 24/7 thus serve as an adjuvant to other renewable energies in either Nano grids suppling homes or apartments or a micro grid suppling small communities or apartment buildings as its design is size-adaptable to the amount of energy needed to produce.

Article:

Mode of Distribution of Electricity: The way I see it, we have 3 options to decide from:

1. Make every household off grid with its own clean energy power source.
2. Make each community have its own clean energy power source and distribute electricity to its residents similar to the power-grid we currently have, but divided into multiple individual smaller community clean energy power plants. Thus there will no longer need power-grids between communities so less loss of energy in transporting energy. Osmo-e could potentially work in any location if equipment is maintained above freezing temperatures, thus work well in places where solar or wind clean energy are not an option. Osmo-e can also be added as an adjunct to solar and wind clean energy power plants if needed.
3. A combination of options 1 and 2, by making off grid households optional to community based clean energy power plants.



DESIGN:

The main design in OSMO-E is to take the concept of a hydroelectrical plant and making it have a liquid flow in cycles within pipes due to reverse osmosis, osmosis and gravity. It's also an adaptable design making the size adaptable to the need. Thus having a head of at least 3 meters long being adaptable for hospital needs or much larger heads to fill the needs of a bigger institution. Basically the length of the head will be proportional to the amount of energy produced by Osmo-E.

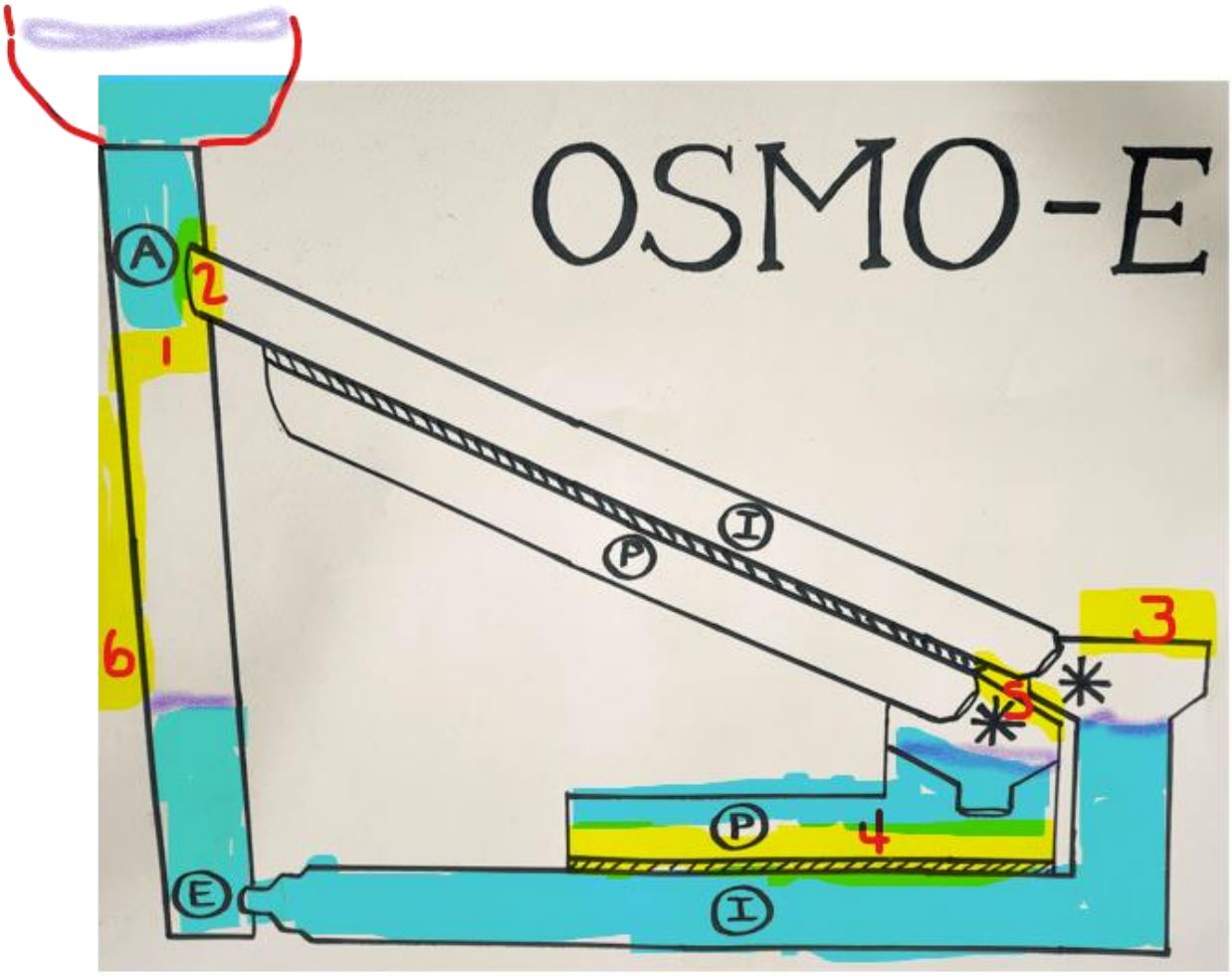
Osmo-E could work 24 hours a day 7 days a week, hence its ability to work during the night time and during cloudy days gives it an advantage over solar energy.

The idea is similar to a hydroelectric plant, but in this case the water is cycled within the pipes by means of simple diffusion and gravity. The concept of the

idea was based on how blood is transferred throughout the body, cycling throughout the body via arteries with the forces of gravity and osmosis guiding it along the way. Since arteries are like interconnected tubes, I thought maybe electricity can be made from such design. The rest of the design was based on how to use osmosis, gravity and Poiseuille's Law to make the flow circulate in cycles. The goal is that the solution consisting of water and a solute at point A will be rushed down the head and be filtered at the same time by a semi-permeable membrane via cross-flow reverse osmosis membrane (although other membrane can be used depending on costs and choice of solvent).

Once down the head of at least 3 feet long, the water should hit both turbines at the end of both pipes. NOTE: The head should be at least 3 feet long in order for the water to produce enough pressure on the turbines to produce a significant amount of electricity. The cross flow RO membrane will separate the 2 pipes allowing the solution to allow the flow of water through but not the solutes. The filtered water that crossed the membrane is now in the pure water compartment "P". The water that rushed down the head without being filtered is the unpure compartment "U". These two compartments are kept separated until they are united once more by a semipermeable membrane, but this time an osmotic membrane where the solvent will flow from high concentration to low concentration. Thus pure water will dissolve the solute in the unpure compartment, thus increasing hydraulic pressure while doing so. This should increase the pressure enough to cause the water to run through the exit pipe and end up in point "E". Completing therefore the cycle as the water returns to the compartment it started in so it can fall back down the head over and over again…

NOTE: The pipes change their radius in the design as a means to increase or decrease the pressure.



Locations of Latches: 1-6

Before initiation of OSMO-E:

- Latches 1, 2 and 4 are closed.
- The head will have no solution in both P and I compartments.
- The tube below the point 3 will have solution with solute but will be filled with water reaching below the turbines. Water with solute will also be in the tube with point E, but won't reach until point A.
- The P compartment below the point 5 will have solution without solute but will be filled with water reaching below the turbines. Latch 4 will be closed and keep osmosis from occurring until it opens upon initiation of OSMO-E.

- Latch 6 is a series of small latches located on the side of the tube with point E right above the surface of the water in the tube. Each will start off open and close once water reaches its sensors shortly after opening latch 1.

NOTE:

Since latch 1 and 2 are closed water with solute above point A will remain stagnant until latch 2 opens first to allow solution with solute enter the head and start the reverse osmosis process. The air from the empty head will flow out of the open latches 3 and 5. Which should close once the head is filled and once the water reaches the turbines.

Initiation of OSMO-E

- Latch 2 and 4 open simultaneously. Latch 2 will allow solution with solute to enter the head and start the Reverse Osmosis process. The air in the head will exit through the latches 3 and 5. These latches close as water reaches the turbines. Simultaneously latch 1 will open allowing remaining water in tube A to fill the tube, air will exist latch 6 and once water reaches latch 6 it closes.
- When latches 1 and 2 are open the water should reach halfway the radius of the opening of the head and not go pass the opening so the amount of water in OSMO-E should be precise.
- The cycle of the water hopefully should initiate with this initiation process.

Created by: Dr. Michellie Hernández, MD

ADDITIONAL NOTE: I have not tested this project, it might also work with creating a pump system like the heart thus electricity generated might power the pump creating continuous flow of a liquid. Which got me thinking of possibly combining my concept with a pump and the research of generating power from continuous flow. https://pubmed.ncbi.nlm.nih.gov/16646485/