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Portable Flood Relief Unit: Using Nanofiltration and Hydroelectricity Generation

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Situation

Bangladesh is a flooding hotspot as 80% of Bangladesh is considered to be floodplain [1]. It also has an extensive sea coastline [2], putting the nation at a high risk of experiencing periodic widespread damage. On average, in Bangladesh, about 18% of the country is flooded annually. However, in severe cases, the percentage of the total area flooded can go up to 55% [3]. Majority of the country's population live in rural areas.

Problem

Flood Affects	Impact
Lack of Water	<ol style="list-style-type: none"> Inhabitants face difficulties to commute with ease and are stuck in their homes Floods pollute water supplies. Traditional methods of water purification cannot be implemented.
Lack of Electricity	<ol style="list-style-type: none"> Causes damage to electric grids (infrastructure) Floods lead to shortage of electricity

What is the Portable Flood Relief Unit?

A transportable unit contacting a water purification device and a hydrogeneration unit to produce electricity and clean drinking water in flood affected areas (Figure.1).

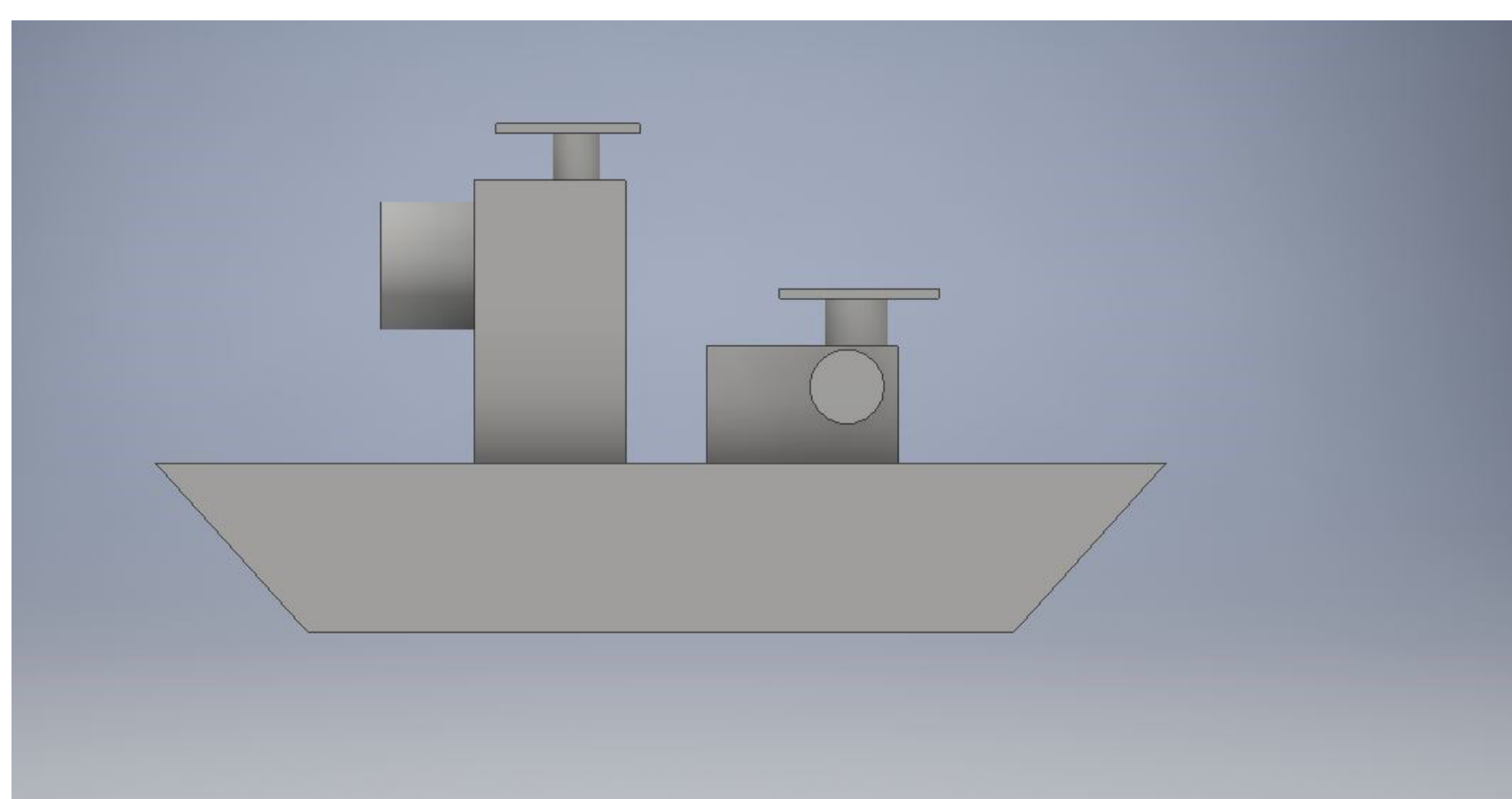


Figure 1. Portable Flood Relief Unit

Solutions

Water Purification:

Small scale photo voltaic nanofiltration will be implemented into PFRU [6]. The process of Nanofiltration will separate ions of sodium and chloride and other impurities from the contaminated flood water[4] (Figure. 2).

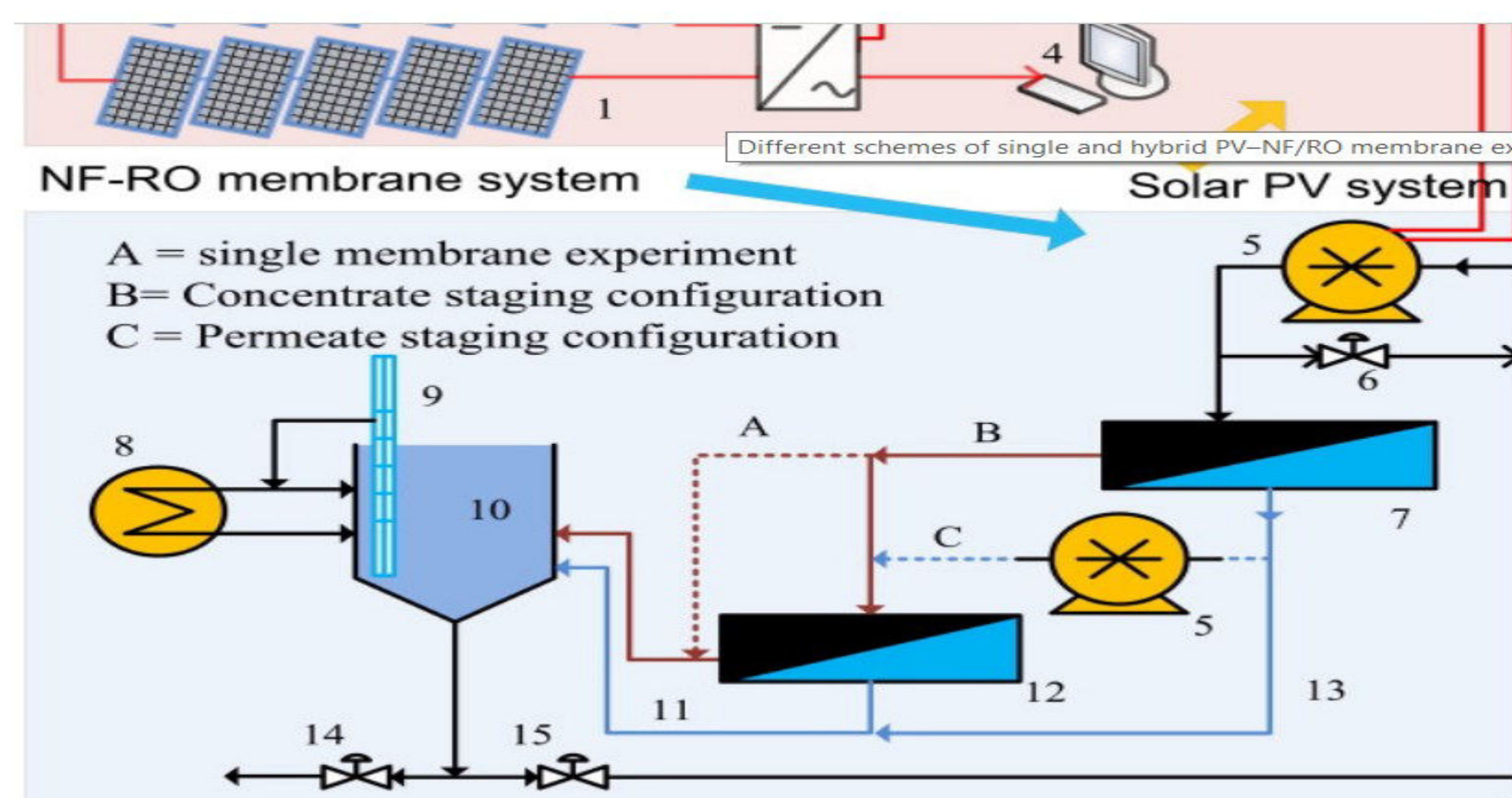


Figure 2. Small Scale Nanofiltration [6]

Electricity Generation:

A pump will be used to collect flood water. This water will be pushed against blades of a turbines connected to an electrical generator [7]. This generator will thus produce electricity.

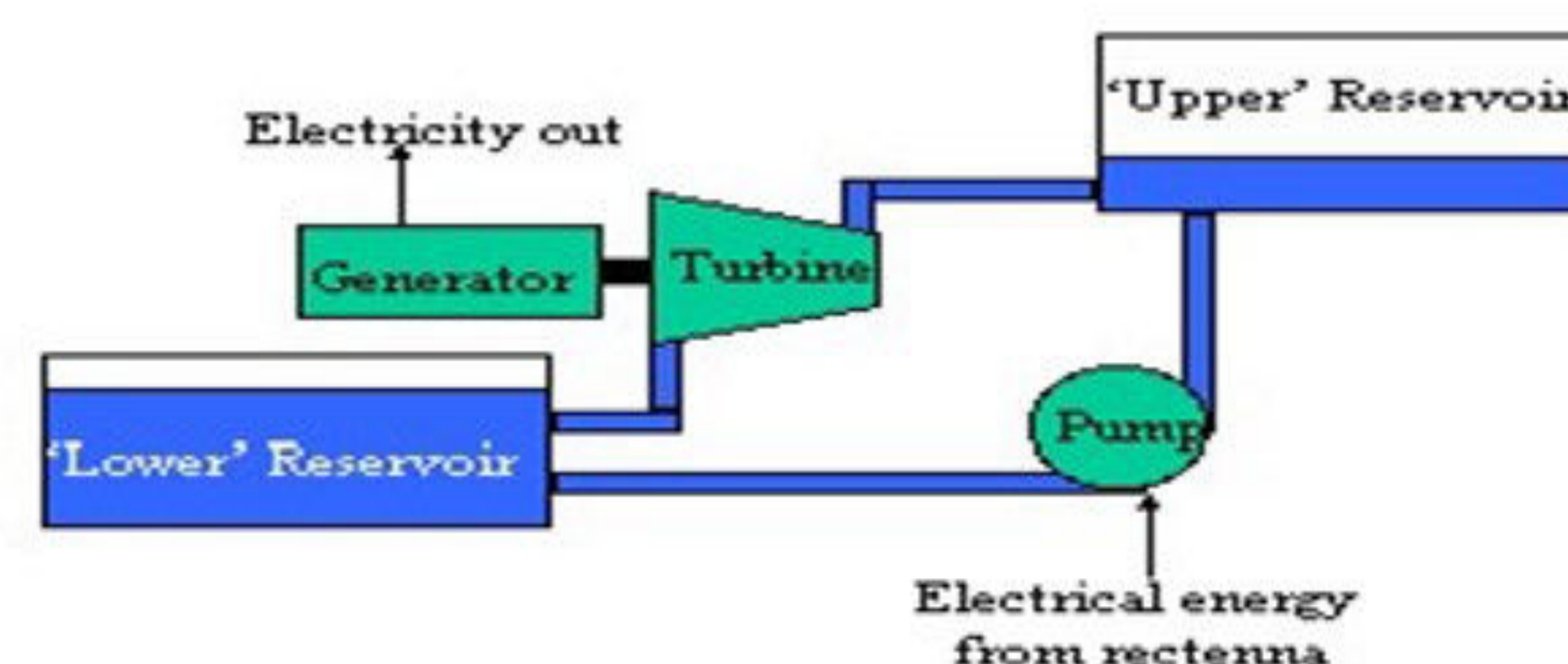


Figure 3. Hydroelectricity generator [8]

Portability:

PFRU will be placed on a boat. This will enable easy access to flood water for purification and easy distribution of purified water to the flood victims.

Evaluation

Monocrystalline Solar Panels:

- * 40 percent efficiency [5].
- * Powers both the Nanofiltration and Hydroelectric systems[5].

Nanofiltration:

- * Flood water to be purified using 10-15 nm diameter cellular membranes[6].
- * Necessary minerals and Disinfectant to be added to make water drinkable.
- * Mounted on a boat for maximum mobility.

Maintenance:

- * Solar panels maintained by local electricians.
- * Pumps and cellular membranes can be cleaned using household items.

Feasibility:

- *The PFRU unit would be too expensive for an individual to afford. It should be a community interest.

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