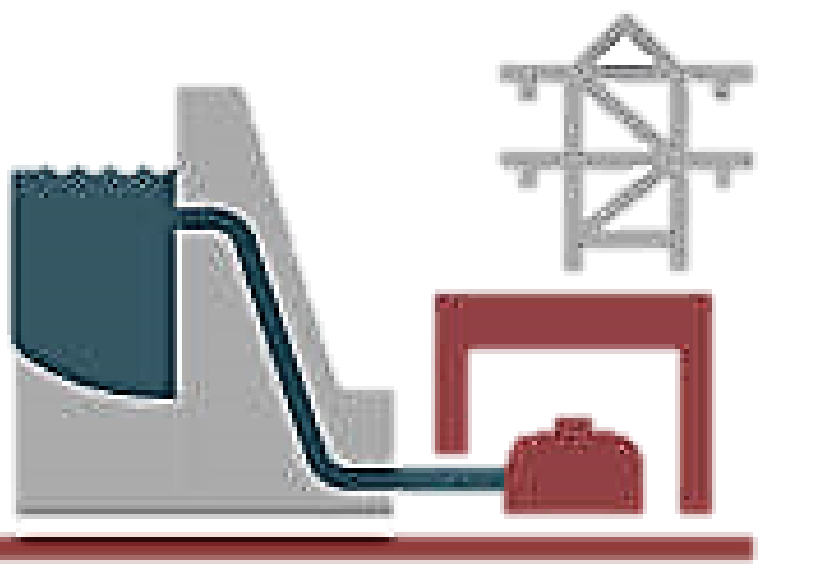
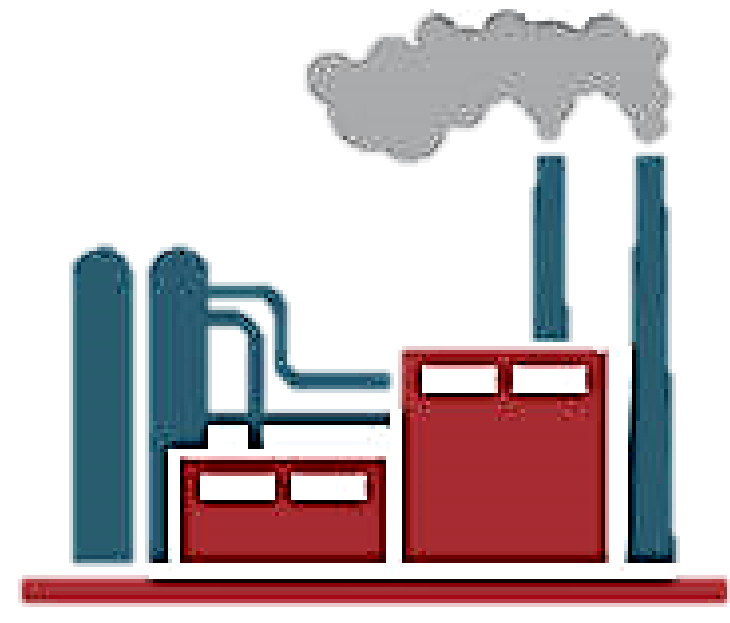


A Comparative Analysis between Energy Storage Based & Conventional Fuel Based Peaking Power Plant in The Context of Bangladesh



Abstract

This project is devoted to analyze the feasibility analysis of Energy Storage System (ESS) for replacing the peaking power plant. The aim of this research is to reduce the generation cost of per unit energy to satisfy the peak demand. And the reduction of the tariff of consumed energy during peak hour as well. Our daily load curve show that there is an imbalance between energy demand and conventional power plant's energy production. Peaking power plants has been built to balance the load curve. But due to high overhead cost the production cost is quite high. The goal of our project is to analyze the cost regarding peaking power plant, battery storage system and pumped hydro reservoir in detail, and establish the most economically feasible policy to meet the peak hour demand in the context of Bangladesh.

Objectives

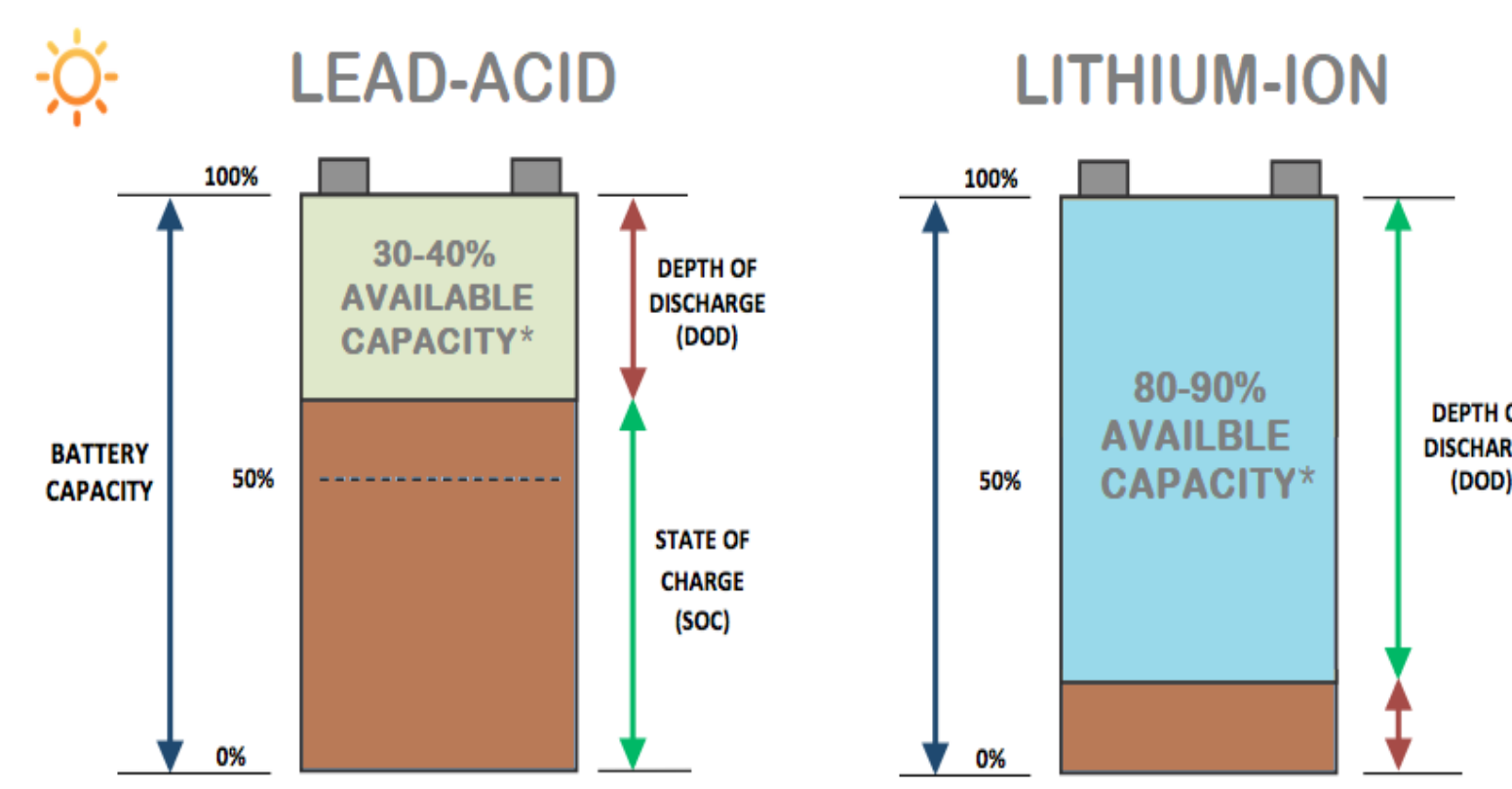
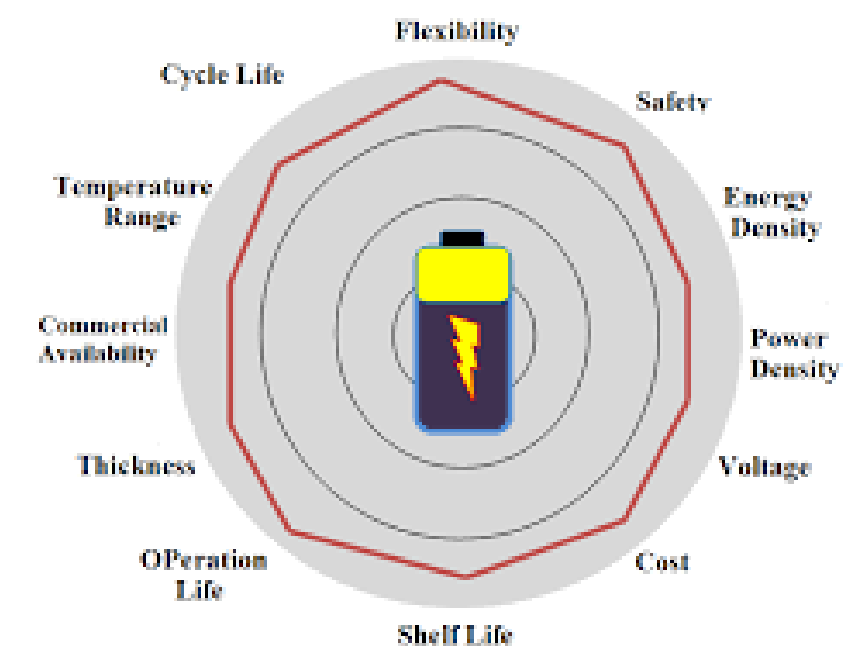
- Finding alternative cheaper options for peaking power plants
- Feasibility analysis for the possible options

Project Method

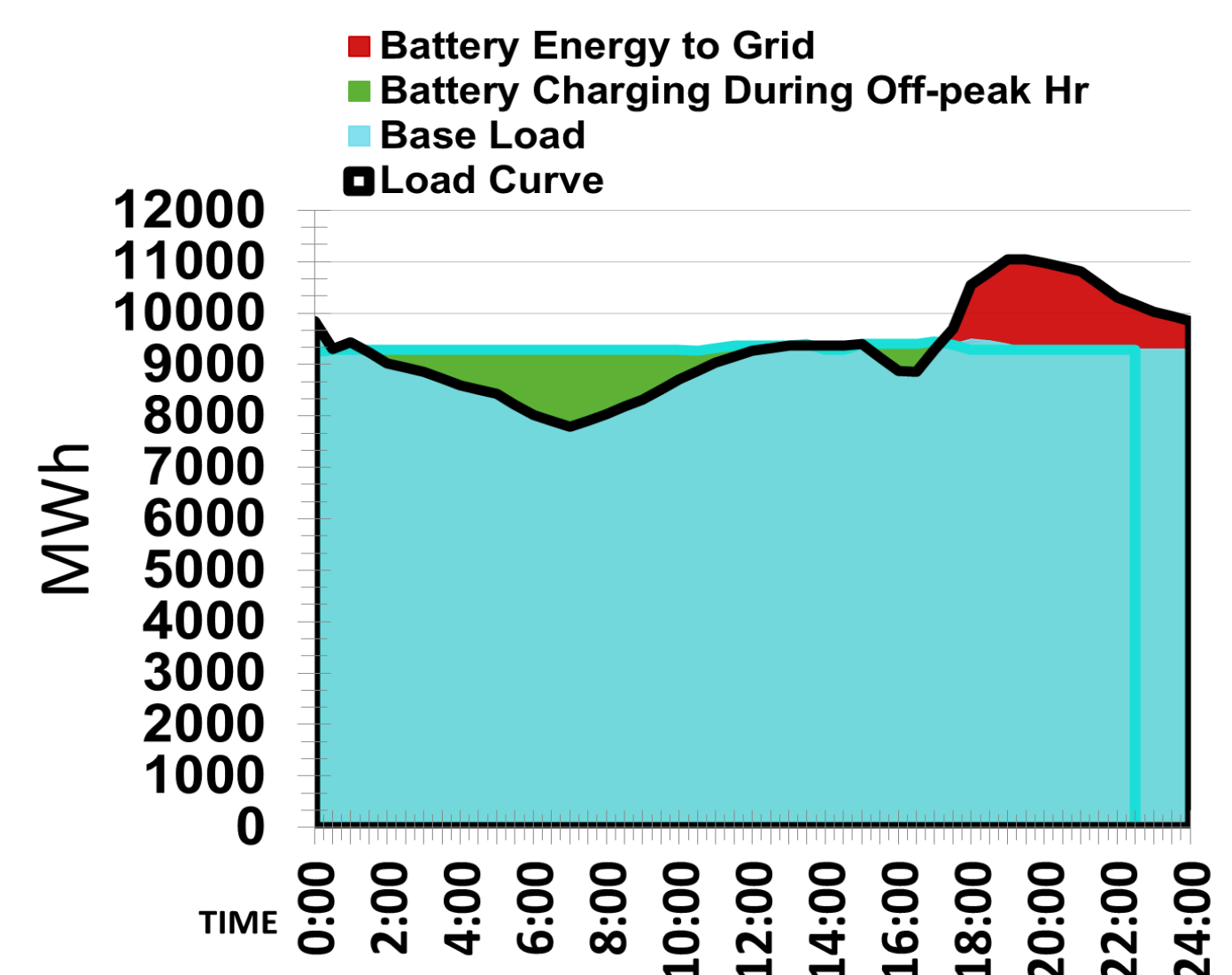
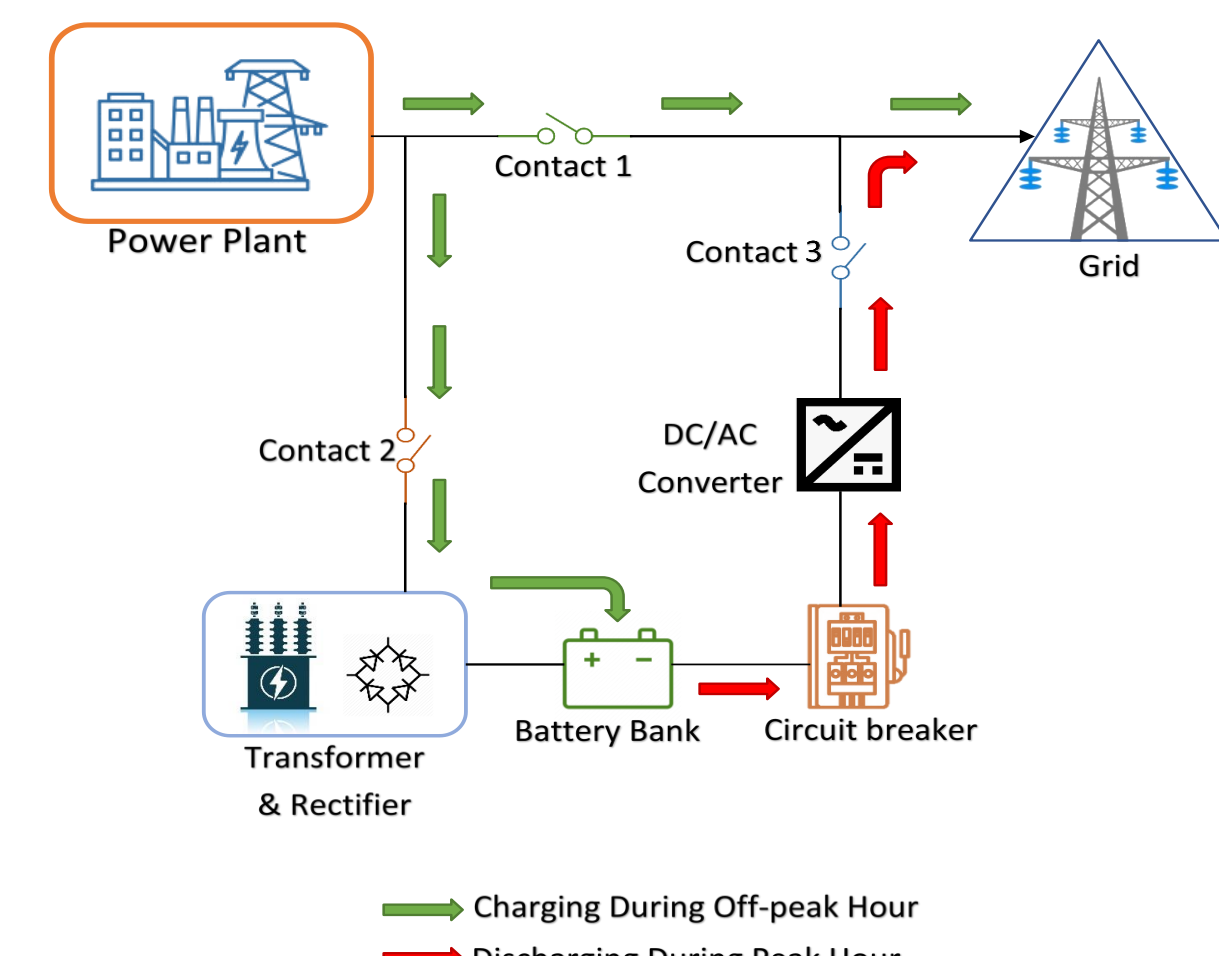
To achieve our goal, we analyzed the production cost of different fuel based peaking power plants. The observation implies that the higher overhead cost is the main reason behind high production cost. To replace these fuel based peaking power plants, Energy storage System could be a cheaper alternative.

Battery Energy Storage based peaking power plant

- Battery Selection Criteria
- Preferable Batteries for ESS Scheme

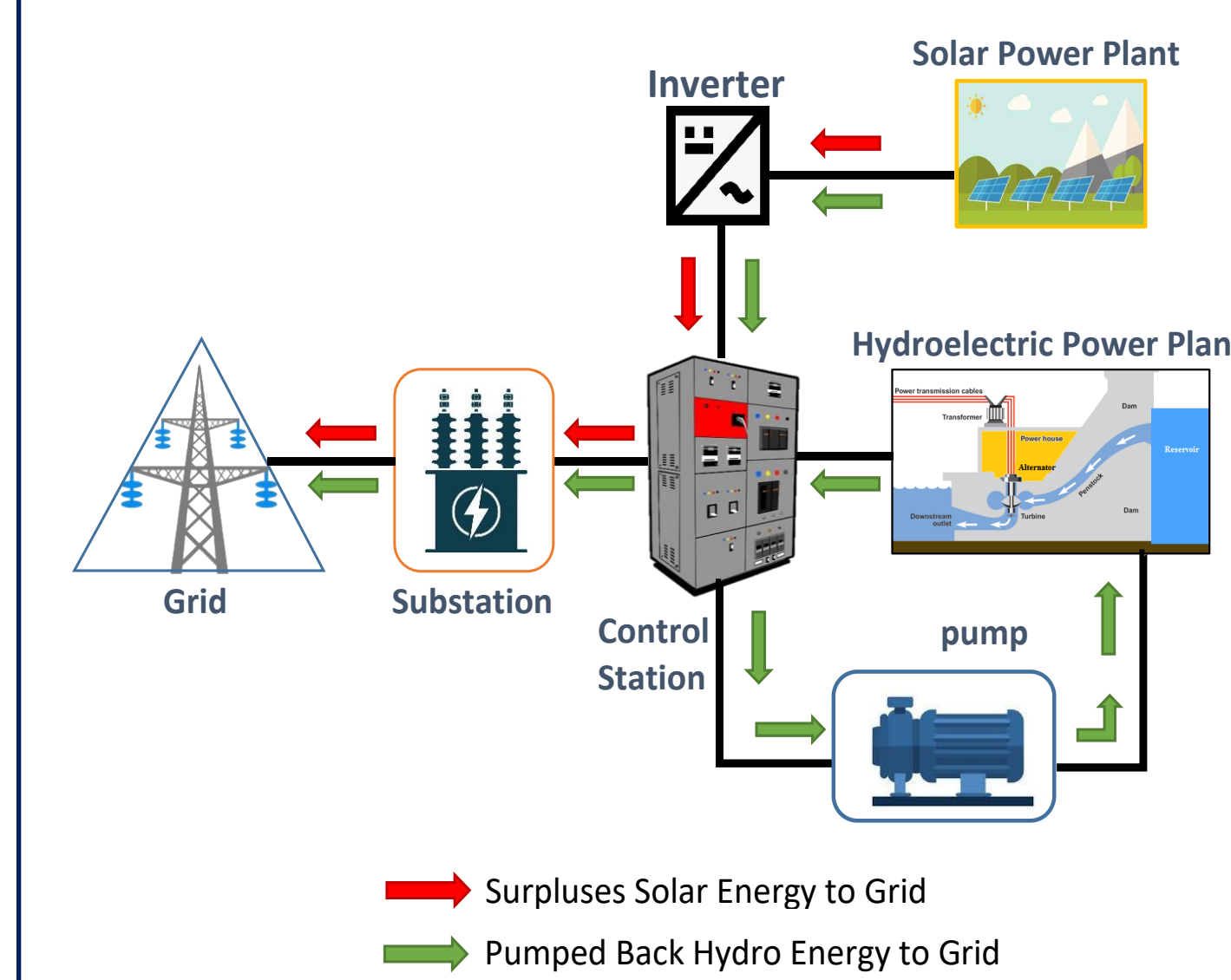
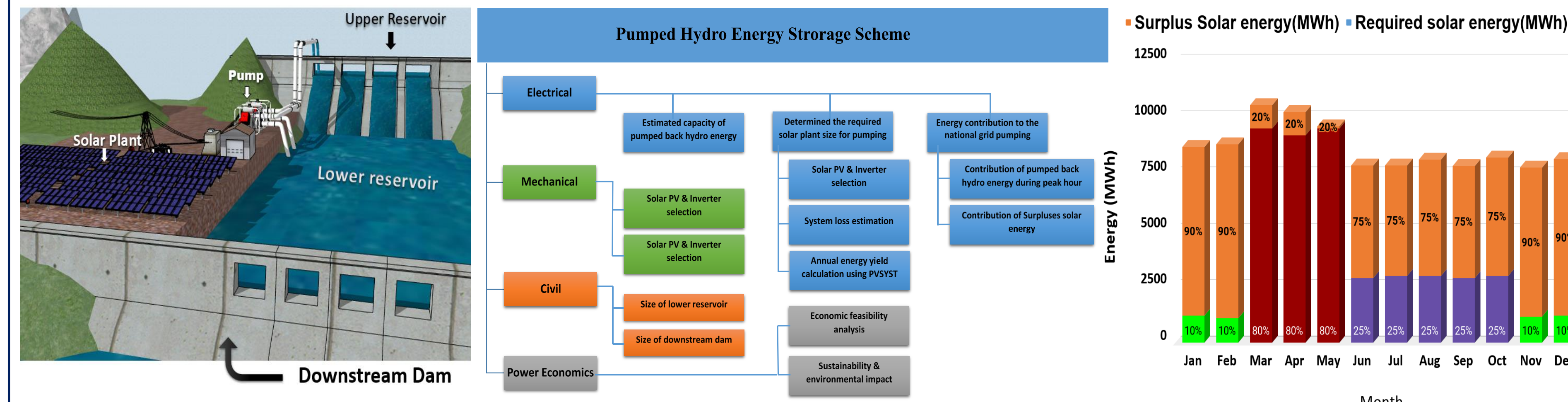


- Battery Energy Storage Scheme

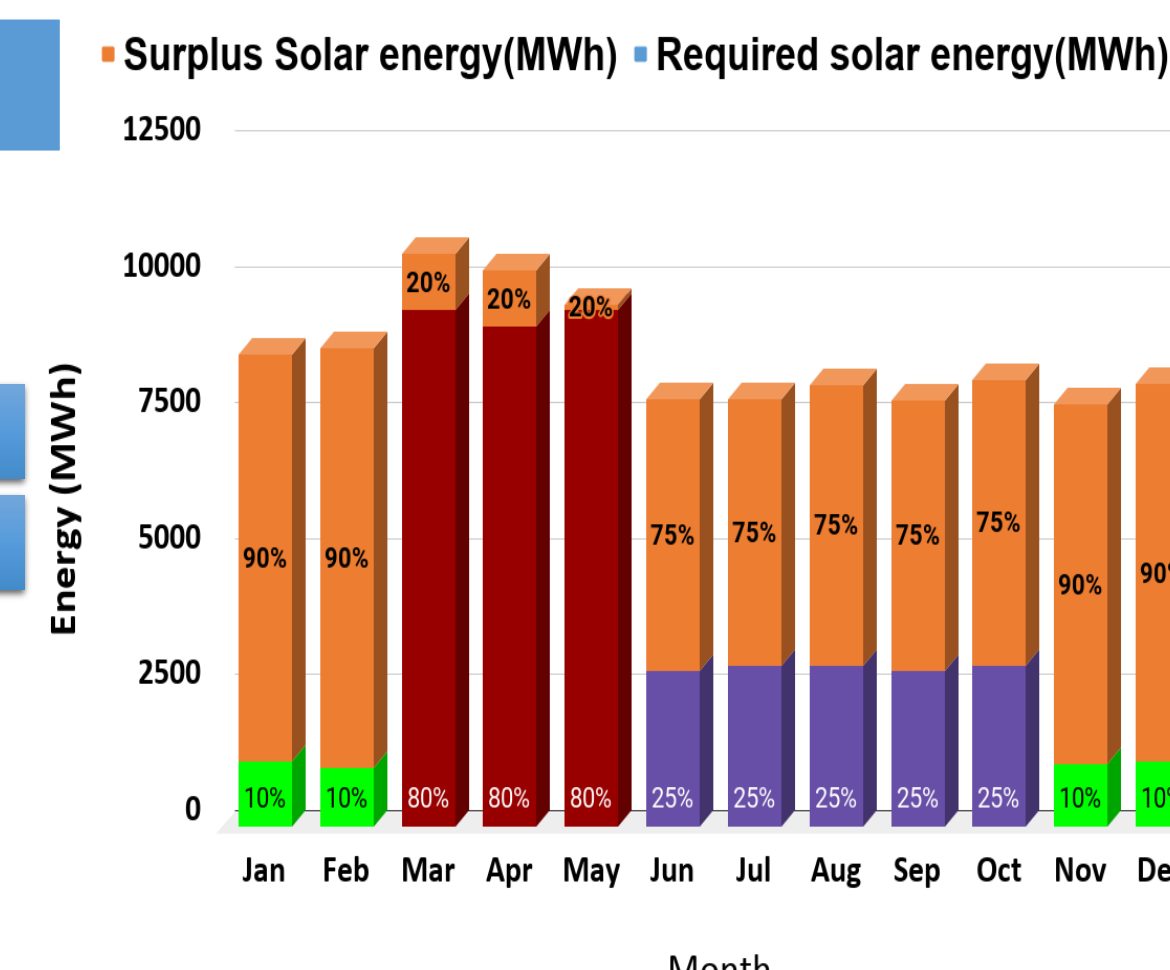
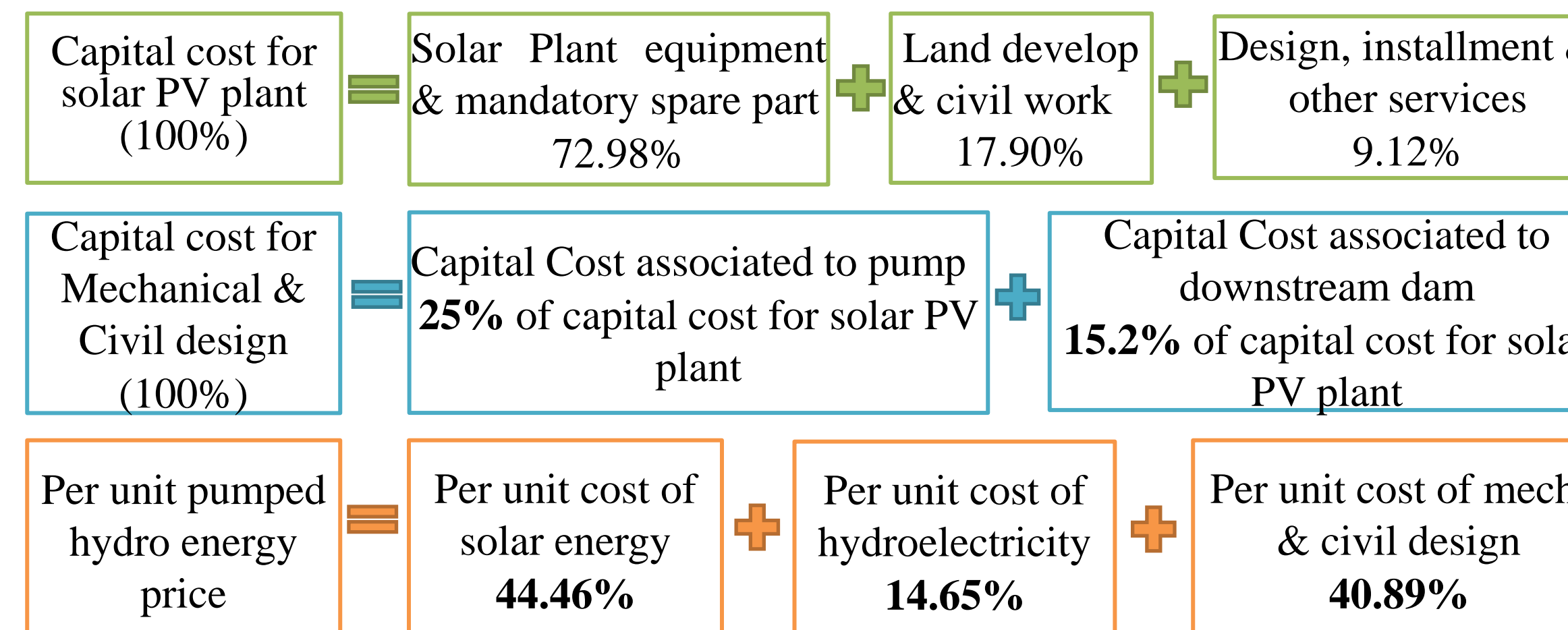


Pumped Hydro Energy Storage Based Peaking Power Plant

- Pumped Hydro Energy Storage Scheme

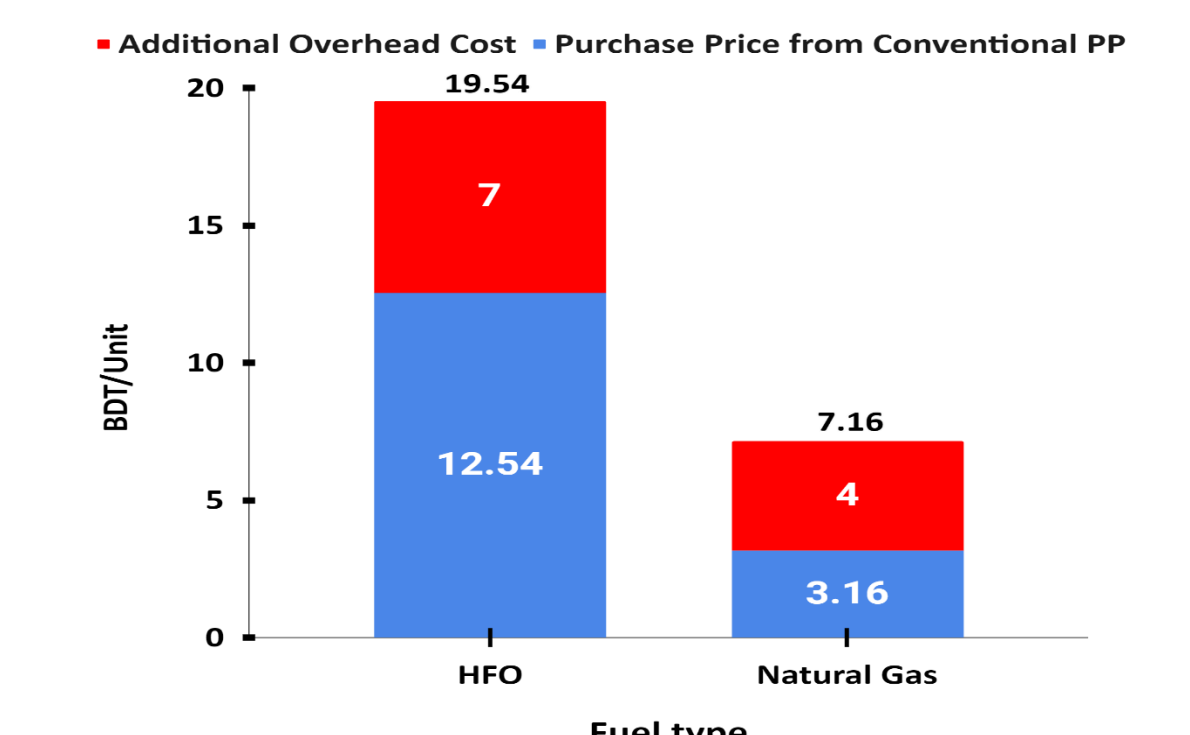


Pumped Hydro Energy Storage Scheme (cost break down)

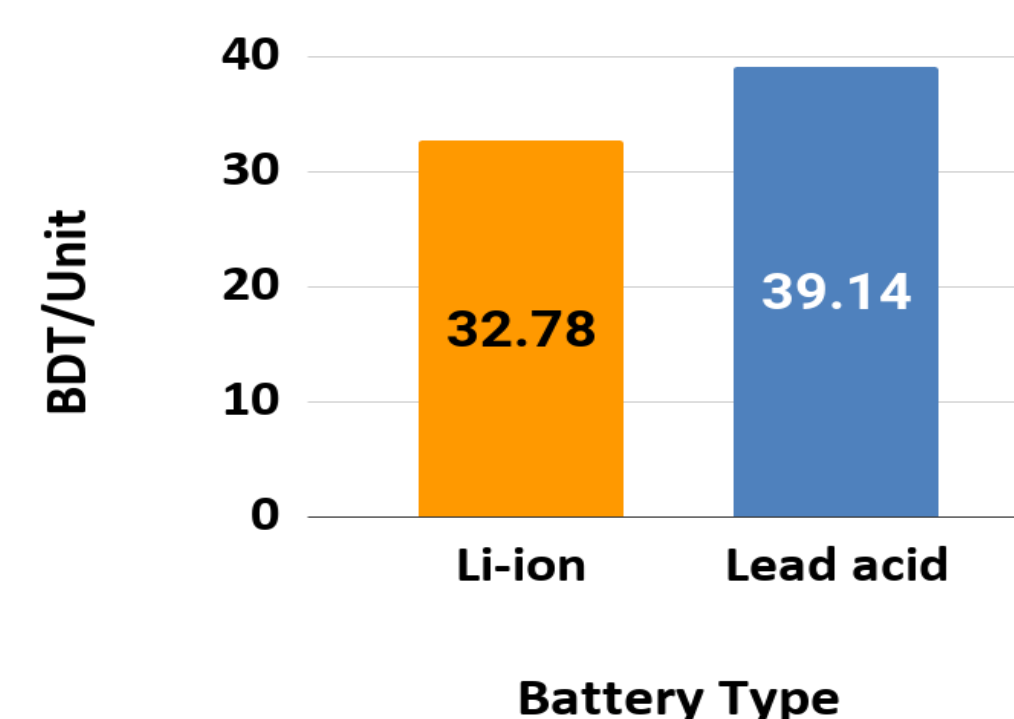


Results

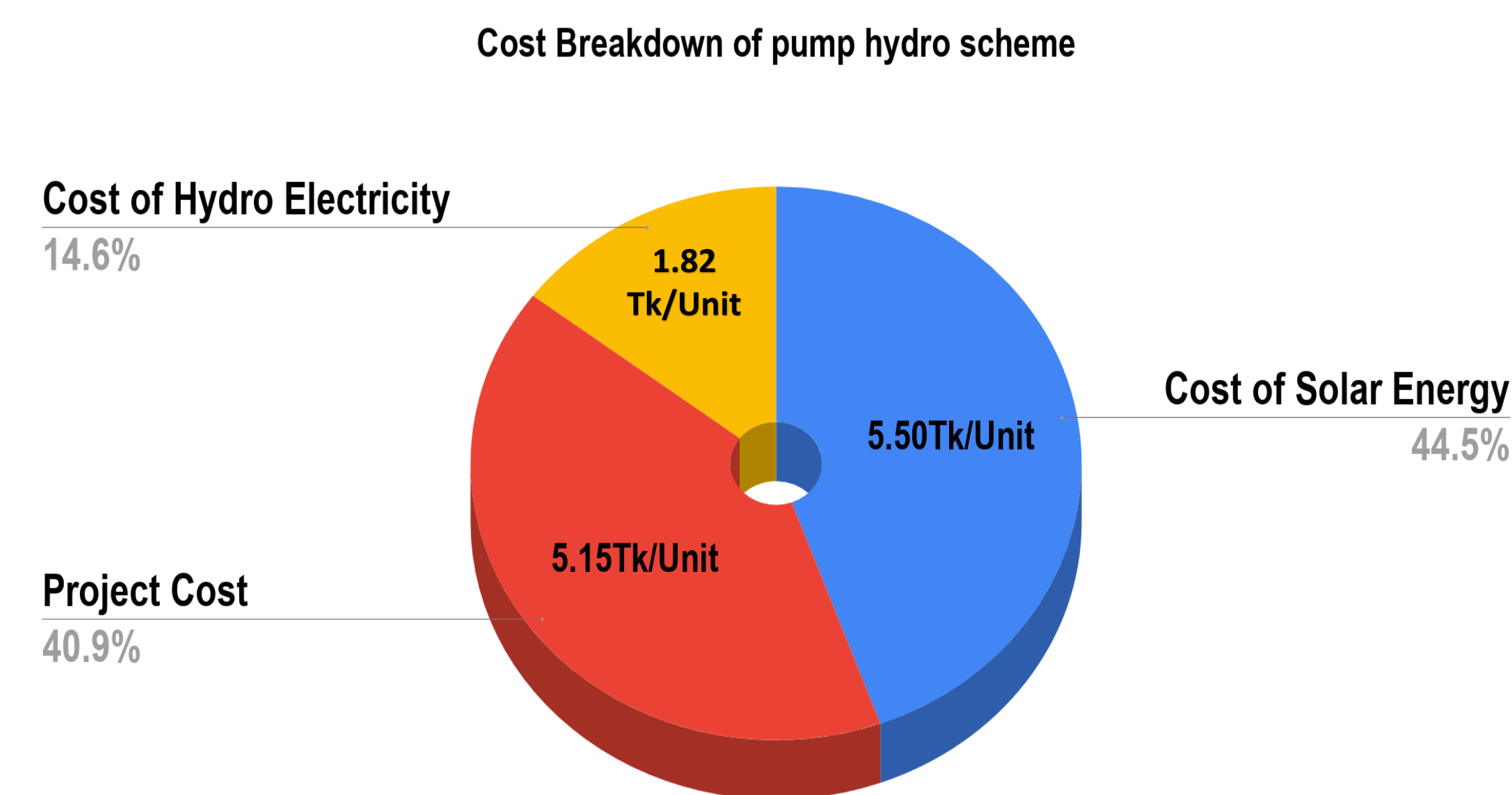
Per unit purchase cost from peaking power plants



Stored Energy cost vs. Battery Type



Pumped Back Hydro Energy Cost: 12.47 BDT/KWh



Conclusion

Our study shows that, the only Karnaphuli Hydroelectric Power Plant will be a very convenient candidate for pumped hydro peaking plant. As the price of battery is quite expensive, the BESS scheme could not be a cheaper option at present. But the revolutionary development in Battery technology gives us hope that in very future the price of Li-ion battery will be decreased significantly.

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