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With the development of science and technology, traditional energy resources like carbon burning will finally run out and can no longer meet the need of mankind. So there comes a growing need for eco-friendly energy resources. Currently available ones include solar energy, wind energy, hydrogen energy and nuclear energy, one of the most mature of which is solar energy. Our goal is to create models which can evaluate currently existing energy storage systems and batteries and in turn help select the best one for every given house, and which analyzes cement battery’s pros and cons and incorporate it for any houses.

In the first and second models, the house is restricted to a remote and 1600-square-foot one, which means that the price to connect to the grid is too high to be taken into consideration. We evaluate each mature, existing ESS and batteries and decide it for a house whose area and number of residents are given. The models are based on XXXX. The criteria for ESS includes Continuous Power Rating and Intantaneous Power Rating, and that for batteries includes the minimum of unit cost, which is expressed as a function of battery Capacity, Reliability (the possibility of Actual Power Rating higher than Needed Power Rating) and Price Lifespan Rate. According to the criteria above, the model decides the best energy storage system and batteries for a particular home.

By generalizing and combining the two models come the following one, which includes in it the resources from grids and allow any house location and any number of residents. The impact of the former depends on the price of electricity and the distance from the house to the grid, and that of the latter is the required Continuous and Instantaneous Power Rating. With this model, we can select the energy storage system and batteries from existing popular ones for every house.

Cement batteries. 114514

Finally we wrote a non-technical news article describing our models which can help select for any houses the energy storage system and batteries including the existing ones and the novel cement battery

**Introduction**

As science and technology develop, the need for energy grows. In the long period, the tradition carbon burning will finally come to an end. One of the most popular and mature eco-friendly energy resources is solar energy. Then the question arises that what energy storage system and batteries should a house apply. This is what we aim at in the essay.

In our models, attributes that describe the house’s features are Area, Number of Residents and the Distance from grid. In order to evaluate the energy storage systems, we develop functions whose arguments are its Constantaneous Power Rating and Instantaneous Power Rating. Those for batteries are Capacity, Reliability, and Price Lifespan Rate.

In recent decades arises a new kind of batteries whose material is cement, which can be employed in the energy storage system. We analyze its pros and cons, apply it to our models, and compare it with other existing battery types.

As the current used energy resource is non-renewable, replacing it with new and eco-friendly ones can not be avoided. We need to transfer to reliable new energy resources as soon as possible.

**Problem Restatement**