# Scope of the Independent study.

We can present the circuit diagram and provide methodology for designing the system to implement the "The Smart Integrated Energy System using alternate Energy Sources" The hardware implementation will not be part of the project as it requires special expertise. Below mentioned subjects will be part of this system.

## Financial Model:

The below mentioned are the major products which will be required for hardware setup.

1. Lithium ion batteries

2. Solar Panel

3. Invertors.

4. Switches

5. Overcharging protection circuit.

6. Wind turbines

7. Other equipment

Charging a consumer will depend on two factors

**1. Initial cost.**

**2. Service cost.**

The initial setup has to be done in such a way that local energy shall recover the setup cost in allocated time frame.

For example:

If we consider St. Stephen, Boston Massachusetts as 1 Area with 100 residents. After we perform battery bank analysis and come to conclusion that initial setup cost will be around 1 lakh dollars.

The cost per consumer will be

100000/100=1000$ per consumer. This 1000$ should be recovered from consumer as it is 1 time investment. This can be done in installments of 1 year/5 year/10 year or any number of years OR 1 time payment to install the system.

**Please note:** The cost may vary as per the analysis which will be conducted in the next phase.

**Service Cost**: Low service cost for maintaining the system.

**Output:** The overall system cost of an area depending on the battery bank analysis.

## Battery bank Analysis for a particular Area.

The methodology will start with analyzing the power requirements of a particular area or the community to analyze how many batteries will be required in the battery bank.

**1. Collect the 1-year data for a consumer.**

Reason: Since the geographical condition may vary from season to season hence we need to analyze the usage pattern of a particular area.

For example: During, winters the heaters in Boston city will consume lot of electricity.

We can take all the data from the existing energy supplier.

This will decide the usage pattern of the building and hence we can determine the number of batteries per area.

Here I need to do **Big data** analysis. Basically getting all the user consumption data and to find out how much power is required for a particular Area. Hence I was doing some research on graph databases like Neo4j and OrientDb as I mentioned on Friday.

**2. From this data consider the maximum value of energy usage for the purpose of battery requirements.**

**3. Repeat the above 2 steps for all the consumer in an Area/Building.**

**4. Addition of all these maximum values of each consumer shall be added to find total power requirement of building or an area.**

**5. Using this value of total power you will decide type of battery bank specification in terms of Voltage and Ampere Hours**

**6. Once this is decided. This data will be used to find suitable solar panel and wind energy system which can provide the power required we will consider the overdrive usage factor of 1.5.**

**Output: Number of Batteries which would generate equivalent amount of power requirements for an Area.**

Note: Overdrive usage factor.

Example: If a battery requirement for a particular area is 10000 volts DC charge the batteries deployed will be of 15000 Volts DC charge so that consumer should maximize the usage of Renewable source of energy.

## Extra Feature which can be added.

Reverse Selling of Energy to other consumers or global suppliers.

For example- A consumer is going outside and he/she knows that he won’t be using the consumer battery. The consumer can communicate with the Local Area and then the consumer can earn credits or rewards for sharing battery with local area.

Website

You also mentioned about the website which will create the popularity of this system. I will start to work on the website as well.

## Short Animation video

I am planning to make a short animated video for a layman to understand the project and its purpose.

**Please Note:**The hardware implementation will not be part of the project as it requires special expertise.

## Extra Analysis

**The below-mentioned points can be added as a part of Extra Analysis or a new extra project.**

1. **Solar Energy patterns:** To predict the amount of sunshine and temperature on the past data so as to decide the number of Solar panels for a particular area.

Again need of Big Data Analysis on the history of sunlight in a particular area.

1. **Solar Tracking device:** Smart algorithm which can track the Sunlight from all the sides and move the solar panel where we have maximum sunlight and hence we can maximize the utilization.

**Please Note:** Wind Energy tracking device is not possible since Wind energy is not predictable.