Conclusion

This paper studies the integration of technology into consumer life to aid and control residential using advanced and superior technology enabled by Smart Grid developments.

The Smart Grid is a budding web with no beginning or end. Consumer homes, generators and electrical appliances will be connected without bias so energy flow is adequately and securely maintained under all conditions. It ensures a two-way flow of electricity and information between the power plant and the smart meter, which will be installed in every home. The paper helps further the use of the smart meter by using its readings to create a scenario of a typical household. This is created to paint a realistic picture of load shifting and PHEV charging with the primary aim of minimizing cost for the consumer.

Using RTP and TOU rates from ComEd for the Chicago area, the program is built keeping the consumer’s needs in mind. The Java framework, using parameters for peak price and load, is able to shift loads dynamically as per consumer convenience to determine significant savings per household.

Future Work

Need for Disaster Management: Today, interruption of electricity due to blackouts can begin a series of botches that can affect communications, signals, security and traffic [14]. In places that are too hot or cold or places that require constant heat or cold suffer greatly and in turn begin another domino effect of failures including losses in infrastructure and personal assets. A smarter grid with automated self-healing features and adaptive technology will strengthen the power grid making it more resistive to natural and man-made attacks. Such a grid will help minimize outages and minimize losses when hit.

The system is built so when an area or sector loses power, it is isolated from the rest of the grid so neighboring areas may function unaffected while the isolated sector is located and power is restored immediately. With the Smart Grid functioning as an interactive web of network and information, each household is built individually yet fully connected to other houses in the community. This way when one house loses power, it is isolated so other houses remain unaffected.

Disaster Management is an important concern that can be tackled using clean and effective programming. Figure 8 depicts a possible algorithm that a program may follow to handle stress and spontaneous failures on the grid. While all of the code is written using JAVA, future work would include working to build a smart phone application so a consumer may be able to control his/her energy consumption at the palm of his/her hand. The technology market is changing quickly and dramatically. Today, a majority of homeowners own smart phones. Hence, a free software application that enables a homeowner to minimize his/her electricity bill and manage energy with his/her smart phone should be made available as soon as possible.

Exploring Storage Options: Significant research is being made on energy storage integrated with the Smart Grid. Research thus far has external storages functioning as individual units to supply power only when needed and recharged at the earliest convenience. One such energy storage container is a disused PHEV