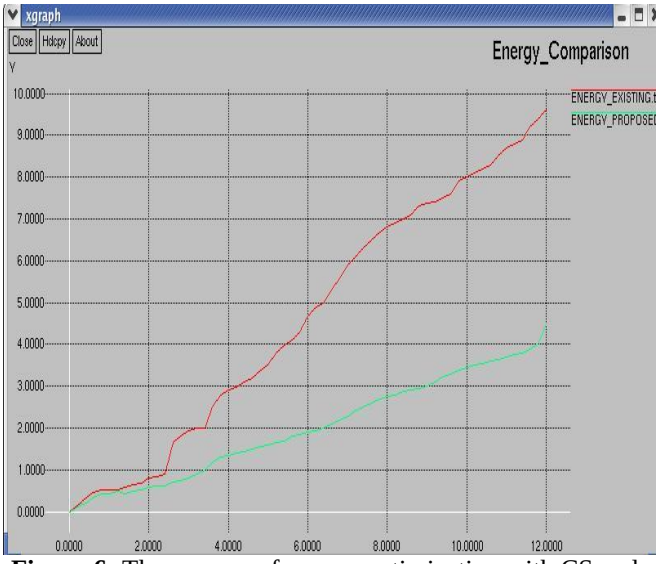

Figure 6: The process of energy optimization with CS and without CS.

6. Conclusions

The hybrid CS is used to design a clustering-based data collection method, to reduce the data transmissions in wireless sensor networks. The information on locations and distribution of sensor nodes is used to design the data collection method in cluster structure. Sensor nodes are organized into clusters. Within a cluster, data are collected to the cluster heads by shortest path routing; at the cluster head, data are compressed to the projections using the CS technique. The projections are forwarded to the sink following a backbone tree. An analytical model that studies the relationship between the size of clusters and number of transmissions in the hybrid CS method is proposed, to find the optimal size of clusters that can lead to minimum number of transmissions. Then a centralized clustering algorithm is proposed based on the results obtained from the analytical model. Finally a distributed implementation of the clustering method is presented. Extensive simulations confirm that our method can reduce the number of transmissions significantly. When the number of measurements is 10th of the number of nodes in the network, the simulation results show that our method can reduce the number of transmissions by about 60 percent compared with clustering method without using CS. Meanwhile, our method can reduce the number of transmissions up to 30 percent compared with the data collection method using SPT with the hybrid CS. Extensive process of energy optimization, shows the amount of energy optimized during data transmission with CS and without CS method.

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