Economic Model Predictive Control is a receding horizon controller that minimizes an economic objective function rather than a weighted least squares objective function as in Model Predictive Control (MPC). We use Economic MPC to operate a portfolio of power generators and consumers such that the cost of producing the required power is minimized. The power generators are controllable power generators such as combined heat and power generators (CHP), coal and gas fired power generators, as well as a significant share of uncontrollable power generators such as parks of wind turbines. In addition, some of the power consumers are controllable. In this paper, the controllable power consumers are exemplified by large cold rooms or aggregations of super markets with refrigeration systems. We formulate the Economic MPC as a linear program. By simulation, we demonstrate the performance of Economic MPC for a small conceptual example.