**OF Formulation**

**Energy Storage Model**

**Constraints**

**Nomenclature**

**Set**

t = time

**Parameters**

= electricity price at time t $/MWh

= initial energy level before t1

= minimum energy level

= maximum energy level

= maximum discharge

=maximum charge

= charge efficiency

= discharge efficiency

= operational cost

= Penalty factor

= Loss rate /MWh

**Variables**

= Profit from trading

= Binary variable for charging

= Binary variable for discharging

= Energy stored

= Energy bought for charging

= Energy discharged for sale

= Penalty cost

=charge energy

=discharge energy

**OF Formulation**

**Energy Storage Model**

**Constraints**