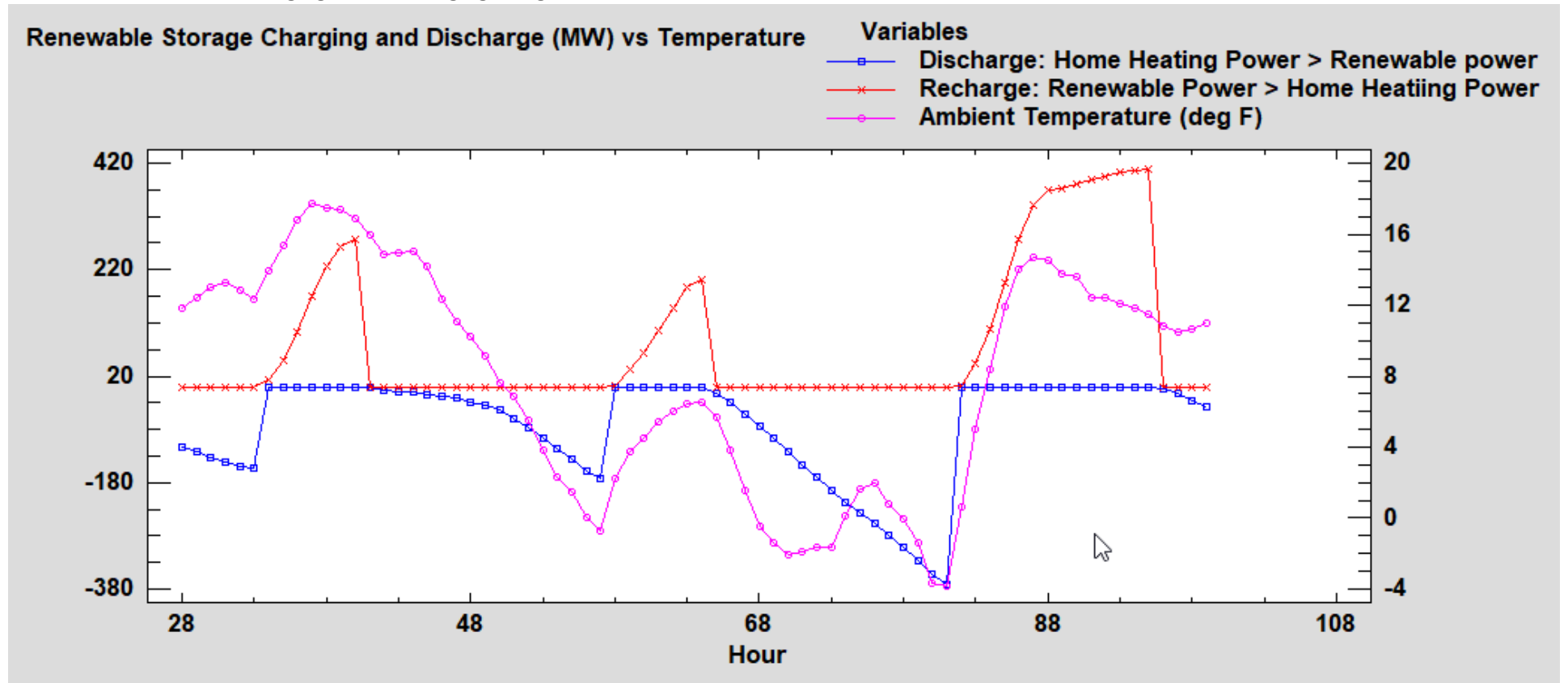


## Cumulative Renewable Charging and Discharging Margins



Case Study: Hourly Data 30 December 2017 0000hr to 1 January 2018 2300hr. In order to use renewable power for residential home heating it has to be stored for use when needed. In this graph the blue discharge points show hours when the cumulative difference between available renewable power and the power needed for residential home heating for 2,737 housing units converted to air source heat pumps is negative (energy storage discharge). The red points show when the energy storage would be recharging. The pink points show ambient temperature. Note that the discharge and recharge accumulation restarts when renewable power exceeds the residential heating power requirement.