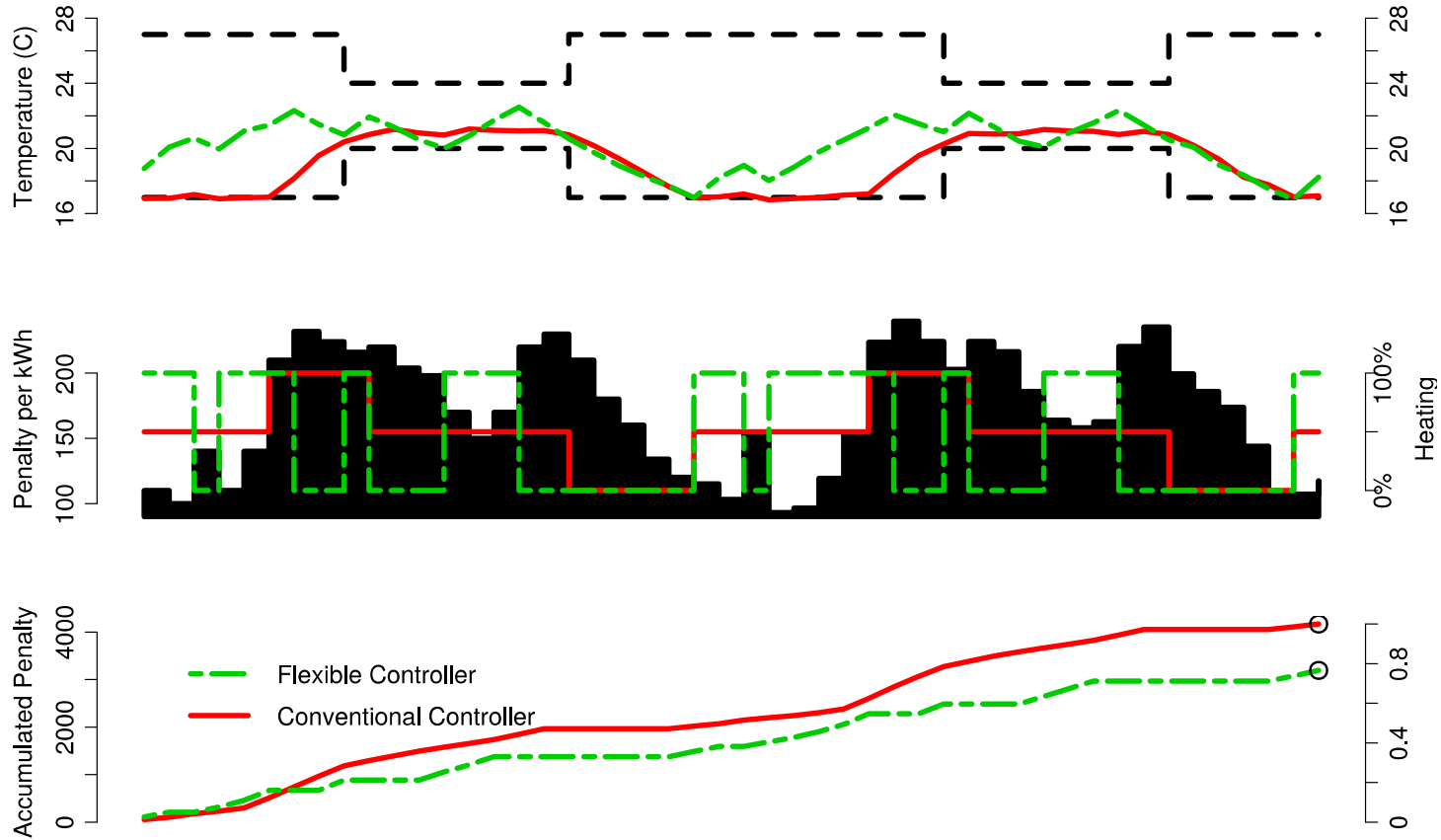


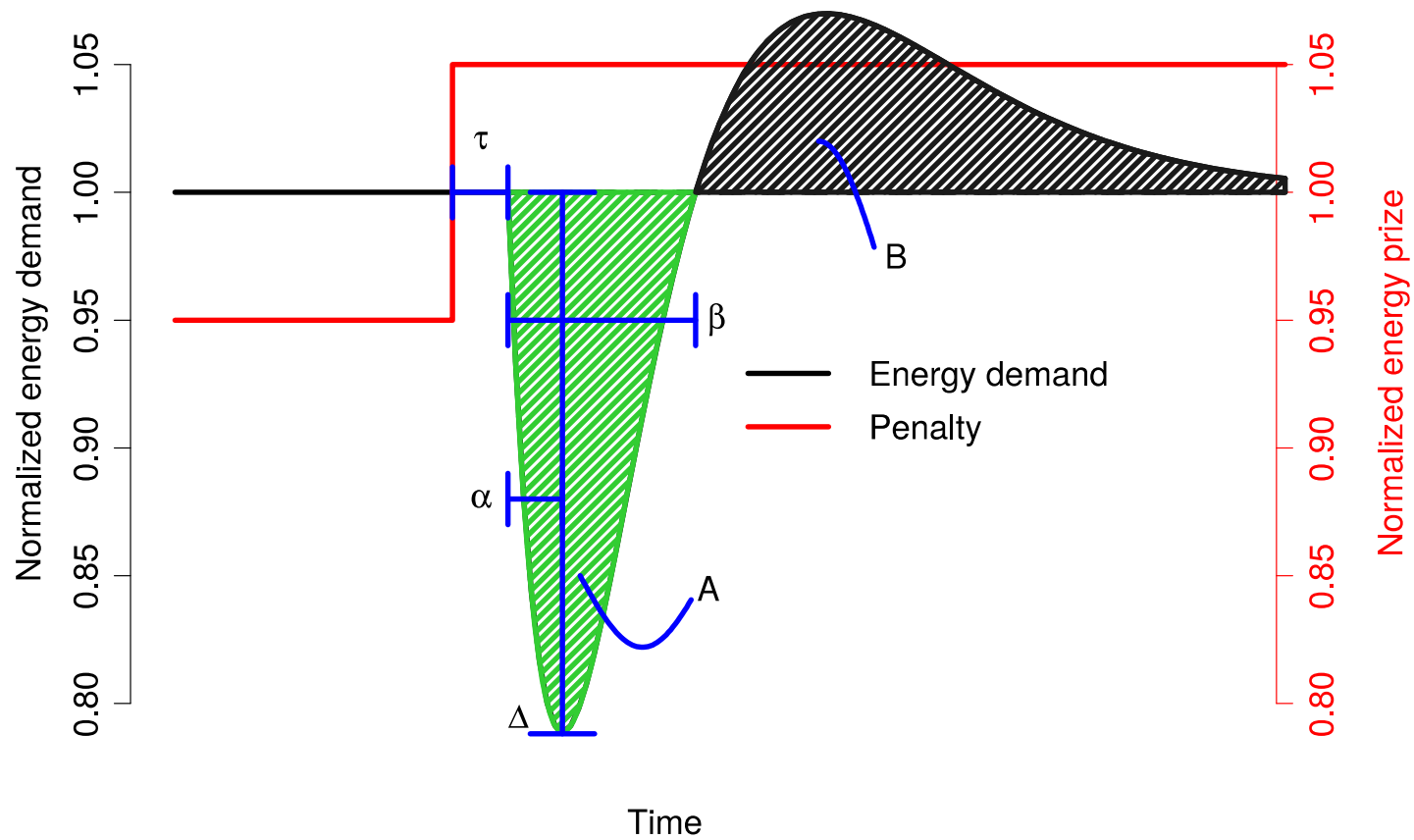
Splitting Grid Problems based on Energy Flexibility Characteristics

- Penalty based setup
- Energy flexibility characterization
- Individual performances
- Combined performance

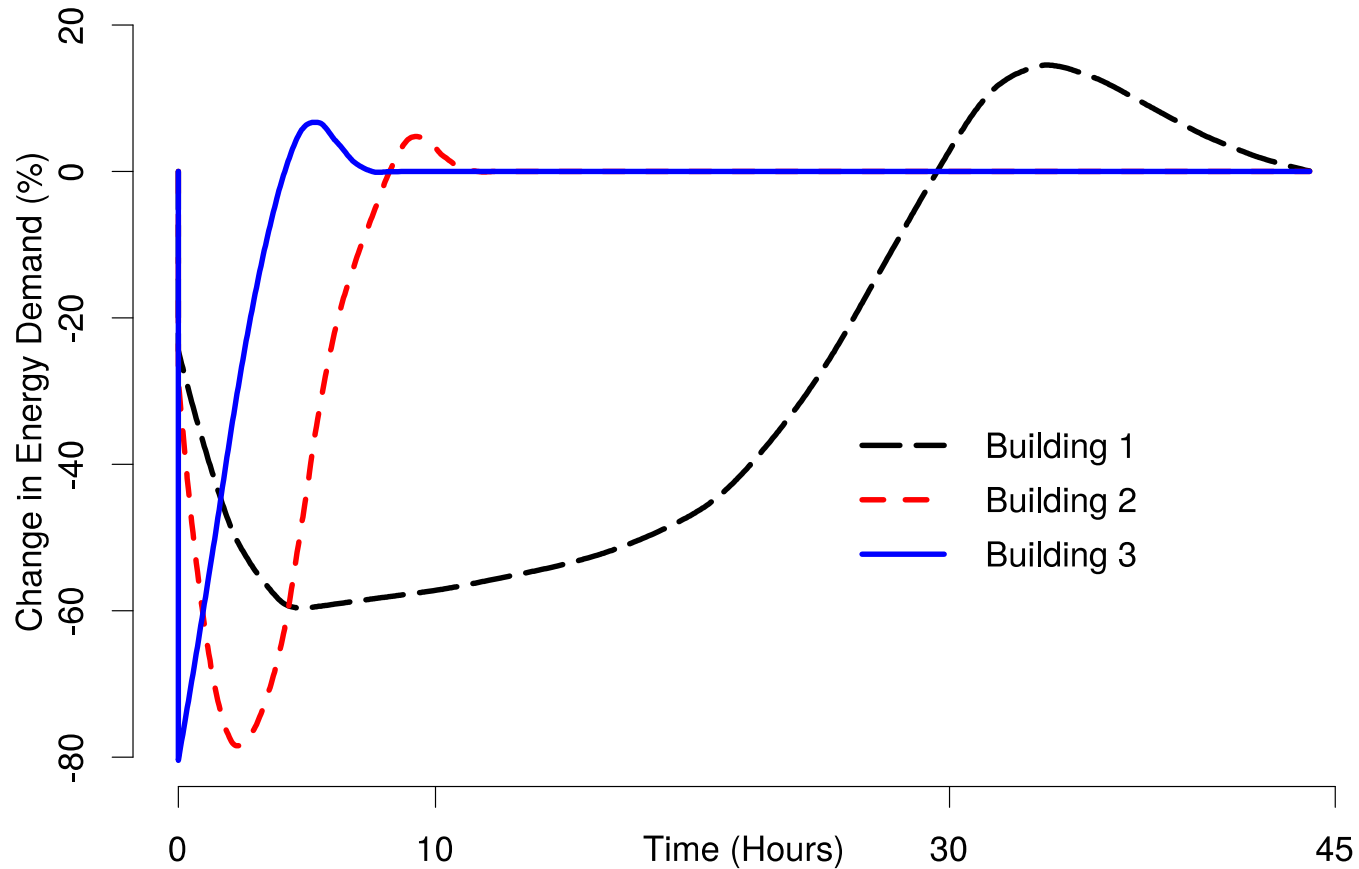
Penalty based setup



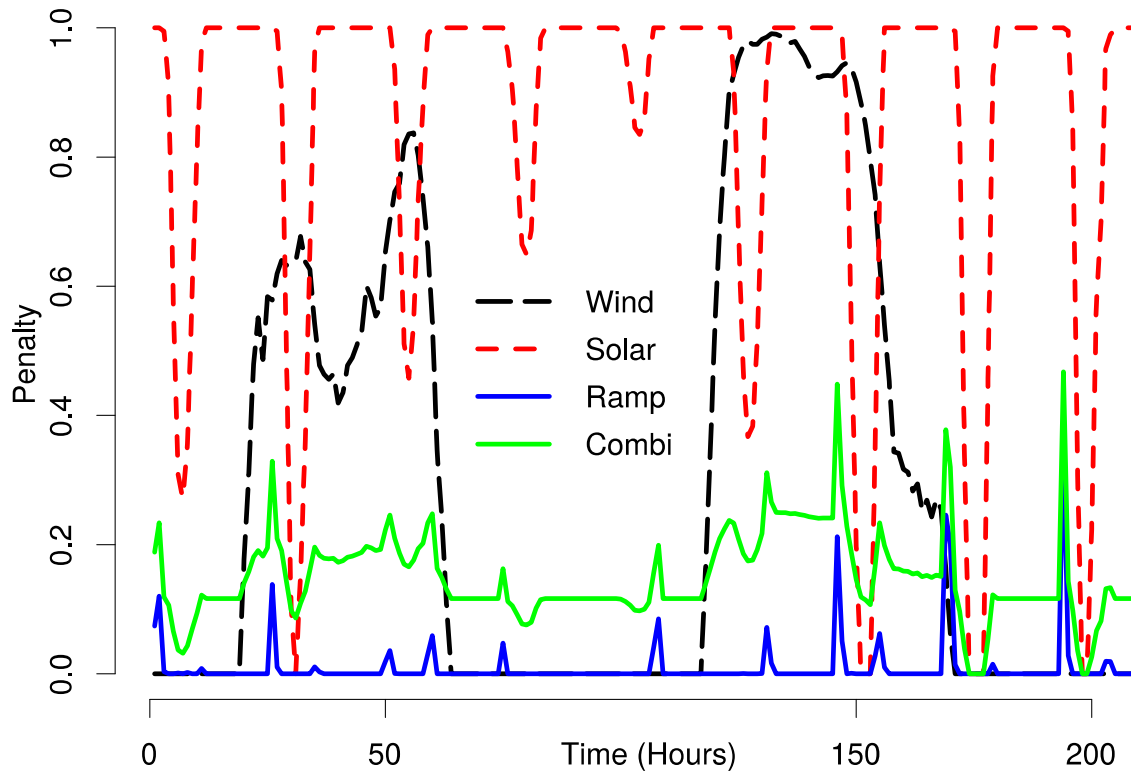
Flexibility Function



Examples of Flexibility Functions

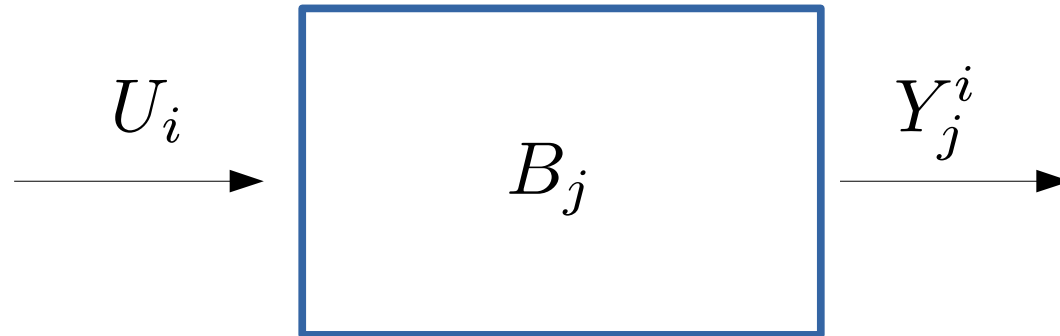


Examples of Penalty signals



	Wind (%)	Solar (%)	Ramp (%)	Combi (%)
Building 1	11.8	4.4	6.0	2.4
Building 2	3.6	14.5	10.0	3.9
Building 3	1.0	5.0	18.4	1.4

Performance



$$\int_0^T Y_j^i(t) U_i(t) dt$$

$$\int_0^T \left(Y_1^{\text{Wind}}(t) + Y_2^{\text{Solar}}(t) + Y_3^{\text{Ramp}}(t) \right) U_{\text{Combi}}(t) dt$$

$$<$$

$$\int_0^T \left(Y_1^{\text{Combi}}(t) + Y_2^{\text{Combi}}(t) + Y_3^{\text{Combi}}(t) \right) U_{\text{Combi}}(t) dt$$

$$\int_0^T Y_1^{\text{Wind}}(t) U_{\text{Wind}}(t) dt < \int_0^T Y_1^{\text{Combi}}(t) U_{\text{Combi}}(t) dt$$

Conclusions

- Qualitative analysis of Flexibility is useful
- Energy flexibility is not an ordered set
- Splitting benefits consumers and grid operators