Heat pump and DSM

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Backgrounds

• Domestic sector energy consumption for heat and heat related emissions
• Electricity/heat daily and seasonal demand shift
• Heat pump retrofit challenges
• Non-dispatchable renewables generators limitations and impact on grid (e.g. wind curtailment)
• Demand side response of heat pump and thermal storage
Heat pump test-setup
Modification
Test in three stage: 1.) Direct mode, 2.) Storage mode, 3.) Combined mode
Combined mode performance
Combined mode performance (2)
Combined mode performance (3)

Thermal storage performance
Combined mode performance (4)

![Graph showing COP performance over dates from 13/05/2015 to 04/06/2015. The x-axis represents dates, and the y-axis represents COP. The graph shows three categories: Overall, Storage, and Direct. The Overall COP values range from 1.0 to 3.0, with Storage and Direct COP values generally lower than Overall. The graph highlights daily performance fluctuations.]
Future plans

• Heat pump performance improvement
  ✓ New working fluids
• System parameter optimisation
• Controller development for: weather compensation and electricity pricing/load benefits
• End-user satisfaction
!!! Thank You !!!

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