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Exploring 'futures'

- Across UK: tendency to develop new more sustainable and efficient technologies to meet the target of reducing 80% of greenhouse gas emissions by 2050
- future energy systems: rely heavily on intermittent energy generation and thermal energy storage

However, TES will change people's:

- views/understanding of energy: from an infinite resource to a finite resource use of their heating and hot water systems
- requirements for heating and hot water
- requirements for 'future' thermal stores

Aim & Objectives

How do we design future socially, technically and economically viable thermal energy storage systems?

Aim

- understand users' attitudes towards intermittent energy generation and energy storage

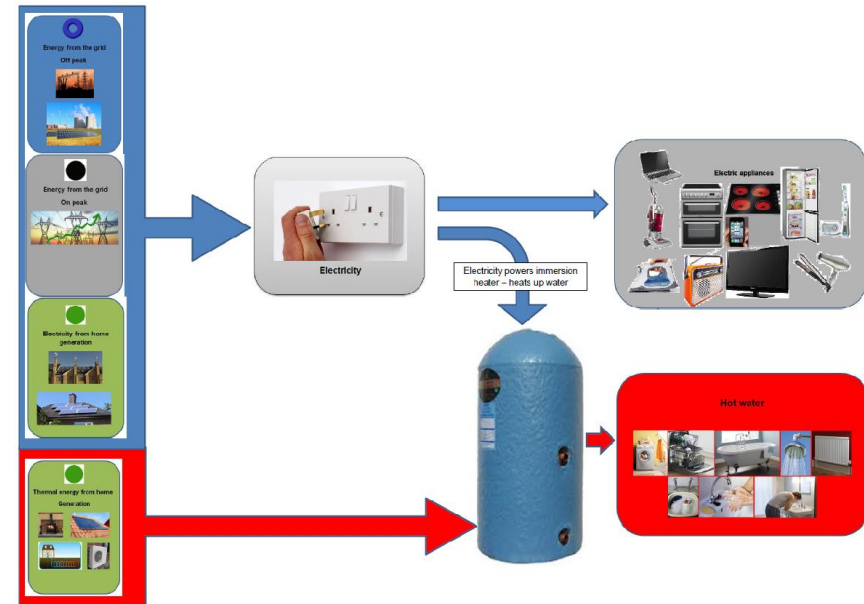
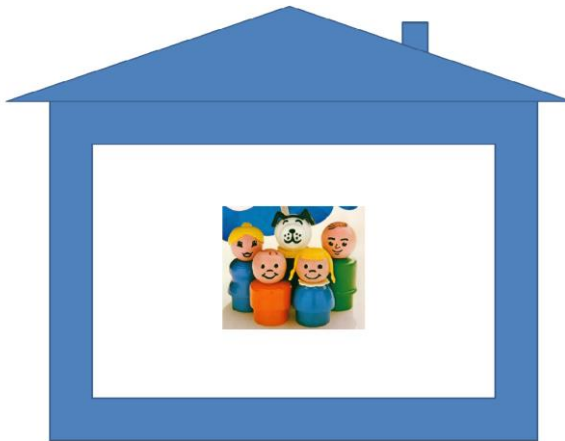
Design of the Game

Scenario-based Game on energy

Assumptions:

- Domestic heating will be predominantly electrical
- Microgeneration will increase in homes
- Grid supplied electricity will have highly variable tariffs
- Electrical supply could therefore be intermittent or expensive
- Demand-side response will be expected at a household level

Vignettes or “Little People”



Data collection with the Energy Game



Participants: 35 families

Part 1: **unstructured interview** based around little People's hot water usage timeline constructed by the participant.

Part 2: **semi structured interview** on their feelings and attitudes towards intermittent energy and requirements from future TES



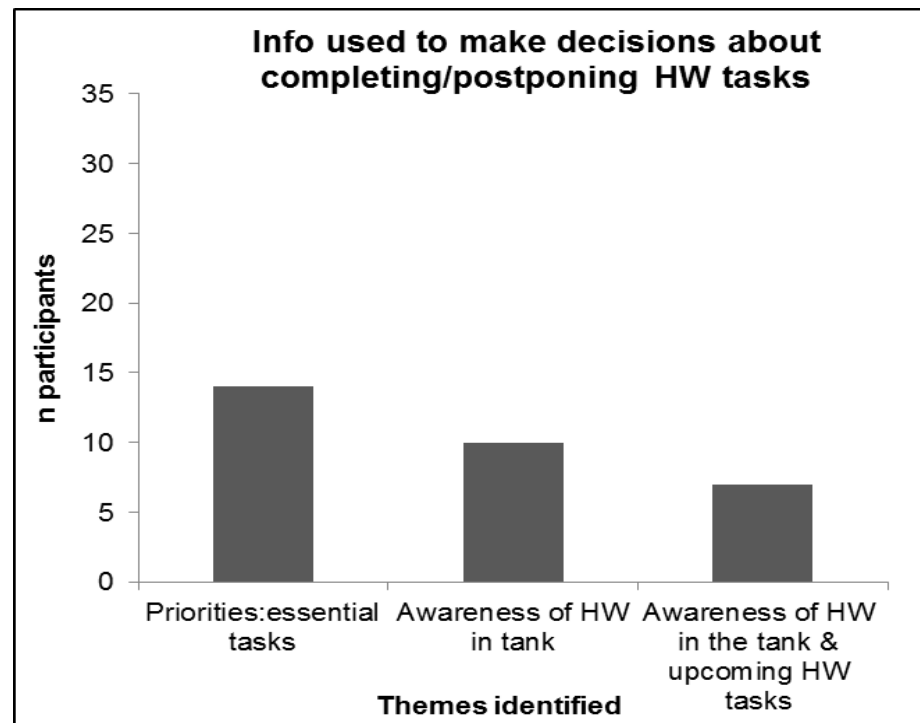
Analysis - Stage 1

- audio recordings of interviews transcribed in full
- descriptive data were entered into NVivo 8 software
- thematic analysis: combination of inductive & deductive approach

Process of data coding:

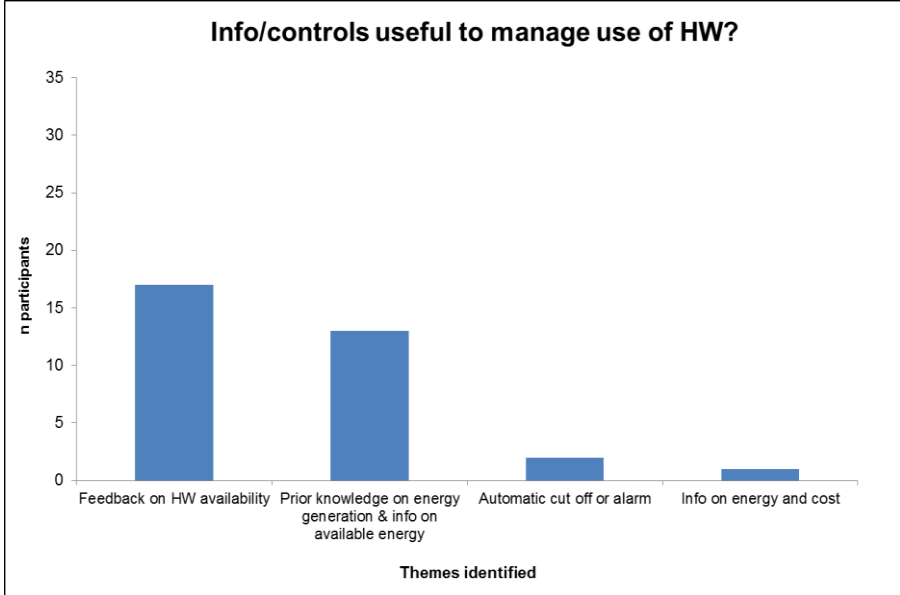
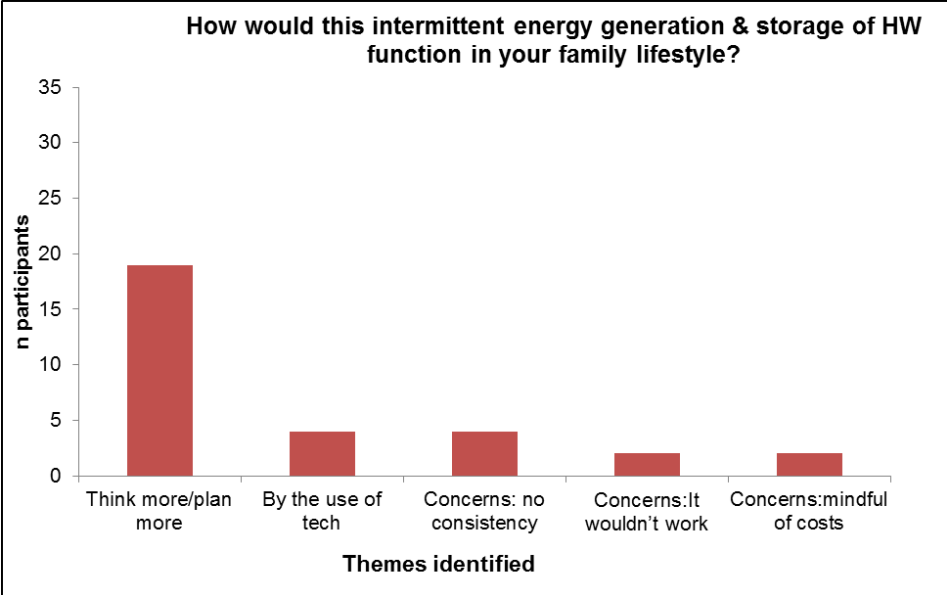
1. preliminary scanning of interview transcripts - template of a priori codes
2. identified data-driven themes: describing patterns in the interview transcripts
3. demographic variables: contribution to hot water strategies and understand their influence in the perception/understanding of the thermal energy storage

Findings: feelings & attitudes



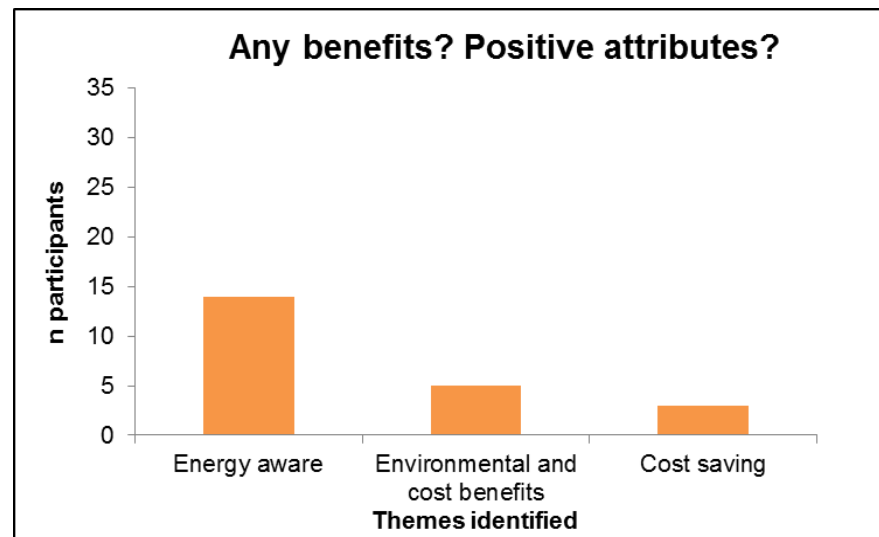
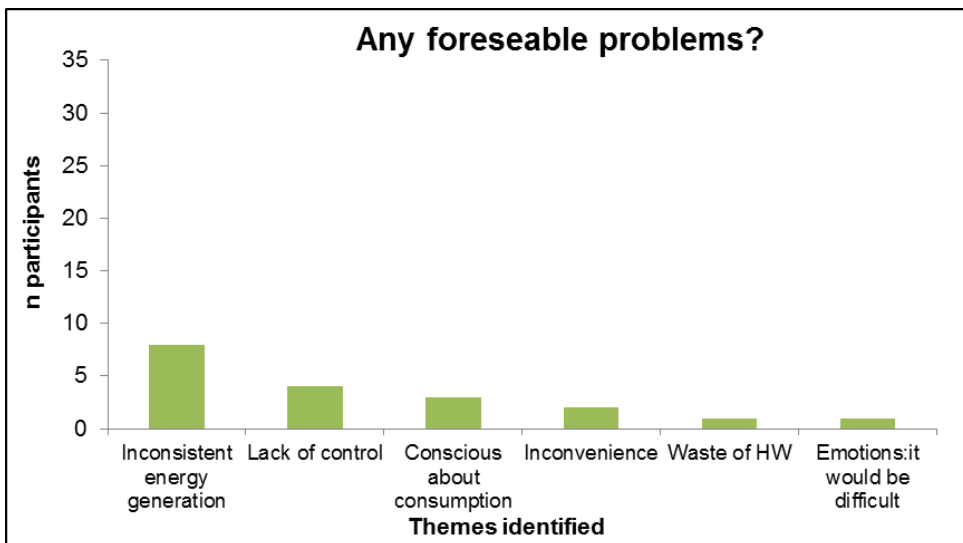
n = 35

Findings: intermittent energy & family lifestyle



n = 35

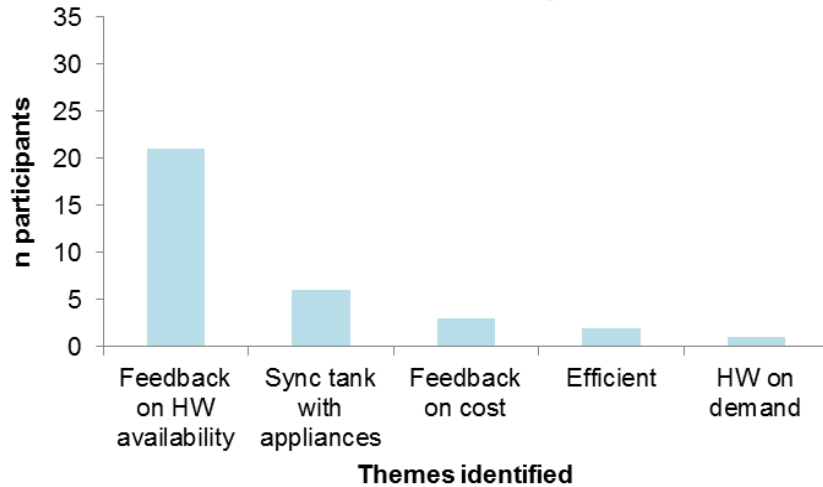
Findings: barriers & facilitators



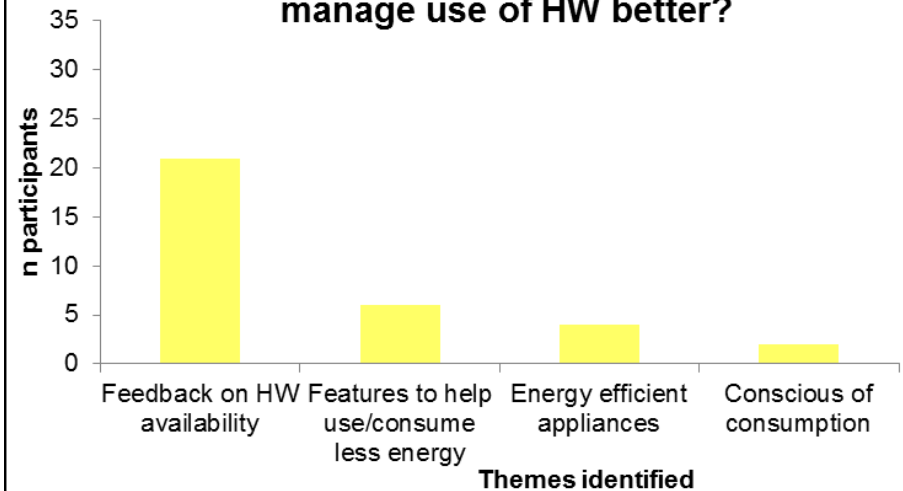
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Findings: requirements for future TES & appliances

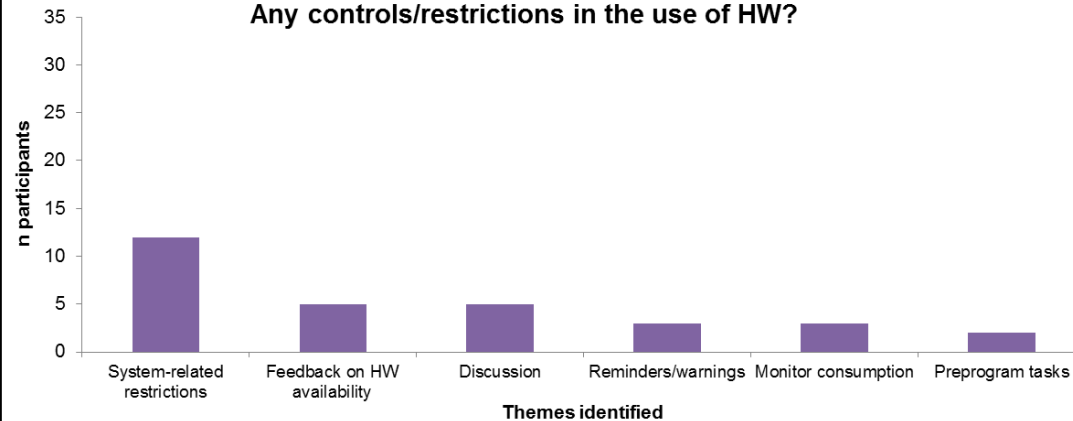
Future HWT: requirements?



Future appliances: do or tell you to help manage use of HW better?



Any controls/restrictions in the use of HW?



n = 35

Analysis – Stage 2

- to account for the likelihood of adopting future thermal energy storage systems users were grouped into types based on commonalities in:
 - feelings towards future energy systems
 - tolerance towards intermittent energy generation
 - information/controls required to function within their family lifestyle
 - planning behaviour
 - perception of the barriers and positives of the system
 - requirements from future storage and future appliances

using reference and guidance from transcripts and timeline

Implications for domestic thermal energy stores

- Based on users' attitudes towards intermittent energy generation and thermal energy stores..

Adopters

- Willing to adapt
- Appreciate environmental benefits
- Tolerant of gaps in energy generation



likely to adopt TES

Challengers

- Do not tolerate essential tasks are not completed
- Need restrictions to function in the new system
- Focus on the inconvenience of the system



Might adopt TES, but if requirements are met

Disapprovers

- Difficult to change current lifestyle
- Difficult to find any positives in new system
- Do not enjoy overthinking
- Do not tolerate instances without HW



NOT likely to adopt TES



Thank you

Any questions?

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