



RiDC

Presentation

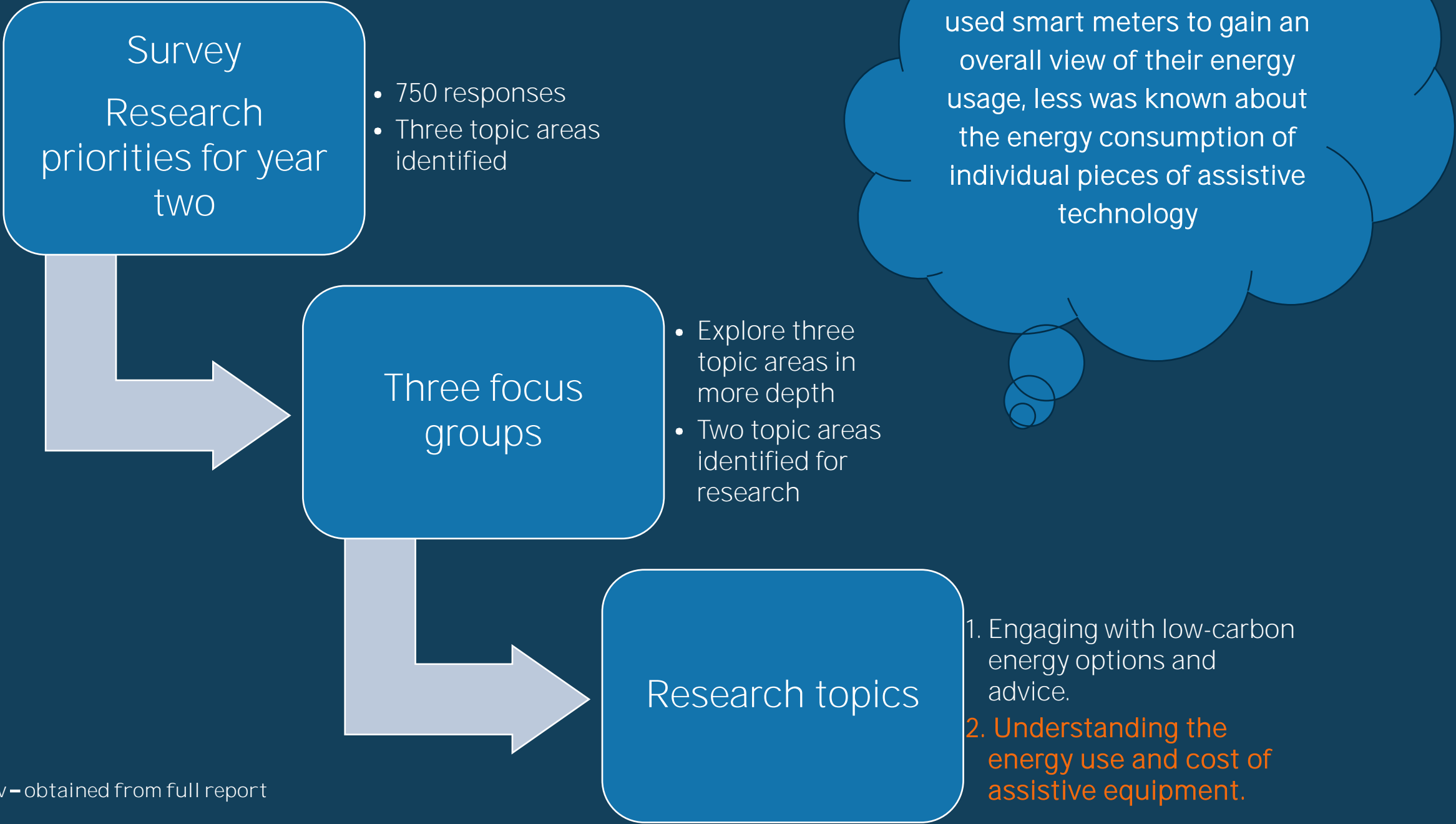
The Energy Monitoring of Assistive Technology

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November 2023
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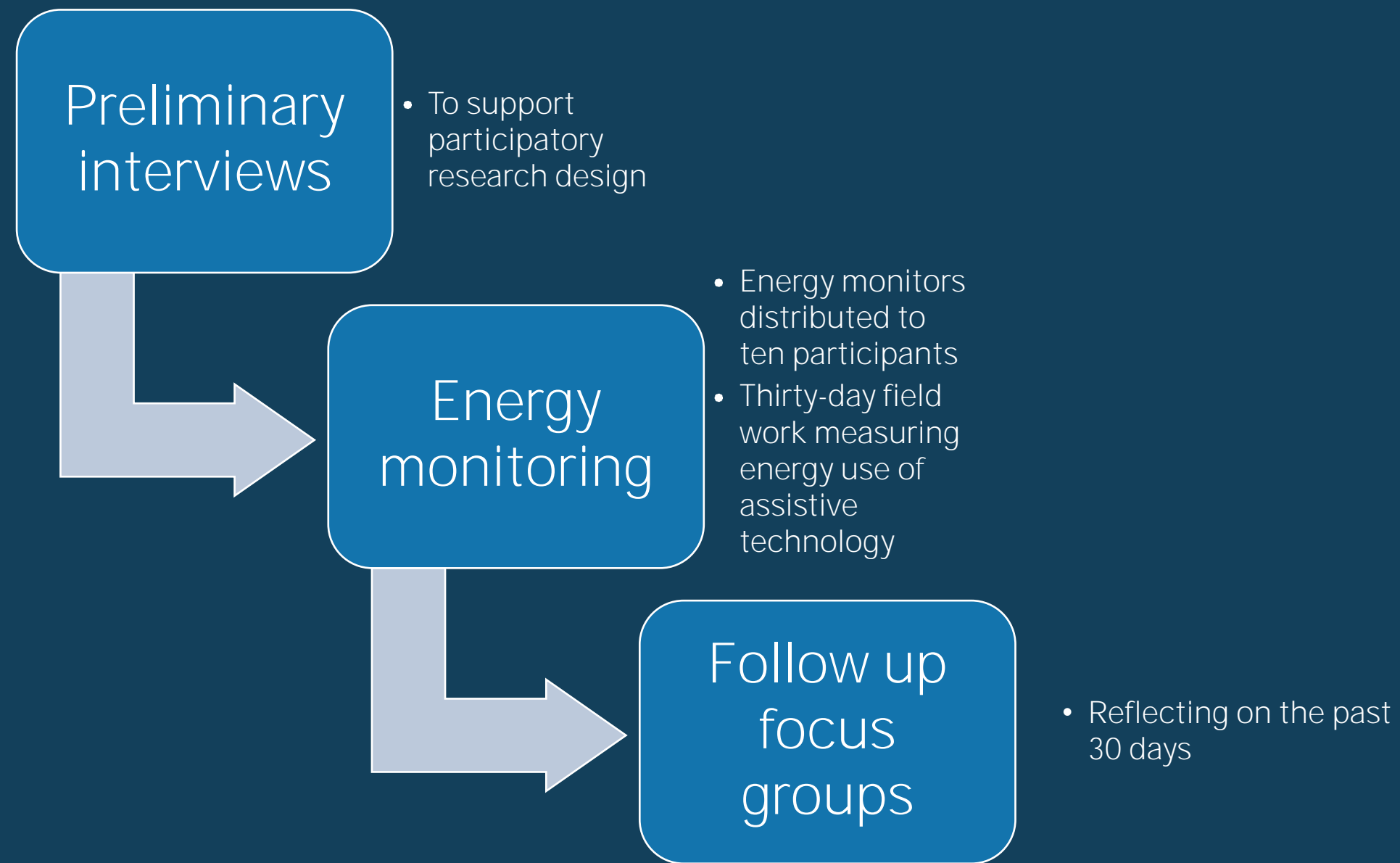
energy
saving
trust

Participatory Research Design



*Figure 1. Participatory Research Flow – obtained from full report

Participatory Research Design



*Figure 2. Energy Monitoring Research Flow – obtained from full report

Preliminary Interviews

Design

- Interviews with ten participants
 - Minimum two pieces of assistive technology
 - Most had far more than two

Aims

- Figuring out practicalities

Would the Kasa Smart Plug by TP-Link work for participants?

- Gain feedback on the research design
- Considering wider impact of research and benefits of research for our panel



Preliminary Interviews

Findings

Overall, participants felt that a project monitoring the energy use of their assistive technology would be beneficial both on a **personal level** and in the wider context.

Importance of quantifying energy use:

"It's going to give people with a disability... more information... Because at the moment, there is very little information out there in regards to energy output for assistive technology".

Visual, dexterity & mobility

Financial support and improving energy efficiency of technologies:

"More broadly, I think it is very beneficial because one, it gives more evidence for... things like more support from the government and more pressure for energy companies to do something about it. But also for... the device manufacturers themselves, it's more pressure for them to really think about energy efficiency and energy usage".

Dexterity, mobility, visual & cognitive

Importance of being able to make informed choices:

"I have OTs coming in and saying... 'We need to get you this equipment or we need to get you that equipment'. By knowing what the energy is... I can have that extra equipment. But then if... what I've got already is taking too much power, do I really need that? It will help me I think making future decisions on what equipment I need and what equipment I don't".

Visual, dexterity & mobility

However...

“It might be an argument for using with my energy provider about whether I am on...certain packages or not. Help lobby the government to take account of that... because we have no choice, I can’t not have them plugged in... So, it’s a cost that I have to meet”.

– Dexterity, cognitive & mobility

Energy Monitoring

Design

Who?

- Nine out of ten participants continued to energy monitoring project

When and Where?

- Monitoring energy use of assistive technology over 30-day period
- Remote testing with Researcher over the phone to support with setup

What?

- Two to three pieces of assistive technology using Kasa Smart Plug by TP-Link (model KP115). One participant was provided with alternative monitor without app to ensure inclusivity.
- Frequently measured pieces of equipment: powered wheelchairs, adjustable beds, rise and recliner chairs.
- How do we define 'assistive technology'? Equipment that is most vital for health and well-being but being careful with blur between assistive tech and medical equipment.

Research Questions

1. *What is the thirty-day energy consumption of assistive technology?*
2. *What can be done to support assistive technology users with energy consumption in the home?*
3. *What are the benefits of people knowing the energy consumption of their assistive technology, in terms of purchasing/choosing new pieces of equipment?*

Aims

1. *Raising awareness of the extra energy incurred, purely as a result of having assistive technology in the home.*
2. *As a basis for potential in depth future research, comparing the energy efficiency of various types of assistive technology.*

Findings

Average energy use over 30 days

- Approximately £4.24 per month (based on Energy Savings Trust* standard rate – England, Scotland and Wales)
- £50.88 per year
- £2.54 per month (standard rate – Northern Ireland)
- £30.48 per year

*[How do we calculate our energy saving data? \(energysavingtrust.org.uk\)](https://energysavingtrust.org.uk) Data retrieved on 26th October 2023. Data for England, Scotland and Wales from 1st October 2023 and for Northern Ireland 1st July 2023

- A cost that those without a disability would not have to incur

- Airflow mattress: £11.35 per month

(standard rate – England, Scotland and Wales)

- £136.20 per year

Important to note

- Above mentioned participant had around 27 pieces of assistive technology
- These figures do not include hardwired assistive technology – could this be far higher?

Benefits of Energy Monitoring?



Remote Function

- Indirect positive result of being able to control assistive technology remotely – connecting to Google Home



Small individual changes

- Turning off assistive technology with timer



App accessibility

- Lack of internal accessibility settings
- Screen reader compatibility



Vital equipment

- Cannot reduce use of equipment – focus must be on the energy efficiency of the technology itself

“It ...made me... really think about what else I could do...going forward... a real novelty thing being able to turn the fan on and off myself. In fact, on one occasion I called my carer...in to do it. And then I was like, ‘Oh no, you can go away again now’ ... So for me...it is actually quite... an eye opening experiment”.

Dexterity, mobility, visual & cognitive

Lack of Information

Information: availability

Participants felt there was a lack of information out there on monitoring energy use of individual pieces of equipment:

“For me, it was very accessible. I guess it felt a bit daunting before I did it, you know, to start with...I think if I'd not had like your kind of like guidelines and, you know, knew that I could...get advice, I might not have started it in the first place. Because I think, the inaccessible bit is like finding the plug, you know, going on Amazon yourself and like reading through like all the information and finding out what you need”. _Dexterity, mobility, visual & cognitive.

They also felt there was a lack of available data on the energy efficiency of different technologies:

“There are lots of variables. Being disabled is expensive in so many ways. We are lucky in a way that our power chairs, beds, stairlift have been provided via grants and NHS provision. But it does mean we are limited on which item we get...I think industry in general should give information on how much energy devices use”. _Dexterity, hearing, cognitive & mobility

Information: accessibility

Participants felt that whilst there is a wide availability of energy saving information out there, it didn't feel helpful to them based on their individual needs:

“My energy company I say are pretty good at sending out kind of generic information about how you can reduce costs but not maybe specifically around assistive technology or like disability related kind of expenditure”.

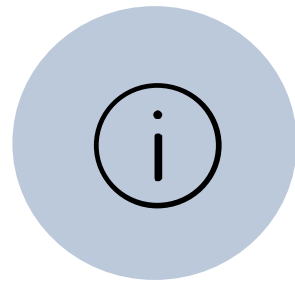
Dexterity, mobility, visual & cognitive

Possible actions

- Further research involving direct comparisons of different pieces of assistive technology. With the aim of providing more specific and tailored information to disabled consumers

Future Direction

What can be done? Recommendations for action:



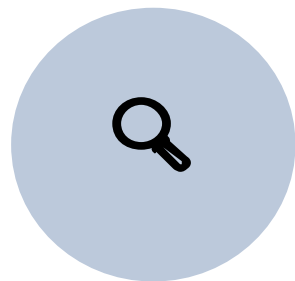
Information: available and accessible

- Make provision for accessible information. This information should be tailored, where possible, to individual needs and circumstances.
- Types of information this includes: consumer information and financial support.
- Adhere to the Web Content Accessibility Guidelines (WCAG 2.2).



Industry Standard

- Ensure there is a minimum standard set for the energy efficiency of assistive technology.



Further Research

- Consider carrying out further research allowing for direct comparisons of the energy consumption of an extensive range of assistive technologies, including medical equipment.
- Research should involve large sample sizes, comparing manufacturers/models of this vital equipment.

Future Direction

What can be done? Recommendations for action:



App development

- Ensure apps associated with energy monitors are accessible.
- Adhere to the Web Content Accessibility Guidelines (WCAG 2.2).



Provision of energy monitors

- Evaluate, the benefits of providing energy monitors to assistive technology users, where appropriate.



Funding

- Increased funding for assistive technology users to run this vital equipment.

“The technology...that I use... maintains my independence... if I didn’t have my BiPAP machine for example, I wouldn’t be here”.

Dexterity, visual, mobility & cognitive