

Deliberating the Public Acceptability of Energy Storage- Headline Findings

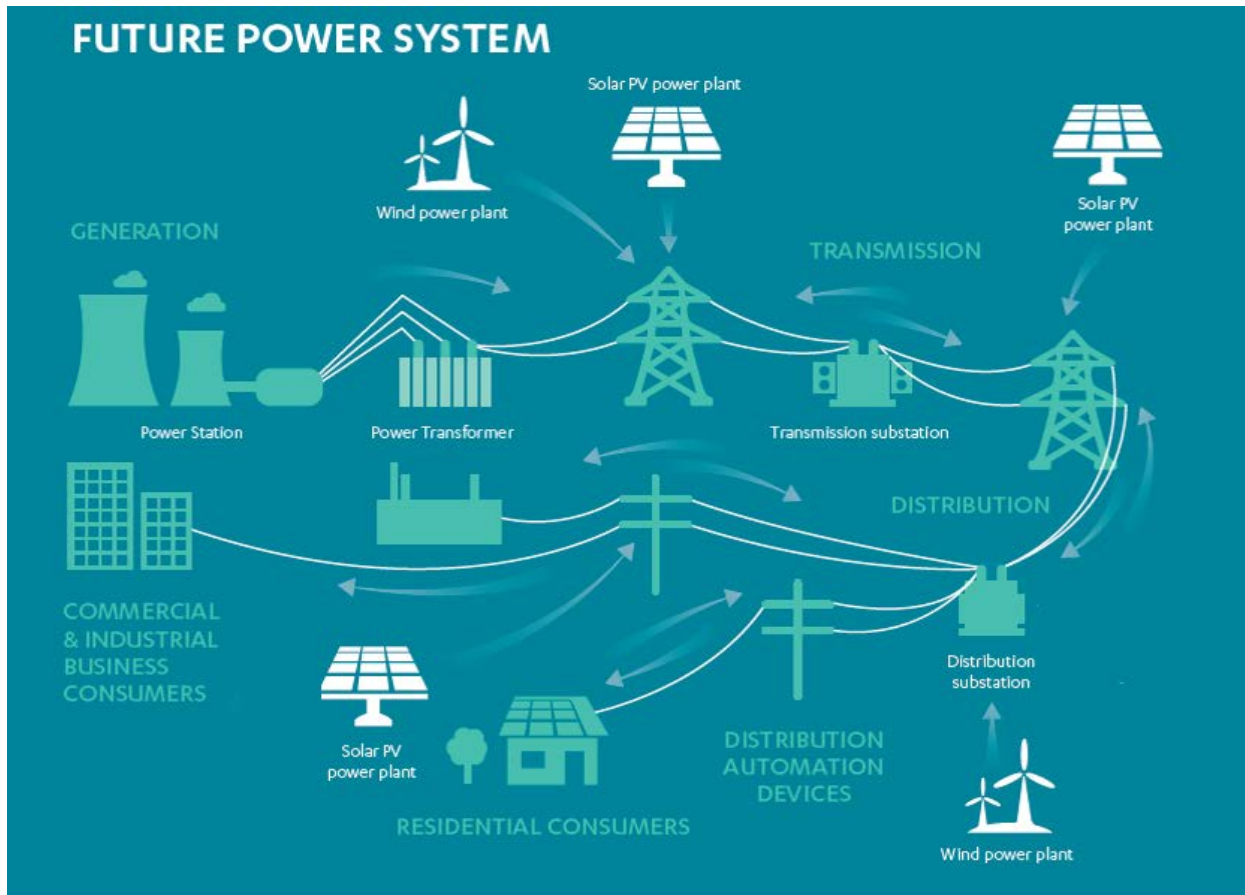
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RESTLESS Project: Realising Energy Storage Technologies in Low -carbon Energy Systems- www.restless.org

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Why Energy Storage?



Intermittent renewables less flexible than fossil fuels- **matching supply with demand.**

Unstable and multi-directional energy flows- **grid stability.**

- Image: National Infrastructure Commission (2016)

Why public acceptability?

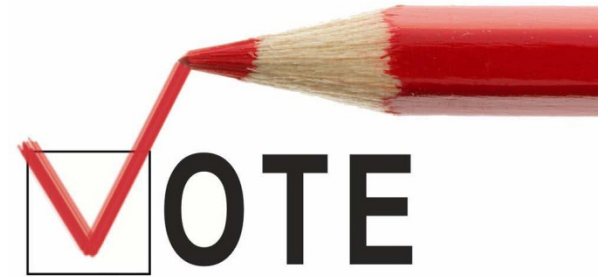
Publics are deeply implicated in how energy systems are shaped and used...

Citizens- taxpayers with voting powers

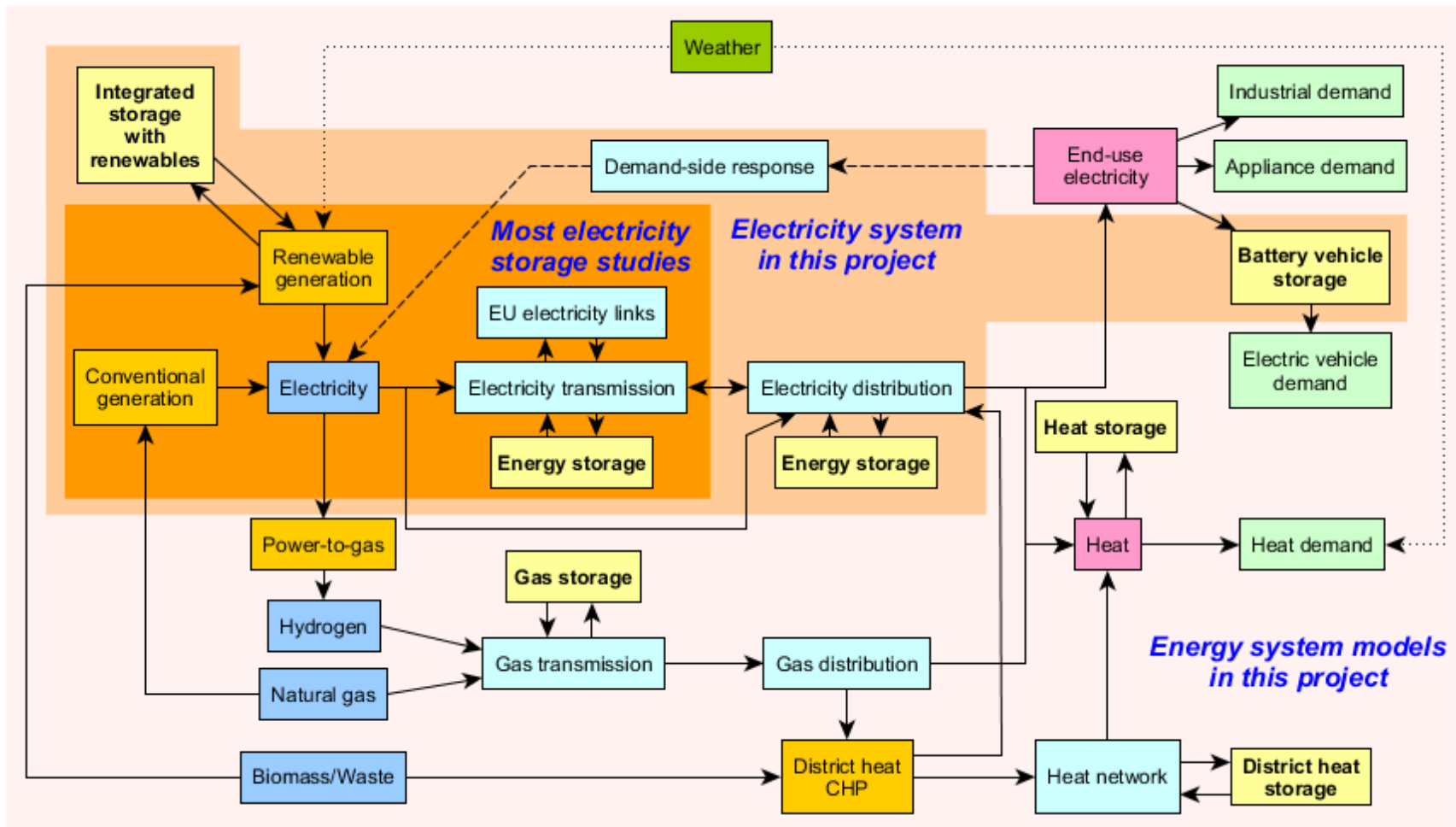
Energy consumers & producers



Active proponents & protesters



Whole systems approach



Methods

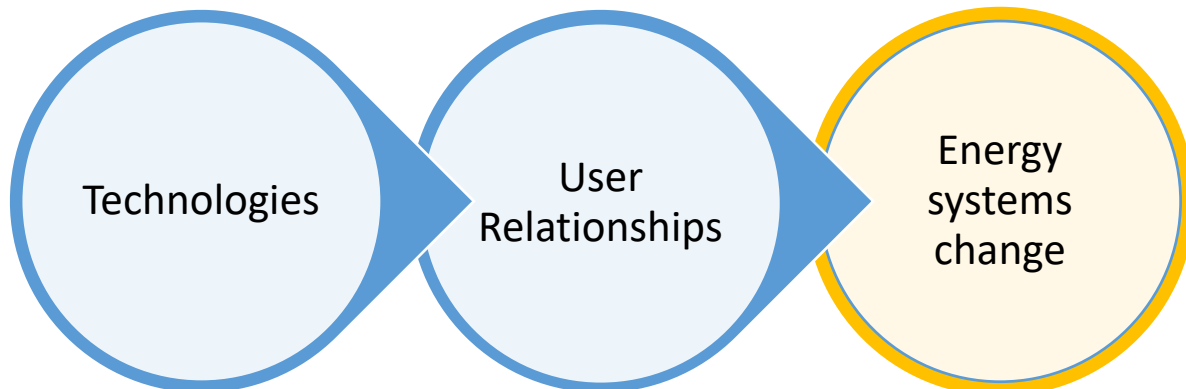
4x seven hour **deliberative workshops**

Qualitative: 12 participants per workshop

(N=46 after drop outs)

Mix of discussion and information provision:

- Ideas and expectations about present and future energy systems
- Perceptions of individual storage technologies
- Governance- Storage in context.



Initial Impressions:

- Participants unfamiliar with ES as a concept.

Intermittency and renewable curtailment not previously considered, or assumed to be easily fixed.

“I think producing it [electricity] from natural sources, is the best method....so, it's taken straight where it's going to be used. But it's obviously not a possible thing to do; I just assumed it would be.”

Mike, Birmingham- homeowner

THINK BIG 6

ARE BAD? £8BN PROFITS OF THE..

NATIONAL GRID

CEO JOHN PETERSEN, PAY PACK: £1.1M LAST YEAR £1.1M
Mr Petersen, 54, has been a "successful" executive in the power industry since 1990, despite his family home in Wiltshire being hit by 10 years of tax.

The 54-year-old has been a successful executive in the power industry since 1990, despite his family home in Wiltshire being hit by 10 years of tax.



SCOTTISH & SOUTHERN

CEO ALISTAIR PHILLIPS-DUNN, PAY LAST YEAR: £1.1M
The 54-year-old earned 73 times more than his average employee. His net worth is estimated at £1.1m after 10 years of tax.

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WESTERN POWER DISTRIBUTION

CEO ROBERT NATHAN STIMMON, PAY LAST YEAR: £1.1M
Mr Stimmon, 54, has been a successful executive in the power industry since 1990, despite his family home in Wiltshire being hit by 10 years of tax.

The 54-year-old earned 73 times more than his average employee. His net worth is estimated at £1.1m after 10 years of tax.



IR POWER NETWORKS

CEO MARK MORLEY, PAY LAST YEAR: £1.1M
Mr Morley, 54, has been a successful executive in the power industry since 1990, despite his family home in Wiltshire being hit by 10 years of tax.

The 54-year-old earned 73 times more than his average employee. His net worth is estimated at £1.1m after 10 years of tax.



NORTHERN POWERGRID

CEO MARK MORLEY, PAY LAST YEAR: £1.1M
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Northern Gas Networks

CEO MARK MORLEY, PAY LAST YEAR: £1.1M
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The 54-year-old earned 73 times more than his average employee. His net worth is estimated at £1.1m after 10 years of tax.



WALKER & WATTS

CEO MARK MORLEY, PAY LAST YEAR: £1.1M
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GRID

EXCLUSIVE BY DAVID JONES

Corporate Editor

THE bosses of ten energy firms are being paid up to £5.9m a year — as their sky-high profits inflate the bills of hard-up families.

The companies, including National Grid, Scottish Power and SSE, have the monopoly on the pipes and cables that get gas and electricity to homes — and use it to make annual profits of almost £10billion.

National Grid, the biggest of the firms, paid its 10 head bosses a total of £5.9m last year.

That means the average pay per head is £590,000 — and a £100,000 reduction in salaries would cut the company's annual profits.

The firms' bosses claim that the huge profits are justified by the huge costs of maintaining the gas and electricity networks, which have been hit by 10 years of tax.

Mr Jones says that the huge profits are justified by the huge costs of maintaining the gas and electricity networks, which have been hit by 10 years of tax.

Mega pay for network fat-cats

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PROFITS



POWER HUNGRY

Firms' rising profits



Adds £60 per year to your bill

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Technology Perceptions

- When looking at individual technologies **aesthetics and spatial effects, efficiency, reliability, sustainability, safety, and technological progress** important in shaping how participants responded to ES technologies
- While some participants expressed clear preferences, **no technology emerged as wholly acceptable/unacceptable.**

Salient Technology Perceptions

	Network Scale				Domestic/ Community Scale		
	Pumped hydro- electric	Compressed Air	Power-to- gas	Batteries on the Grid	Batteries in Homes	Heat in Homes	Community Heat
Aest. and Space	+	+	n/a	-	-	+/-	0
Efficiency	+	+	+/-	-	+/-	-	+
Env. and Sust.	+	+/-	+/-	-	-	n/a	0
Reliability	+	+	n/a	n/a	+/-	+/-	+
Safety	+	+/-	-	-/0	-/0	0	n/a
Tech. Progress	n/a	+	+/-	+	+	-	n/a

+ positive evaluation - negative evaluation

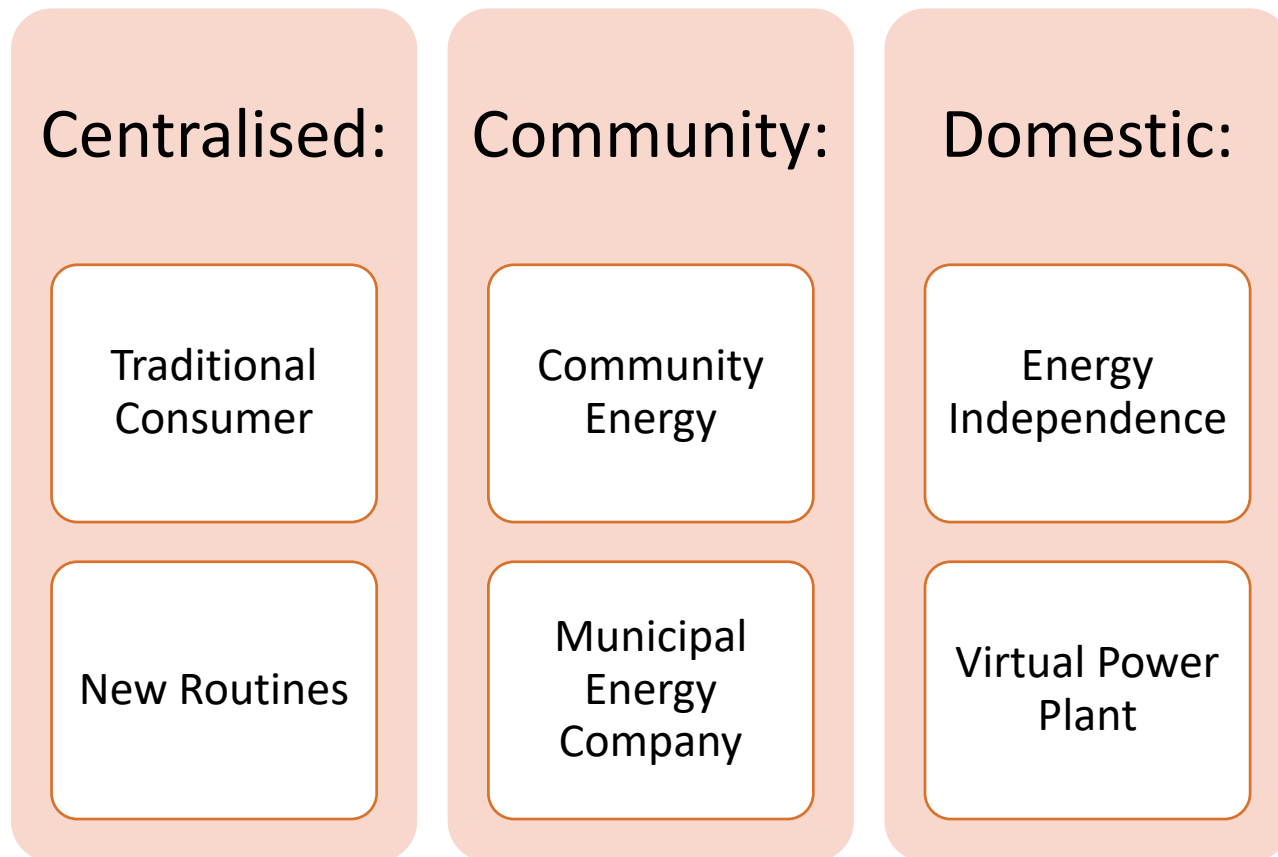
0 ambivalence or
conditionality

-/+ divergent opinions between
participants

Table indicates issue salience and therefore does not reflect full spread of perceptions relating to each technology, issues raised only briefly and not taken up in wider discussions are thus not included.

Acceptance is about more than technologies...

- Acceptability also contingent on who is introducing a technology and the way that introduction is governed.





Convenience

- Budgeting
- Low Maintenance
- Reliable
- Cyber security



Empowerment

- Empowerment
- Independence/ self-sufficiency
- Enhancing responsibility
- Community cohesion

Traditional Consumer

**Municipal Energy Co.
Virtual Power Plant
New Routines**

**Energy Independence
Community Energy Storage**

Integrity

Competence

Trust

Centralised storage options

- Large energy companies
- Profit seeking, dishonest
- Sense of powerlessness in face of unaccountable status-quo

Decentralised and Community storage

- Municipalities and communities lacking in expertise.
- Past blunders- local authorities

➤ Appetite for new actors and hybrid forms of energy storage provision?

Domestic, community and municipal storage

- People and communities contributing to system should derive benefits.
- Individuals and groups investing in storage should receive commensurate benefits.

Reciprocity

Fairness

Equity

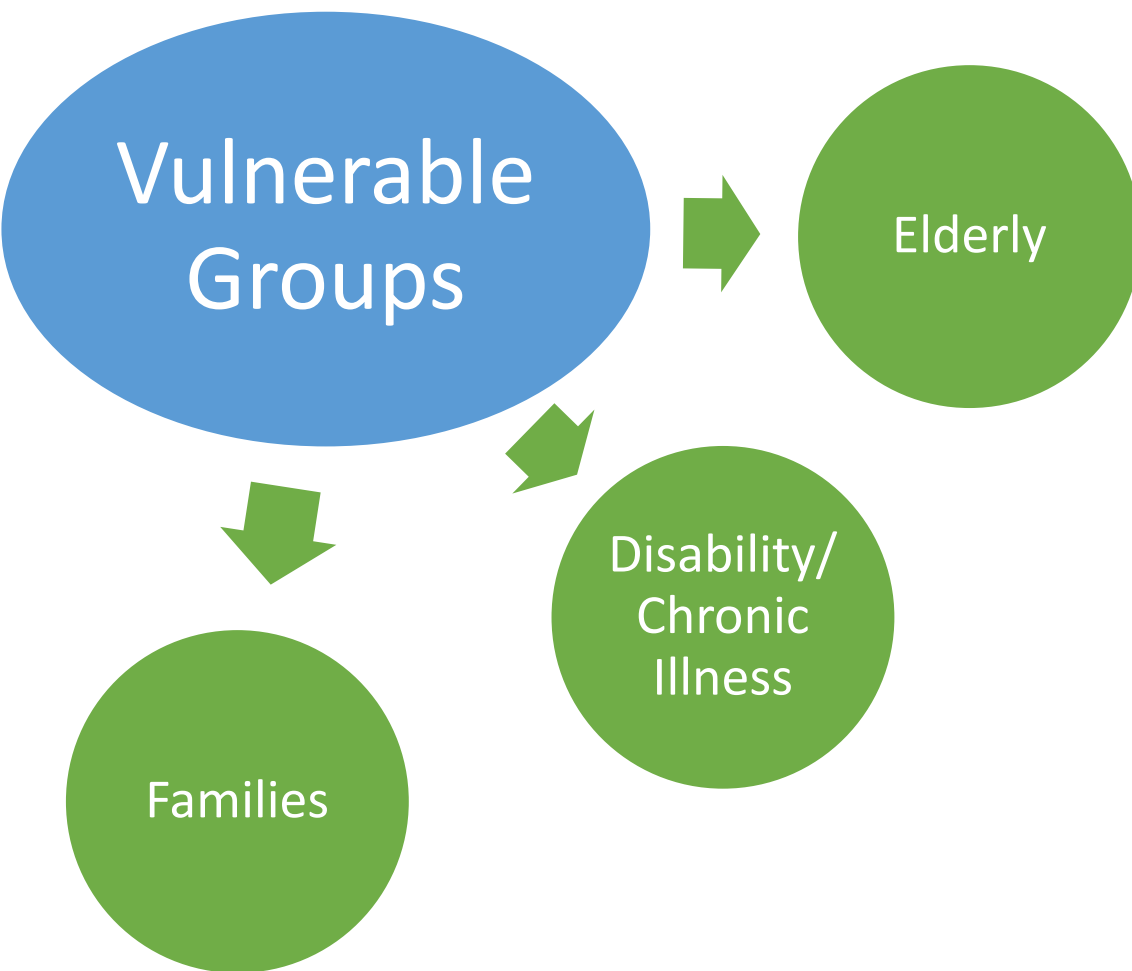
New routines, community storage, energy independence

- Uneven access to new technologies may exacerbate existing inequalities
- Affordability, tenancy and regional inequality

Responsibility

All models

- People should act in ways that minimise consumption and support the energy system.
- Social norms will change with time



**Demand response,
community & domestic
storage**

- “Vulnerable” groups should not be penalised/ left behind by societal shifts to storage.
- Require flexibility, automation and ability to tailor energy services to meet needs.

“Amy: Disabled people on dialysis machines, and...things that they have, you know, and these oxygen things that they need to use during the day time.

Ken: I think it’s balance, and obviously tail... tailored to individual needs, but you shouldn’t be penalised.” (Amy & Ken, B1)

Conclusions

- Intermittency/ curtailment **unfamiliar problem** for many. Could come as an unwelcome surprise!
- Responses best characterised as **ambivalent** and **conditional** but no technology or governance option proved wholly acceptable/unacceptable- context dependent.
- Desire for both **independence** and **convenience** varies between people- but appetite for novel forms of energy and service provision- people want choices.
- ‘**Fairness**’ was a key issue, particularly around time-of-use pricing, not adequately addressed in policy discourse around storage.
- Our findings should guide further engagement with affected communities **prior to planning** practical deployments of storage.

Thank you

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Acknowledgements:



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BIRMINGHAM



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Nottingham



EPSRC
Pioneering research
and skills

**ENERGY
SUPERSTORE**
THE UK'S ENERGY STORAGE RESEARCH HUB

UKERC
UK Energy Research Centre

EPSRC
Engineering and Physical Sciences
Research Council


Department
of Energy &
Climate Change


The Scottish
Government
Llywodraeth Cymru
Riaghaltas na h-Alba


Llywodraeth Cymru
Welsh Government

 **E4tech**

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RENEWABLE ENERGY ASSOCIATION


**SP ENERGY
NETWORKS**

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Hydrogen
& Fuel Cell
ASSOCIATION**