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Enhancing User Engagement in Local Energy Initiatives using Smart Local Energy Engagement Tools (SLEETs)

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Background and context

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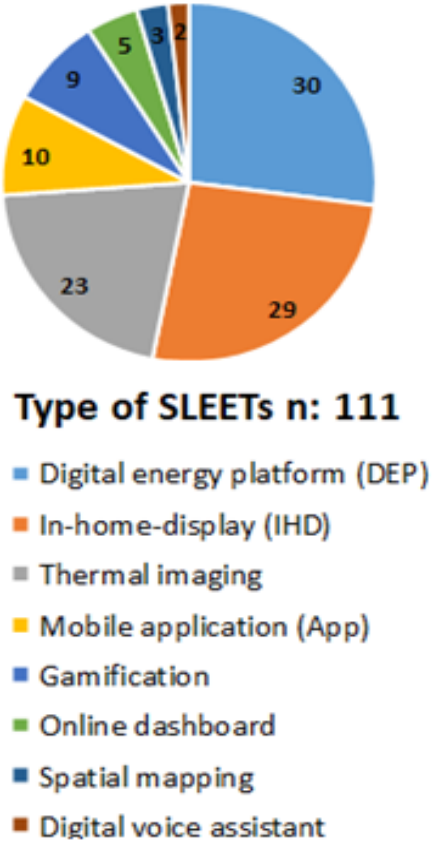
- UK energy system is rapidly becoming decarbonised, decentralised and digitised to meet the net zero target by 2050.
- Local energy initiatives can help in meeting this target by delivering cleaner and cheaper energy services locally.
- SLEET are digital tools which can integrate smart use of data and communication technologies for enabling interaction with users.
- SLEETs allow users to:
  - better manage, control and observe energy to reduce energy use, cost and carbon emissions
  - match energy demand and supply.
  - get involved in local energy markets
- Limited number of studies that investigate the effectiveness of SLEETS in enhancing user engagement in local energy initiatives.

Study overview

- Examine the *prevalence*, *effectiveness* and *inclusiveness* of SLEETs deployed in local energy projects across the UK (and internationally) from 2008 to 2019, using a meta-study approach.
- Characterise SLEETs in terms of:
  - Type of interface
  - Extent of interaction
- Explore relationship between:
  - SLEETs characteristics
  - Characteristics of local energy projects (energy vector, location, start year, lead actor, funder, engagement pathway).
- 111 SLEETs identified across 86 projects (*Community energy, Local energy, Smart Local energy system* (SLES) projects).
- Categorised into eight groups of SLEETS.



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Findings

Characterising SLEETS

Extent of interaction	Type of interface		
	Numeric	**Visual**	**Voice-based**
Information driven (one-way)	In-home-displays (IHDs)	Spatial map (energy flows across scale)	-
	-	Thermal imaging	-
Information & interaction (two-way)	Online energy dashboard/ web portal	Gamification (Energy mapping tools that require input from users for example to assess solar potential)	Digital voice assistant
	Mobile app	-	
Information & control	-	-	
Decision support	Digital energy platforms (DEP)	-	-

- Information driven tools found to be dominant (54 out of 111 SLEETs)
- Voice-based SLEET was the least popular (2 out of 111 SLEETs)

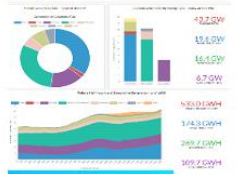
SLEETs

In-home-display (IHDs)

Spatial mapping

Thermal imaging

Online dashboard



Mobile app

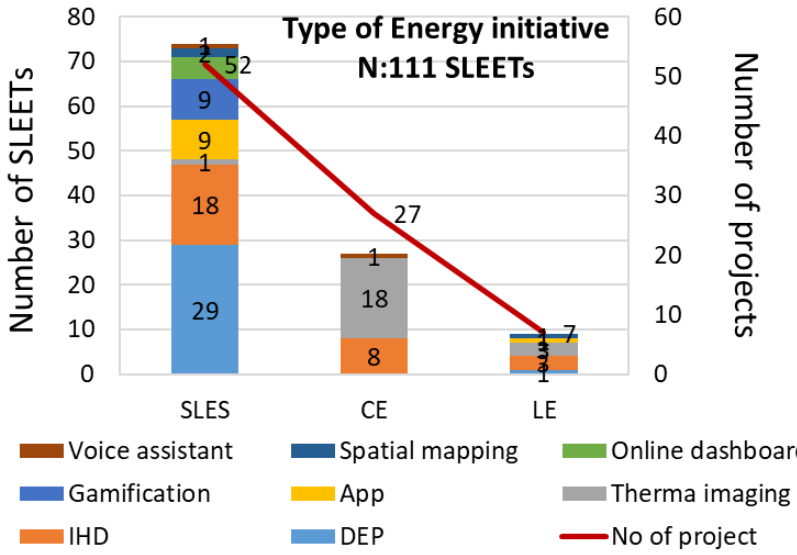
Gamification

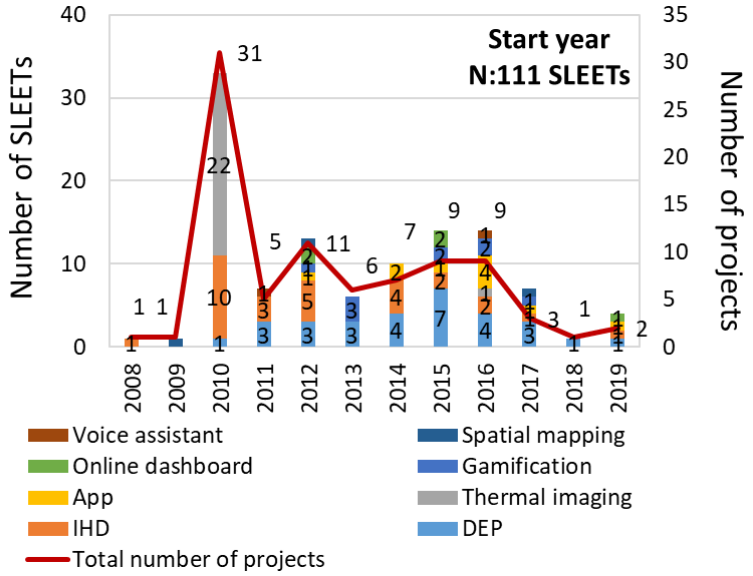
Digital voice assistant

Digital energy platforms (DEP)

Prevalence of SLEETs

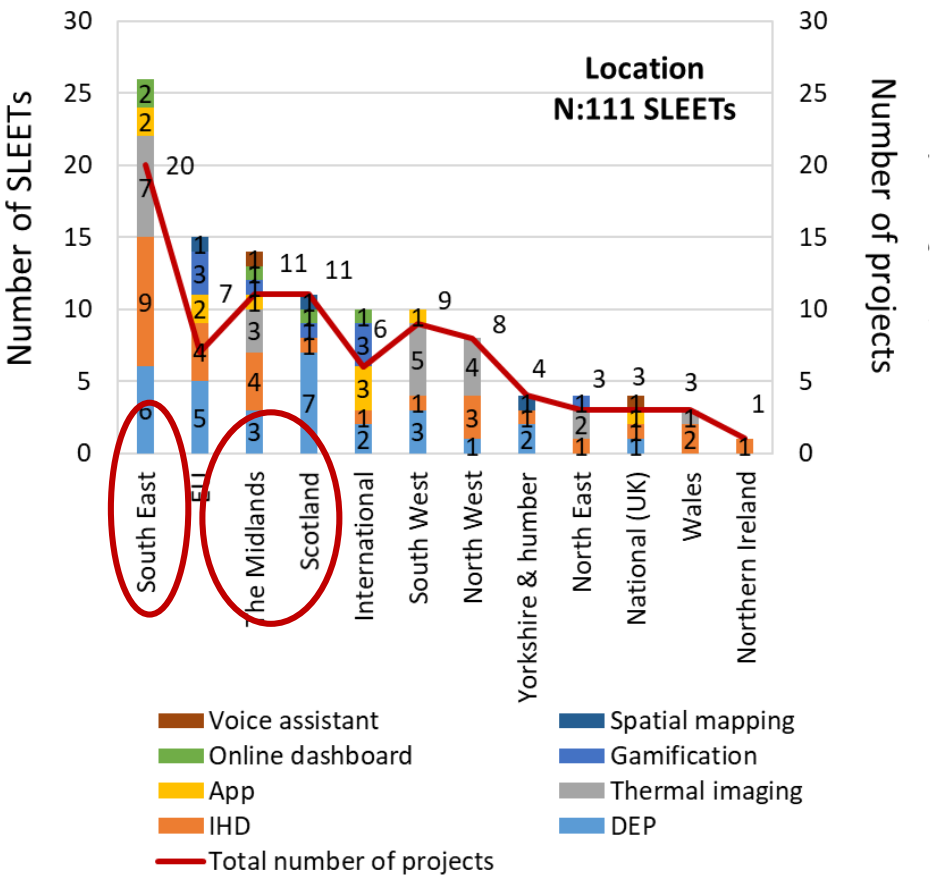
- Majority of projects deployed multiple SLEETs. Smart local energy projects deployed most SLEETS (61%)
- DEPs were popular in SLES as *decision support* tools (29 out of 69 SLEETs)
- SLEETS with one-way interaction were dominant in 2010 driven by the nationally funded LEAF programme on CE projects:
  - Thermal imaging for highlighting heat losses from buildings (22 out of 33 SLEETS)
  - In-home display monitors for providing energy feedback (10 out of 33 SLEETs)

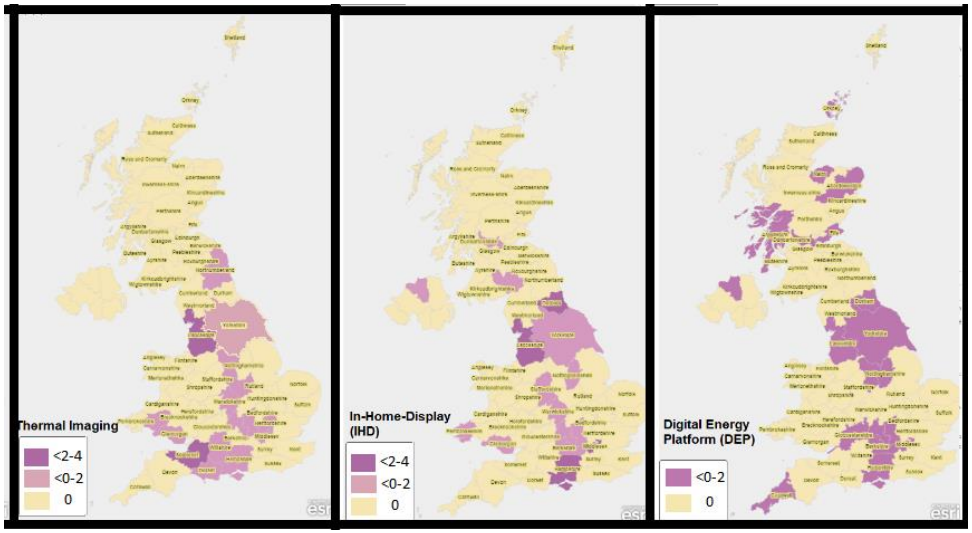




Prevalence of SLEETs

- Projects funded by Government, regulator and Research Councils deployed SLEETS to engage users with energy management
- In the UK, majority of SLEETs were deployed in projects undertaken in areas with grid constraints.
- Deployment of SLEETs was prevalent in areas with:
  - Local renewable energy technologies
  - Active community energy groups
  - Engagement of local authorities with local area energy action plans





Effectiveness of SLEETs

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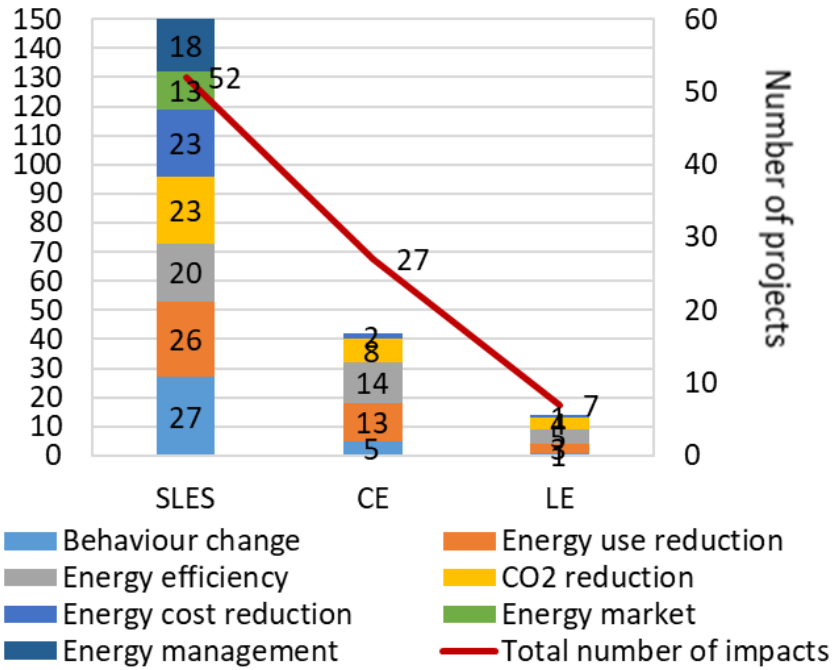
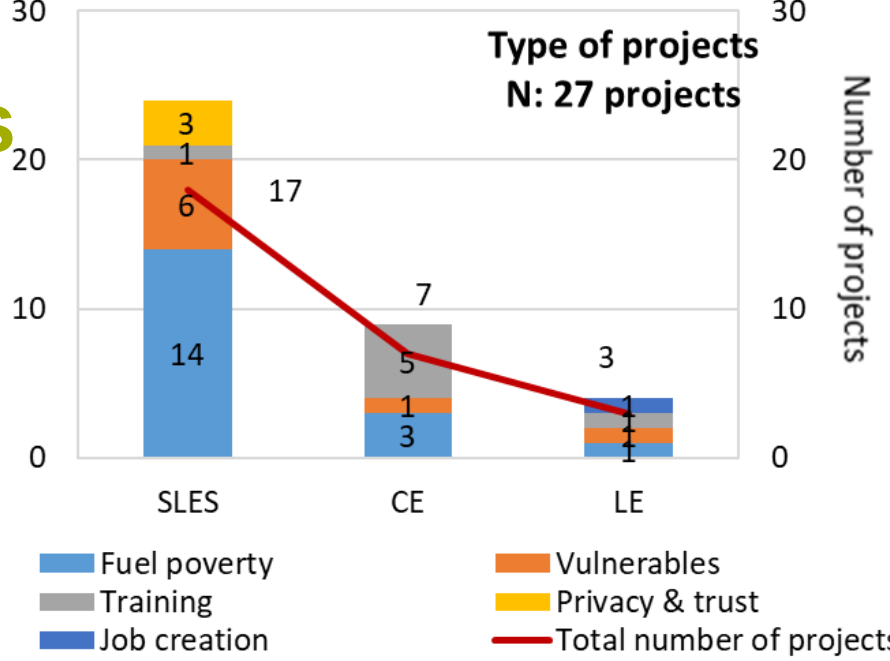
- Majority of SLEETs deployed in SLES projects to support users with:
  - Behavioural change (n: 27)
  - Energy reduction (n: 26)
  - Energy efficiency (n: 20)
- Involving users in local energy market was found to be less popular (n:13)
- Choice of SLEET was related to the form of user engagement adopted. Where user engagement was about *communicating* and *informing*, interactive tools were deployed
  - In-home-display and gamification used for *communication*
  - Thermal imaging used for *informing* users

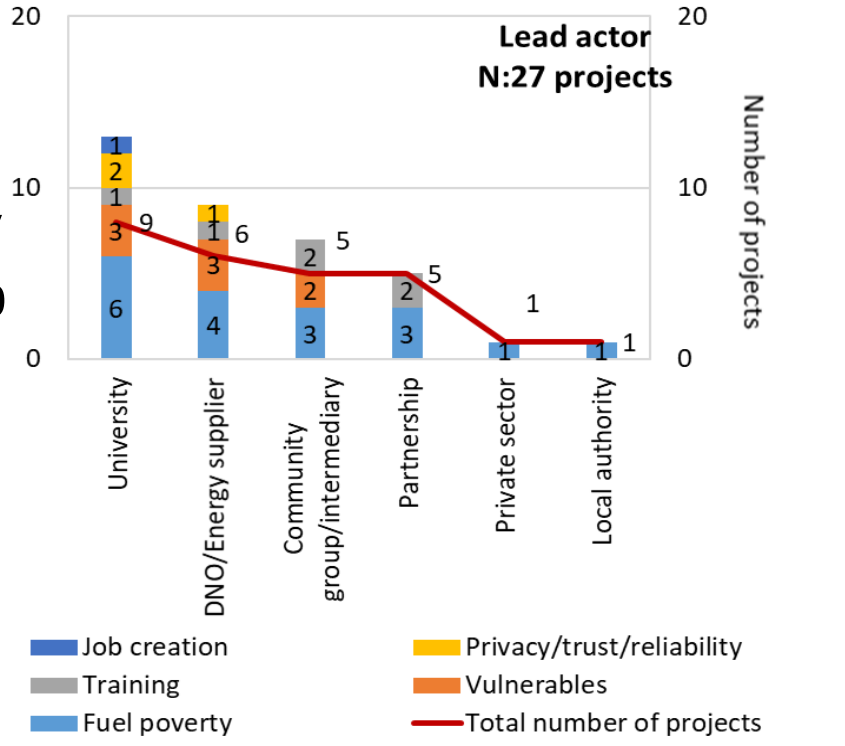


Inclusiveness of SLEETs

- 27 out of 86 projects (31%) considered inclusiveness of SLEETs, mostly in SLES projects:
  - Fuel poverty
  - Vulnerable groups
  - Training (very few)

- SLEETs focussing on the above were implemented in projects led by university, DNO or community group to:
  - Improve user engagement
  - Project acceptance
  - Build trust





Final thoughts

- Majority of local energy projects that deployed SLEETs were SLES (61%) since these projects focus on digitalisation of energy by allowing smart control of local energy demand, distribution and energy supply.

- Most of the SLEETs were information driven with a focus on analytics and unidirectional dashboards. To enhance user engagement, these tools need to move beyond a one-way flow of representing local energy flows to two-way interaction and control.

- Very few SLEETs were accompanied by training of users through inclusive modes of delivery e.g. community events, in-home visits. There is a role for intermediaries here to provide training.

- SLEETs also have a new role during the pandemic allowing user engagement with less face-to-face interaction.

- In future worth exploring how different groups of people actually use various types of SLEETs to engage with local energy management.

Thank you for your attention!

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