

# Home energy management and automation: Prosumer attitudes and behaviour

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## CRC P Integrated Smart Home Energy Management Technologies

solar  analytics

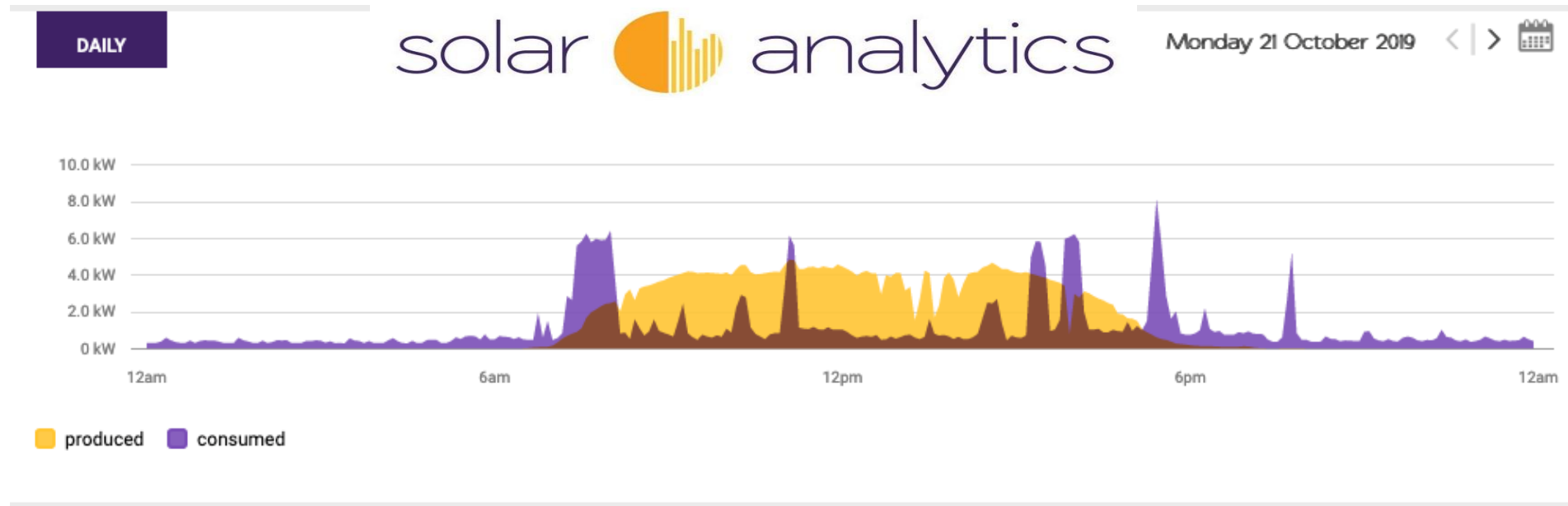


  
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# CRC-P Smart HEMS Project



1) Understand prosumer motivations, behaviours, attitudes and needs.

? ) Help prosumers to shift loads to increase solar self-consumption

? ) Enable user's DERs to respond to network signals

# Data & Method

- 1) Online survey of Solar Analytics customers (120)
  - Highly energy-engaged solar prosumers - “Early majority” (Rogers, 2015)
- 2) Online survey - green tech social media (41)
  - Invited ‘Smart HEMS Users’ but many don’t have Smart HEMS
  - Highly energy-engaged “innovators”
- 3) Semi-structured in-depth interviews (24)
  - Selected from above, categorised by motivation

**Not** representative of all energy users, highly self-selecting, but there are insights to be gained:

- Innovators are an *exceptional stakeholder group* (Sovacool, 2018)
- Importance of early adopters as partners (Strengers et al., 2019)

# User Motivations for buying solar and batteries / for managing energy / for engaging with energy

- Bill saving is the most important motivation
- BUT multiple motivations combine in decision making (environmental / social / comfort / independence)
  - e.g. solar / batteries
  - Cost savings can be a proxy for carbon reduction (and visa-versa)

*Of course, we all want to save money ... but to me, that's more of a parameter to measure how effectively I'm using energy or being environmentally friendly*

**Need to address multiple (complementary and conflicting) motivations**

e.g. articulate the broader benefits of managing the grid as well as market opportunity:

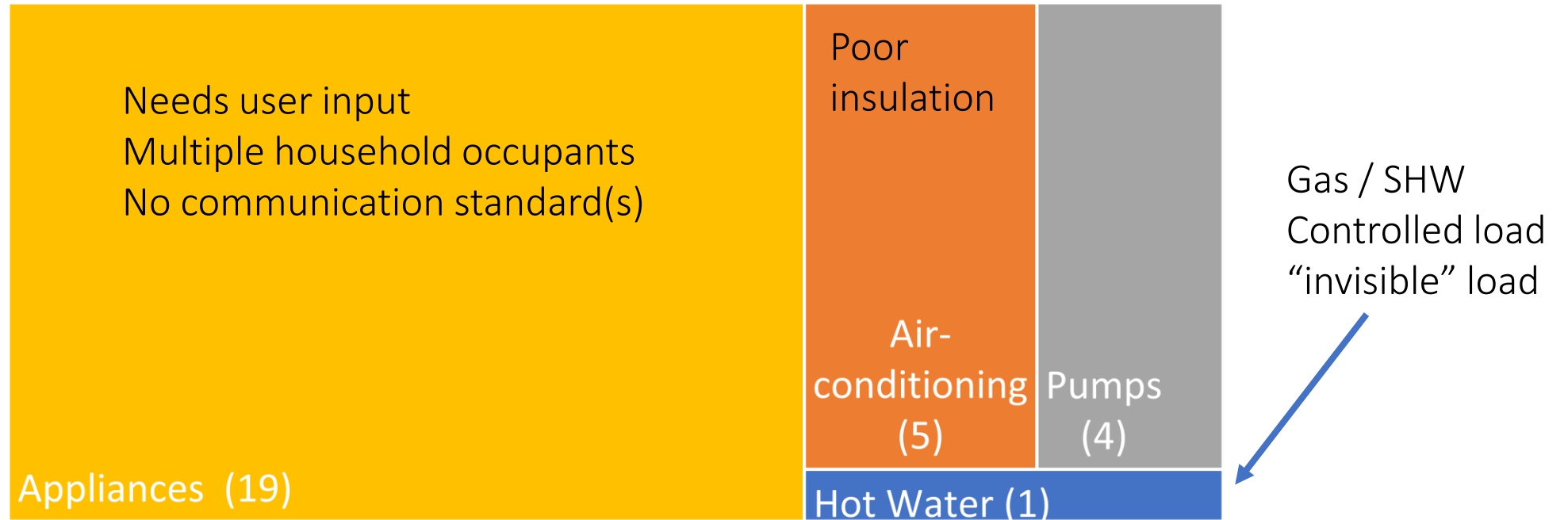
- carbon benefits (increased DER capacity)
- societal benefits
- broader financial benefits (avoided network augmentation)

# Existing Load-Shifting Behaviour

85% of these SA users use SA to manage their energy use.

Half of these shift loads to increase self-consumption / save money / reduce carbon emissions.

Current load-shifting behaviours (from 24 interviews):



The effects (kWh, \$, kgCO<sub>2</sub>) are rarely quantified.

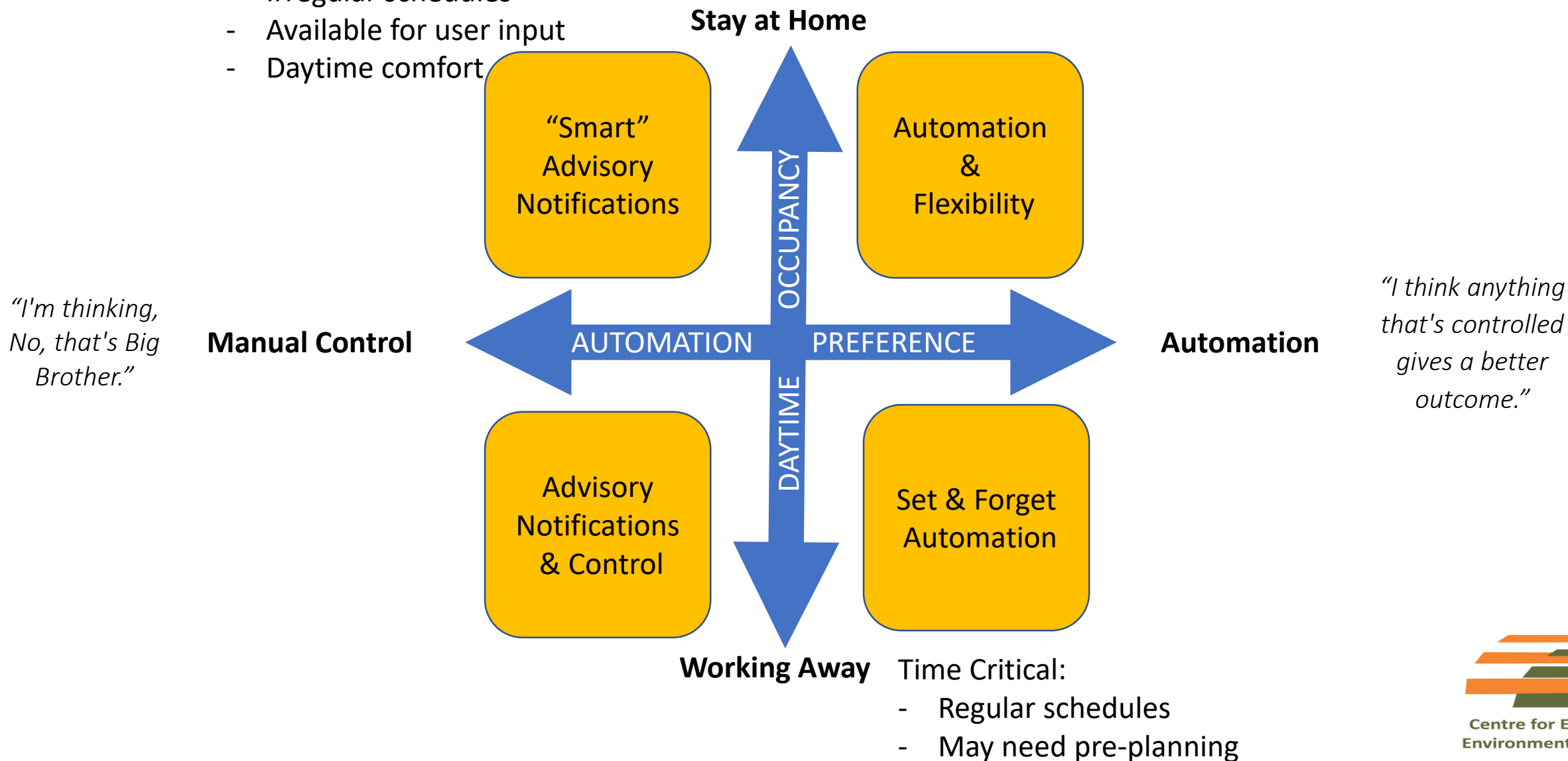
# User Needs Segmentation

Flexibility (offered / demanded)

- Irregular schedules
- Available for user input
- Daytime comfort

User HEMS needs are dependent on:

- Daytime occupancy
- Personal preferences towards automation



# User Needs from Smart HEMS

- **Demonstrated reliability** is the most important feature
- The ability to **override** automation or **opt-out** is essential
- **Clear, accurate and effective communication** of information, recommended behaviours and potential savings is important

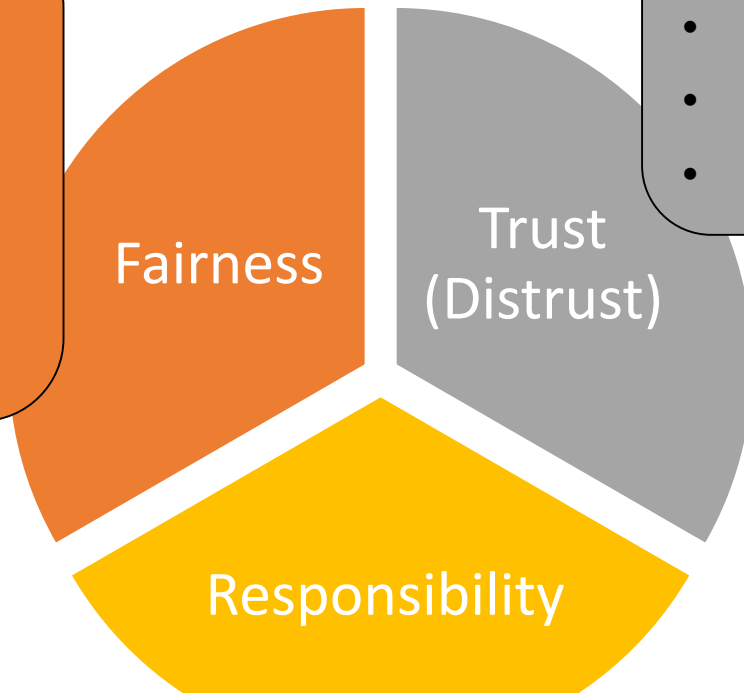
*“People should not have to become geeks  
to do really big things with solar.”*

- Notifications or automation that don't align with user experiences or preferences (“Stupid smarts”) undermine trust
- Algorithmic learning and behaviour change recommendations must account for **multiple occupants**.
- **Demonstrated value** (in terms of bill savings and/or environmental benefits)

# Attitudes to Demand Side Management

- PV connection / curtailment
- Load control
- Geographic / Social
- Transparency
- Compensation
- Health exclusions / Opt-out

- Energy companies
- Automation
- Algorithm
- Service Provider
- Data



IEA Users' TCP  
"Social Licence to Automate"  
(Weds pm)

- To ensure fairness / regulation
- For grid maintenance
- For education
- To lead



# Questions?

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