



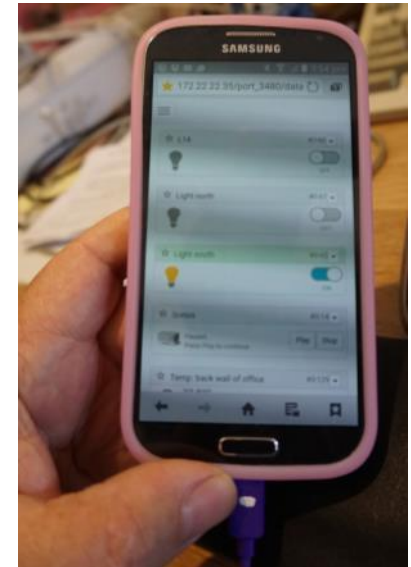
Saving energy in the smart home:

Opportunities and challenges

Yolande Strengers @yolandestreng
Centre for Urban Research

The (energy) smart home

- Automation
- Feedback/ real-time data
- Solar PV/ micro-generation
- Smart meters
- Electric vehicle integration
- Variable price signals for electricity (linked to smart tech)
- Efficiency
- Information and communication technologies



The broader smart home vision

- Convenience
- Comfort
- Security
- Entertainment
- Aesthetics/ mood enhancers
- **Energy management systems**
- Monitoring and care (of energy, people, pets)
- Voice control



An increasingly mixed bag...

- Convenience
- Efficiency
- Control
- Automation
- Comfort





Two projects on the smart home



Smart home control project

Funded by Energy Consumers Australia (2016-17)

Focused on the benefits and detriments of smart home control for 'energy vulnerable' and 'regular' households.

- **Stage 1** – Content analysis of smart home control marketing materials
- **Stage 2** – Self-Install Trial of off-the-shelf smart home control devices (smart light bulbs and plugs) with 40 households in Victoria and South Australia (56 participants)
- **Stage 3** – Observed Installations of 3 smart plug products in 6 Victorian households

With Dr Larissa Nicholls, Tanzy Owen and Dr Sergio Tirado



Smart plug: \$70-80

LED Lighting Starter Set: \$100-170

Automating the smart home

Australian Research Council project
(2015-18)

- Qualitative content analysis of international magazine/ online articles written about the smart home – 272
- Industry interviews (Australian)
- Household ethnography: tours, photography and interviews with Australians who live in smart homes (broadly defined!) – 31



With Dr Larissa Nicholls, Dr Jenny Kennedy, Rikke Jensen, Paula Arcari

<https://automatedsmarhome.wordpress.com/>



Depth not breadth

- How are people integrating smart home technologies into their everyday lives?

Resource Man (the desired energy consumer)



- Rational, functional, efficient and tech-savvy consumer/ smart tech user (from energy industry/ policy)
- Engineering/ economic solutions
- Individual operator
- Competent and empowered
- More likely to be a man

See: Strengers, Y 2013, *Smart energy technologies in everyday life: Smart Utopia?*, Consumption and Public Life, Palgrave MacMillan, London.

Image credit: Interactions ma





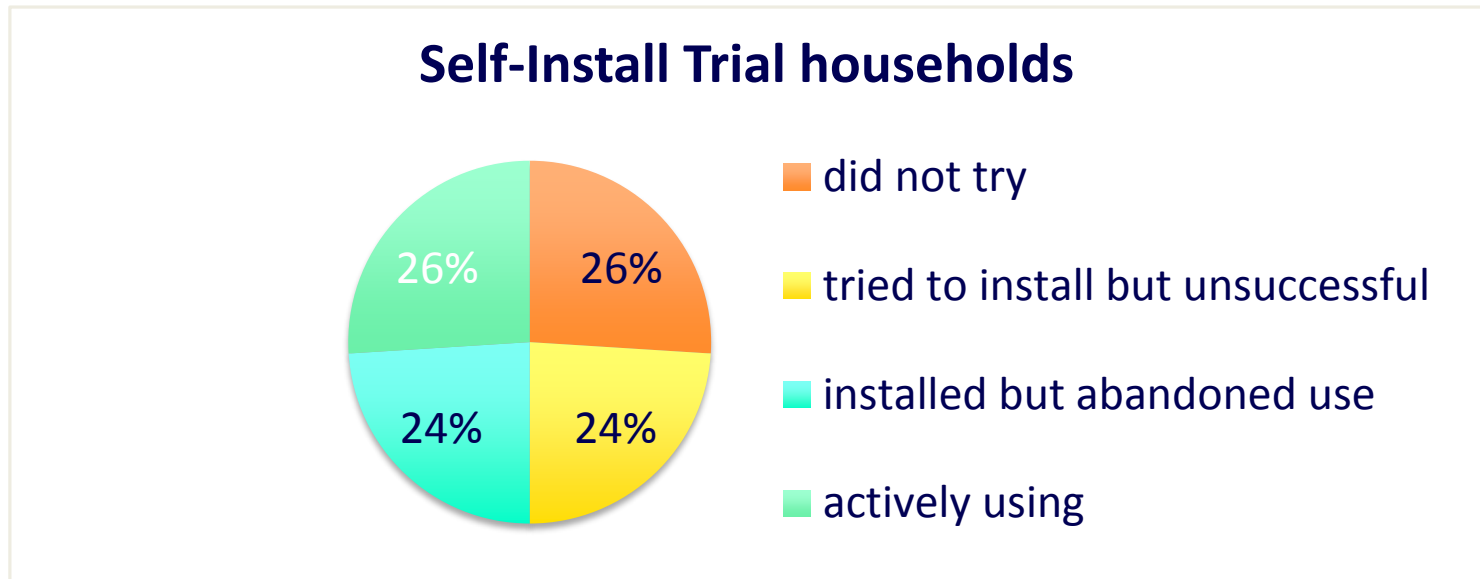


Key challenges



Plug and play?

- ECA Study



See: Nicholls, L., Strengers, Y., & Tirado, S. (2017). *Smart home control: exploring the potential for enabling technologies in households*. Melbourne, Australia: https://gallery.mailchimp.com/b38874b25e686137780eb836e/files/5d00ecfb-2098-4148-89dc-49b72b98d0aa/ECA_SHC_Final_Report_CURRENT.pdf

Lifestyle benefits (ECA study)



- Predominant marketing themes from ECA study:
 - enhanced comfort
 - more convenience
 - better security
 - personalisation
- Energy saving and load shifting **minor component** of smart home visions and promotion

See: Strengers, Y, Nicholls, L, Owen, T & Tirado, S 2016, *Smart home control devices: Summary and assessment of energy and lifestyle marketing claims*, Centre for Urban Research, RMIT University, Melbourne, Australia.





Lifestyle benefits (ECA study)

- **Smart bulbs** used in kitchen and living room to dim light and create ambience
- **Smart plug** used to switch electric heater on before coming home
‘Melbourne is a very cold place in winter... it just meant that there wasn't that initial discomfort of being freezing in the house on entry.’
- Increased electricity use
‘The devices probably [have] not [saved energy] because I'm looking at them more as a potential safety and comfort feature.’

See: Nicholls, L, Strengers, Y & Tirado, S 2017, *Smart home control: exploring the potential for enabling technologies in households*, Centre for Urban Research, Melbourne, Australia.

https://gallery.mailchimp.com/b38874b25e686137780eb836e/files/5d00ecfb-2098-4148-89dc-49b72b98d0aa/ECA_SHC_Final_Report_CURRENT.pdf

Pleasance (ARC study)

- **Lutron home automation**
 - ‘Your home is a place where you experience **comfort, romance, and peace of mind**—a place where you experience *pleasance*.’
 - ‘*pleasance ... is a fundamental feeling that is hard to define but that people desire to experience*’.

See: Strengers, Y & Nicholls, L 2017, 'Convenience and energy consumption in the smart home of the future: Industry visions from Australia and beyond', *Energy Research & Social Science*, vol. 32, pp. 86-93.





What other researchers say

- ***““Savings” ... so often turn out to be steps taken down an upward-moving escalator’*** (Darby, 2008: 502).
- ***‘SHTs (smart home technologies) may lead to more rather than less energy use, such as by creating new forms of energy demand, e.g. through pre-warming rooms, by normalizing or even raising energy-intensive expectations’*** (Hargreaves & Wilson, 2017: 10).





Other 'smart home' trends

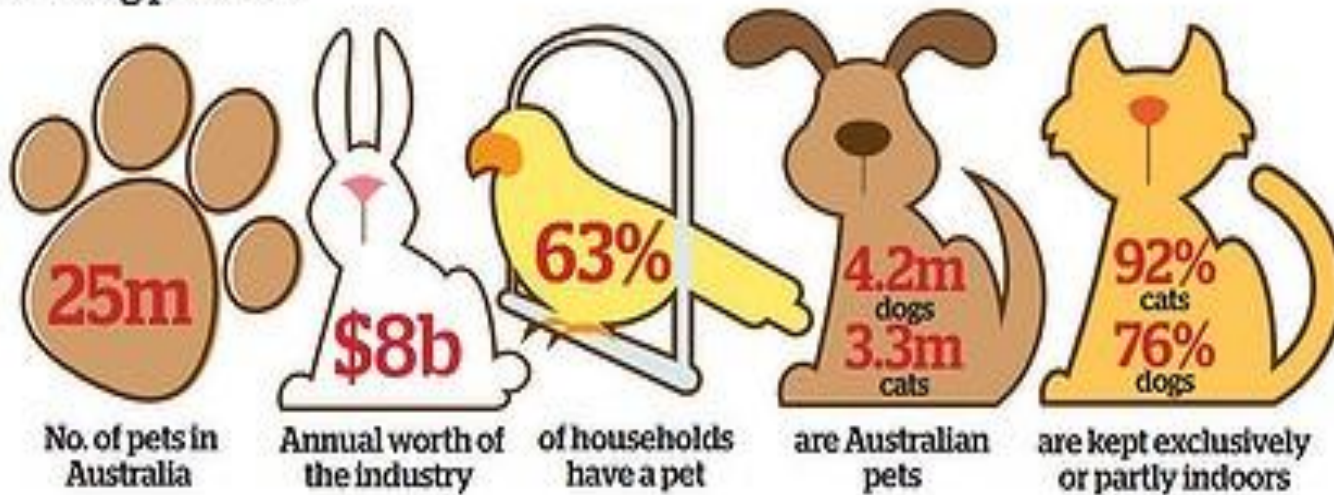


Smart pet trends



Australian pet stats

The big pet facts



Dogs and cats predominately stay at home during the day

Image source: <http://www.smh.com.au/environment/animals/its-raining-cats-and-dogs-20130921-2u6lo.html>



Emerging pet comfort trends

- ‘I have been thinking about **putting in a couple of ducts in here** [the garage] for the air -conditioning as well, **just for the puppies** you know, just when it’s really hot’.
- Oh he [the cat] has **a heat mat that’s on all the time**, 24 hours a day, seven days a week, 365 days of the year and that is not going off... Yeah **they love it**

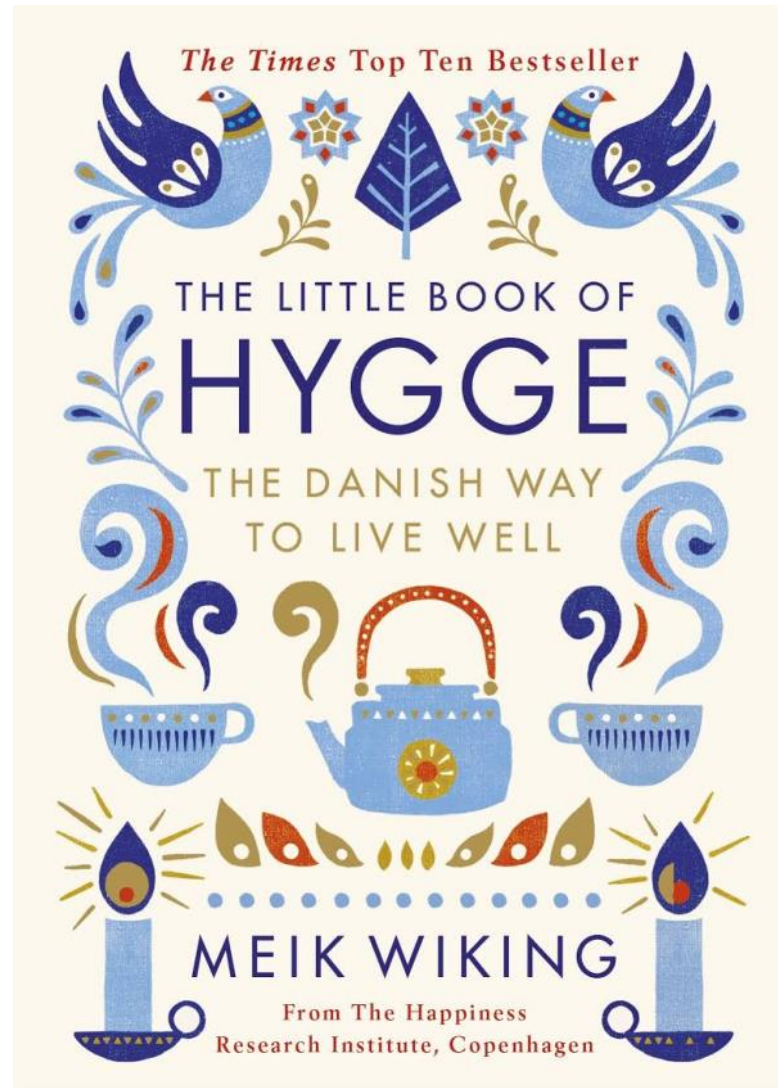
See: Strengers, Y, Nicholls, L & Maller, C 2016, 'Curious energy consumers: Humans and nonhumans in assemblages of household practice', *Journal of Consumer Culture*, vol. 16, no. 3, pp. 761-80.

Opportunities



Smart energy saving technology?





Hygge

- Pronounced *Hoo-ga*
- Danish concept popularised in USA, UK and Australia (Wiking, 2017)
- A way of life which emphasizes intimacy, warmth and togetherness
- Translates as ‘cosiness’ or ‘pleasure’
- Low-energy aesthetic (candles, blankets, hot drinks, home-cooked food)
- Prioritises ‘natural’ or adaptive comfort – breezes, sunlight, ventilation etc.

See: Jensen, R. H., Strengers, Y., Raptis, D., Nicholls, L., Kjeldskov, J., & Skov, M. B. (2018). *Exploring Hygge as a Desirable Design Vision for the Sustainable Smart Home*. Paper presented at the Proceedings of the 2018 Designing Interactive Systems Conference, Hong Kong, China.





Conclusions

- The smart home's potential to save energy is widely promoted and aspired towards
- Usability and energy reduction challenges remain an ongoing issue
- Clear need to engage in lifestyle expectations promoted through smart home industry

Thank you

The ECA 'smart home control' project was funded by Energy Consumers Australia Limited (www.energyconsumersaustralia.com.au) as part of its grants process for consumer advocacy projects and research projects for the benefits of consumers of electricity and natural gas. The views expressed in this document do not necessarily reflect the views of Energy Consumers Australia

The 'Automating the smart home' project was supported under the Australian Research Council's *Discovery Early Career Researchers Award* funding scheme (project number DE150100278).

Yolande.strengers@rmit.edu.au
@yolandestreng

