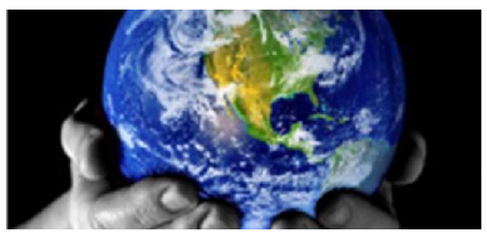
Energy Saving Kits - Educating and Empowering End Users?

A Cross-Country Case Study Comparison

IEA DSM Task 24 - Behaviour Change in DSM: *Phase II - Helping the Behaviour Changers*



Dr Sea Rotmann

Operating Agent Task 24

BECC conference

Washington D.C., Oct 8, 2018

WHY is the IEA running Technology Collaboration Programmes (TCPs)?

The breadth and coverage of analytical expertise in the IEA Technology Collaboration Programmes (TCPs) are unique assets that underpin IEA efforts to support innovation for energy security, economic growth and environmental protection. The 38 TCPs operating today involve about 6 000 experts from government, industry and research organisations in more than 50 countries[1].

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HOW? Task 24 – Phase II Subtasks
How it all fits together (with Phase I)

Subtask 1

Subtask 2

Subtask 4

Subtask 5

Subtask 1

Subtask 4

Subtask 3

Why?
Subtask 6
'The Issues'

Who?
Subtask 7
'The People'

How?
Subtask 8
'The Tools'

What?
Subtask 9
'The Measure'

So what?
Subtask 10
'The Story'

Subtask 11 – Real-life pilots

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WHAT? *Subtask 8 - Toolbox for Behaviour Changers: "Behaviour Change from A to Z"*

[See Toolbox for Behaviour Changers]

B – Behaviour Changer Framework

Definition: *The Task 24* Behaviour Changer Framework *was created to provide a visual overview of the social ecosystem, focusing on all relevant stakeholders, i.e. the* Behaviour Changers *(ST 7) from the different sectors and their relationships with one another, and the* End User.

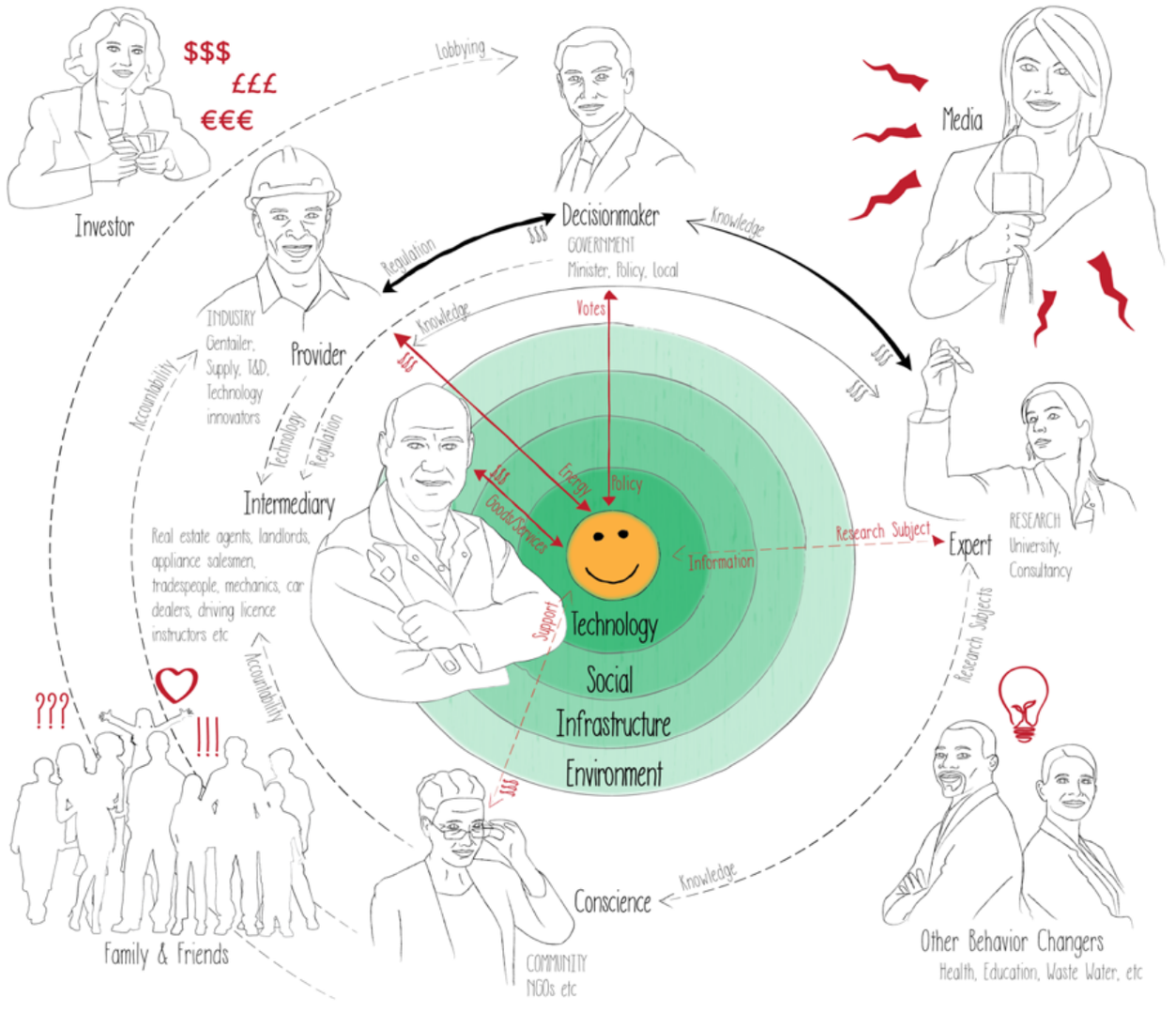
Insights: The “magic carpet” proved extremely successful in the field, leading to actual, measurable energy savings in real-life pilots. It also won an award for most promising or innovative project at ECEEE Summer Study 2017

See also: “Magic Carpet”, Collaboration,

Collective Impact Approach

Read more: Rotmann, S (2016) *“How to create a ‘magic carpet’ of behaviour change”*

Watch: explanatory video



C – Case study analyses

Description: *A* case study analysis *is not merely a descriptive but a critical exercise, typically an examination of a situation/institution with view towards making recommendations*

Tool: Subtask 8 case study templates – what we used to collect cases below

See also: Focus Groups, Interviews, Psychological & sociological research

Read more:

- ST 1 Mourik & Rotmann (2013) "The Monster case study analysis
- ST 2 Country case study analyses: Austria, Netherlands, New Zealand, Norway, Sweden, Switzerland
- ST 6&7 "Cross-country case study analysis for energy saving kit programmes"
- ST 6&7 Janda et al (2017) Advances in green leases and green leasing: Evidence from Sweden, Australia & UK

Example: Irish Energy Saving Kit

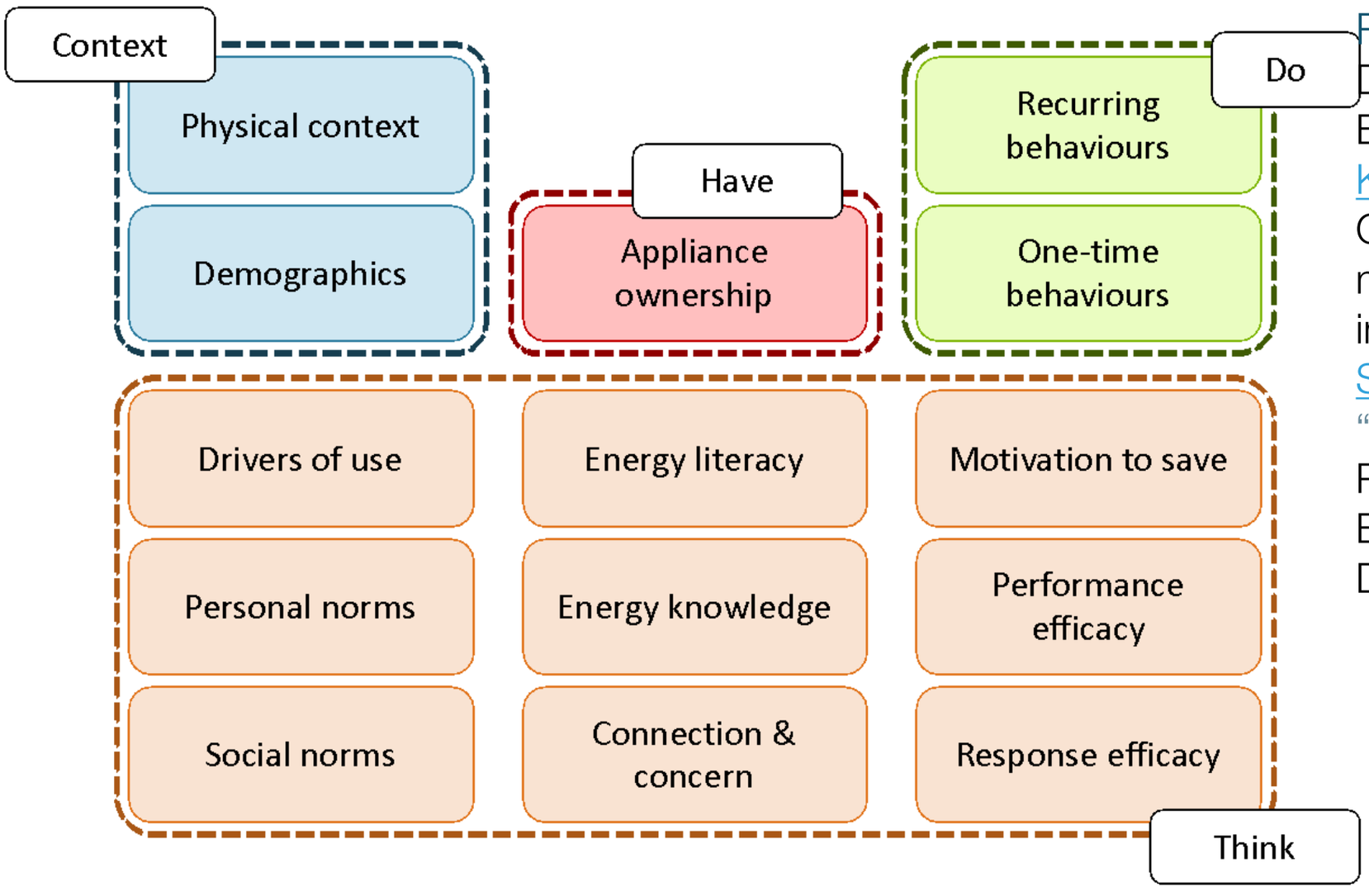
B – Beyond kWh toolkit

Background: Our Project Partners, the See Change Institute, undertook an empirical methodology review of how residential feedback interventions were evaluated:

Read: Subtask 3 Karlin et al (2015) "What do we know about what we know?"

From these insights, they developed a standardised tool, to be internationally validated (see Irish evaluation report) in Subtask 9: "Beyond kWh toolkit"

See also: Evaluation, See Change Institute Process



Read more: Karlin et al (2015) "Exploring Deep Savings: A Toolkit for Assessing Behavior-Based Energy Interventions"
Karlin et al (2016) "Evaluating Energy Culture: Identifying and validating measures for behaviour-based energy interventions"
Southern California Edison (2015) "Dimensions of Energy Behavior: Psychometric Testing of Scales for Evaluating Behavioral Interventions in Demand Side Management Programs"

What is the Task 24 process?
Case study: Ireland

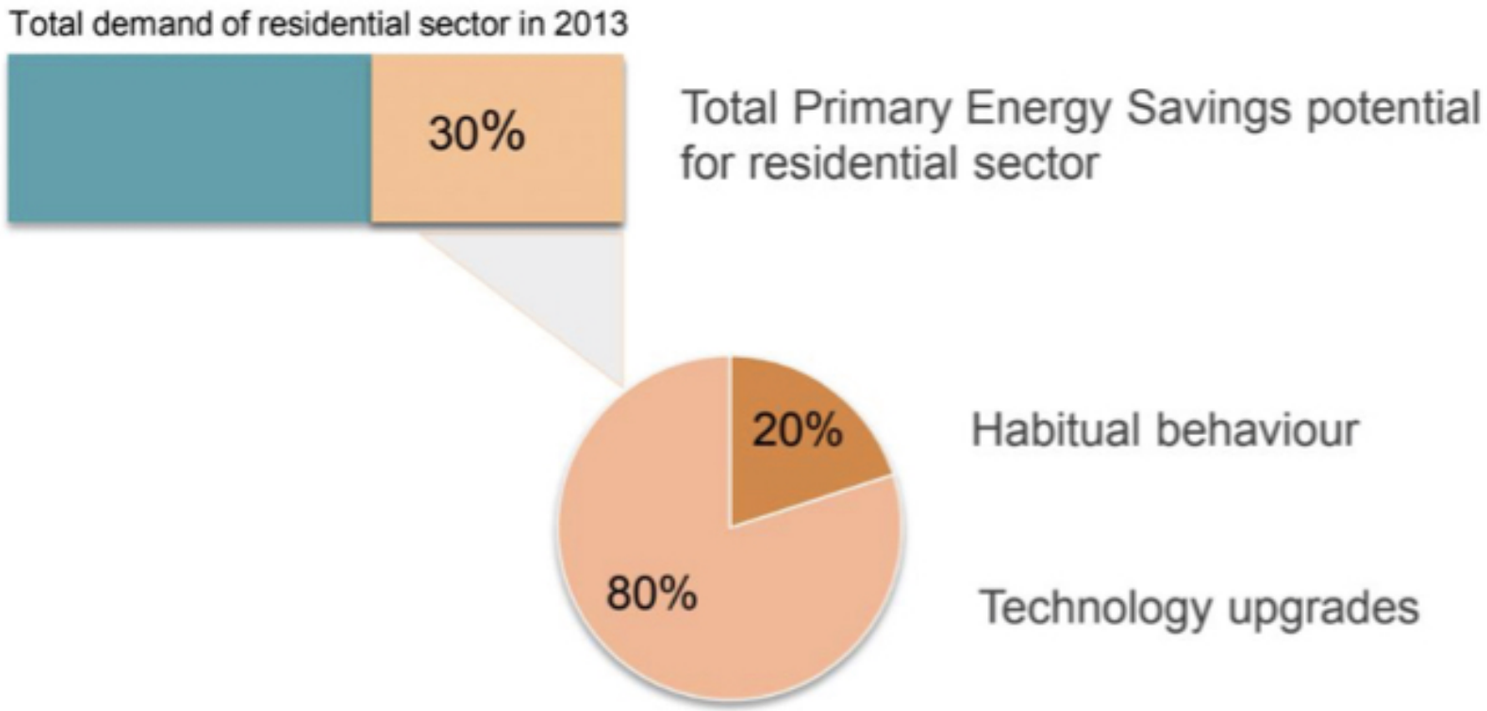
HOW? The Task 24 process

STEP ONE: Subtask 6 - The Issues: Workshop 1 brought Irish *Behaviour Changers* from different sectors together to decide on their top DSM issues:

⇒ Compare and contrast behavioural approaches in SME vs residential sector

⇒ Landlord split incentive issues in the residential sector

⇒ Engaging with *Middle Actors* to improve uptake of home retrofits (expanding a pilot by Dublin's energy agency Codema to use public libraries as Middle Actors that loan out home energy saving kits)



SEAI (2015b) Behavioural Insights on Energy Efficiency in the Residential Sector. SEAI, Dublin, Ireland.

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Subtask 6 – Irish Home Energy Saving Kit Pilot

Irish Top DSM Issue - Pilot

Goals:

- **Educate and empower** households to understand their home's energy and health performance and know what to do to improve it

- Examine the potential of the kits to **encourage behaviour change** in the home in terms of both habitual routine and investment behaviours

SEAI (2018). *Subtask 6&7 Final Report - Ireland.*

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HOW? The Task 24 process

STEP TWO: Subtask 7 - The People: Workshop 2 brought the relevant *Behaviour Changers* together to use the Task 24 "*Behaviour Changer Framework*" and design thinking to map the end user journey and identify pain points and possible solutions

seai SUSTAINABLE ENERGY AUTHORITY OF IRELAND

seechange INSTITUTE

M.CO

Codema Dublin's Energy Agency

Comhairle Cathrach Bhaile Átha Cliath Dublin City Council

Energising Communities!
Join the dedicated 'Sustainable Energy Community' (SEC) Network.

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SEAI (2018). Subtask 6&7 Final Report - Ireland.

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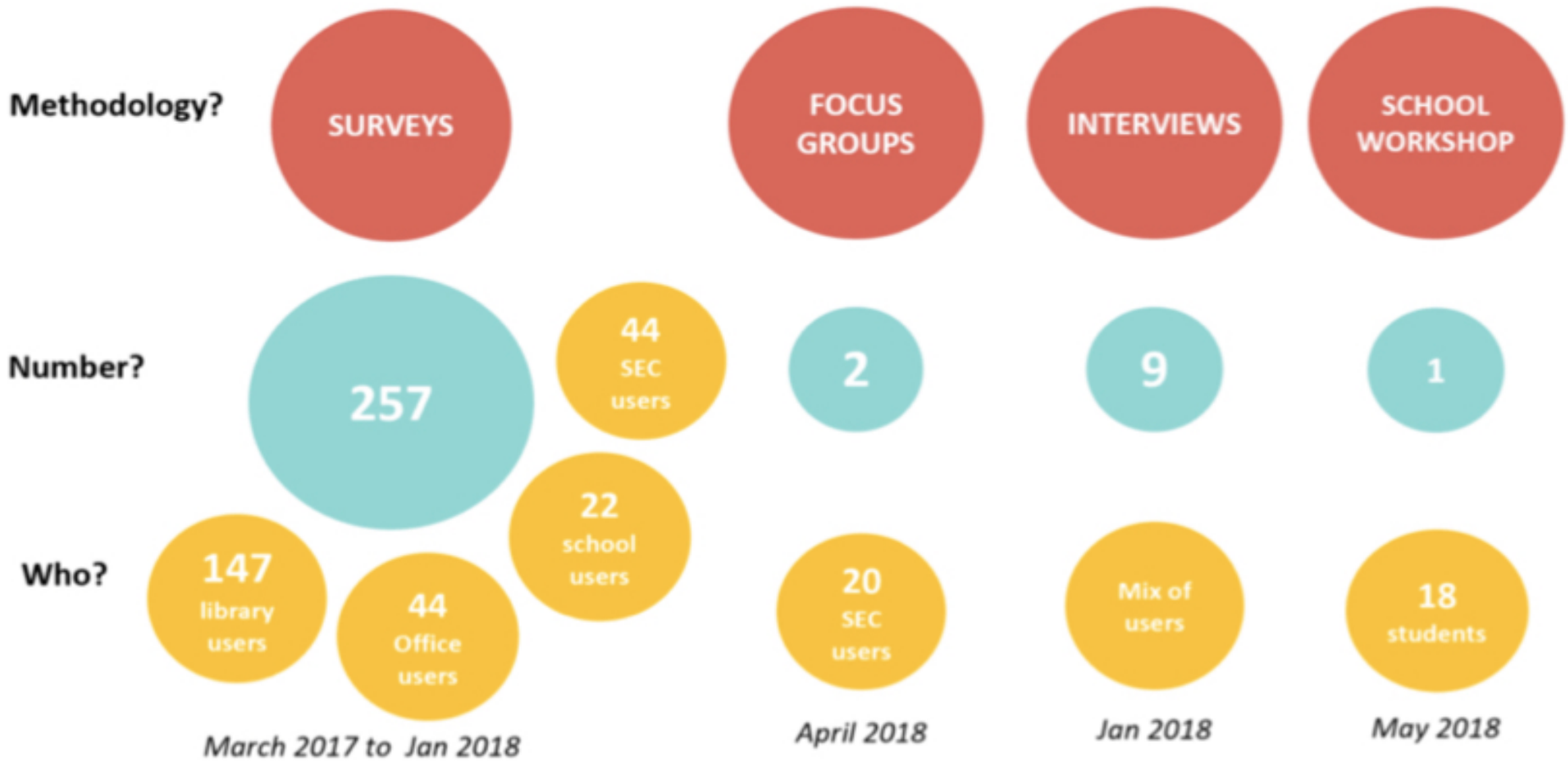
HOW? The Task 24 process

STEP THREE: Subtask 9 - The Measure: The pilot was designed as an adaptation of Codema's existing home energy saving kit programme. Several different end user groups were trialed. The Task 24 "*Beyond kWh*" tool was used to test the SEC end users.



Rotmann & Chapman (2018). *Subtask 9: Using Bayesian Modelling to test the "beyond kWh" toolkit in Ireland*
SEAI (2018) *Subtask 6&7 Final Report - Ireland.*

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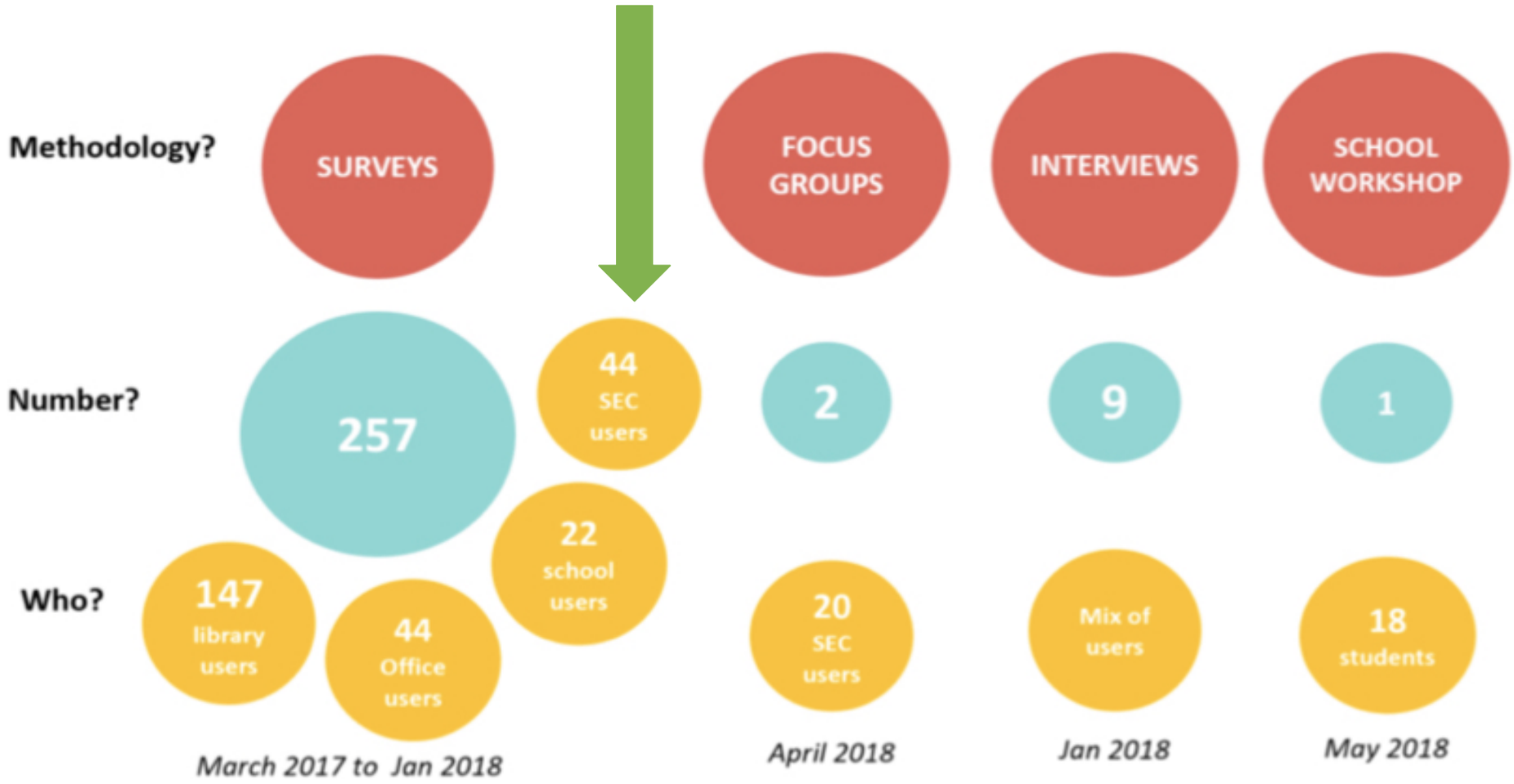

Rotmann & Chapman (2018). *Subtask 9: Using Bayesian Modelling to test the "beyond kWh" toolkit in Ireland*
SEAI (2018) *Subtask 6&7 Final Report - Ireland.*

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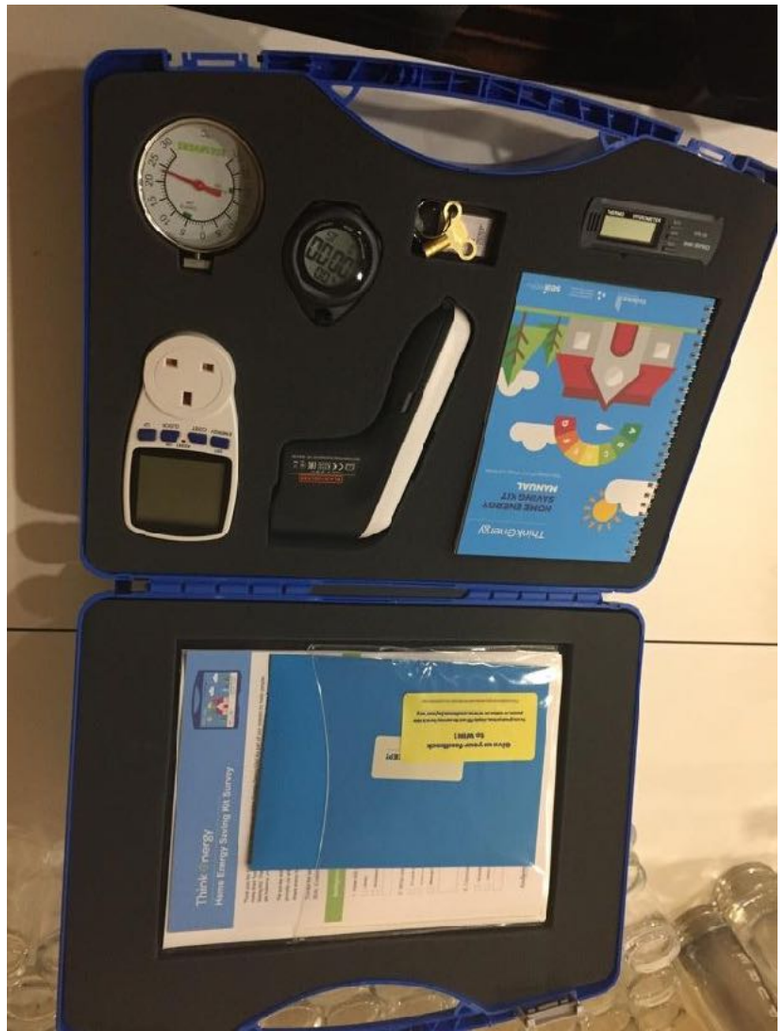
HOW? The Task 24 process

STEP FOUR: Re-iterate: In the third Task 24 workshop, we got all *Behaviour Changers* together again to check in, evaluate progress against expected pain points and re-iterate the design, if necessary.

Subtask 6 – Energy Saving Kit Programmes
Cross-country comparison (IE, AUS, NZ, CA, US)

Goal: Shared learning of international best practice

Methodology: Interviews with programme managers, review of reports



Rotmann and Chapman (2018). BEHAVE

Rotmann 2018. Cross-country case study

HOW? The Task 24 process

STEP FIVE: Cross-country case study comparison: Programme Managers around the world were interviewed about their experiences using similar energy-saving kits.

Different Middle Actors and End Users:

Public Libraries	Utilities	Schools	Sustainable Energy Communities
South Australia Tasmania ACT	Idaho Power	Ireland	Ireland - SAGE
Auckland	PG&E - San Jose	California	
Dublin		New Zealand	
Edmonton Red Deer City			
Kennath			
Butte County OH Sonoma County CA			

Rotmann (2018). *Cross-country case study comparison Ireland.*
IEA DSM Task 24. *Database of energy saving kit programmes.*

HOW? The Task 24 process

STEP FIVE: Cross-country case study comparison: Programme Managers around the world were interviewed about their experiences using similar energy-saving kits.

Similar and different tools in the home energy kits:

Most countries had:

Infrared thermometers

Stopwatch

Plug-in power meter

Fridge/freezer thermometer

Handbook

Only one country had:

Radiator key

Lumens meter

Hygrometer
Magnifying Glass

Compass

Weatherstripping

Shower bag

Rotmann (2018). *Cross-country case study comparison Ireland.*
IEA DSM Task 24. *Database of energy saving kit programmes.*

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HOW? The Task 24 process

STEP SIX: Analyse: We collected a lot of quantitative and qualitative data, which was analysed using different methodologies and triangulated.

Rotmann & Chapman (2018). *Subtask 9: Using Bayesian Modelling to test the "beyond kWh" toolkit in Ireland*
SEAi (2018). *Subtask 6&7 Final Report - Ireland.*
Rotmann (2018). *New Zealand's HEAT kit programme.*

Most useful

TOOL	POSITIVE	NEGATIVE	QUOTES - INTERVIEWS & SURVEYS	USER IDEAS TO IMPROVE
Thermal leak detector 	• Easy • Fun • Instant • Visible	• Time consuming • Not relevant during summer • Challenge prioritising which insulation to invest in first and next steps • Costly to remedy	*It was a very visual and quick indication of heat loss.* *Thermal leak detector of limited use as it was summer when I used it.*	• More direct links to SEAI grants • Need an easier way to integrate results and help users prioritise actions to take.
Temperature and humidity meter 	• Quick, easy & instant • Informative – new knowledge. • Easy to act upon	• Time consuming • Not knowing 'ideal' temperature / humidity as a reference.	*Showed me the home was warmer than I thought and the bedroom over heated.* *Knowing these values, you can directly act to adjust your radiators.*	• Use a device that provides recommendations on temperature/ humidity. • Embedded thermostats – may displace the need for this tool
Plug-in energy monitor 	• Informative and accurate • Learned about standby energy use	• Complicated, time consuming. • Does not fit in all sockets. • Hard to act on the information – some felt the only action was appliance upgrades which they could not finance.	*It was great to show the kids how much electricity items use, so they are now more inclined to turn off things.* *I don't think it will result in a change in my habits as all electricity I use consider necessary.*	• Simplify – make it easy to input costing • Provide advice on which devices to prioritise using the monitor on. • Present average appliance usage for benchmarking.
Fridge/freezer thermometer 	• Easy & quick to set up • Can take immediate action to remedy	• Slow for temperature on thermometer to adjust • Some fridges have thermometers already • Very focused on fridge alone	*Easy to use tool to diagnose issue but equally easy to rectify through adjusting fridge temp. gauge.* *I have a thermometer already built into my fridge.*	• Use digital thermometer for easier reading and faster results. • Add alarm to device when it has finished the reading
Radiator key 	• Easy to use • Fixed/improved radiator performance	• Key type not relevant for all radiators • Felt that technical skills were required to complete the activity. • Leaking water – messy to deal with.	*I knew I had to bleed my radiators, but I had no idea how to do it. The kit explained it in a simple way.* *Bigger job than I want to undertake right now.*	• Query if other kinds of keys could be included to make it relevant for all radiators.
Stopwatch 	• Surprised by how much water used in the shower • Took action to reduce time-spend / volume of water.	• Difficult to use • Not convinced of its relevance • No bag included to capture water • People have stop-watches on phone.	*Having the large stopwatch meant it was easy for the children to use, they felt important.* *Every phone (mobile) has a stop watch of some sort.*	• Clearer instructions for use • Include 'hippo' bag for collecting water.

Least useful

Rotmann & Chapman (2018). *Subtask 9: Using Bayesian Modelling to test the "beyond kWh" toolkit in Ireland*
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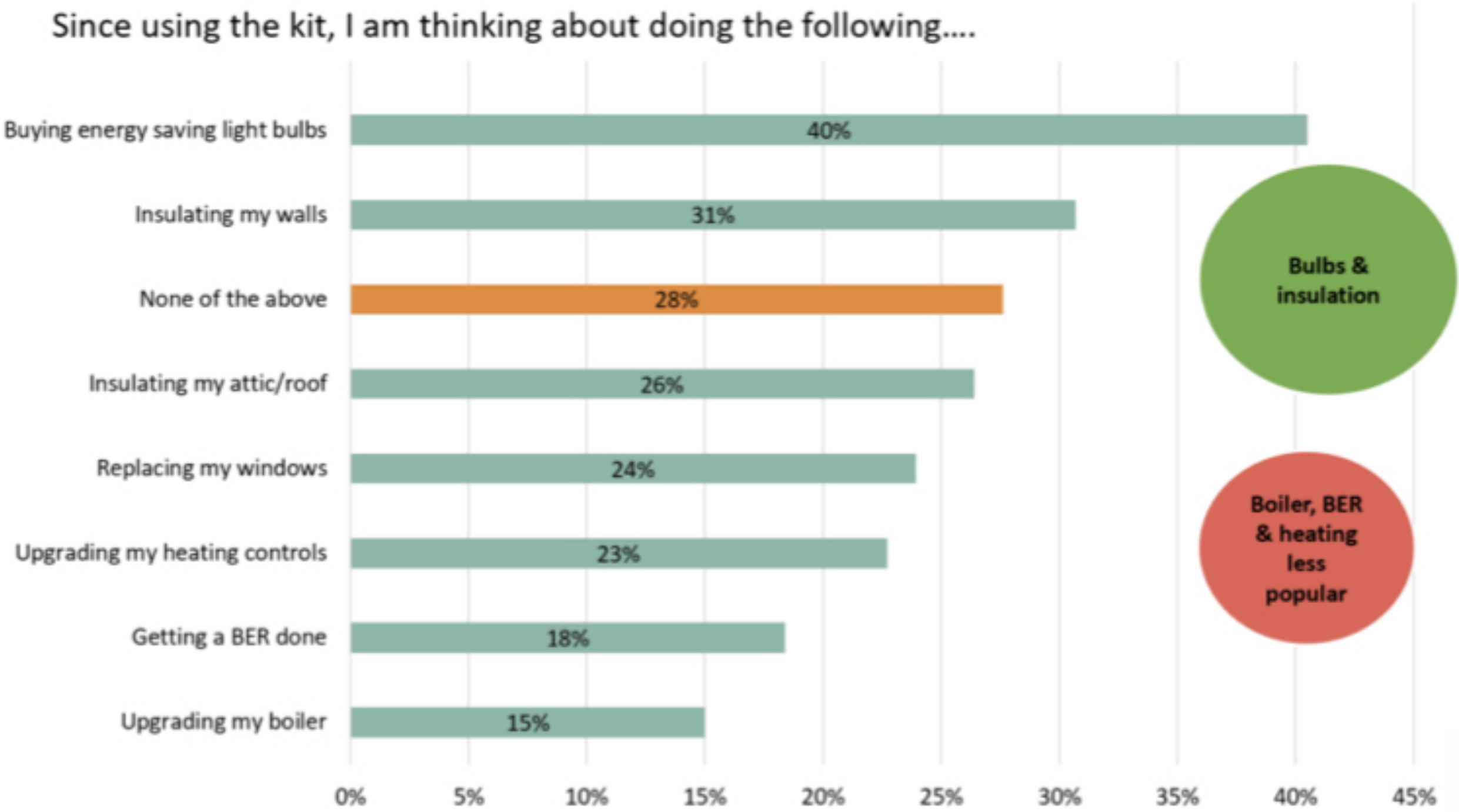

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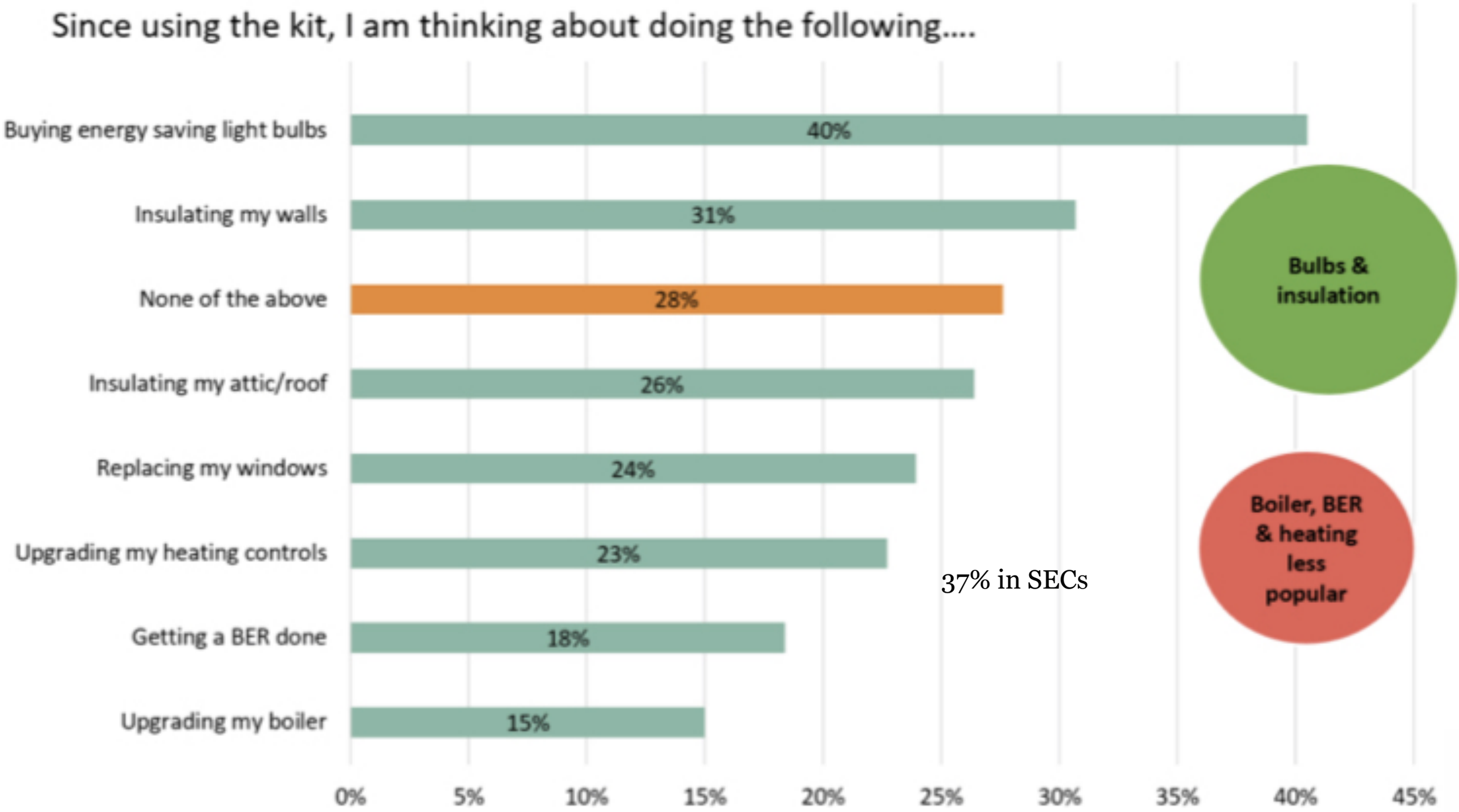

37% in SECs

Rotmann & Chapman (2018). *Subtask 9: Using Bayesian Modelling to test the "beyond kWh" toolkit in Ireland*
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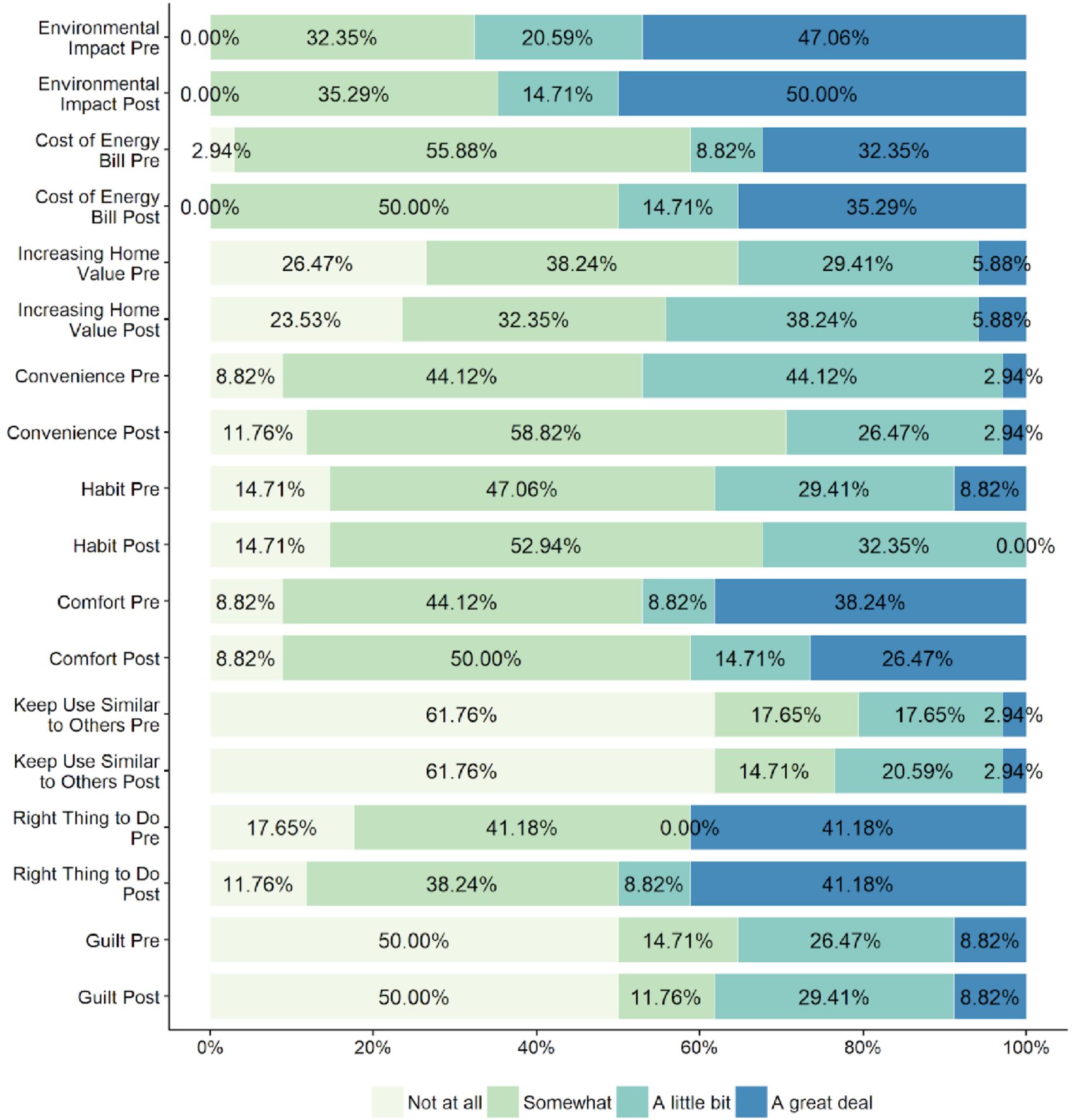
Energy Saving Motives: Pre- and Post-Kit



N = 34 for all items.

eadsm
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MOTIVATION FOR BORROWING KIT...

Completed works

Thinking about Action

Verifier

Verify quality of energy efficiency upgrades already completed to give confidence & assurance in investment.

Savvy

Confirm suspicions and provide confidence in the need for energy efficiency upgrades in advance of investment / action.

Energy Saver

Curiosity about energy use and to get direction on potential energy efficiency behaviours & upgrades.

Enviro-Aware

Improve **knowledge and awareness** on energy use and tips to reduce consumption due to environmental motivations.

High

Technical knowledge / interest

Low

Focus on TLD & thermometer

Interest in HES tools

Interest in all tools

Rotmann & Chapman (2018). *Subtask 9: Using Bayesian Modelling to test the "beyond kWh" toolkit in Ireland*
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Educa-tor

Involve **whole family and teach children** how to use tools, measure home performance and what it means (in New Zealand)

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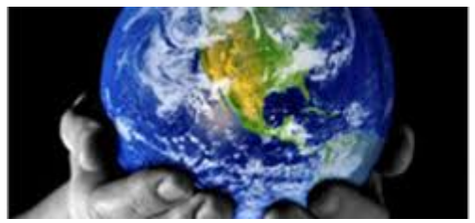
Rotmann (2018). *New Zealand's HEAT kit programme.*

HOW? The Task 24 process

STEP SEVEN: Disseminate: 4 reports, a database, workshop minutes, BEHAVE paper, BEHAVE and BECC presentations

- SEAI (2018). Subtask 6&7 "Final Irish Report"
- Rotmann (2018). Subtask 6 "Irish Energy Saving Kits cross-country comparison"
- Rotmann and Chapman (2018). Subtask 9 "Evaluating the Irish Energy Saving Kit programme"
- Rotmann (2018). Subtask 6 "New Zealand's HEAT kit programme"
- IEA DSM Task 24 (2018). Database of the Irish cross-country comparison
- IEA DSM Task 24. Irish Workshop minutes (for funders only)
- Rotmann & Chapman (2018). *ENERGY SAVING KITS – EDUCATING AND EMPOWERING END USERS? A Cross-Country Case Study Comparison*. BEHAVE conference.

Behave 2018



behavior, energy & climate change becc

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HOW? The Task 24 process

NEXT Steps Behavioral Centers

STEP EIGHT: Next steps: In Ireland, the home energy saving kits will hopefully be rolled out nation-wide and in both Ireland and New Zealand, more pilots involving schools are planned. Both countries hope to create an App to close to the loop for the end user and help tailor the most appropriate solutions based on their data.

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Thank you very much for your attention!

Any comments or questions?

drsea@orcon.net.nz

Thank you to our brilliant funders and collaborators: