Encouraging Heat pump Adoption in Ireland: Insights from Behavioural Economics

June 23, 2021
14h00 – 15h00

Leonardo ENERGY Webinar Channel
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19th Webinar of the UsersTCP Academy
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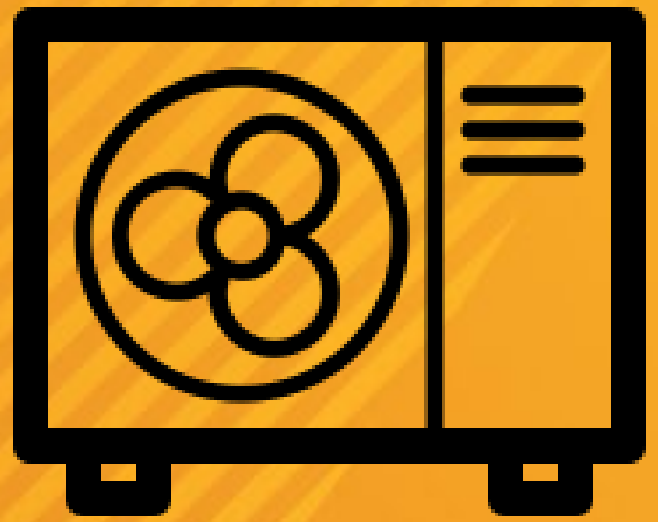
Speakers:
Karl Purcell, SEAI

In this short talk, Karl Purcell, the program manager of the Behavioural Economics unit at the SEAI, will outline the heat pump adoption customer journey and highlight the barriers and drivers to uptake at each stage. The presentation will conclude with some recommendations for policymakers looking to encourage further heat pump adoption.

Encouraging heat pump installations in Ireland



Behavioural Insights Series Paper

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SEAI Behavioural Economics Unit

Using the latest evidence from Behavioural Science and Economics to encourage citizens, homeowners and businesses to change their energy behaviour.

Karl Purcell

Marek Bohacek

Andrew O'Callaghan

Jim Scheer

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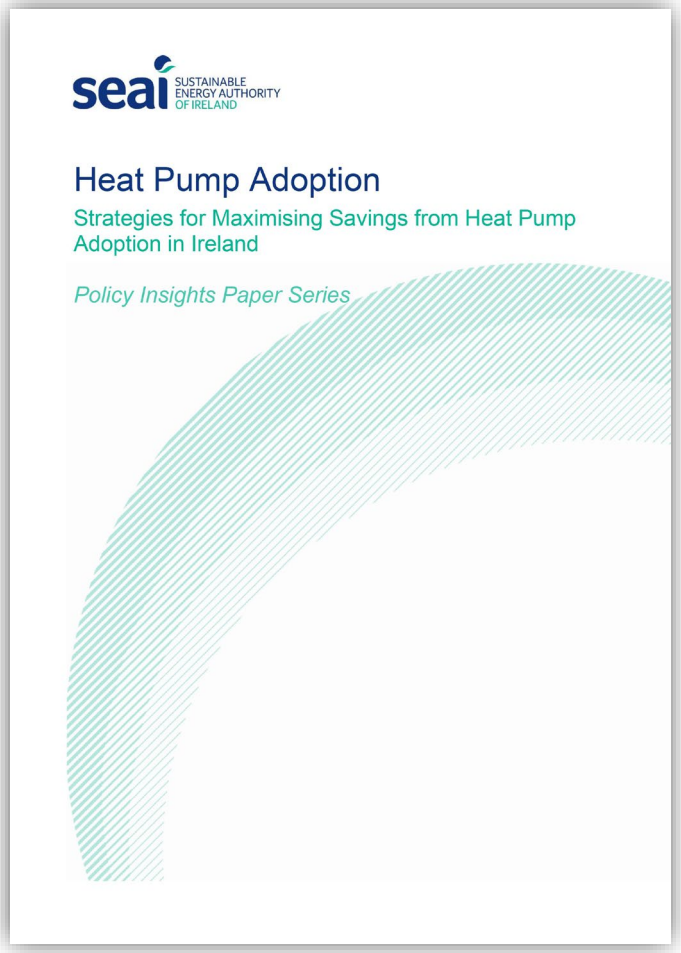
Behavioural Insights for Policy Series

- Behavioural insights deliver the highest level of impact when applied throughout the entire policy lifecycle.
- Applying insights at the problem identification and policy analysis stages of policy formation.



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Aims & Scope of Report

This report is:

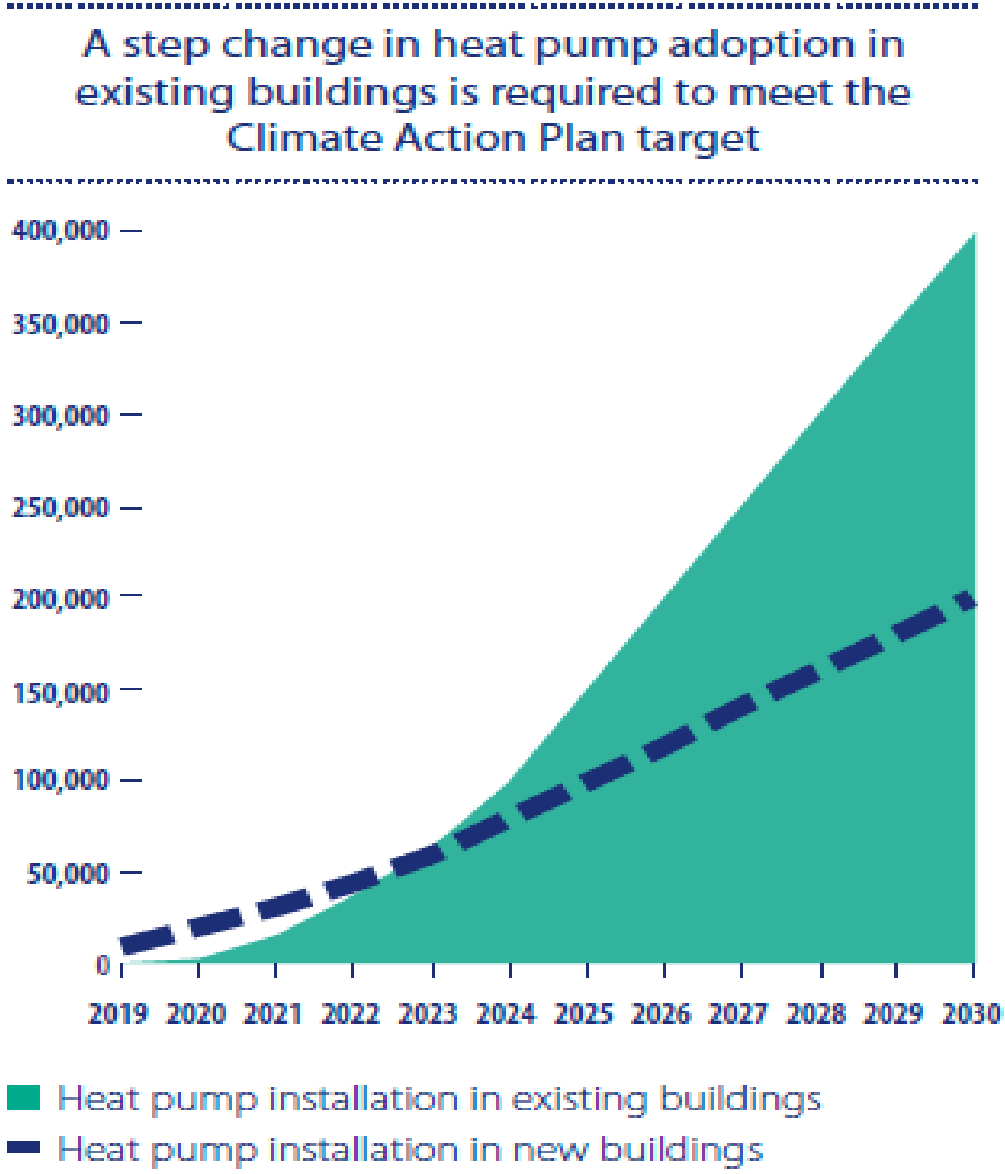
- An outline of relevant barriers and drivers of heat pump adoption.
- An indication of additional measures that may support efforts to achieve heat pump targets, based on available evidence.

This report is not:

- An economic feasibility study of the suggested policies.
- A review of fiscal policies, such as carbon tax, VAT, etc.

Policy Context

- Need to decarbonise residential heat.
- The biggest contributor to heat emissions in 2018 was heating demand from residential homes, which accounted for 47% of heat emissions
- CAP has set ambitious targets for the installation of heat pumps in domestic dwellings.



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We aimed to review the evidence on barriers and drivers of heat pump adoption

The aims and objectives of the paper were to:

- Identify the barriers and drivers to heat pump adoption at each part of the adoption lifecycle;
- Identify factors that influence the realisation of the potential savings from heat pump adoption in Ireland; and
- Identify potential strategies for increasing heat pump adoption in Ireland and realising higher operational efficiency.

The heat pump adoption customer journey

The Heat Pump Adoption Customer Journey Has 5 Stages

Considering	Not actively researching, but forming opinions of, heating technologies
Choosing	Making an active decision between a number of alternatives for replacing/repairing the heating system
Organising	Coordinating and organising the installation of a heat pump
Designing and installing	Facilitating installation and making design decisions with the contractor
Operating	Operating the heat pump on a day to day basis.

What are the barriers to uptake and what solutions can we apply to encourage heat pump adoption?

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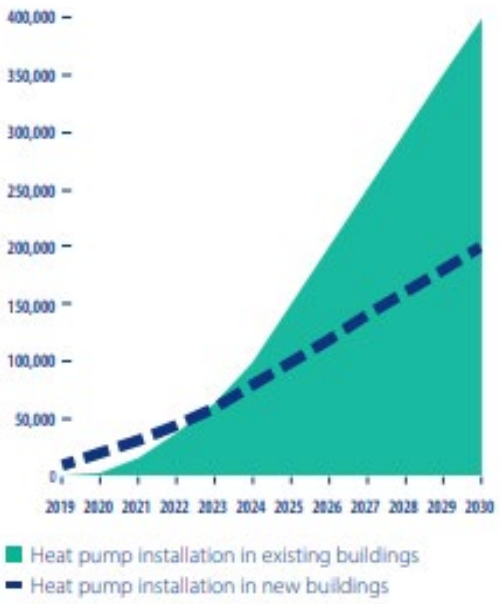
Rialtas na hÉireann
Government of Ireland

Encouraging heat pump installations in Ireland

A Behavioural Economics Perspective

A step change in heat pump adoption in existing buildings is required to meet the Climate Action Plan target



Heat pump customer journey

STAGE 1: CONSIDERING

Not actively researching, but forming opinions of, heating technologies

BARRIER	Low awareness and understanding of heat pumps	We tend to stick with traditional approaches	Narrow focusing during distress purchases	We focus more on up-front costs rather than long term costs
POTENTIAL SOLUTION	**Introduce** National and community-based marketing campaigns	**Encourage** regular boiler servicing and include information on alternative technologies	**Encourage** the development of "heat as a service" providers and "boiler loans"	**Provide** feasibility study grants for developers




STAGE 2: ORGANISING

Coordinating and organising the installation of a heat pump

BARRIER	Disruption during installation	We tend to avoid making uncertain choices that we think we might regret later		Low number of qualified heat pump installers	Hassle of organising assessments and home visits	Lack of finance
POTENTIAL SOLUTION	**Provide** training to heat pump installers	**Provide** an online recommender tool to help people see if a heat pump is right for their home	**Create** a role for an "assigned certifier" to quality assure all heat pump installations	**Provide** and promote re-skilling and training opportunities for plumbers and tradespeople	**Encourage** one-stop-shop development	**Provide** low-cost medium-term financing





STAGE 3: DESIGNING, INSTALLING & OPERATING

Making design decisions, facilitating installation & operating

BARRIER	Low understanding of heat pumps	Over-use of "boost" function and supplementary heating	Complicated heating control design	Negative installation experiences	Designers use rules of thumb when designing systems	
POTENTIAL SOLUTION	**Require** training for heat pump adopters on all grant schemes	**Avoid** under-sizing systems and creating a dependency on auxiliary heating systems	**Simplify** heat pump heating controls	**Provide** training to heat pump installers to maximise customer satisfaction	**Trial** the introduction of customer questionnaires and installer checklists to improve heat pump design	**Provide** training and support services to heat pump installers




Please note: *The potential solutions identified here will require further consideration prior to implementation.*
The barriers, solutions, and customer journey shown here have been simplified for presentation purposes. Please see the full report for more detail.

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Sustainable Energy Authority of Ireland (2020). *Encouraging heat pump installations in Ireland. A Behavioural Economics Perspective.* Sustainable Energy Authority of Ireland.

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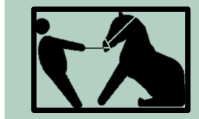
Detailed breakdown available online…

	Considering	Choosing	Organising	Designing & Installing	Operating
Low Awareness of Heat Pumps	X	X			
Poor understanding of heat pumps and how they work	X	X	X	X	X
Narrow focusing during distress purchases	X	X			
Contractors often report low demand for heat pumps from consumers and so may not offer them	X	X			
Regret Aversion	X	X	X		
Present Bias	X	X			
Risk Aversion	X	X	X		
Status Quo Bias	X	X			
Lack of finance	X	X	X		
Concerns about noise of heat pump		X		X	X
Concerns that heat pumps are slow to heat rooms	X	X			
Potential for heat pumps to delay installation due to system complexity	X	X	X		
Disruption of installation process is seen as a hassle			X	X	
Bad experiences with installing heat pumps	X	X			
Negative reviews and feedback from previously poorly	X	X			

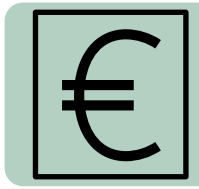
Overview | **Barriers by cust journey stage** | Drivers by cust journey stage | Solutions by cust journe ...

Barriers to realising savings from heat pump adoption

Hyperbolic discounting



Status quo bias



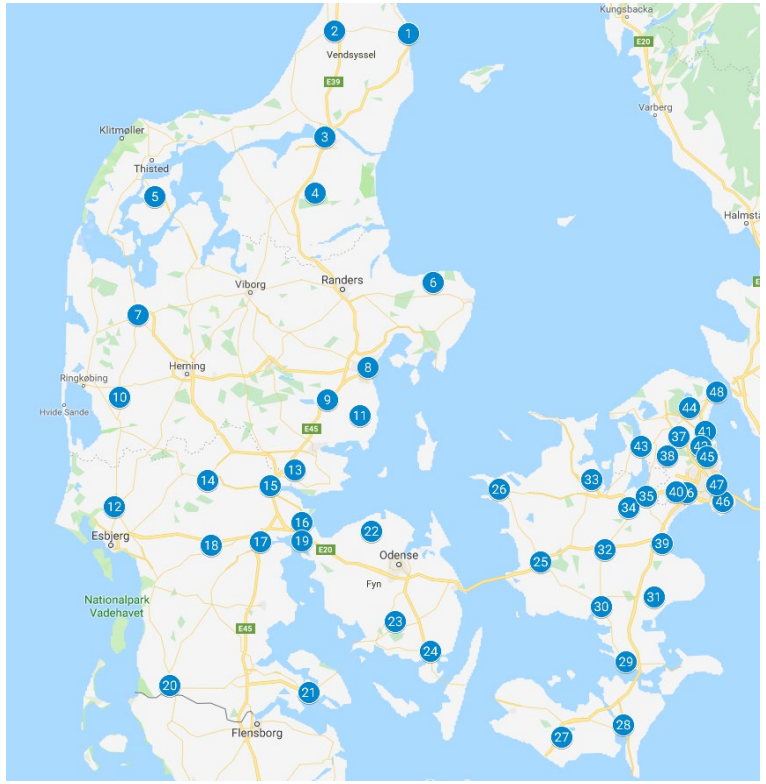
Cost

Complicated heating controls

Low awareness and understanding

Increase awareness by holding targeted community events supported by national campaigns

- Denmark successfully ran a large number of targeted events to encourage people relying on oil-boilers to switch to heat pumps
- Events were held all across Denmark
- Events were typically 2 hours long, with an hour of presentations, followed by an hour for attendees to talk with installers and book appointments for consultations
- 26% of respondents to a survey of attendees stated they had switched away from oil since the event



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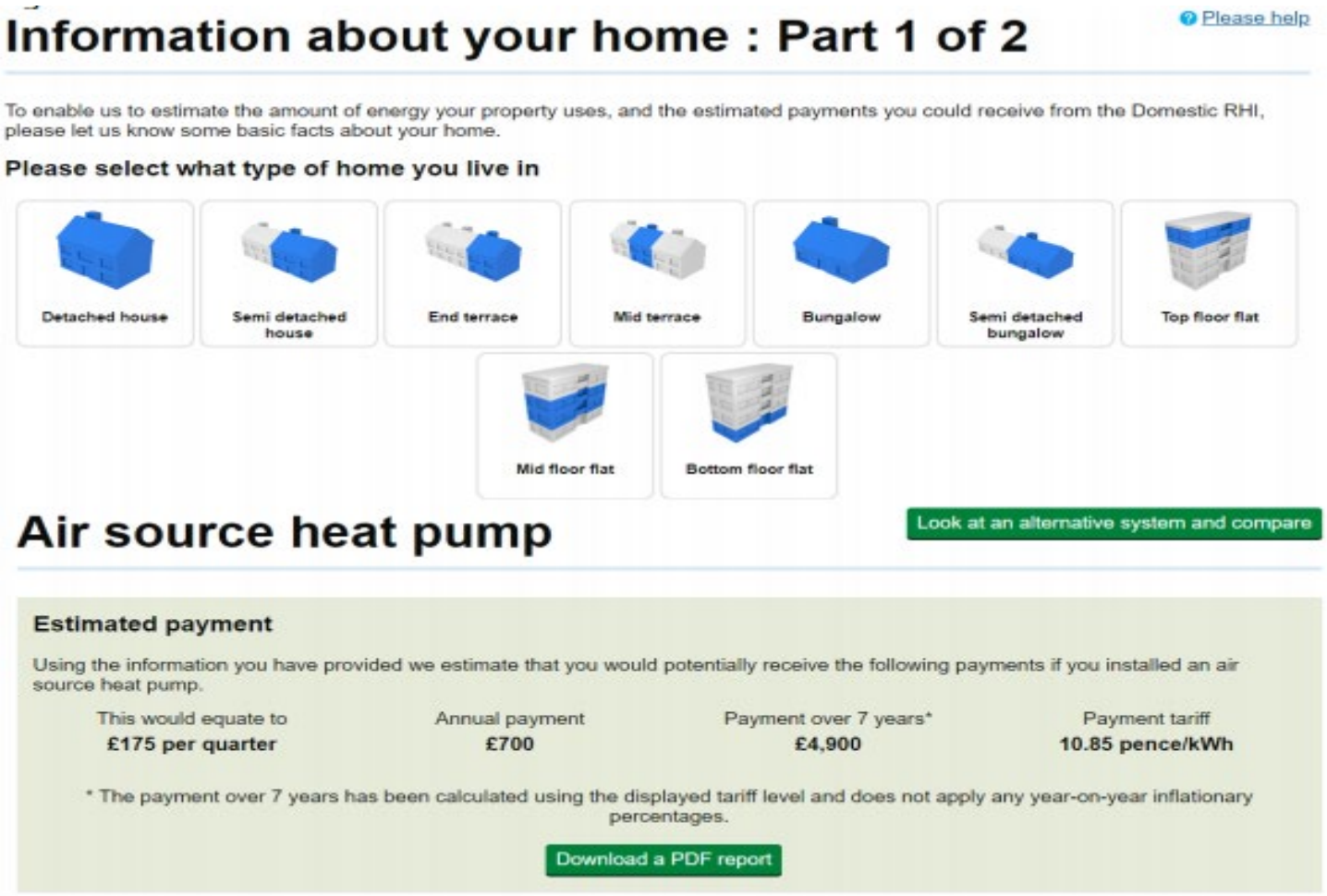
Provide online recommender tools

- Online tools simplify choices for homeowners
- Homeowners don't know what technology is right for them
- Homeowners are likely to misestimate savings without recommender tools



Provide training to installers and focus on high quality design and installation

- Training should be provided for installers
- It is important that systems are well sized for each home's heating demand and installed correctly to minimise energy loss
- The focus of the training should be on high quality design and installation of systems
  - In particular, training should focus on avoiding under-sizing and ensuring pipework is well insulated
  - Providing "sales" training for installers can also increase customer conversion and satisfaction

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Provide low cost finance through one-stop-shops

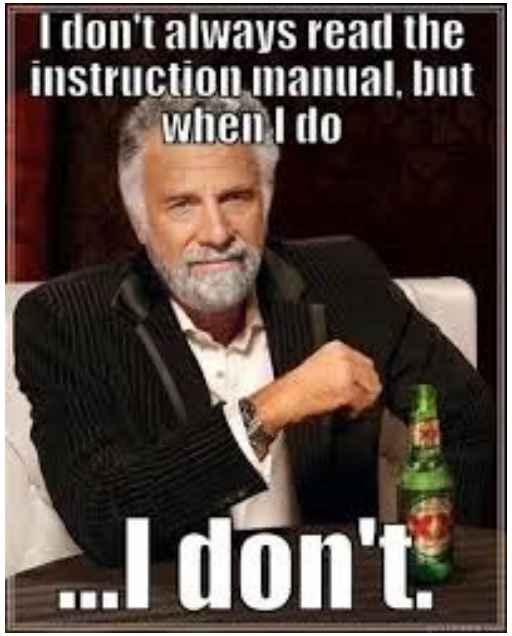
- Managing the many different contractors needed for a retrofit that includes a heat pump installation puts a large administrative burden on homeowners (Owen, Mitchell and Unsworth, 2013)
  - One-stop-shops should be formed and manage projects on the homeowner's behalf
- High up front costs means low cost finance is essential

Simplify heat pump heating controls and teach homeowners how to operate their system efficiently

- Previous UK studies show that:
  - People find smart heating controls difficult to use (DECC, 2013);
  - Only 50% of heat pump owners were satisfied with their controls (Caird, Roy, and Potter, 2012).

- People want:
  - Clearer feedback on savings and efficiency
  - An indicator to show when the boost function is on
  - To be taught how to use their system correctly

- SEAI's Behavioural Economics Unit will be conducting experiments on this important topic this year



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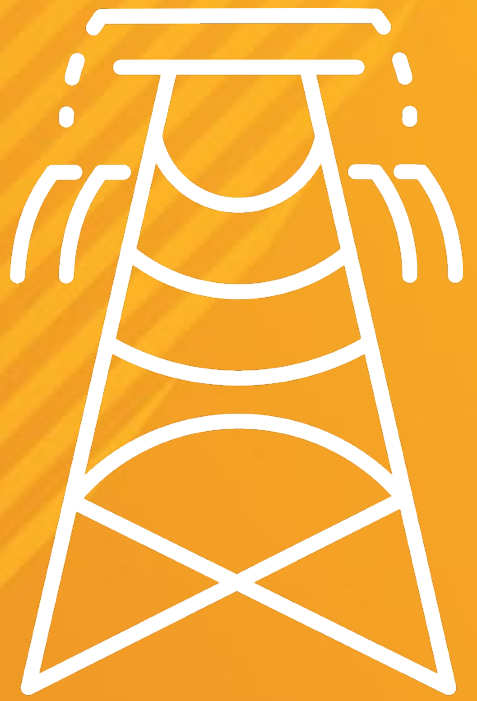
Factors that influence the savings achieved



The following factors influence the savings realised following heat pump installation

Installation quality

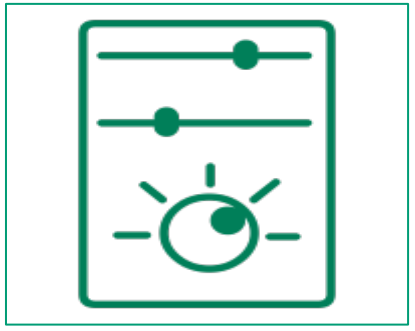
Pipework and pipe insulation is key

System design and heat pump installed

Accurate sizing is important.

Design choices often based on subjective decisions

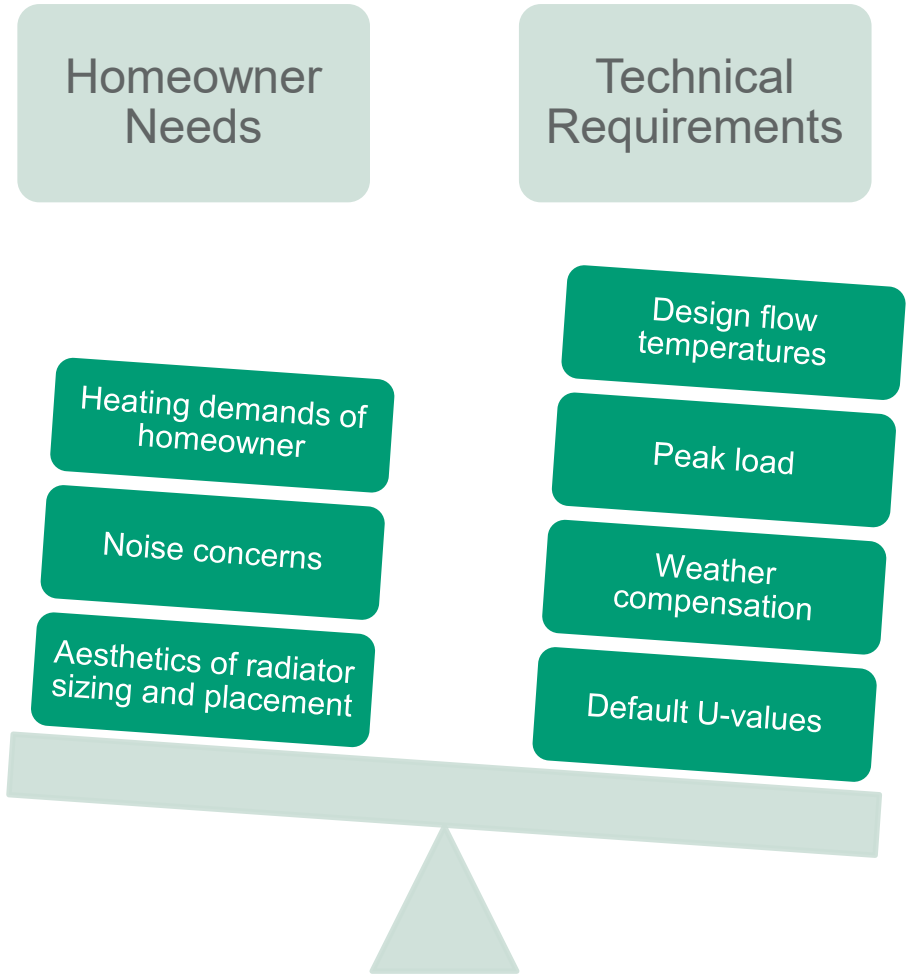
Pre and post energy tariff



Previous fuel type used

Homeowner behaviour and use of controls

The calculations and decision making involved in heat pump design are complex and this may lead to errors / underperformance…



ROOM Kitchen/Dining room									
Design Room Temp	21	Notes:							
External Design Temp	-3								
Design Temp Difference	24								
Ventilation Heat Loss	No. of air changes per hour ac/h	Room Volume (meters) Length (m)	Width (m)	Height (m)	Amount of air to be heated per hour m^3/h	Air change factor $W/m^3.K$	Design Temp Diff °C	Heat Loss Watts	
	1.5	4.9	2.7	2.4	47.628	0.33	24	377.21376	
Additional air changes due to Chimneys or Flues	3	For additional air changes see table in section 2.2. Ventilation Heat Loss			95.256	0.33	24	754.42752	
Fabric Heat Loss		Length (m)	Width (m)	Height (m)	Area m^2	U-Value $W/m^2.K$	Design Temp Diff °C		
External Floor		4.9	2.7		13.23	0.77	24	244.4904	
External Wall (Gross area)		7.6		2.4	18.24				
Window			1.1	3	3.3	1.6	24	126.72	
Window			1.1	1.05	1.155	1.6	24	44.352	
External Door			1.75	2.1	3.675	1.6	24	141.12	

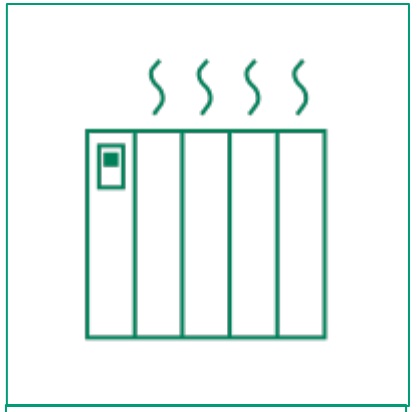
Who is most likely to install a heat pump?

The following groups are more likely to install a heat pump

Movers

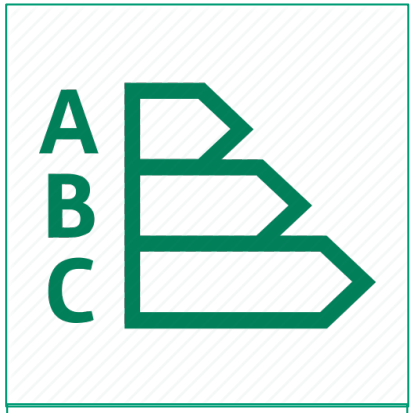
Larger homes

Oil users



Electricity users

Tech Enthusiast



Lower/higher BER

High Education

High SES

Some important findings to keep in mind…

Some important findings to keep in mind…

- People's tendency to continue with the status quo is **extremely** strong
  - It will take significant investment in demand generation, and other policies, to encourage people to adopt heat pumps
- Installation quality can have large impacts on the savings achieved
  - Standards, training, and on-site support will be crucial
- People find it hard to assess whether a heat pump is right for them
  - We should develop online tools and calculators to help them make decisions more easily
- How people operate their system will impact the savings achieved
  - We should require householder training across all grant programs
- Heat pump system design is difficult, even for skilled workers
  - Simplifying calculations, providing technical support, and checklists will help

Thank you!

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Ireland's European Structural and Investment Funds Programmes 2014-2020
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Full paper available at: https://www.seai.ie/data-and-insights/behavioural-insights/

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User-Centred Energy Systems

A Technology Collaboration Programme by IEA

UsersTCP and the International Energy Agency (IEA)

- The **International Energy Agency (IEA)** is an intergovernmental organisation that works to shape a secure and sustainable future for all, through a focus on all fuels and all technologies, and analysis and policy advice to governments and industry around the world.
- To facilitate global cooperation on energy technology, the IEA created the **Technology Collaboration Programme (TCP)**. Today, the **UsersTCP** is one of 38 TCPs each focused on a different topic. Together, they connect thousands of experts across government, academia and industry in 55 countries dedicated to advancing energy technology research and application.
- The UsersTCP is **functionally and legally autonomous** from the IEA. Views and findings of the UsersTCP do not necessarily reflect those of the IEA.

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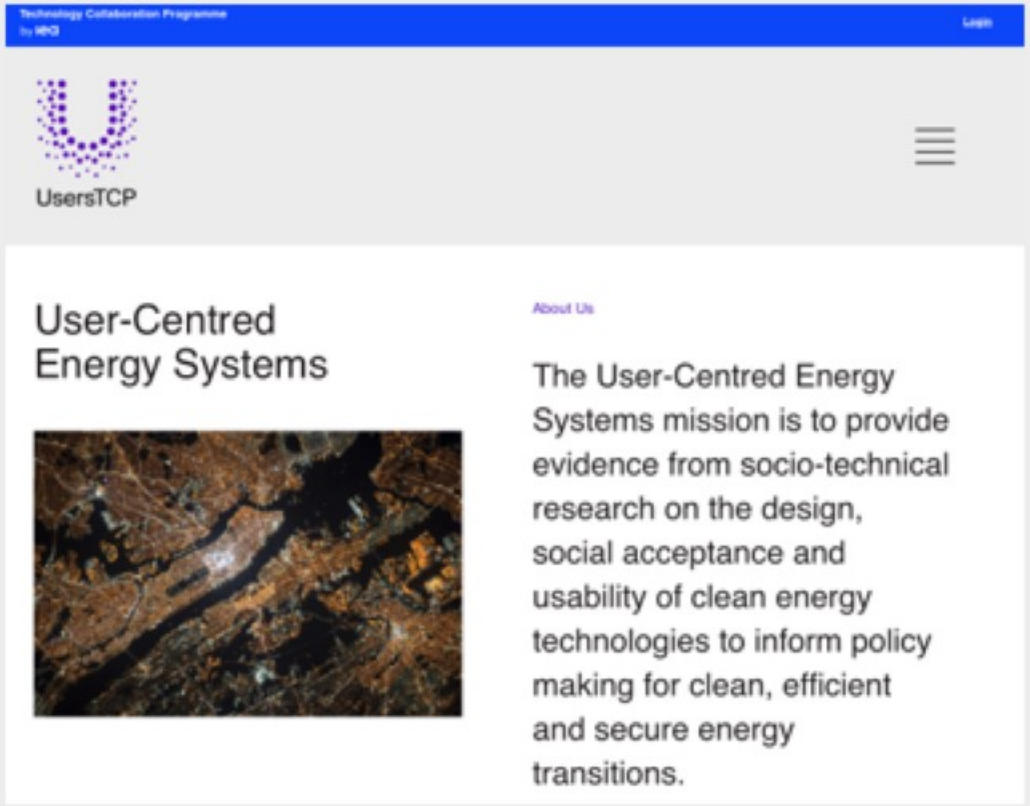

Webinars

User-Centred Energy Systems Academy

Annexes

UsersTCP | Business Models and Systems

UsersTCP | Peer-to-Peer Energy Trading

UsersTCP | Social License to Automate

UsersTCP | Hard-to-Reach Energy Users

UsersTCP | Behavioural Insights Platform

UsersTCP | Gender and Energy