

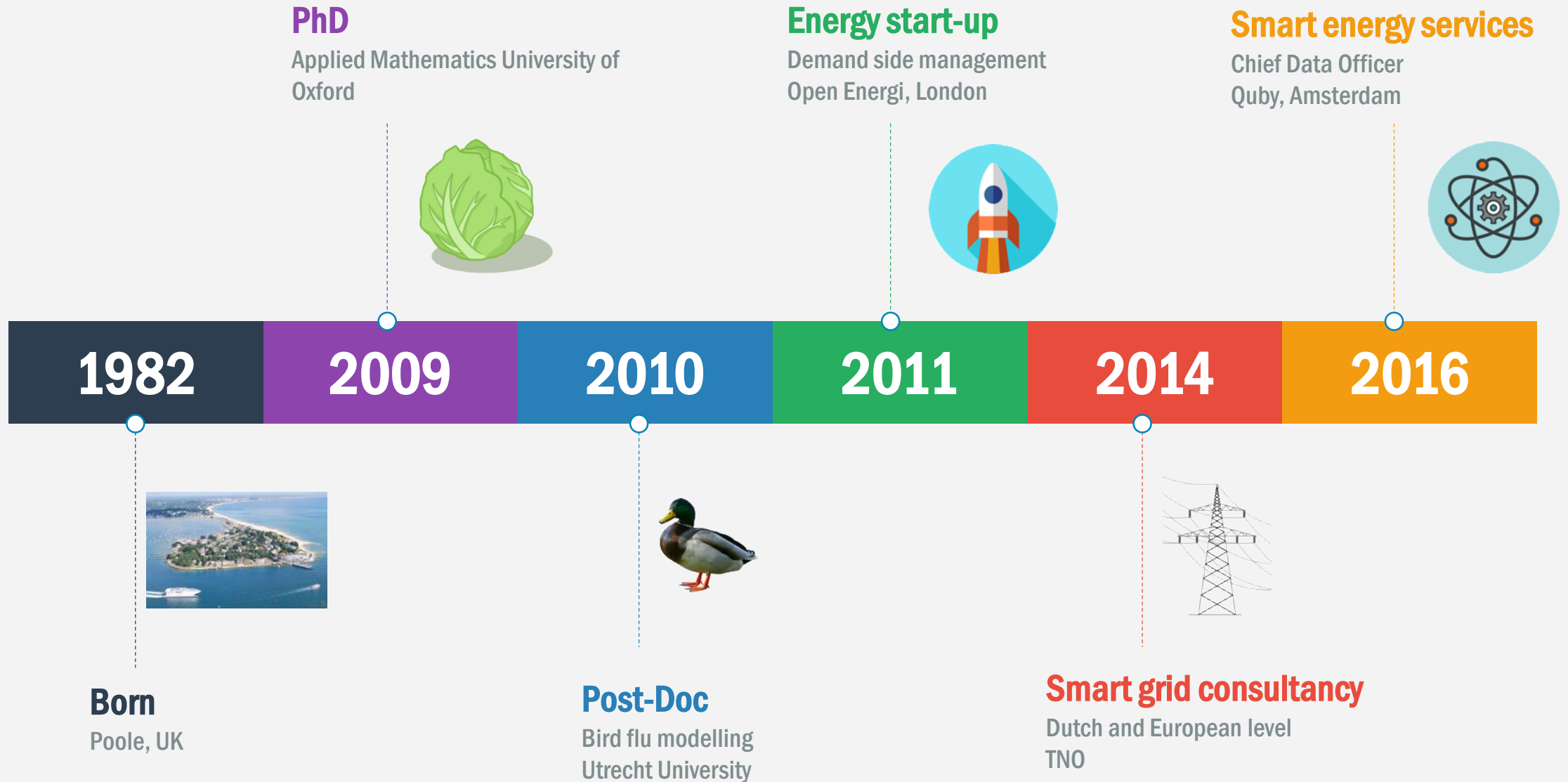
# Making homes efficient and comfortable using ML and IoT data

Dr. Stephen Galsworthy

Chief Data & Product Strategy Officer, Quby

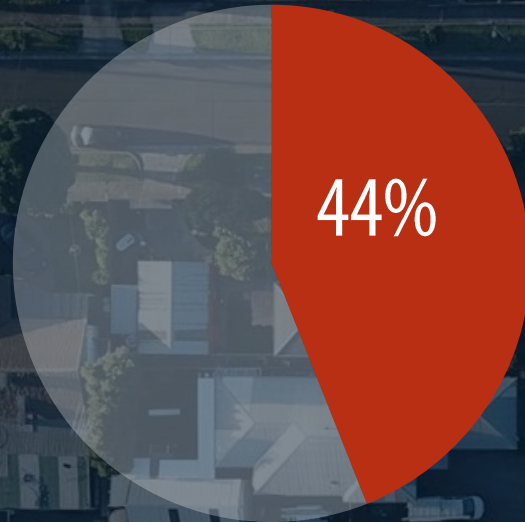
[www.linkedin.com/in/galsworthy/](http://www.linkedin.com/in/galsworthy/)

# About me





Households use 44% of all natural gas  
and 27% of all electricity in the EU



But how much is just wasted?

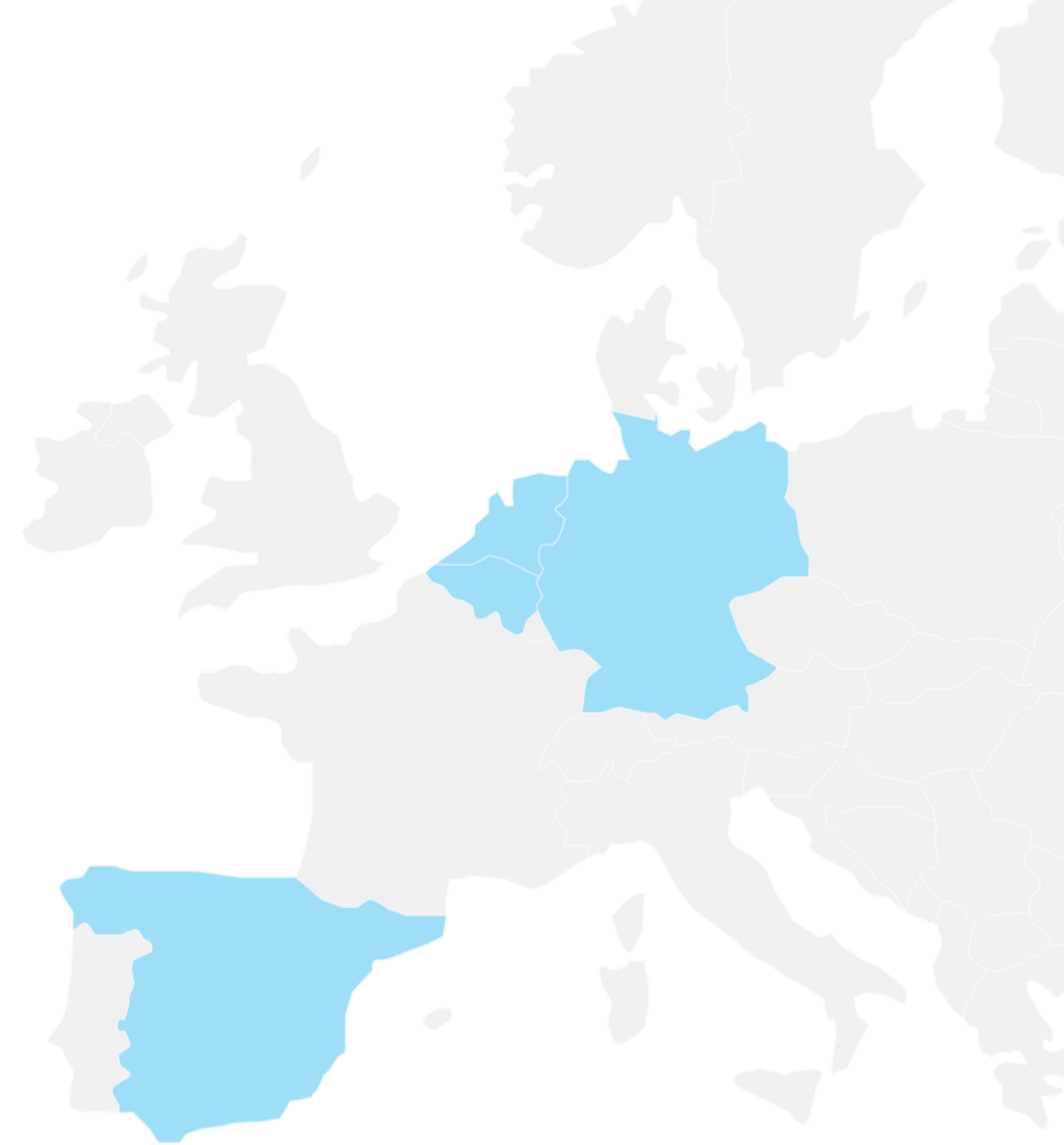
**At Quby, we are not here to tell  
people how much to consume ...**

... but to make sure all their use is  
intended.

500,000 connected homes across Europe

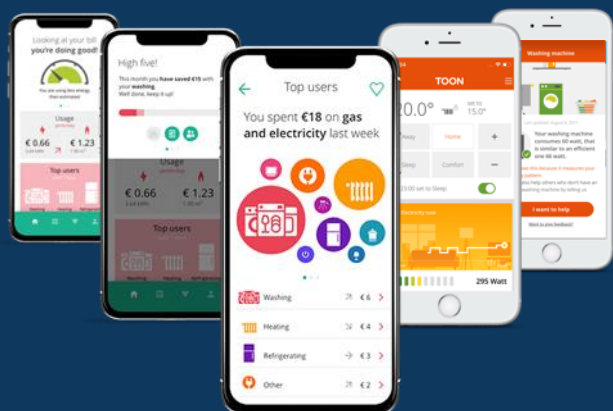


Quby





## Advice and Insights



## Smart thermostat



## Monitoring the home

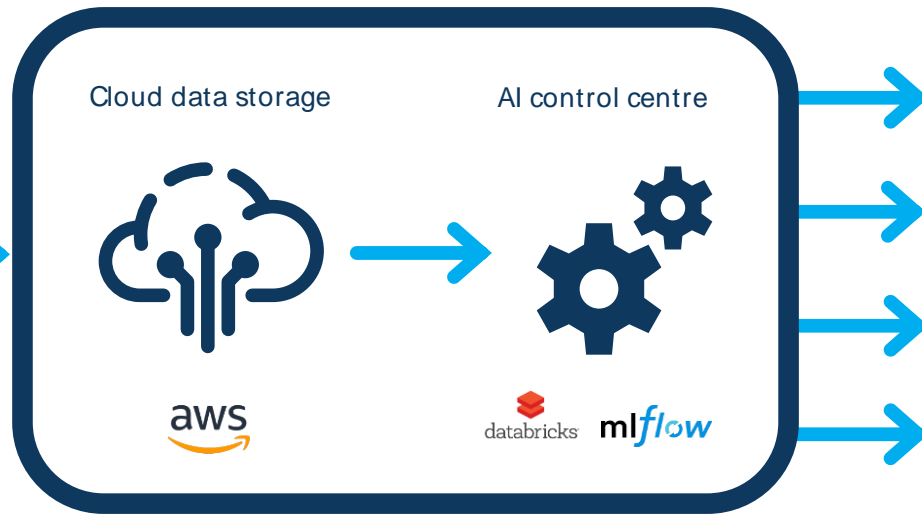




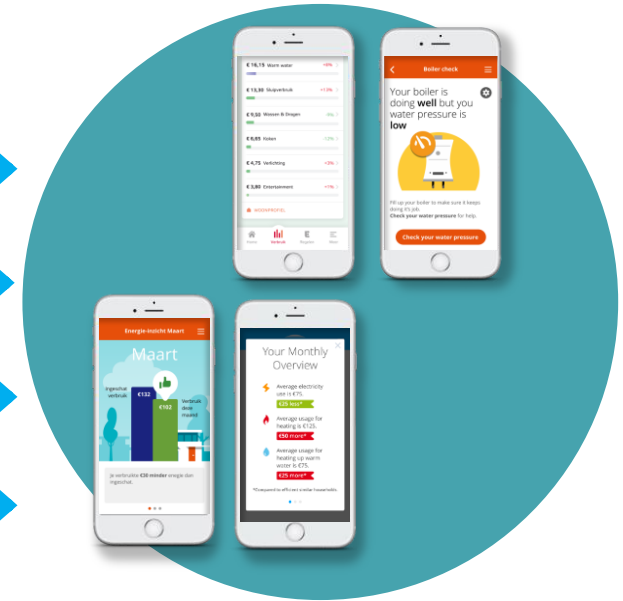




IoT and Customer data



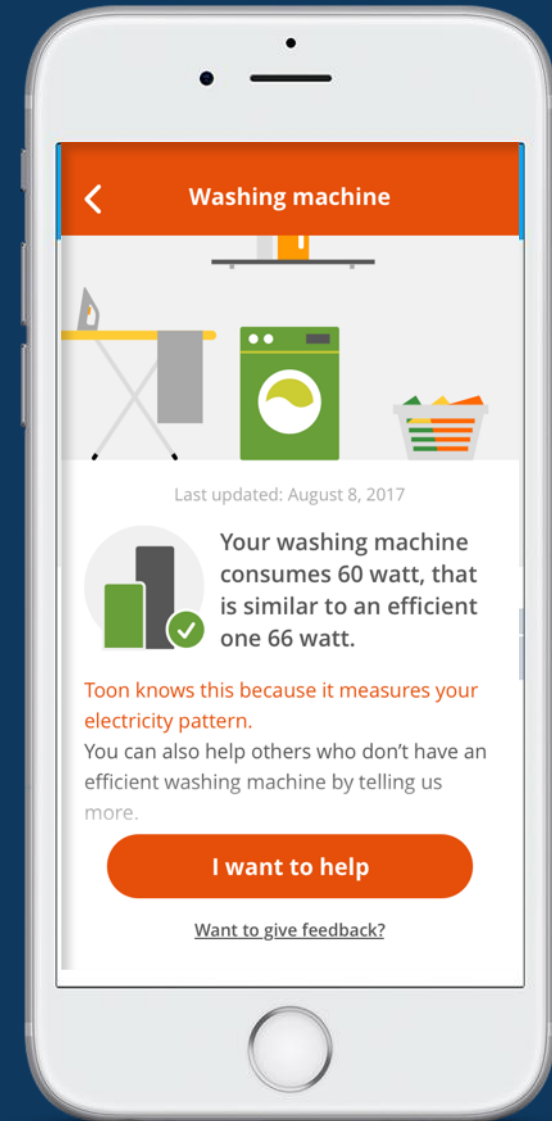
Quby platform



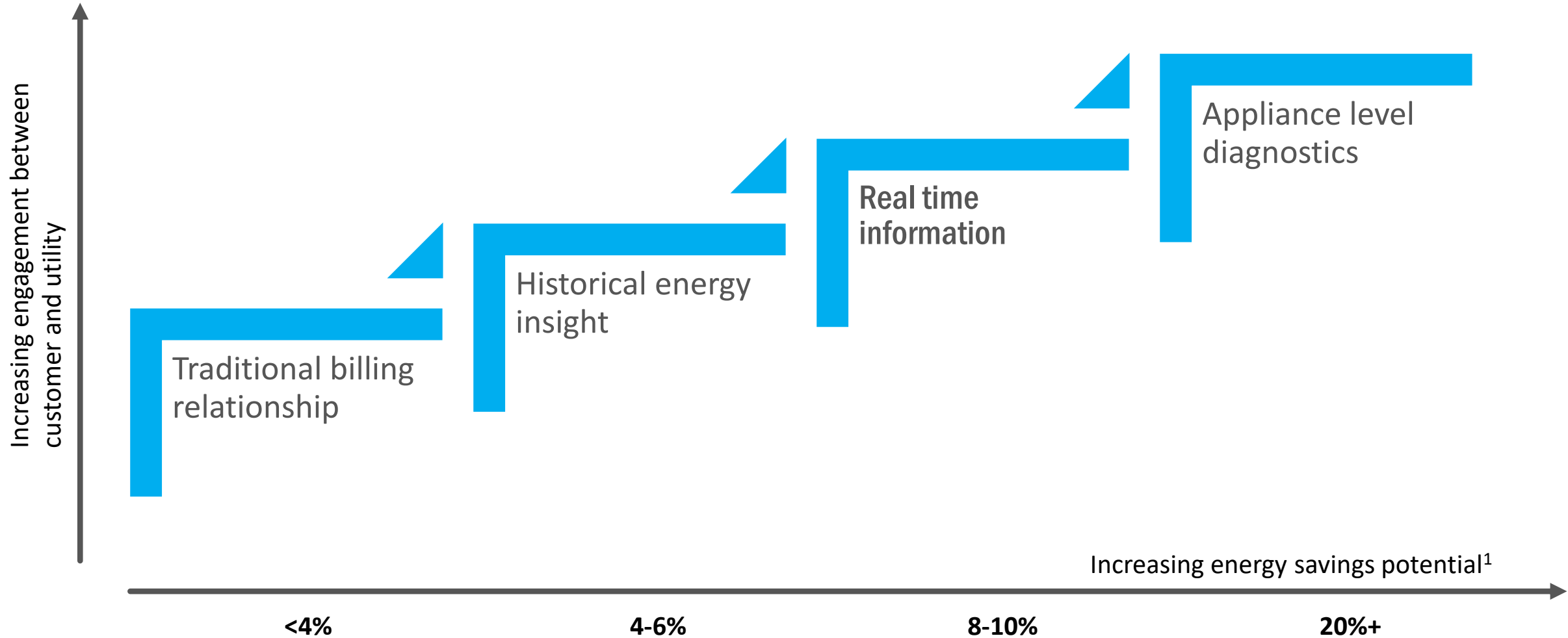
Personalised services

# Example #1

## Waste Checker



# Maximizing energy savings and customer engagement

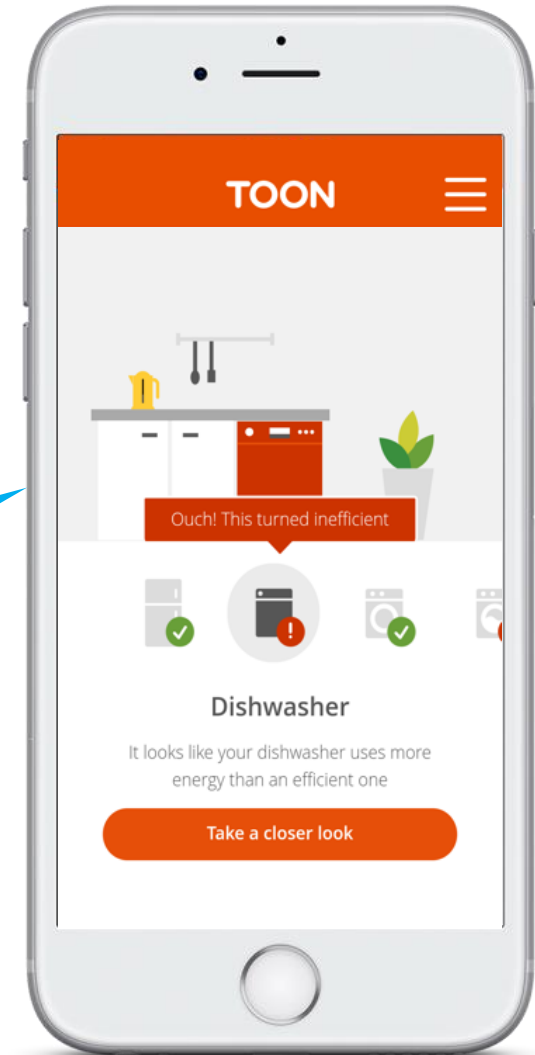


## Waste Checker offers personalised advice on inefficient appliances and behaviours

- Efficient appliances expected to save consumers €100 billion annually by 2020
- We have found that over 40% of household appliances are inefficient or being used inefficiently

*"It looks like you often wash at high temperatures. Your dishwasher needs more energy to heat the water.*

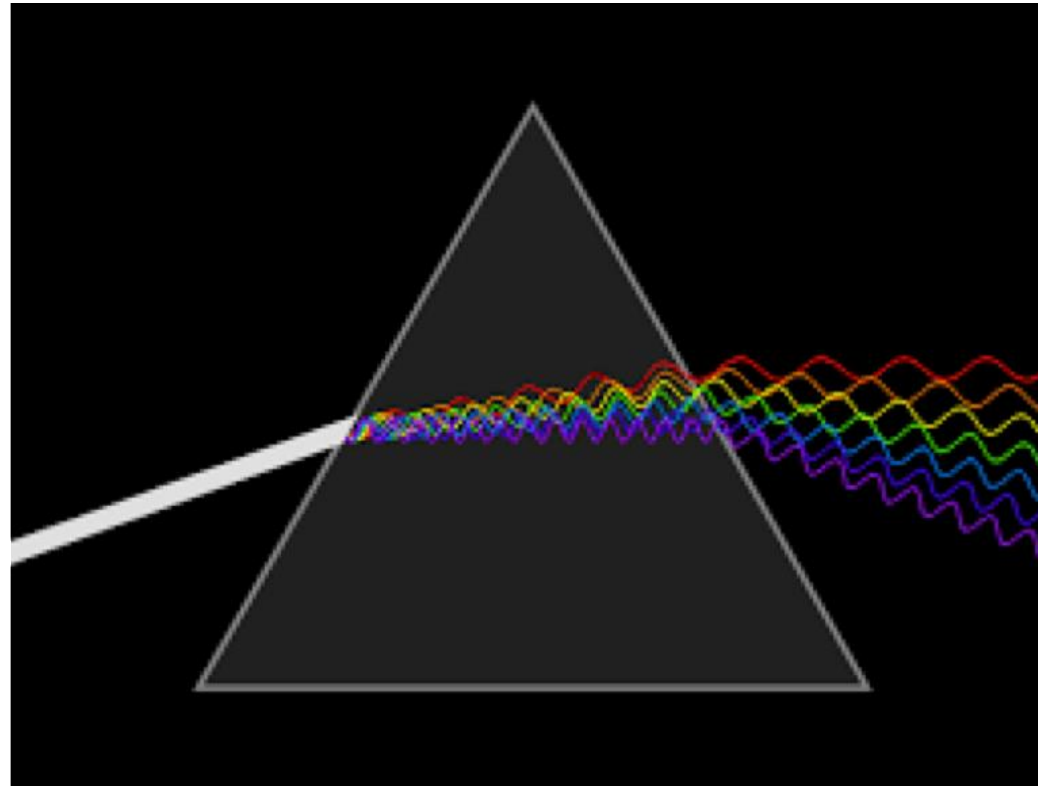
*Washing at 50 degrees, or ECO mode, will get your utensils just as clean, go ahead and try it."*





# Key Technology: Load Disaggregation

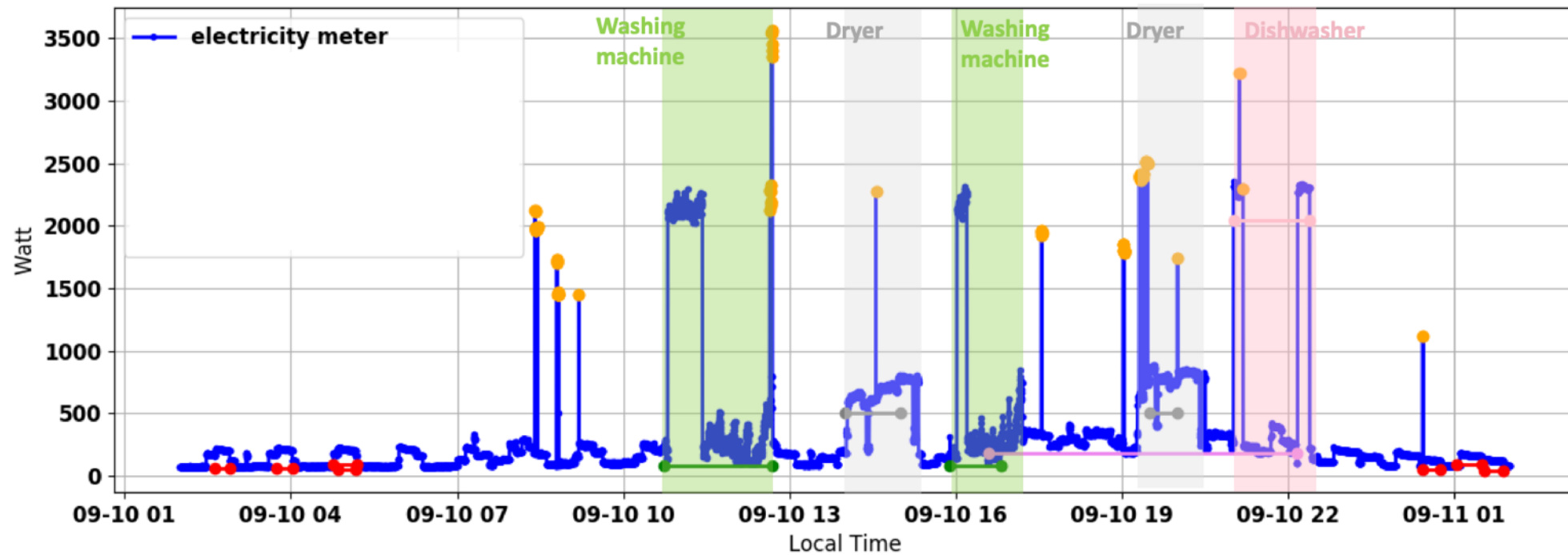
Electricity data



Appliance signals

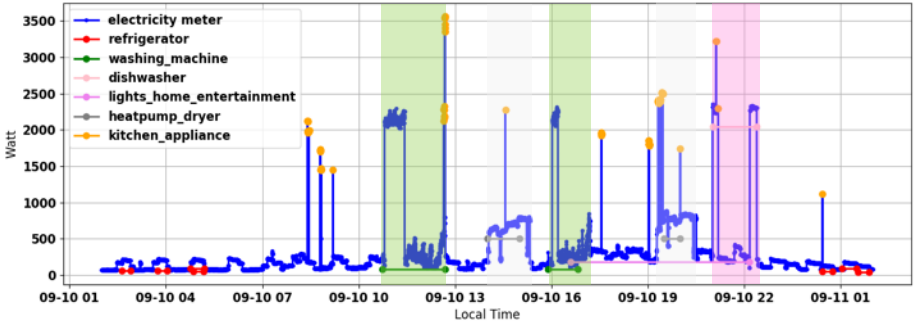
# Quby's disaggregation algorithms

Patented algorithms can detect appliances from 10 second resolution electricity meter data

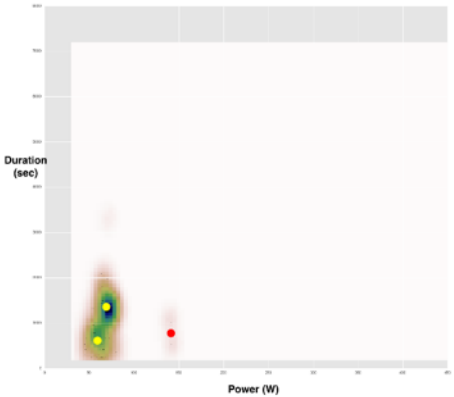


# Use case example: Inefficient dishwasher diagnosis

Disaggregation algorithms run on the 10s electricity meter data



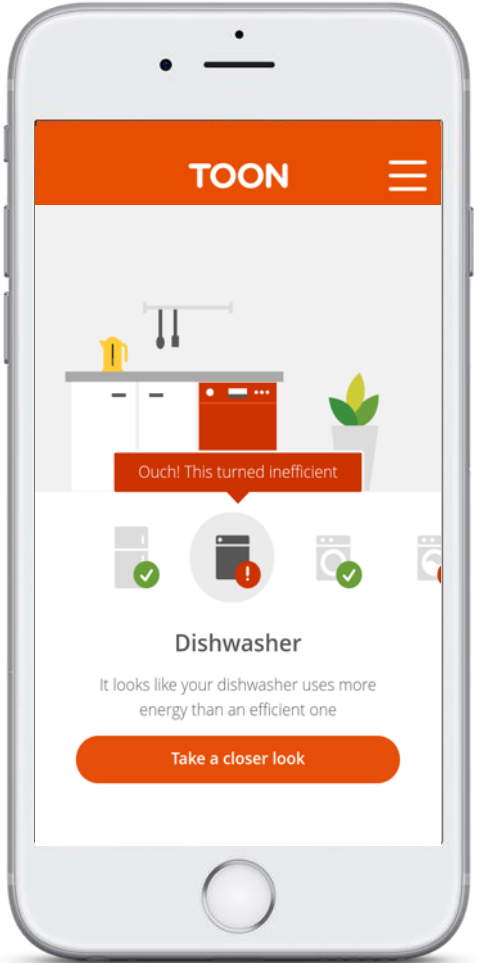
Toon determines the “fingerprint” of the appliance through features



Compared with industry energy consumption standards and peers



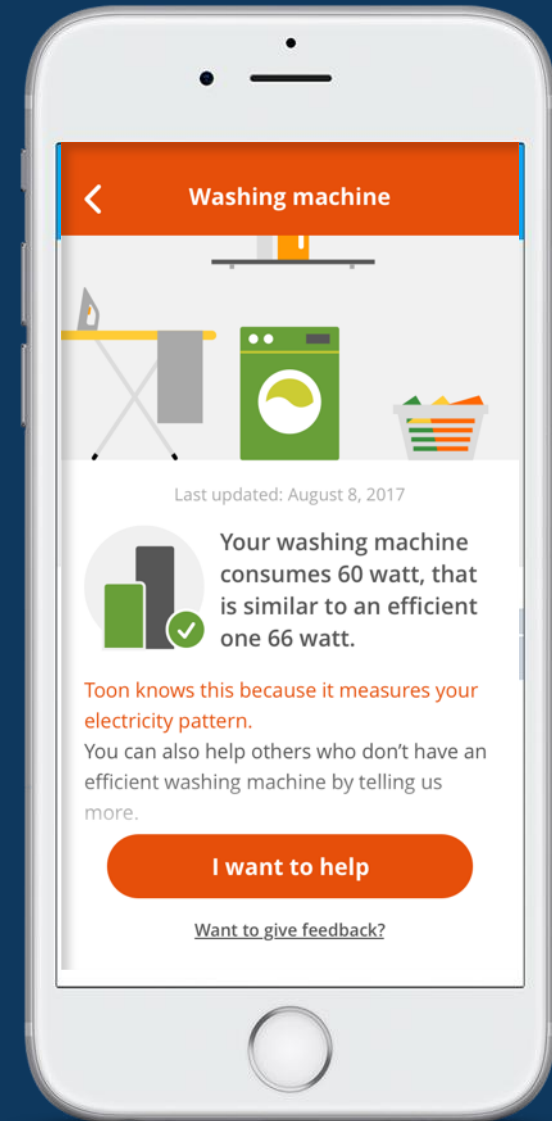
Translated to personalised advice for the end user



## Targeting energy wastage

In the last 12 months:

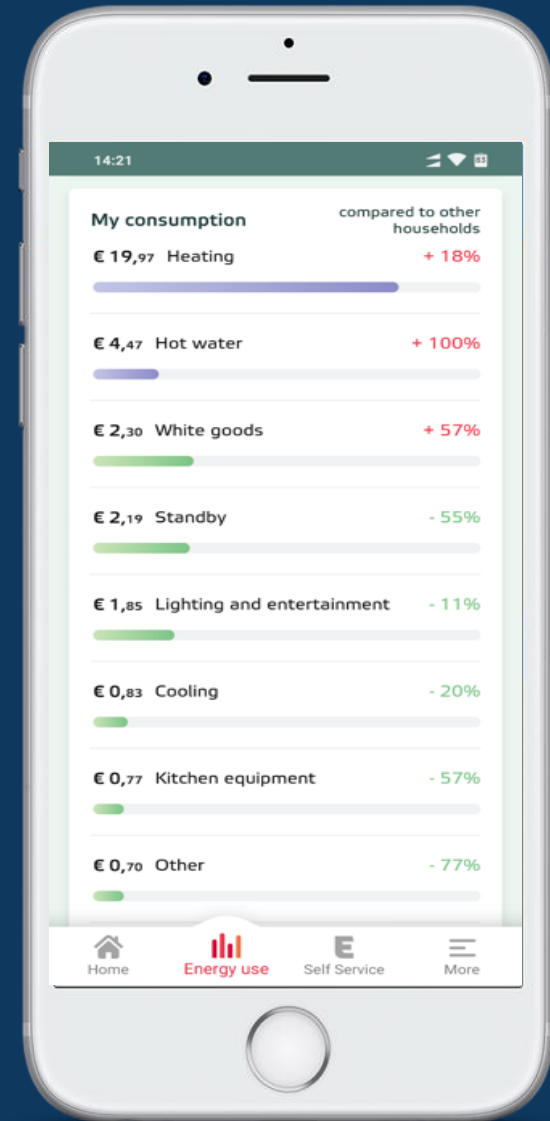
- 87 million inefficient appliance cycles identified
- 67,000,000 kWh of wastage identified and targeted





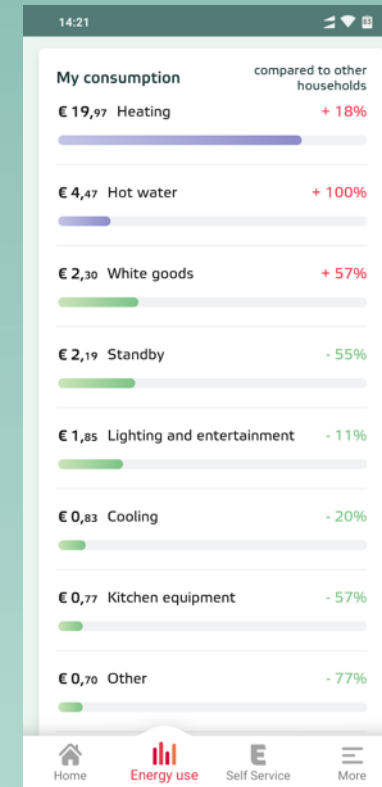
# Example #2

## Bill breakdown



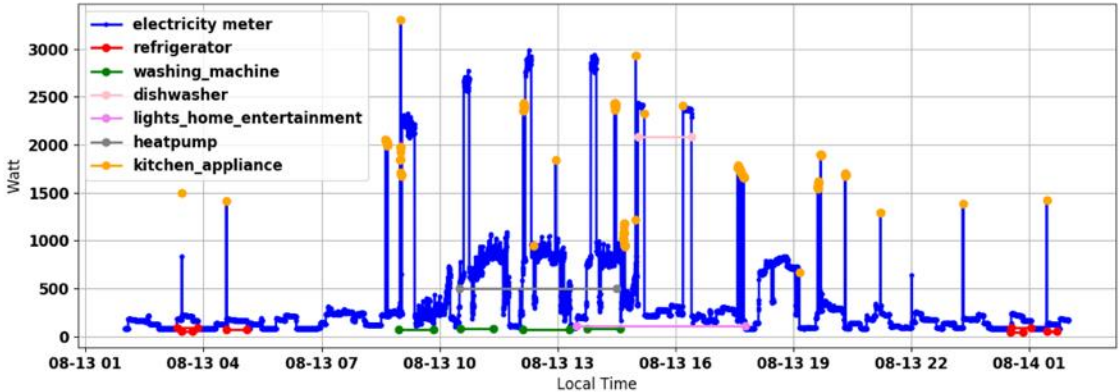
# Inzicht in je energieverbruik met de Eneco app

Met de Eneco app regel je alles rondom de energie die je van ons krijgt. En via inzicht in je verbruik helpt de slimme energie-app je besparen op je rekening. Download 'm gratis.

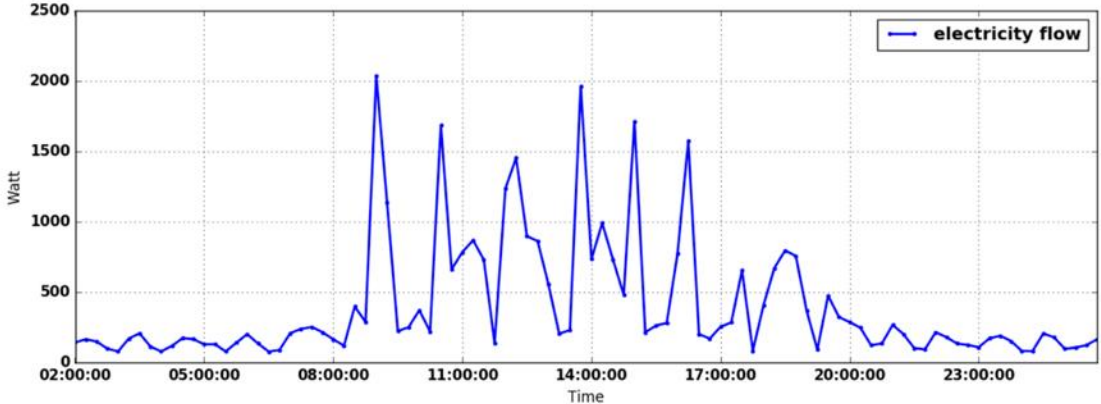


# Data frequency determines the quality and level of detail of the insights that can be given

Toon data  
(P1)



Smart meter data  
(P4)



# Data frequency determines the quality and level of detail of the insights that can be given

Personalized advice

Insight on category level

Real-time feedback

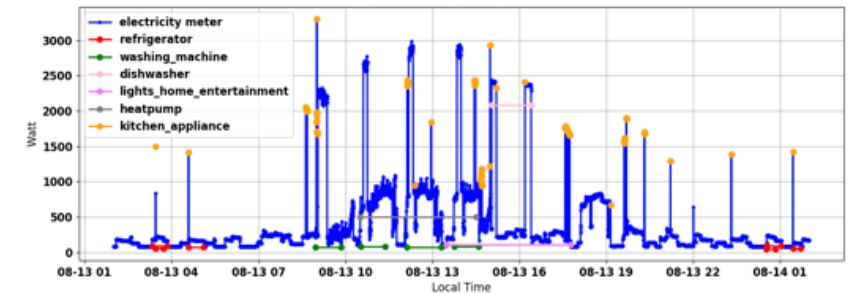
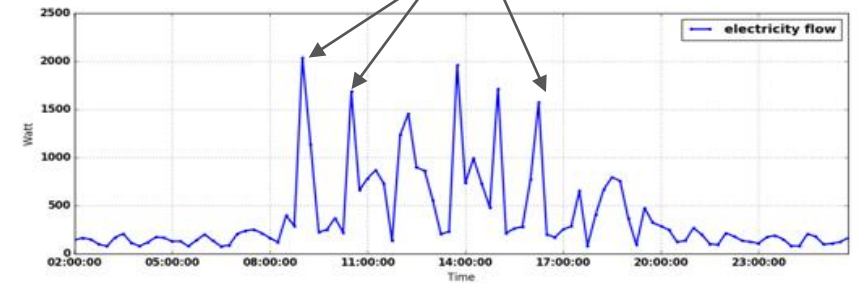
Insight on appliance level

Appliance level diagnostics

15-minute  
data:  
direct from smart  
meter

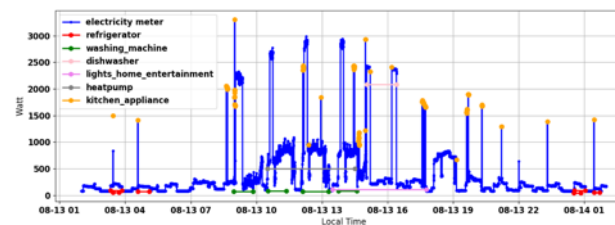
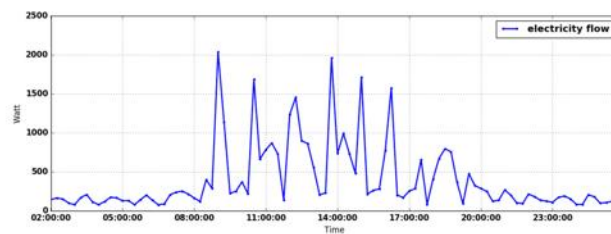
10-second  
data:  
hardware required

Washing machine, dishwasher or dryer?

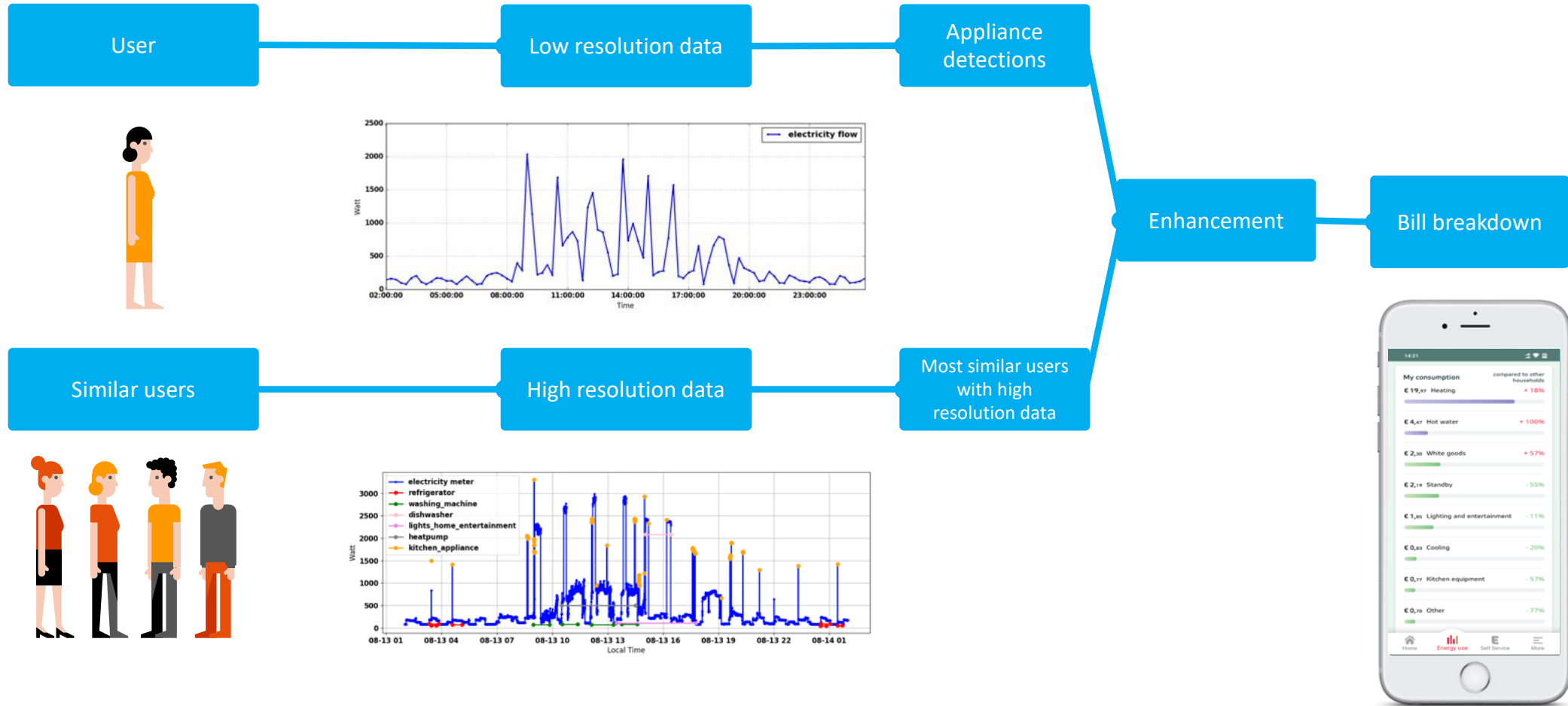




# Key technology: Super Resolution

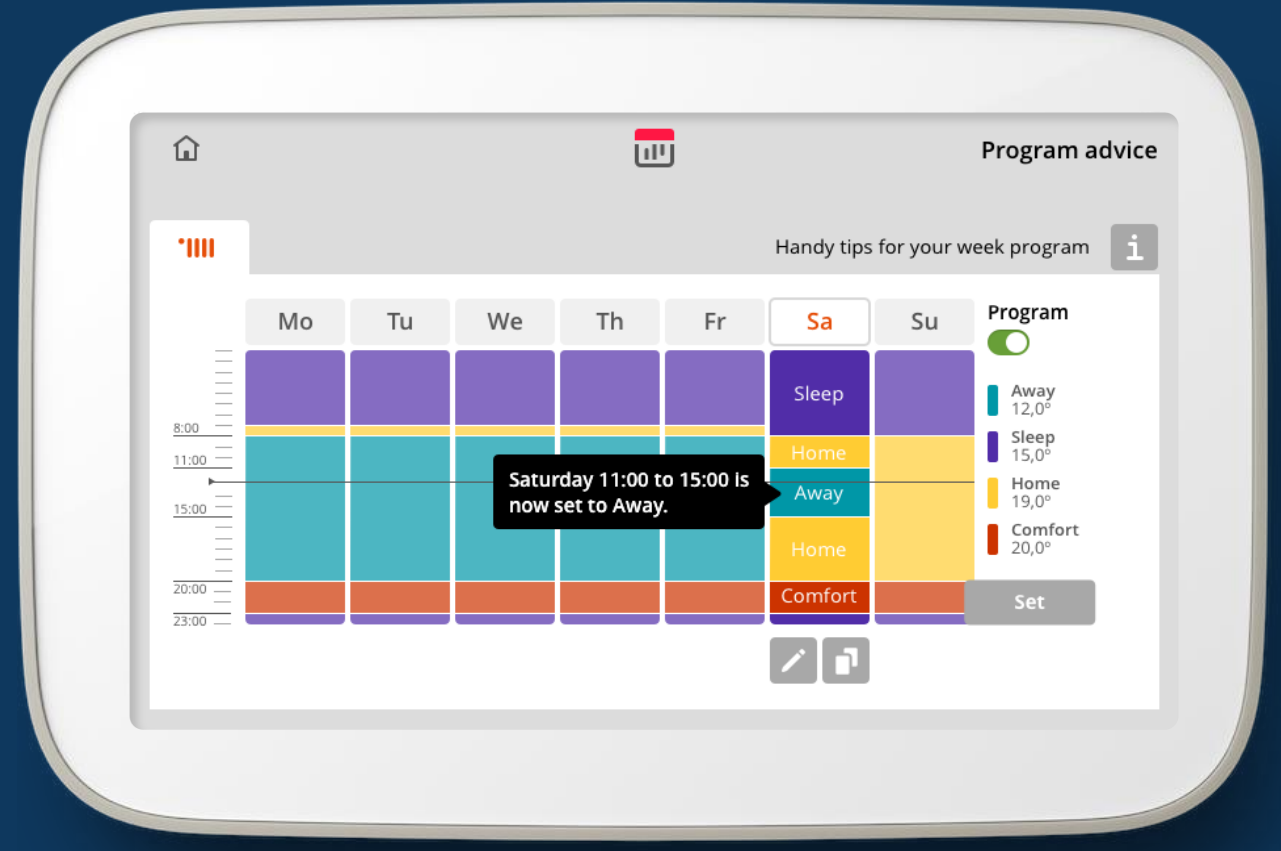


Utilizing our large database of high-resolution data, we apply advanced techniques to offer a more **personalized**, more **dynamic** and more **accurate** bill breakdown service.



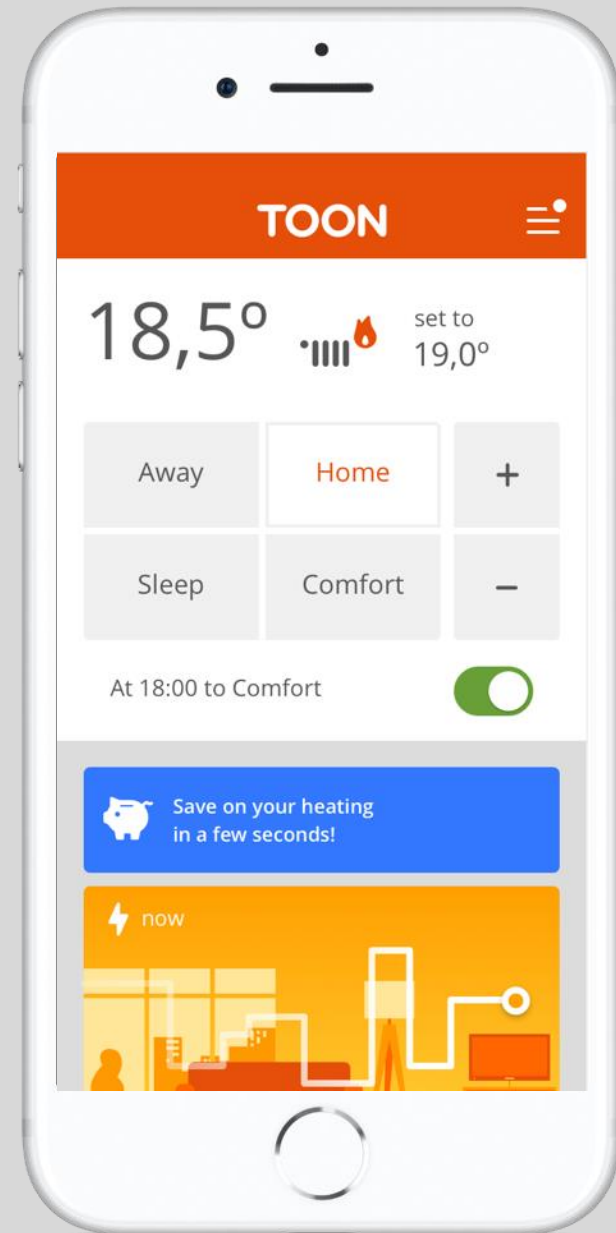
# Example #3

## Smart Program Advice



## Program Advice

- Not all Toon users make use of the thermostat program
- One third of users has significant gas use while away





## Program Advice

- Helping users select a program that best fits their lifestyle



# Key Technology: Presence Detection



Partner products



Existing Meters



Boiler adapters



Electricity sensor



Gas sensor



Solar panels and power storage



Central heating system



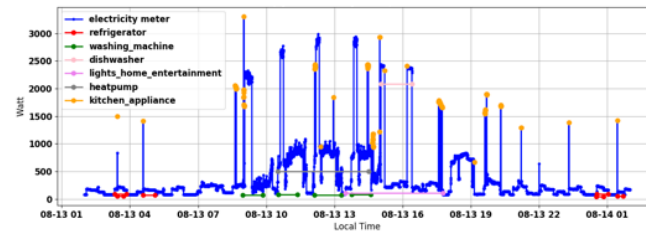
Water sensor



Cooling down and warming up rate



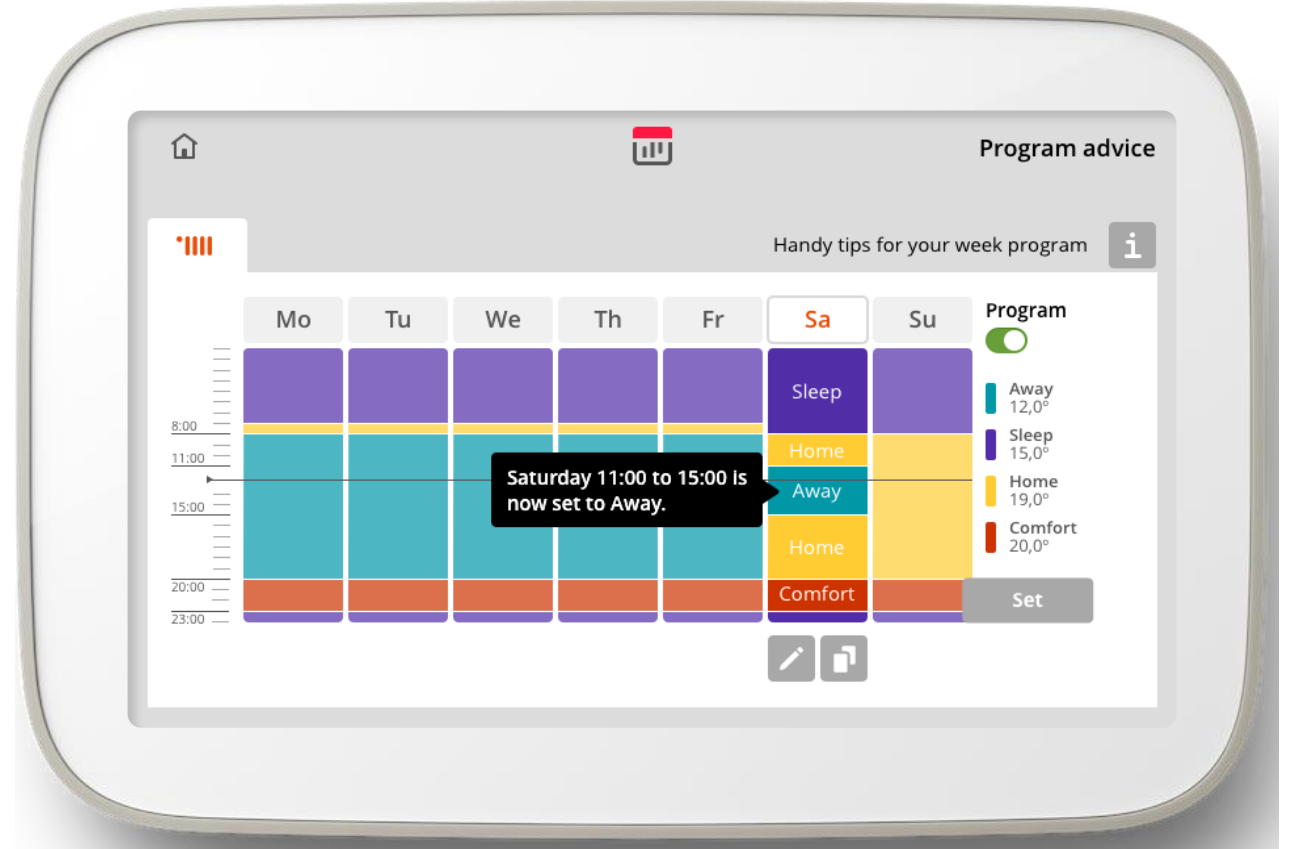
Humidity sensor



Somebody home ?

## Improved comfort + energy savings

- Staged rollout to all Toon users
- Positive results: 60% of users that interact with trigger accept advice
- Gas savings roughly €20 per year per advice



# Step-by-step we are enabling the transition to a sustainable energy system





