CATAPULT
Energy Systems

How to help businesses manage their energy

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Understanding what businesses need when it comes to energy management

Introduction

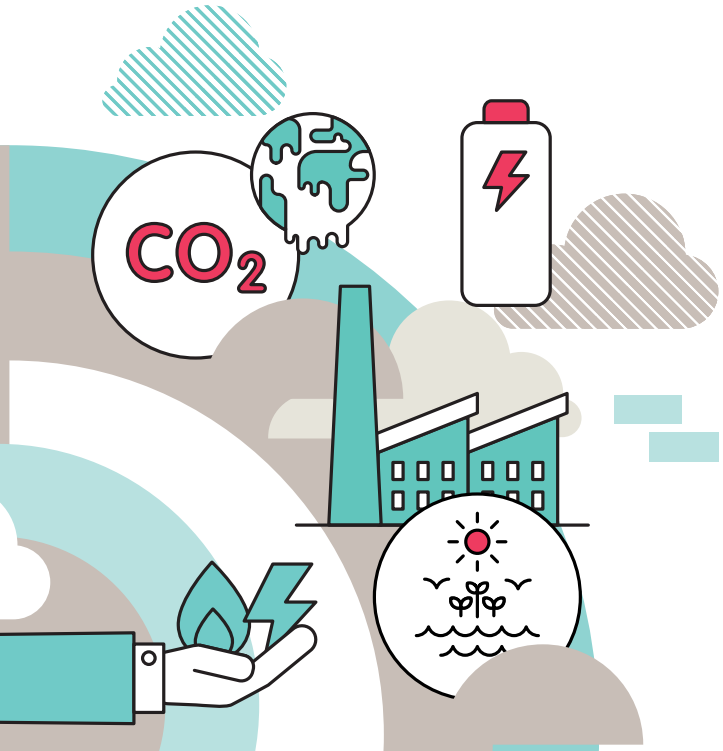
The energy transition is upon us, with many governments now committed to achieving net zero carbon emissions by 2050. To reach these goals we need to be able to make the most out of renewable energy by balancing supply with demand. Smart technologies can automate this balancing by increasing demand when supplies are high or reducing it when supplies are low. This practice is called Demand Side Response (DSR).

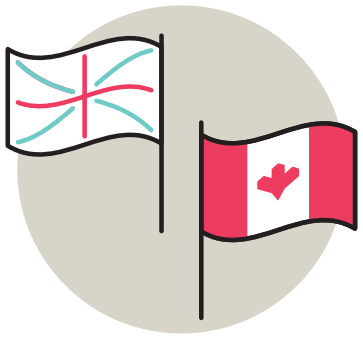
Non-domestic consumers will need to play their role in helping cut their emissions. However, their number one priority is their core business. They may be interested in reducing energy and want to save carbon to do their bit, but this will only ever be a secondary priority.

UK & Canadian Governments have funded the Energy-IQ project to understand how to help businesses manage their energy and reduce their emissions together with DSR.

Energy Systems Catapult set out to understand what non-domestic consumers need to better manage their energy. To do this, we worked with Q Energy, a digital energy services company who have a platform that aims to deliver energy, cost and carbon savings.

We report our findings in three insight papers: the first paper identifies user needs; the second looks at what a solution requires to meet these needs; and the third paper focuses on DSR, highlighting some key barriers and how to overcome them.





The Energy-IQ project

We spoke to several organizations in the UK and Canada (Ontario and Alberta) to understand energy management. This included large commercial property owners, municipalities (local councils) and Small or Medium-sized Enterprises (SMEs).

Within each organisation we spoke to people who were responsible for energy management. We found that engagement in energy management varied depending on the role and responsibilities of the participant.

Participants included:

- Customer Operations Managers, who work within large commercial properties to ensure their buildings' are operating efficiently for their customers.
- Energy Managers, who are solely dedicated to managing their buildings' energy and operations. They typically manage several buildings.
- Small Business owners (SMEs), who have no dedicated Energy Manager and so manage all their business needs themselves.

Smart technologies and DSR offer new opportunities to give users a better experience whilst fulfilling their needs. To design the best solution, we first need to understand what a user needs when it comes to managing their business' energy. This paper summarises user needs, highlights what they are trying to achieve with energy management and outlines their current struggles and solutions.

Different types of Energy Managers

The extent to which someone engages with energy management varies depending on their role, responsibilities and structure of their organisation. We identified three types of Energy Manager from the participants we spoke to.

Many large organisations have dedicated Energy Managers who look after multiple facilities. Their role is to ensure their buildings are running effectively by focusing on improving energy management. Energy Managers have three main goals they are trying to achieve through improving energy management: reducing energy usage, reducing emissions, and reducing cost. These will be prioritised differently depending on their organisations' values. They monitor unusual usage and work closely with maintenance teams and building operators to investigate anomalies. Their role can also involve looking for opportunities to invest in the right energy efficiency projects. We didn't find any significant differences in how UK and Canadian Energy Managers approach energy management.

Customer Operations Managers make sure their buildings deliver great experiences to their customers. They may manage multiple buildings as part of their job. They manage customers' service charge budgets which motivates Customer Operations Managers to better manage their buildings' energy use. They want to limit any spikes in energy use in their service areas as this can lead to overspend and an increased charge for their customers. Their role is not dedicated to energy management; but they do have sustainability goals, so seek ways to help them reduce carbon emissions e.g. replacing lights to LEDs. Customer Operations Managers don't have much visibility of energy usage. They rely on other teams such as facilities and maintenance to detect spikes or issues and raise this with them if it concerns their customers.

Smaller businesses (SMEs) in the UK do not have dedicated Energy Managers. For those we spoke to, it is the business owner who is responsible for bills and managing energy use. Running a business is a full-time job which involves many responsibilities, therefore there is limited time available to monitor energy usage. These business owners believe the best way to reduce their energy costs is to use less energy where possible.

In this paper we refer to these participants collectively as Energy Managers.

What do Energy Managers need?

Having spoken to different types of Energy Managers, we identified common needs for those who manage their business' energy in both the UK and Canada. We categorised these into four main jobs that Energy Managers are trying to achieve:

1. A simple way of tracking and monitoring energy use
2. Quick detection of issues, such as spikes in energy use
3. Easy monitoring of costs, bills and budgets
4. A simple way of creating energy reports and engaging others

We explain these on the following pages along with where Energy Managers struggle and how they are currently trying to get their jobs done. (Where appropriate we have highlighted moments specific to Canada with the flag).

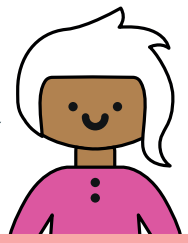
Visibility to track and monitor energy usage

Being able to easily monitor and track buildings' energy usage is a key requirement for Energy Managers. It's important for them to understand their energy data in order for them to make changes and reach their carbon and energy reduction targets and save on costs. There are few main ways in which they need to be able to do this.

They need:

- An overview of how much energy is being used in their building and how this compares to previous years or other buildings (for those who manage multiple buildings). This will help build an understanding of their energy usage and how much it can be improved.
- A comprehensive and simple visualisation of their buildings' energy usage 'here and now'. To quickly identify any problems that arise and need fixing, and to inform the choice of energy efficiency improvements.
- To be able to monitor their buildings' energy use over time (1) to build an understanding of what impacts energy usage, and (2) to measure the effectiveness of any improvements made. This will allow them to provide evidence to other stakeholders or clients and build a case for future projects and improvements.

I want a simple way of tracking and monitoring my building's usage



Struggling moments

When managing multiple buildings, it's hard to know if they are functioning efficiently and which ones need attention.

The building's system (BAS/BMS) raises hundreds of alarms which are not always accurate so it's hard to know which ones are reliable to act on.

I have to wait for my bills to monitor usage and sometimes the data is missing.

I have to download my bills and upload them into Excel to understand trends in my energy usage. This can be time consuming.

I don't have clear visibility of my energy usage so I don't know what I can do to improve.

I need to avoid the 5 peak demands otherwise I'll have to pay high rates for the rest of the month/year.

Current solutions

Look at energy consumption and costs using monthly bills.

Conduct building walks to physically detect any problems/issues.

Receive 100s of alarms from the BAS/BMS that come through to email. But these are not always accurate.

Interrogate BMS/BAS schedules to see what can be turned off.

Download bill data into an Excel sheet and do own analysis e.g. creating benchmarks.

Use an online tool to benchmark usage against other buildings and estimate energy savings for implementing projects.

Quick detection of issues such as spikes with energy use

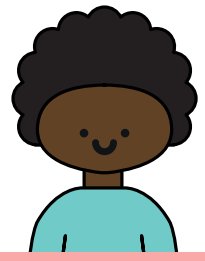
Issues with energy use are often spikes in demand, where the building is using more energy than expected. This spike in usage can be an indication that something isn't working properly, for example equipment being left on when it shouldn't be or broken equipment. Limiting spikes in energy usage is a key job when it comes to energy management.

Faster detection of issues means that problems or anomalies can be dealt with quicker, thereby limiting the amount of energy used, carbon emissions produced, and any high costs associated with this.

In order to do this, they need:

- To be alerted to spikes and anomalies quickly and pinpoint what/where these are so they don't go undetected for long and can be fixed quickly.
- To be able to easily monitor if their building is functioning as expected, or if there are issues that require investigation e.g. if equipment has been left on overnight.

I want to quickly detect any spikes and/or issues with my building's energy usage



Struggling moments

During building walks, I look out for anything that may be a problem in my building. I don't have time to inspect every detail.

When there is an issue it can be guess work to locate/pinpoint, requiring a lot of time and effort e.g. if a meter stops reading.

Broken equipment can go undetected for a while and later cause bigger issues.

I manage multiple buildings so it's hard to monitor them all and be as reactive as possible.

BAS/BMS alarms are not always accurate so it's difficult to know which ones to focus on.

Bills can be overcomplicated and incomplete making it hard to detect anomalies.

Current solutions

Use an online tool to log all jobs to be done in a building. Jobs are then picked up by relevant team.

Customers notice an issue in the building or in their own bills and report it.

Conduct building walks to physically detect any problems/issues.

Other teams get in contact when they detect something unusual e.g. Utilities team.

Receive 100s of alarms from the BAS/BMS that come through to email. But these are not always accurate.

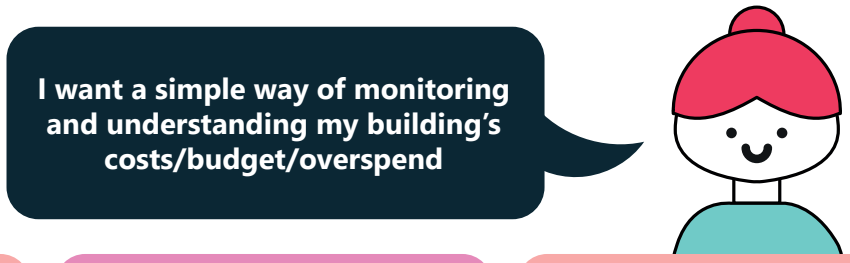
Use a billing tool or download monthly bills and look for unusual usage.

Easy tracking of costs, bills and budgets

From a financial perspective, it's important for businesses to understand their energy costs. They need to track these to ensure they are sticking to their budgets and are being billed correctly. This also helps them understand what causes high energy costs so that they can look at ways to reduce them.

To do this they need:

- Clear and simple visibility of their energy costs so they can save time investigating and easily recognise if they are within budget and financially on track.
- To easily identify and understand where costs are coming from. They need to know what causes high costs to help determine what they can do to change this and make savings.



Struggling moments

It's difficult and time-consuming identifying where costs and overspend have come from when looking at multiple spreadsheets and invoices.

I want to reduce the chances of overspend and keep to my budgets but don't have easy access to this information so it's often too late.

I don't know how I can better manage my building's energy and budget if I can only see this information quarterly.

*My bills are complicated so it's hard to know where costs are coming from and where to make savings.

I don't have a good understanding of my costs to know what I can do to reduce them.

Current solutions

Customer gets in touch with an issue or queries their service charge. The utilities team then investigate.

Pass on energy related issues to other teams on an ad-hoc basis for them to investigate.

* Interrogate bills and send monthly meter reads to the supplier to ensure they are billed correctly.

Review several spreadsheets and invoices every quarter to investigate costs and overspend.

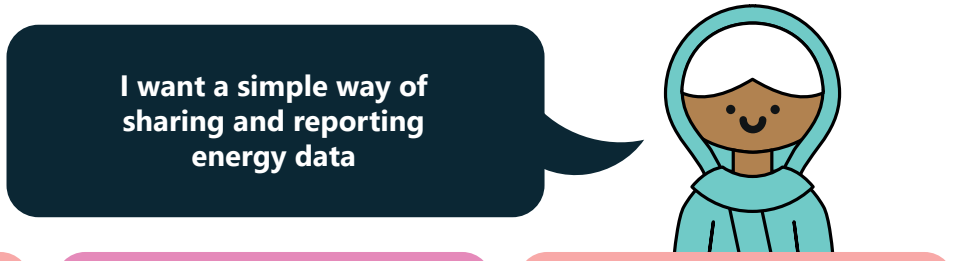
*SME

Create energy data reports and engage others

Energy management often involves talking and engaging with others. This includes sharing data with team members to help investigate issues or sharing good news stories to engage others. Energy Managers may also be expected to report to clients, customers or other stakeholders about energy management. They need to explain how they are reaching their goals by showing how energy, emissions or cost savings have been made.

In order to engage others and create reports they need to be able to:

- Easily identify and illustrate where and how they have made energy, carbon and cost savings. They need to show directors or other stakeholders how they are reaching their carbon and energy targets and build cases for future energy projects.
- Simply extract data to create reports for different types of stakeholders (e.g, clients, customers, building operators, directors) so that they can communicate energy with others to:
  - facilitate collaboration so other team members can help solve issues
  - engage and encourage others to make behavioural changes
  - measure the impacts of improved energy management.



Struggling moments

I have high level oversight of usage, but I need to discuss the data with building operators who know the building's operations better.

I manually go through bills and and extract the data to create reports on excel for different stakeholders. This is time consuming.

I often have to explain energy usage/share energy data with other teams or staff. If they were able to see this information too it would help with discussions.

*I am in a business partnership so it's important I am sharing information about usage and costs with the other business owners.

I want to help customers make changes to become more environmentally friendly and save money, but I don't have access to their energy data.

Current solutions

Manually create reports using an excel sheet, where bills are uploaded, and trends are analysed.

Use a billing tool or download monthly bills and discuss this with others.

*SME

The four key jobs and user needs identified in this paper are consistent across the different types of Energy Manager because they are all working towards similar goals: reducing emissions, energy usage or costs. These goals are not mutually exclusive: the same action often contributes to all three.

Any new energy management solution should relieve struggling moments and help users do their jobs more easily. DSR has the potential to be part of the solution by helping businesses save on energy costs and emissions by making use of cheaper, cleaner, renewable energy. It can also help them reduce their peak demand by shifting usage to different times of the day.

Want to know more?

Read our second insight paper **'What does an Energy Management Solution look like for businesses?'** to find out what an energy management solution requires to support Energy Managers getting their jobs done.

If you want to learn more about introducing DSR within an energy management solution, what the key barriers are and how to better engage users, take a look at our third paper **'How to help businesses engage with DSR through Energy Management'.**

Energy-IQ project – who's involved:

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Penso Power

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CATAPULT Energy Systems

Energy Systems Catapult supports innovators in unleashing opportunities from the transition to a clean, intelligent energy system.

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