

GEO

Smart solutions for the “hybrid home”



Desmond Astley-Cooper

Director
Turquoise International

To talk to me about
the issues raised in
this article, feel free
to contact me via email
DAC@Turquoise.eu or call
me on **020 3535 7948**

In this whitepaper, we interview Patrick Caiger-Smith, CEO of geo. I have been looking after Low Carbon Innovation Fund's interests in geo since 2013, six years after the company was founded in the Cambridge area. It has been a fascinating experience. I have seen the business evolve from a modest digital engineering firm making household smart meter displays for the large utilities to a major player in one specific area of the rapidly-developing 'Internet of Things' or IoT as it is often called.

Such developments are also referred to as 'Industry 4.0', a rather trendy reference to the Fourth Industrial Revolution that its cheerleaders say it presages. Leaving aside all the hype, it's become increasingly clear that this new wave of innovation is introducing some major changes in the way things are done. At its core, it's about machines talking to machines without the need for human interference other than exercising oversight.

So, during the time I've been involved with geo, it has not only become a market leader in the supply of displays to the Government-mandated smart meter program but also a company with a clear view of its future. It is developing the architecture which allows domestic systems like power supply along with everyday workhorses like washing machines to operate together in the most efficient way possible, thereby saving the householder both effort and money.



Patrick Caiger-Smith

CEO
geo

“ We’ve developed 25 different products and delivered more than four million energy monitoring systems that can accurately read the energy use of a home in real-time. We’re now working on connected, data-driven technology that makes this possible.”



geo – smart solutions for the “hybrid home”

Rising energy costs are denting consumer bank balances and stretching some household budgets to breaking point. geo’s technology might just be the answer that cash-strapped consumers have been looking for. Patrick Caiger-Smith, CEO of geo, explains how a start-up from Cambridge is working with the UK’s biggest energy providers to make Britain’s homes smarter, and how the company is disrupting a market set to be worth \$4.5 billion by 2020.

Alongside Christmas, Easter and Mov-ember, energy price rises are something of an annual tradition. Consumers, particularly those on Standard Variable Tariffs (SVTs), often face two choices: stay put and pay more, or shop around for the best deal. But who really has the time?

At geo, we believe that homes hide numerous opportunities to save money and energy. We also believe that greater oversight about energy use helps homeowners to control the amount they spend on gas and electricity every month. We’re now working on connected, data-driven technology that makes this possible.

Our story



geo's business proposition was first developed in 2007. We wanted to know if consumers were aware of how much energy they were using in their homes, what this was costing them and any areas in which they could make improvements. The timing couldn't have been better: since 2003, the average household bill for heat and energy had been rising. Fuel poverty was also hitting the headlines, with thousands of households across the UK forced to decide between heating their home or cooking dinner.

With no-one lending a helping hand, we decided to take matters into our own hands by looking at how the emerging Internet of Things (which we'll discuss in more detail later) could be harnessed to make home heating and electricity use more affordable.

Using consumer research, we outlined an initial product offering that led to the development of our first comprehensive range of electricity monitors for homes. Since then, we've branched out into three core areas of energy monitoring: smart metering, smart solar and smart heating. We've developed 25 different products, delivered more than five million energy monitoring and control systems and have become the leading provider of in-home displays to the UK Smart Metering Programme, a nationwide rollout of meters that can accurately read the energy use of a home in real-time. In 2017, we won the Queen's Award for Enterprise. The journey doesn't stop here, though. In fact, with the Internet of Things and smart homes on the horizon, our journey's only just begun.

Understanding the smart home

If you've opened a newspaper recently or perused an issue of Wired, you'll have undoubtedly noticed that the "Internet of Things" is considered to be one of this year's hot topics. But what does it actually mean?

"Simply, the Internet of Things is made up of devices – from simple sensors to smartphones and wearables – connected together," explains Matthew Evans, the IoT programme head at techUK. "IoT offers us the opportunity to be more efficient in how we do things, saving us time, money and often emissions in the process."

In industry, the Internet of Things is often referred to as "Industry 4.0", (or "the Fourth Industrial Revolution" if you want to get particularly excited about it). The term describes a shifting work dynamic from one in which humans are required to interact with machines, to one in which machines interact with one another. This isn't as alarming as it sounds: machine-to-machine communication has been lauded for its potential to remove human intervention from laborious, repetitive tasks, such as monitoring, picking and packing as well as machine tending.

According to Gartner, more than half of major new business processes and systems will incorporate some element of the Internet of Things by 2020. "The IoT is relevant in virtually every industry, although not in every application," says W. Roy Schulte, vice-president and distinguished analyst at Gartner. "There will be no purely 'IoT' applications. Rather, there will be many applications that leverage the IoT in some small or large aspect of their work."

How does this translate to the homes of consumers? Quite simply because it enables a home and its appliances to manage one another without human intervention. For example, a thermostat that can set itself to switch on and off automatically in line with the homeowner's daily routine and a dishwasher that can set itself to run while the householders are at work – both products that are now in the market.

The smart home market represents an exciting opportunity for investors. According to statista, revenue for this sector is expected to grow annually by 19.9 per cent until 2022, resulting in a market volume of \$5.847 million (isn't \$5.8bn a better way to express that?) by the same year. Perhaps more importantly it creates new areas of technical development, such as data security and home automation, that could stimulate economic growth for the UK. While most of these technologies are still being developed, some are already available in the marketplace, particularly within home heating. This sector forms the backbone of geo and its services.



Where does geo fit?



geo's strategy is now focused on using our energy management technologies to create and develop the "hybrid home," Patrick says. This is a building that uses a mixture of stored and sustainably-generated energy to power and heat the home. The energy used depends on several variables, including the time of day (i.e. peak or off-peak), the homeowner's habits, the appliances used within the home and external factors such as temperature or weather. All of this is controlled by the home's systems and sensors that, operating together, form a home-energy application of the Internet of Things.

At the heart of this strategy, we are developing Core, an integrated home energy management system that can oversee a home's smart meters, solar storage systems and appliances. Using the data that it gathers, Core will be able to identify where a home is most efficient, and where efficiency can be improved. This, then, allows the homeowner to make small changes to their usage habits or appliances which could reap big rewards when the monthly or quarterly bills come through the letterbox.

As we develop Core's capability, we will also branch out into other areas of smart home management, such as electric car charging, self-starting dishwashers and washing-machines, and solar-powered hot water heating. All of this will function in the background according to a schedule of preferences that the homeowner sets.

Alongside the development of Core, we are also evolving our strategy towards one of education, control and automation. This, essentially, describes our ideal customer journey. We begin by educating the customer as part of an "explorer phase" during which we demonstrate the range of energy options available. We then provide the tools so the customer can manage this energy, whether that's heating, appliances or solar optimisation. The next step? We want to automate these controls entirely, with everything running efficiently through intelligent algorithms that communicate with one another to monitor and manage the home. That is, in essence, what the Internet of Things means for us.

What are the benefits?

Technology and capabilities such as these have several advantages. Storing electricity during off-peak times, for example, reduces our reliance on the National Grid, particularly during peak times, which could save homeowners around 30 per cent on their energy bills. Increased control and oversight of the energy that we use also allows us to make small and simple changes to our routines, so that we only use the energy that we really need to.

Eventually, this automated technology will become so sophisticated that it will be able to function in the background without any human input. We are already seeing this level of capability in the marketplace: weather compensators, for example, adjust a boiler's output and efficiency depending on external temperatures.

The market

Home energy can be a challenging sector for even the most established businesses. A highly competitive market that is largely dominated by the aptly named "Big Six" energy providers, home energy is often subjected to increasingly strict legislation or government control. The development or withdrawal of government incentives (as experienced by the renewable energy sector) can also determine the longevity and success of a home energy company. Without proper guidance, leadership, strategy, investment and diversification, start-ups will lose volume and traction which will ultimately lead to their failure.

geo has managed to steer its way through these challenges. Several successful rounds of funding have secured capital from high net-worth individuals and also from the Low Carbon Innovation Fund (LCIF) managed by Turquoise. Since then, however, our increased liquidity has enabled us to be cash-generative for the last five years.

Our success has fuelled our reputation for quality in this industry. As a result, we have built vital relationships with several energy suppliers and now work with them to roll out smart meters to their customers nationwide. This is just our first step on the journey to the smarter, "hybrid" home. Not bad for a start-up from Cambridge!



For more information about Green Energy Options (geo):

visit : www.geotogether.com
 email : customerservices@geotogether.com
 call : +44 (0)1223 850 210

Green Energy Options, 3 St Mary's Court,
 Main Street, Hardwick, Cambridge, CB23 7QS