The expert view: energy thinking for cities

Interviewer: Gareth Byatt – Principal Consultant, Risk Insight Consulting
Interviewee: Emma Fletcher – Low Carbon Homes Director, Octopus Energy & Chair of the RICS Residential Professional Group Panel

August 2025

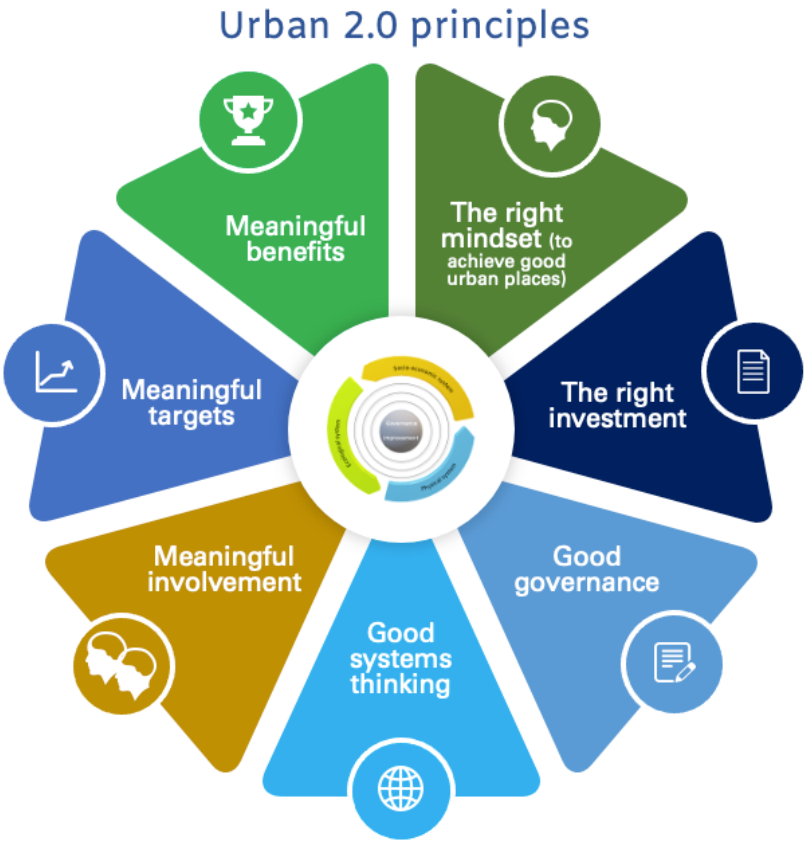
An Octopus Energy engineer in the UK (image provided by Octopus Energy)

Emma,

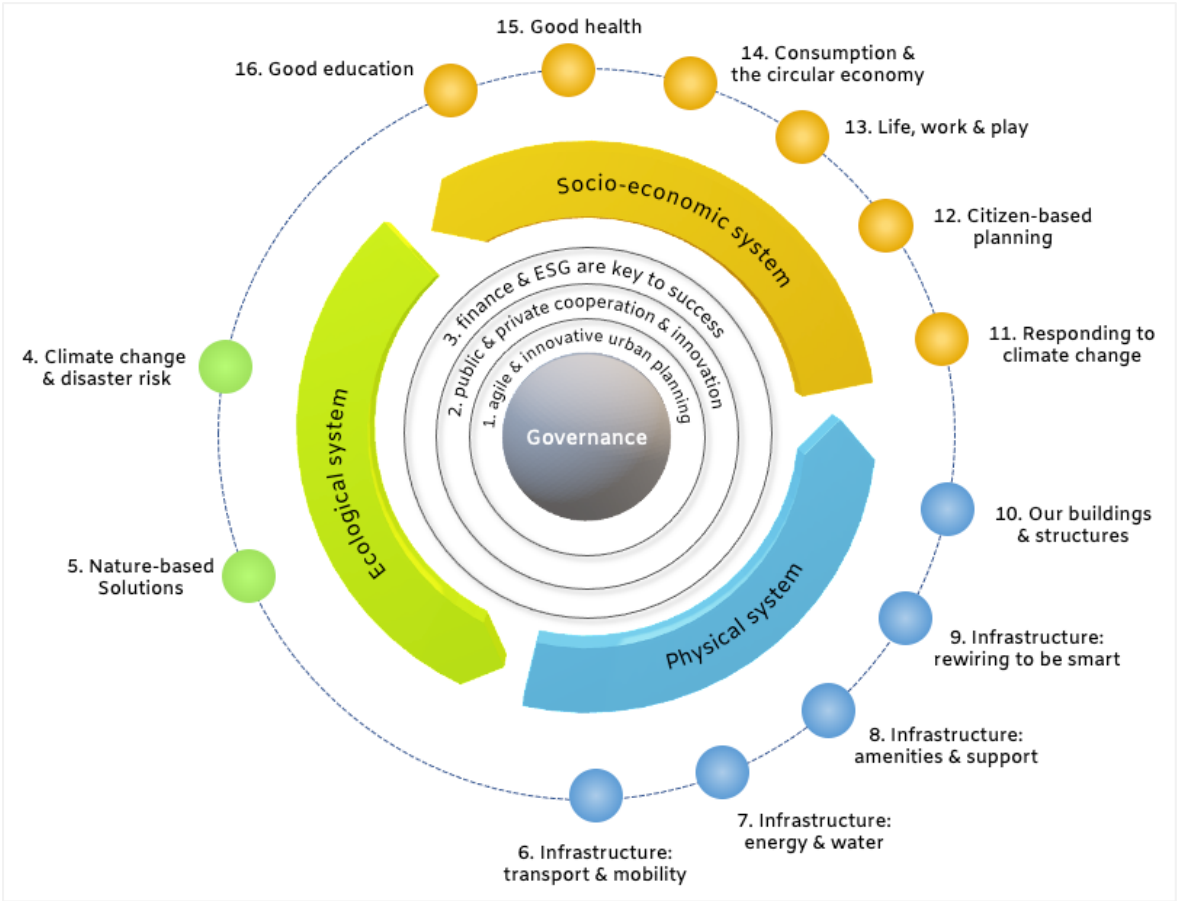
Thank you for making the time to talk with me about how Octopus Energy approaches and manages the energy needs of customers, particularly in cities and towns, and your thoughts on how to ensure our urban places are resilient and sustainable today and for the future.

In our discussion, I may refer to urban principles I use in my work on sustainable and resilient urban development, and an associated urban system I use in my Urban 2.0 work, which are described below (whilst “section 7” of the Urban 2.0 system focuses on energy and water, both energy and water link into all parts of the system):

Urban 2.0 principles (by: G Byatt)



The Urban 2.0 system (image by G Byatt)



Could we start this interview with a brief outline of the current activities of Octopus Energy, given your position as a global "flag bearer" of clean energy and a provider of energy solutions to millions of customers in the UK and other countries?

Emma: *Our focus at Octopus Energy is to help the world stop burning fuels, and to move to an electrified world powered by clean and green sources. There are many challenges and also opportunities to work towards achieving this in different energy markets, taking into account how they have all evolved and are still evolving over time. With the cost of energy rising (a key issue for everyone) and energy demand also rising, we are working towards showing the value of having flexible energy markets that are powered by clean energy. Part of this is to encourage our customers to be flexible with when they demand, buy and consume the energy they need.*

We spend a lot of time talking with different types of customers (household consumers, businesses and others) about when and how they use their power and what their needs for flexibility are today and will be in future.

We want to provide customers with flexibility and clean energy when they need it. We do not want see parts of the energy system stand idle because of excess capacity in the grid – this is an inefficient use of resources. It is far better to store excess energy for use later.

For example, we do not want to see wind energy curtailment. As we have written about on our website, we believe we can prevent inefficiency of energy resources and, importantly, save people money, through Zonal Pricing and programmes like Free Electricity. To do this, energy market flexibility is key. We want to help people get the most from energy, whether it is managing its use in the properties they occupy or charging up their electric vehicles (be they cars, vans or trucks) overnight to gain from lower energy overnight tariffs.

Gareth: What are some of the ways to ensure a flexible energy market on the supply side, Emma?

Emma: *Our focus to help achieve an electrified world powered by clean energy sources drives our focus on ensuring clean energy is stored when it is cheap to produce and hence buy, to make it ready to use when it is more expensive to buy (whatever the reason for this may be at the time). We achieve this in various ways. We have Power Purchase Agreements (PPAs) in place, as contracts between ourselves as a wholesale buyer and a renewable energy generator, with a range of power generators. We have a wide range of community-level generators as well. Octopus Energy Generation (part of the Octopus Energy family) manage over 300 renewable energy projects generating 2 TWh of green power, as of mid-2025 making us Europe's biggest investor in solar energy. Octopus currently maintains one in 10 of the UK's solar farms. We own wind turbines as well.*

The more energy we can procure to be self-sufficient, the more we can plan for sensible storage solutions in order to make stored energy available when it is required, in a flexible way.

The more we can plan ahead for flexible energy needs, the more we can benefit from a range of energy sources and avoid having to buy energy from elsewhere which can be expensive in a volatile market. This helps us to achieve resilience against shocks and stresses. We see the world as one where local flexibility for energy helps everyone.

Octopus is set up in a global and local manner. The approach to our work is supported by an energy tech platform called Kraken, which uses advanced data and machine learning and is focused on serving our customers in the best way possible. We license Kraken to other energy providers as well. Its use around the world has expanded rapidly since 2016, and as of mid-2025 it is used in 32 countries around the world. As of mid-2025 we retail energy in eight countries, and we share our technology across these markets.

Gareth: Thanks for this context about the ethos and approach of Octopus Energy, Emma. I'd like to expand on your point about energy flexibility and a global perspective about urban energy needs and solutions. I know that as well as being a major energy provider in the UK, Octopus has (as of mid-2025) a presence in several European countries as well as Japan, New Zealand and the US.

Does Octopus liaise with the IEA and / or other energy think tanks about how to manage the future of energy?

Emma: *There are teams at Octopus who are closely involved with a range of think tanks that focus on energy. In the UK, which is my main geographic focus, an organisation I am part of which looks at good practices and new ideas is the Royal Institute of Chartered Surveyors (the RICS is a global organisation based in the UK), in particular their Residential Professional Group Panel which focuses on residential requirements (which is a big part of energy demand globally).*

We are involved with people and organisations who can make a difference, as well as traditional think tanks. To give you some examples of this:

- *We have been doing a lot of work in Japan (we have a strategic agreement with Tokyo Gas, which by the way uses the Kraken tech platform).*
- *We are active in the US which includes working with a sustainable investment fund backed by former Vice President Al Gore.*
- *We have been working in Sierra Leone with the actor Idris Elba and one of his charitable causes to support the provision of energy there.*

We are also involved in the COPs (Conference of the Parties). We have been representing at these global climate forums for a number of years. At COP28, we collaborated with partners to install five working wind turbines between Dubai airport and the COP venue.

At events of all sizes, local to international, we aim to demonstrate practical things working on the ground and to engage with people on how to make clean energy work in a way that is cheaper than other solutions, not just talk about it as an aspiration.

Gareth: It's good to see the emphasis on practical solutions to engage everyone, from policymakers at global events such as the COPs through to equally important local events with local authorities and communities of people.

You mentioned Octopus is active in Sierra Leone. I have seen that you are active in Africa, for example, through your generation arm launching its first African energy fund in June 2025 and the first Africa Energy Entrepreneurship Award being launched in mid-2025 by Octopus and the Sustainable Markets Initiative (SMI) Africa Council.

Africa has enormous potential to harness clean energy, including for its cities and towns, many of which are growing fast (controlling the pace of urban development is a challenge for many of them). Whilst making clean energy happen on the ground at scale is, I'm sure, a challenge, it's very interesting to hear about projects to make it work.

When it comes to the provision of electricity across all of the developing world, the International Energy Agency (the IEA) Tracking SDG7: Energy Progress Report 2025, released in July 2025, states that millions of people continue to lack clean, sustainable energy, and an estimated 666 million people still do not have any electricity at all. An SEforALL article published in July 2025 talked about expanding decentralised Renewable Energy Solutions amongst other calls for action. Let's hope this situation can be tackled sooner rather than later.

Emma: *Solving the world's energy needs requires international cooperation, and in our case at Octopus, being active across the globe is what we believe to be the right thing. It's a combination of global thinking and local implementation, with a combination of political will, investment and good governance. Octopus has always had ambitions to be global from the start (I mentioned our Kraken database just now which as of mid-2025 is being used in 32 countries).*

Gareth: I am anticipating that your presence in many geographic markets allows you to see all the differences in how country energy markets work, which helps you to share good practices across geographies (appreciating that context is always key, and national regulatory frameworks differ)?

Emma: *Sharing approaches and examples of good practice is important. Internally within Octopus as an example of our culture, as a company, we hold learning sessions from across our organisation on Friday afternoons. Through this regular learning rhythm we all get to hear about and discuss what's happening around the world, including innovation and ideas that we and others are working on.*

For our own energy innovation and development, a lot of our approach comes from our headquarters in the UK, knowing that the adoption of parts of our work will happen faster in some parts of the world than it does in others. For example, in Germany (one of our European retail markets) they already build most of their homes to a zero bills standard, which makes the adoption of what we are working towards for zero bills possible relatively speedy in that country (with some great learnings for elsewhere). It's an example of government policy helping to make things happen.

In New Zealand, where we also have a presence, they are keen to adopt the zero bills approach, which we are pleased to be involved in making happen.

Gareth: Thanks for this context about your approach to knowledge sharing and the zero bills example, Emma. I saw a press release in May 2025 about the Octopus Energy Zero Bills Standard, aiming for 100,000 'Zero Bills' homes by 2030.

This brings me onto the energy needs for people who live and work in cities and towns across the world. Energy is one of the fundamental parts to how urban environments everywhere can thrive and be resilient and green places. Cities and towns cannot "power forwards" without the energy they need to work and grow.

The IEA released a report in May 2024, Empowering Urban Energy Transitions, in which they state the decarbonisation of cities is a global priority, and that access to and use of data for decision making on energy can support faster and more targeted implementation of actions for city and power system planning. The report also states that digital solutions and systems can add value, with the high-density of cities providing opportunities for economies of scale to optimise energy infrastructure.

These points by the IEA seem to align with the approach of Octopus.

A lot of people I liaise with talk about the Smart City, which is really about being smart with solutions, not just "digital high-tech". When you look at cities and towns through history, people have always sought to be smart, with cities and towns being hives of activity where people meet and exchange ideas and try new things.

Am I right to think that smart energy management for "smart cities" includes providing energy flexibility in supply and demand? I am thinking about how energy provision links to other parts of the urban system (per the Urban 2.0 system I mentioned earlier). For example, how "smart" clean energy solutions can power all types of urban transport (from eBikes to EVs), buildings and infrastructure. I know London Underground has trialed giving energy back to the grid for example, and I am aware that Octopus' electric vehicle (EV) charging platform, Electroverse, as of mid-2025 connects drivers to over 1 million public EV chargers around the world.

Emma: *As we discussed earlier, flexibility is the name of the game. This includes aspects such as on-site generation and consumption as part of the energy mix and the provision of different clean energy sources with no wastage of energy generation.*

I think we should be mindful of the language we use when we talk about smart solutions for cities. We don't want to make people hesitant to change for fear of technology controlling their every move. We are innovating every single day in all sorts of ways, and we try to keep our communications about what we are doing straightforward. As a business, we're always looking at ways to improve customer service. We're constantly looking at ways to improve the performance of energy technology such as heat pumps, the performance of solar panels, batteries for energy storage and other things.

Energy agility is a smart approach, and we have published an explanation about Agile Octopus, our agile smart grid, on our website. With variable half-hourly prices based on the wholesale cost of energy (that is, the price we at Octopus pay for it), Agile Octopus rewards customers for using more energy when the grid is using clean energy, and for using less of it when the grid is using dirtier forms of energy (usually between 4-7pm on weekdays).

For our customers, we want to make sure all parts of the energy network talk to each other in a simple way and that it is reliable for them. People have busy lives and we want to make energy easy for them. On our supply side, we have to ensure assets and interfaces are in place and that technology helps us in different ways across the network, for flexibility. For our customers, we want to make it simple and easy to use.

Gareth: I appreciate the point about keeping smart solutions simple, Emma.
Is the adaptation of energy markets and regulations by governments to ensure they are flexible to cater for modern times and also for the future taking place fast enough? Are there certain areas that need particular impetus?

As an example of possible efficiencies that can be achieved in energy markets, I read a July 2025 press release from Octopus Energy sharing analysis from FTI Consulting, commissioned by yourselves, which shows that reforming the energy market by adopting zonal pricing could prevent the construction of nearly 3,000km of unnecessary pylons – almost three times the length of the UK – and deliver up to £27 billion (US$35.8bn) in savings for bill payers*.

Emma: *There are various things that can be done. Zonal Pricing is an example of a flexible strategy we are working on. In the UK, with the advent of new energy developments like microgrids we want to ensure energy markets are ready for them, that connection costs and timeframes of linking microgrids to the network are sensible, and that these grid systems can be run in a way that everyone benefits.*

Consider for a moment how UK households have individual MPANs assigned to them (an MPAN is a Meter Point Administration Number which is a unique identifier for an electricity supply point in the UK, used by energy suppliers to locate the supply for billing and to also make it easy to switch between suppliers). For a microgrid, a commercial MPAN can be used as part of its set-up.

If a microgrids is to have a commercial MPAN set up it adds costs, service charges, and other things to account for. Factor all of this into an existing regulatory system and there can be unintended consequences resulting in more cost burden being put onto microgrid projects. No one set out to add layers of requirements to changing the energy grid to make it more flexible; it's evolved this way as the market has changed. Legacy approaches need to be reviewed and updated to suit a flexible energy market (with markets across different countries having specific characteristics).

Gareth: I appreciate you bringing up the example of microgrids. I only know a limited amount about them – done well, they seem to offer a lot of benefits. It seems to fit with "the right investment" principle in the Urban 2.0 principles that I outlined earlier.

I have talked with Urbanists such as Alain Bertaud about how urban planners need to "work with what they have" as well as commission new development. People say that once a street network has been laid down it's very hard to change it. I'm wondering if it's different when it comes to energy, particularly electricity more so than gas?

Using a microgrid approach, can we retrofit in a simple, low-cost way a flexible energy solution to existing streets, whatever their blend of use is for residential and commercial, and by doing so remove the need for home or business boilers and other energy equipment for individual properties? I wonder if microgrids can work for some areas, and for others on-site generation is the best option.

There's also how we can take part in the grid, too. I have read the Octopus blog piece about demand side energy flexibility, which can, amongst other things, allow homeowners and businesses to "participate in the grid" by providing back to the grid any surplus energy they may have sometimes – for example, electric vehicles giving power back to the grid at night, or if they are using groundsource heating or solar panels, to contribute energy to the grid. I see this is part of "meaningful involvement" that I talk about with Urban 2.0 principles that I mentioned earlier.

Emma: *The microgrid solution is basically what we've done in the village where I live in the UK, with a clean energy district heat network. The Swaffham Prior Heat Network is a solution that has led to our village moving off fossil fuels sources and onto a reliable, clean and low-cost form of energy.*

At Octopus we are always looking at new ways to make this type of approach work. We are working on a planning application for what we call an Energy Superloop in Melbourn, a village about 50 miles (80 km) north of London. You can read about our plans for Melbourn on our website. We define an Energy Superloop as a local network that connects clean energy sources, such as wind or solar, with community infrastructure to create an efficient energy system to power homes.

For the Melbourn Energy Superloop plan, our intent is to use an existing Octopus solar farm (i.e. the clean energy provider) which is close by to serve local infrastructure, in this case, a scalable and innovative data centre company called Deep Green, which is a containerised data centre company that Octopus has invested in which amongst other things focuses on providing free heat from their operations to others. The Melbourn plan includes Deep Green buying power directly from the Octopus solar farm to provide them with low-cost reliable energy.

To continue the energy loop through to people's properties, when Deep Green cool down their data centre the process generates warm water which can be put into a district heating network for the village of Melbourn, whilst at the same time we can install super-fast broadband and support the Janet Network, a super-fast network run by Jisc which is the UK digital, data and technology agency for tertiary education, research and innovation.

I got into energy loop thinking after listening to a podcast about the energy story of the Isle of Eigg off the coast of Scotland, which has created Eigg Electric, a community owned, managed and maintained company that provides electricity for the island's residents from clean energy sources of water, the sun, and wind. They pulled together funding from different sources to make it work for a sustainable future. The BBC wrote an article about what they were working on in 2017. They are featured in the International Microgrid Symposiums. I started thinking: what if we treat everywhere as if it is an island? What if we look at what resources and assets are available to making a cost-effective energy loop work for the long-term, including cost-effective options to fill any gaps in the loop? Then if we can make energy loops work, can we pair these loops up when feasible to create networks of microgrids that achieve low-cost clean energy with resilient local flexibility of supply and demand?

Gareth: I appreciate this example of flexible energy in action, Emma. It gets me thinking of examples such as district energy network solutions that are powered by ground sourced heat pumps and batteries that serve a whole street rather than having a device for each property, including retrofits, not just new builds. Net Zero Terraced Streets in the U.K. is an example that comes to mind.

Emma: *Going back to your example of whether we can change an old street, the answer is "Yes we can, if we make the time to think through it."*

We could think about a local district heating and cooling network, working with the physical assets that are in the area ("working with what we have", as you say). Is there a local bus or train station that has space, for example, to drill boreholes underneath for groundsource heating to be distributed locally?

Using our energy loop principles, perhaps we could install and run an energy centre at the back of a local shopping centre for example (in agreement with the owner of the shopping centre, including practical things like access requirements, whether it changes parking availability, etc.) An industrial air source could run down the street with heat piping networks that serve the properties on it (commercial and residential). Could owners of these properties receive support for swapping out existing gas boilers for a heat interface unit, to achieve a reduced cost of energy bills for them, which is a key matter everyone is concerned with today?

Gareth: This example has got me thinking about the value of good governance (one of the principles I referred to earlier) to carefully review all aspects of new ideas and manage them well if they are accepted to trial / implement. I also think about how we can find the right investment for new initiatives, perhaps from multiple sources, with investors who are shown the value of investing through good investment cases.

Systems thinking can help us look at ways to achieve what we need for heat and cooling. Various parts of the world have to deal with both hot and cold temperatures, some are predominantly one or the other. I think of reverse cycle air-conditioning systems that are common in houses in Australia, for example, I have written about air-conditioning industry.

There is work by the likes of the RMI on global cooling as well. I am keen to see better, greener air-conditioning solutions to replace the traditional ones that exist. I appreciate that making changes to properties for cooling in traditionally cooler climates like northern Europe depends on the specifics of each property and the piping and insulation they have.

It's interesting to think about these options, and how government and local policy could support their introduction as part of a focus on “the right investment”. I have seen that the UK government is offering different grants for what they call the Boiler Upgrade Scheme, for example (they don’t seem to be set up for cooling options).

As seen with the project of Swaffham prior close to Cambridge in the UK which you have been closely involved with, “where there’s a will, there’s a way”. I usually see during community engagement activities that a range of views and opinions are expressed. Often, I see that people who initially object to certain ideas can in fact help us to look harder at finding a good solution. Hopefully that is the case with the local energy projects you are pursuing at Octopus?

Emma: *That’s right. And cooling should be part of our thinking along with heating (depending on where we live, cooling can be very important). Different solutions are appropriate for different places. Some solutions are quick and low-cost. If you are drilling boreholes for groundsource heating, the actual top of such boreholes for a microgrid is typically about 30cm square (it depends on the exact needs and design, of course).*

We need to think about where it is best to place them, what is under the ground already – existing services, archaeology to consider. Perhaps a ground penetration survey can tell you.

If we can think about the parcels of land we want to use and protect and how to create a good energy loop, we can be smart about it.

Gareth: This seems a good example of “the smart city” which we discussed earlier. I’m thinking that these types of solutions are a great way to ensure real, genuine involvement from and with the local community (the “meaningful engagement” part of the Urban 2.0 principles I mentioned earlier). It’s more than a generic discussion; it is focused on action to be environmentally friendly AND save people money AND provide flexibility and resilience, with a good payback period.

With the examples of Swaffham Prior and Melbourn (and the Isle of Eigg), it sounds like the local authorities for these places have been supportive and engaged, and the local communities in these areas also. Is it that case that forward thinking was first required by people who wanted change, with local authorities being open to ideas and willing to listen?

I imagine that yourselves at Octopus are looking at various ways of making a positive impact at the local level everywhere you operate. You mentioned earlier your solar energy business and that you own wind turbines too.

Emma: *We are very much customer driven (I mentioned that we spend a lot of time talking with our customers about when and how they use their power and what their needs for flexibility are).*

We own some wind turbines in the UK that we call The Fan Club, which customers in their locations can join. As of mid-2025, we have four turbines – two in Yorkshire, one in Lincolnshire and one in Wales. If you live in a post code close to these turbines, you can have a 20% saving on your energy bill when the wind is blowing and 50% off when it's really blowing.

With schemes like this we see people directly impacting and directly engaging with each other and the energy network. Our customers have WhatsApp groups through which they let each other know when the turbines are really working for them, and they agree to use energy at this cheap period for whatever they need to do. It's a very different and more personal relationship with the energy network, which links to your meaningful involvement principle.

Gareth: I like this example of linking up the broader thinking on energy supply and demand to what people can do directly, rather than feeling somewhat removed from it all. It reminds me of the “smart city” discussion – smart isn’t just about everyone using high-tech devices.

To get things done locally, I imagine it requires a group of people who are committed to finding a good solution for clean energy for their local area, who do the work and engage others to find a way to make it happen?

Emma: *There is never a perfect time to think about these things, unless perhaps you are renovating your house and replacing your heating / cooling system, or a new development is taking place. Trying to convince people to do something when maybe they don't really have to is a challenge. How can we define what's in it for them in various ways?*

Maybe it requires a phased approach. If the sums add up, maybe it starts with investing in a heat pump, and then the local area (street or block) moving to a district heating network. Meanwhile, how do we encourage people to take part in energy schemes that do not involve burning things now? For energy providers like Octopus, if we can get you a smart tariff that is also better for the planet because of the clean energy network we are investing in, we are making progress.

Gareth: One of the things I talk with municipal teams about is their knowledge and awareness of all of this. I appreciate they have rules and regulations to abide by, and I think some authorities are, pardon the pun, switched on about what needs to be done, whilst also working within the constraints they have. It’s hard.

Emma: *I think it's been a very difficult and challenging time for city, municipal and local authorities. Around the world, governments change, and the consistency of messaging has not always been there.*

I do think there are valuable learnings to share. Learning what people are doing elsewhere and seeing how their approaches might work (maybe with adaptations) in your territory is always useful.

Gareth: I'd like to return to our discussion point earlier about energy needs in the developing world, and how emerging economies might be able to make clean energy work.

I am involved with some research on India, a country that is still burning a lot of fossil fuels, of course. As well as climate change, we see its negative impact on air pollution (which is something I am researching).

Hopefully, the more that we can show how good clean energy solutions including examples such as the Energy Superloop can work for everyone, often with low-cost innovation, they can develop novel approaches for their localities and maybe show developed economies how to move forward as well.

Emma: *There is a lot of potential everywhere. I have seen some brilliant things being done in a lot of places, for example, the imaginative use of waste products for energy use to provide things like lighting in poor housing areas. I sometimes think of it as smart ideas, simply delivered.*

Gareth: When it comes to research into energy solutions, I know that Octopus held an Energy Tech Summit in June 2025 which was linked to the London Climate Action Week (LCAW) annual event (I note you had some great speakers).
Do you link up with cities to support other types of resilience including climate focus events? For example, many cities hold "Resilience Focus Events" during UN-Habitat's "Urban October". I get involved with certain municipal authorities such as Bordeaux with resilience-focused events.

Emma: *We aim to make sure that we get to events in the places where we operate as much as we can. As part of this, we try to be involved in climate change week events held in cities when it's possible.*

The range of events nowadays is very broad, and although it's not possible to attend them all, there are great opportunities for learning. To give you a personal example, I have been involved in a project in the English county of Kent which involves the UK National Health Service (NHS) because they know that warm, healthy homes to reduce the pressure and the burden on the NHS. It's quite unique collaboration that has been brought together.

Gareth: When it comes to research, Does Octopus liaise with academic institutes, for example with the Energy House Labs initiative by the University of Salford which focuses on home energy efficiency, and UCL's Energy Institute?

Emma: *We value the work of academia, and we are involved with them on a number of fronts including speaking at conferences and events. I personally liaise closely with Professor Richard Fitton at Salford with the Energy House. We both sit on the RICS Residential Professional Group Panel.*

I have collaborated with UCL as well, for a couple of their podcasts and some conferences. We have sponsored a research paper by the University of Cambridge on the value of sustainability, which links to our Zero Bills homes proposition.
We have also been doing some work with the University of York for research into our solar power sharing project.

At Octopus we like to think that our practical focus on developing solutions and trialling things to either get things going or fail fast on projects can be informed by academic research. We do appreciate that some academic initiatives are longer-term, and we try to keep up with their outputs.

Gareth: I have interviewed Richard Fitton about the Energy House. Hopefully initiatives like this one allow you to try new things quickly and obtain feedback and data quickly to decide if an idea is worth moving forwards.

Emma: *That's an example of what Richard and the team at the Energy House are doing, working with some large housing developers. We also have our Octopus Centre for Net Zero and our own innovation centre at Slough at Octopus.*

In this centre we have a house built to 1990s UK building regulations, for example, where we test things inside it.

Gareth: I'd like to talk about energy resilience now. Energy networks can be vulnerable to a range of shocks and stresses – be it from natural hazards such as storms, heatwaves or cold snaps (or even a Coronal Mass Ejection from the sun) or from humanmade threats such as Cyber attacks. We saw what happened to Spain and Portugal in April 2025, when their power network went down in a major outage.

In June 2025, an incident report was released focusing on what they believe happened.

What measures are practical to ensure an appropriate amount of resilience is in place in energy grids to minimise the risk of major power failures, including coping with new peaks in demand (such as high demand during very hot or very cold weather)? I wonder if resilience of the energy grid is an example of ensuring there is clear agreement on what our "risk tolerance" is – simply put, how much we are willing to spend on resilience, a range of energy options at our disposal, stored energy in reserve and back-up measures?

Emma: *I think we can achieve energy resilience by generating energy for our consumption in our own locality and geography, rather than buying it from another country (with the scale of a geography being relative to what we are looking at). Resilience should come from having a good selection of assets to use that can be used to supply different places, and that can be scaled up if required at certain times.*

One challenge we have at the moment with energy is the existing distribution network and where we can and should connect clean energy assets we need to the grid. Planning for new clean energy assets can take time to be approved, for understandable reasons. Plans to introduce assets such as solar farms or wind turbines can be an emotive subject for people.

History has laid out our existing energy grid before we thought about the new assets that we implement today, and these new assets need to attach to grids where the connection points are. Perhaps our biggest issue is ensuring that the right assets go in the right places. Every locality for situating an asset has unique aspects to it.

Where we locate energy assets influences things like new housing provision. This links into the broader system of infrastructure, and how well located our utilities are to each other. Should there be more joined up thinking about where water companies have their assets and where power is being produced?

In some parts of the world where there have unfortunately been disaster events that have damaged or destroyed energy assets (for example, from earthquakes or major storms), they have been able to change their energy system to allow new approaches, including better resilience against future threats they face. This can include reducing or stopping the use of overhead cabling, for example, which reduces their risk.

Gareth: It's interesting that you mention disaster events, Emma. A research project I am involved in is called Disasters Avoided, through which we are documenting examples of disasters that could have happened, but did not, because of good proactive action. How we manage energy (and water) is certainly an important part of how we can avoid disasters.

My last question, Emma, is about the long-term future energy solutions, which includes the wide range of research and development that is ongoing at the moment.

Emma: *To go back to the start of our discussion, we have to stop burning fossil fuels – that is core to the Octopus culture. The solutions to achieve this goal will, I suspect, be different in 25 years' time to what we are doing to achieve it today, as we continue to learn and innovate with new approaches.*

The steady state of using one or two energy sources of gas and oil is the past. Regional opportunities will vary. We don't know how they will evolve.

A major challenge we have to focus on today is to make sure the homes and other buildings we are constructing are built to the best standards possible and that they show people how we all benefit from making changes to not burn or use as much fuel.

In an age of varying political and media opinions and algorithms, we think we are a business that has a clear purpose and vision, and one that is every day putting things into practice.

Gareth: Thank you very much for your thoughts and perspectives, Emma. I look forward to following the progress of Octopus Energy's activities.

