GRASS-ROOTS SUSTAINABILITY: WHY WE NEED TO BECOME MORE SELF-RELIANT AS CONSUMERS

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Here, Paul explores the current and future landscape of energy production, deconstructs the barriers to becoming a more sustainable society and examines why it's down to us as consumers to develop a greater self-reliance in powering our homes.

Every minute of every day, five thousand times as much energy as we need hits the earth in the form of solar energy. That surplus isn't going anywhere; it just gets absorbed into buildings, into the ground, the desert or the sea, warming everything up.

But what if we could harness more of that? What if we could make energy as abundant as data on the internet? Imagine the global problems we could solve. In my opinion, this is not only possible; it's beginning to happen right now. However, before we can begin to see a real step-change, we must address the perpetually complex question of what's truly going to drive that momentum and turn us into a more independent and sustainable society.

The global impact

To begin to answer that question, let's first look at the influence of global markets on the UK's fuel and energy production, and the ever-present concern that we'll eventually run out of resources. Ten years ago, the world was focussed on peak oil; we thought we were going to run out of it and that it would get really expensive – but the reverse is now happening.

The business models of fossil fuel companies have failed in that respect. The price of oil has fallen to around $50 a barrel and is likely to stay there. So effectively, what happens is that it's not worth extracting oil anymore because people don't want it in sufficient quantities. We're not going to run out of oil, because demand will continue to fall.

But gas and electricity are different, because of the way they're being generated. Gas extraction is a complex issue; we've had a lot of gas coming onto the market in the US from shale, but the price plummeted so they stopped producing. We now have gas coming from Russia through huge pipelines, and from Qatar as liquid natural gas in giant containers.

Both of these sources are politically disruptive, and if there was any fluctuation in production we'd have a short-term supply issue which would drive up cost. Energy companies won't absorb these variables, so they'll

always be passed onto us as consumers. And while we've seen fewer price hikes in recent years compared to around five years ago, political and event-led drivers make the market volatile and unpredictable.

A need for self-reliance

Because of these variables, the price of electricity is only going one way – and it isn't down. We live in an age of fragile world markets, politically-motivated events, concerns around world food production and potentially climate change driven catastrophes like the recent hurricanes across the Caribbean and the southern states of America - all of which impact on the availability and cost of energy production.

This clearly highlights the need for the UK to become more self-reliant at a national level, and for the government to create mechanisms for us to move towards a more sustainable society in terms of energy production and usage. But that's unlikely to happen either. Under David Cameron's government, the longstanding trajectory of building regulations changed with the withdrawal of a ratchet mechanism for zero carbon homes called *The Code for Sustainable Homes;* which had been in place for over nine years and which the construction industry and its supply chain had embraced.

Now, this target has been pushed onto the backburner. With our current fragile government focussed entirely on negotiating Brexit, there isn't really room for sustainability targets and so government-driven building regulations are likely to stay as they are until at least 2020. So perhaps then we need to look to a more local level and consider the ability of town, city and county councils' to influence sustainable through planning and building regulations.

There is some hope here; depending on where you live, the amount of solar we are seeing specified to go onto new homes is gradually increasing, with a growing number of local councils taking the lead in terms of more sustainable building standards in their localities. Scotland, for example, has higher and more solar-friendly building standards than the rest of the country, installing solar panels on around 60 percent of new homes.

Planning authorities in London are following suit, although there are constraints in terms of the type of building since high rise flats may not have the roof space for solar panels. We're also seeing more eco-driven building regulations in other pockets of the country, including parts of Devon, the Southeast, Lancashire and Yorkshire, where planning authorities have clear objectives to drive local energy from renewables.

The power to drive change

But again, this is a complex and time-consuming process; at the moment, it's down to individual councils to decide how and when they're going to implement sustainability targets – if at all. So if the drive to become carbon-free and more independent in our energy production isn't going to come directly from global markets, national governments or local councils, where will it come from?

The answer is simple; it's us. As consumers, we now have the power not only to demand more sustainable homes from our local authorities, but to take a greater level of responsibility for the production of our own energy.

Our houses are generally more sustainable now than they've ever been; most of us have double or triple glazing, and we have fairly high levels of insulation in our walls, floors and ceilings. New build homes now come with A-Rated appliances which generally use much less electricity. Therefore, the energy needs of the average house are lower now than they ever were.

As a society, we're not too far away from the average homeowner having the capacity to become at least semi-sustainable. Solar energy is available to the vast majority of us - with the only exceptions being those who live in listed, thatched or particularly unusual buildings – and new data published this month by the National Grid declared 2017 our 'greenest' summer on record.

At just over £3,000 for an average system, the cost of solar panels is now 20 per cent of what it was when people first began installing them. Aesthetically, there have been significant developments too; gone are the old blue panels jutting out eight inches above a roof; we now embed panels that are the same colour as your roof tiles directly into the roof, so that it looks part of the house.

Long-term benefits

But while there's no doubt that installing solar panels will give you free electricity and create revenue from your unused electricity through the Government Feed in Tariff, looking for a monetary return on investment is really not the point of renewable energy. You wouldn't look at the return on investment for any other purchase you made in your house, like hardwood flooring or a new sofa, or even double glazing – you'd simply want your house to be warmer or more comfortable.

The real long-term benefits are around producing clean, locally-sourced energy that's capable of matching supply directly to demand. Thirty years ago, an energy company would estimate roughly how much electricity was needed at any given point. They'd know, for example, that we'd probably need more electricity half way through *Coronation Street* because we were all getting up to put our kettles on. So they'd pump this extra electricity down the line from vast power stations to meet the demand, which becomes dirtier and less cost effective with every mile it has to travel to reach you.

But now, our usage is much more difficult to predict; people are using less electricity because their homes are more efficient, and because more electricity is being generated from wind and solar, which is dragging demand down. We're each plugging in more devices, but there's no set time for doing this, and the *Coronation Street* concept no longer works.

Essentially, that renders traditional predictability models useless; the only way we're going to use our energy more efficiently is to match demand directly with supply. This model works especially well for big businesses; take the average supermarket chain, for example. The National Grid can detect when the country's at peak usage, so rather than generating more electricity, they can pay supermarkets to turn their fridges down by 10 per cent across every branch to meet demand more sustainably.

Supply and demand

The supply and demand model works in reverse too; wind or solar farms who are producing too much energy can offer their surplus to local businesses who might need extra energy to charge or use machinery or technology at certain times of day. And it's no different at an individual level; we're now able to generate our own clean electricity from our roof, store any surplus in a battery or sell it to someone across the road.

This sharing economy will also be driven by the potential for users with an EV charging point to allow other electric vehicle users to access their chargers, as well as sharing surplus created by locally generated electricity. As people become more conscious of the available resources within their home created by solar energy, sharing will become much more commonplace.

On my own house, solar panels generate up to 70 per cent of my electricity. I have a hybrid electric car; a BMW 3 Series with a 2L petrol engine and an electric motor with a battery that stores just over 20 miles worth of electricity.

That might not sound like much, but if you think about the daily commute most of us are doing, it makes sense. My daily commute is around 10 miles each way, so I just plug it in when I get home and charge it for the next day. I'm not using any petrol at all for that journey; only electricity. The fuel savings on my daily trip to work gradually add up, but that's not the reason I drive a hybrid; I *want* to do it. It's important to me as part of my own aim to live in a more sustainable and environmentally-friendly way.

Monitoring solar energy

Technology also gives me complete transparency in how my solar energy is performing; I can monitor my usage with an app that's linked directly to my inverter, and I can see what percentage I'm importing from the National Grid, what percentage I'm exporting back to the Grid, and what percentage I'm using of my own solar energy. Today, for example, I can see that 37 per cent of my household energy has come from the Grid, and 63 per cent has been from solar and battery.

The app even shows me a minute-by-minute usage; right now, I can see my Tesla battery is currently 4 per cent full; the power in that battery was empty first thing this morning because it was emptied yesterday, so it's been topped up from the solar throughout the course of a morning. Yet this technology is extremely basic compared to what's coming in the near future.

It's already happening now in Germany, where block-chain technology exists that could change the landscape of renewables and sustainability entirely. It works by providing a shared ledger of all available energy within a user's home, and instead of our current model of a user paying for another user's available energy via the National Grid and utilities companies, it enables direct billing and payment between users.

As smart technologies become more widespread, consumers will become much more accustomed to monitoring and manipulating our home energy by switching things on and off remotely through our smartphones and devices. Artificial intelligence already exists that allow items in your home to predict your usage, switch themselves on or off and become more efficient.

Artificial Intelligence will mean your house knows you have 4 kilowatts of PV available from your roof system; that you have nothing switched on during the day, that you normally get home around 6pm in the evening and that's when you put the kettle on and begin using your energy. It also knows that Mrs Jones next door is at home during the day, so she could buy the spare available energy you're generating then.

That, in my view, is the kind of smart-connected, self-generating energy usage that we're moving towards – and you and I will be the driving force behind it.

For more information, visit www.eco2solar.co.uk

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NOTES TO EDITORS

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