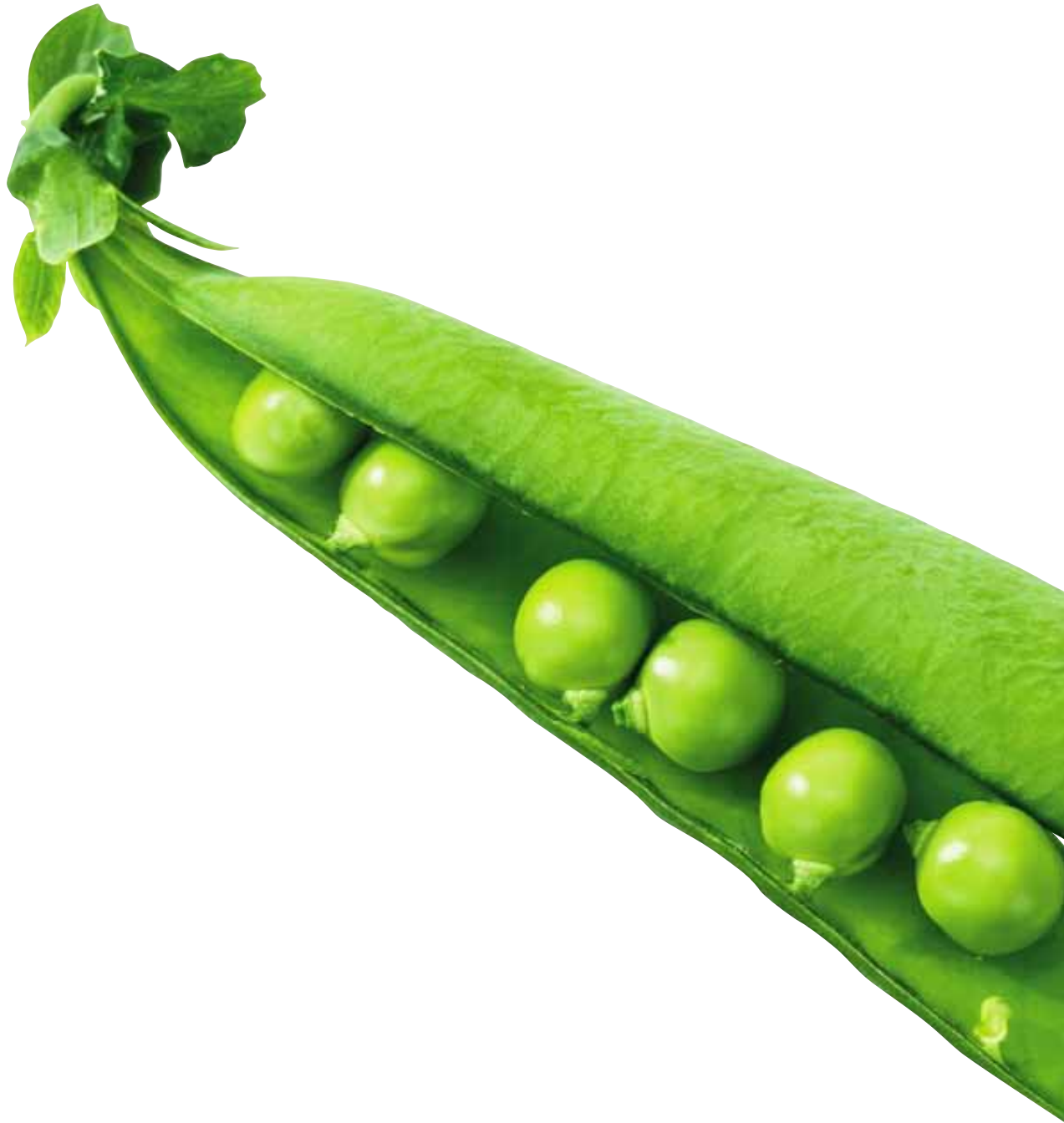


Switch on to lasting
change for a more
sustainable future



ENERGY IN 2020



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Keep the energy flowing

Energy keeps us connected and entertained, warm and safe, in our homes and workplaces.

But there is a cost to us, from rising prices, and to the environment through climate change. So we must change the way we provide and use energy.

Over the coming decade we'll demand more from energy suppliers. Not more energy, but more help with controlling what we use and spend. We'll have new tools that let us know what we're using in real-time. So we can make better choices about when to turn things on – and off. Energy suppliers can offer new tariffs that reward us for the decisions we make. We can then take responsibility for the cost of energy – on our household expenses – and the environment.

To satisfy our desire for more sustainable energy, utilities will have to change. This will mean more clean technologies from renewable sources.

We'll create a new, low-carbon energy culture. Energy will flow two ways – not in the single direction it does today. Consumers will actively buy and sell from the grid. We'll also see investment in new services – like energy storage – or special communities set up to trade energy generation – both locally and virtually.

A sunnier future. Evolution and revolution in energy

A clean technology revolution will change the way we do business. It's needed as the cheap energy we once relied on disappears.

Oil production is likely to peak within 20 years, after which we will depend more heavily on natural gas and coal to provide the energy we need. Growing demand for fossil fuels will drive prices higher. Making tackling climate change tougher too.

At the moment the carbon capture and storage technologies to help fossil fuel-based power production meet emissions targets are still some way off.

This puts more reliance on using natural gas, with its relatively low CO₂ emissions, for power production.

THE ALTERNATIVE ENERGY FUTURE

There is another option. A natural one that can take us to 2020 and beyond.

While traditional generation – including nuclear power – will still play a part, renewable energy sources, like solar power, will start to shine.

The 'rush to the sun' is already starting.

By 2020 wind, tidal and solar-powered energy production will be sufficiently commercialized to be major industries. They will be making a substantial contribution to our energy needs. But new electricity storage solutions will be needed to smooth over the highs and lows in energy supplies caused by renewable sources. Once in place, we are another step closer to making sure we have the energy we need to avoid blackouts due to the phasing out of old fossil fuel power plants.

As the most abundant form of energy, solar energy offers great potential. Solar production is already growing rapidly. So much so that we believe it could be the predominant source of electricity by the middle of this century.

Rush to the sun

Capturing the power of the Sun could become as big a business as the chemical industry or car manufacturing are today. Up to 2 million jobs globally by 2020, 10 million by 2030¹.



1 Solar Generation V – 2008 report – European Photovoltaic Industry Association. www.epia.org

Looking back to power forward

The new generation of nuclear power plants will be built on the knowledge of previous generations. Many of those who delivered and ran the original wave of nuclear plants are now retired. It is their experience that has to be captured to develop the new generation of nuclear engineers.

STILL THE NUCLEAR OPTION

Nuclear fission will continue to play a vital role in satisfying our thirst for energy.

A large number of new plants are planned. However, they won't be commissioned before many existing stations reach the end of their productive life.

To build and maintain these new plants, we need to develop more engineering skills. We also need to find the uranium reserves necessary to run them.

Nuclear fusion is still experimental and is unlikely to be a serious option before the middle of the century, never mind by 2020.

CLEAN PROFITS

More eco-friendly renewable technologies are leading a clean technology revolution. This green revolution is likely to rival the impact of the industrial revolution of the 19th and 20th centuries.

Companies. Sectors. Economies. All will move towards renewable energy production. Together with smarter ways of managing and reducing energy use at work and home – we'll create a new, low-carbon energy culture². Those who can act quickly will benefit. Those who still rely on carbon-intensive energy production will face poorer returns and business prospects.

² McKinsey on Finance – Perspectives on Corporate Finance and Strategy, Number 19, Autumn 2008.

LIGHTS ON OR OFF? YOUR CALL

Changing the mix in energy sources will have to be matched by another transformation – in us. We will need to change the way we use energy.

To keep the lights on, we will need to be wiser about turning them off. Being thoughtful about how we use power will become more and more important. Especially in peak periods. Changes in our behaviour will help avoid blackouts or brownouts.

What will we need to empower ourselves to make intelligent decisions about the energy we use?

We will need information – the right information at the right time. That means using all the media we have today – displays around the home, smart phones, the internet – to get this information to us when we need it.

Managing energy use is not just turning things off – it's about knowing when to turn them on! Information will enable us to make wise decisions about when to use energy. Smarter homes will employ technology that will tell us the impact of choosing to use energy at a particular time. On our money. On the environment. So we behave in a way that sustains our energy supplies.

Added to our intelligence will be the artificial intelligence built into the smart home.

Utilities will be able to send signals to reduce consumption in non-critical appliances. We will be able to change the way we cope with peaks in demand. Rather than calling for megawatts (MW) of central production capacity to be brought online to meet demand peaks, we will be calling for negaWatts – to reduce demand. Utilities could even trade between the two, increasing supply and reducing demand, to give even more options in their hedging strategies.

High-rise prices building up low-carbon cities of the future

As energy prices continue to rise, maximising the benefit gained from the use of energy and resources is a huge priority for governments and regulators alike. Most European governments have plans – or have started – to build carbon neutral homes and even new low-carbon cities.



New era. New thinking

As we move to greener, more sustainable energy over the next ten years the utilities sector as we know it will change. Radically.

A smart information infrastructure will be based on smart meters. These will provide energy consumption information that can be made available in real-time, Driving smarter decisions and improved customer service.

Today the supply chain moves in one direction: from the large centralized power stations generating energy, to where it is consumed in our homes and businesses.

But that model will be overturned well before 2020. The way we produce, and use, wind, wave, solar and other renewable energy sources will change.

Consumers are as likely to be producers. They will continue to use energy, sending what is spare back to the grid, establishing small scale energy trading.

So traditional utilities must change the way their supply chain is organized and structured. If not they are likely to be replaced by more flexible, specialist providers.

THE END OF UTILITY AS WE KNOW IT

- The new breed of energy services company will be more entrepreneur than utility. Green entrepreneurs, they'll invest in government or independently run projects, to develop local energy production and return a profit.
- Energy 'clubs' will also start to appear. Communities buying – and selling – energy within their distribution system. These may be local groups specific to a geographic area, or virtual using the social networking technology we see today. Much of this energy will be produced in members' homes, with the help of energy service providers. To make sure each household has the energy it needs will involve balancing home generation and the national grid.
- New energy storage companies will also emerge, selling storage capacity as a service. This could involve:
 - Storing electricity in large-scale batteries
 - Converting electricity into hydrogen to power fuel cells, as and when needed
 - Storing energy as hot water or using pumped hydro-storage

Who will use the new services? Customers are likely to be network businesses or consumers, producing energy at home using micro-generation devices such as solar panels and mini wind turbines.

- Energy distribution companies will need to meet the new demands of localized generation. Which means smarter networks supporting the two-way flow of energy. The 'smartening' of energy networks will become essential. Distribution companies will move from simply managing a network to being operators of a true, local energy balancing system.
- Smart suppliers will change their core capabilities and be information-driven. Smart in-home technology will provide them with new options that will allow them to trade energy more effectively, using negawatts to reduce exposure in wholesale markets – or allow them to take advantage of a rising market to increase profits. Those that do embrace the new technologies will be able to give customers the services they value the most.

To succeed, each of these new utilities needs detailed, timely information. So they can make the right decisions about the services customers really want. Then go on to deliver them.

Change for utilities will be matched by a new wave of consumer power. Consumers will be attracted by services that let them take responsibility for the cost of their energy – on the environment and their wallets.

SEEING CONSUMERS AS PEOPLE RATHER THAN METERS

But people are different. The way they react to the new energy era will be different. Before we can change the energy consumption of consumers – so they continue to have a secure supply that they can afford, now and in the long-term – we need to know what motivates them.

Here are profiles of five different types of energy consumers you are likely to encounter:

THE ACTIVE GREENS

These are environmentally-conscious consumers. They are ready to invest in technologies that mean they can still use energy that doesn't cost the earth. Their drive for a carbon neutral lifestyle will create the template for a way of life that can support them long-term. Which will inspire others to follow.

KEY INNOVATIONS: MICRO-GENERATION BUILT-IN

There is no single answer to living a more sustainable life. But Active Greens will cut energy waste by increasing insulation. They'll buy the most energy efficient appliances and gadgets too. They will probably install wind turbines, solar panels or ground source heat pumps in their homes – which will be by far the cheapest and most effective way to access energy. They'll work to be self-sufficient. Storage, either in their own homes or as part of a community collective, will mean that they have energy when they want it.

THE FINANCIALLY CONSCIOUS

Motivated by money, these consumers may be fuel poor, or simply cost conscious. They want to control their energy spend. They will even pay a premium for devices that let them do so, as long as they make a net gain. Being eco-friendly or learning how to adjust the amount of energy they use is less important than having more to spend on other things that are more important to them.

KEY INNOVATIONS: MICRO-GENERATION BUILT-IN

The financially conscious will invest in many of the same things as Active Greens, but for different reasons. They'll want to be sure they will get a good return. They will want controls that make the best use of the energy supplied. And they will invest in storage, by themselves or with others, to be sure they have energy when they want it – to maintain their lifestyle. They will also aim to save money by cutting waste through greater insulation and more energy-efficient appliances and gadgets.

THE TECHNOPHILES

These consumers love gadgets. The fact that they can have devices to control their energy consumption and bills is secondary to the fun that they have playing with them – or bragging to their friends! There will be lots of these gadgets out there by 2020. They will be linked to smart meters and other measuring equipment. So consumers can see how much energy is used by their lighting, heating and other appliances. The gadgets will let them control what they use – with the devices even learning their preferences to manage energy consumption for them. These consumers are also likely to run cost-efficient hybrid cars, which generate energy on the move. This can then be uploaded to their home storage device to use – or sell on.

KEY INNOVATIONS: INTELLIGENT APPLIANCES

By 2020, many appliances are likely to have in-built artificial intelligence as standard for smart demand management tools. So fridges will turn themselves off momentarily when energy demand and prices peak. Or smart appliances, like vacuum cleaners with artificial intelligence will turn themselves on and work silently through the night while energy prices are low.



THE HONESTLY DISENGAGED

These consumers aren't convinced that they can have a positive impact on the environment, individually. Or they simply have other priorities that don't include watching the energy they use. So they run their cars and homes without thinking about their carbon impact or the higher energy costs they pay.

KEY INNOVATIONS: RATIONING AND 'FOLLOW ME' ENERGY ACCOUNTS

As the pioneering innovative technologies become fully commercialized by 2020, the premium that the Active Greens will have paid is likely to have disappeared. Which is good news for the honestly disengaged. When they come to buy new gadgets, appliances or home heating systems, they will, by default, be environmentally-friendly.

But that may not be enough. If too few consumers adopt a more sustainable approach to the energy they use, future governments may have to introduce new ways to encourage or reward change to consumption behaviour. This could be done by giving individuals an annual energy credit, stored in a 'follow me' central energy account. Like a bank account, it allows users to move credit between utilities and other services, such as cinema outings or trips abroad. Pocket-sized handhelds would let consumers access their account.

THE ENTREPRENEUR

This group of consumers is both commercially astute and community-spirited. They have skills in business and markets. They recognise the opportunity created by the changes in energy markets. They will work within local and virtual communities advising about investments in utilities. Champion deal-makers, they will broker agreements with energy service providers for the community. So community members get the best price for selling any excess energy they generate and can buy extra energy when they need.

KEY INNOVATIONS: LOCAL CO-OPERATIVE ENERGY FARMS AND BANKS

Local communities can band together to produce energy, using small-scale renewable sources. That energy would then be stored in a local co-operative storage bank. It can then be used or sold. Smart network tools will automatically measure how much energy individuals have put in central storage against what they've used. And credits or debits added to their energy account for accurate billing.



The energy landscape is shifting dramatically and bringing change for us all.

- New opportunities for profit
- Cleaner, more sustainable production technologies
- Smart investments in new energy schemes
- Highly-efficient distribution
- Consumers becoming producers

Making the move to this new world involves different thinking by many people, including governments, regulators and the utilities themselves. They will need to invest in the physical and information technologies that will drive the new energy era.

This is no small challenge. That's why we believe that the utilities sector needs a forward-thinking partner and industry innovator like Logica with it, every step of the way.

We'll help you join the energy revolution and empower you to lead the way. We'll use our deep experience on a number of groundbreaking projects in the utilities sector to do so.

Partner with us for a brighter and more sustainable energy future.

WANT TO LEARN MORE ABOUT THE ENERGY FUTURE AND HOW LOGICA INNOVATIONS CAN HELP YOU SUCCEED?

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Logica

250 Brook Drive
Green Park
Reading RG2 6UA
United Kingdom

sustainability@logica.com

www.logica.com

CODE 843 0210

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