



FUTURE SCAPES

THE SCENARIOS



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FUTURESCAPES

AN OVERVIEW

FutureScapes is an exciting collaboration project which aims to explore the potential of technology and entertainment to create a better, more enjoyable world in 2025.

It's not about predicting the future so much as imagining the possibilities.

There is by definition an infinite number of possible futures ahead of us. But one thing is clear: the world of 2025 will be very different from the one we live in today.

By starting with life in 2025, rather than today, FutureScapes aims to stimulate more creative thinking about how technology might help us live sustainably. By sharing immersive and entertaining stimulus material – such as the scenarios in this document – this collaboration aims to invite the contributions of 'futures' experts and an eclectic mix of thinkers, writers, designers and the public to address the opportunities and challenges of life in 2025 and the potential roles technology will play in it.

FutureScapes is designed to be as open and collaborative as possible and is being convened by leading sustainability non-profit organisation, Forum for the Future, and leading consumer technology company, Sony.

About this document

This document summarises the findings of the FutureScapes research 'capture' phase in the form of four 2025 scenarios and their implications for technology and consumer lifestyles. Intended to be seen as creative, playful thought-starters rather than definitive predictions, the scenarios explore how complex and intersecting trends can play out over time, in an accessible format.

These scenarios are an imaginative starting point for the next stage of the FutureScapes collaboration, when we will invite stakeholders and the public to collaborate in developing potential areas of future technology to enable sustainable lifestyles in 2025.

Developing the FutureScapes scenarios

Each scenario has been created from a range of expert inputs. Our starting point was the existing set of Climate Futures scenarios, developed in conjunction with fifty scientists, economists, and representatives from business, NGOs and government around the world, using an adaptation of the Field Anomaly Relaxation method.

Four of these Climate Futures scenarios were updated and adapted to develop a stronger focus on the role of technology in enabling sustainable lifestyles in the future. This material

was gathered through a 30-strong interview programme, supplementary desk research and an all-day workshop. Contributors included key Sony experts (R&D teams, new ventures, chief technologists, and senior business leaders from across Sony Electronics, Playstation and Pictures), as well as companies such as Superflux and Digital DIY, and external experts from academia and think tanks.

We are very grateful to everyone who contributed their time and expertise.

A NOTE ON READING THE SCENARIOS

Scenario planning is a way of discussing complex future issues in a clear and structured way, to identify and prioritise risks and opportunities. Scenarios are just tools to help people think about different possibilities in the future. We will use these scenarios to challenge people to come up with creative responses to the main question of this project – how can technology enable sustainable lifestyles in 2025? The scenarios are not an outcome in themselves, but a means to answer this question imaginatively.

So there are a couple of important things to consider when reading the scenarios:

- 1. They are just useful stories. They are not predictions and there is no such thing as a “right” scenario. The future may contain elements from all of them or none of them (pretty unlikely). The important thing is to stretch thinking and challenge assumptions.
- 2. The scenarios should be plausible, consistent and interesting stories about the future. They have to be quite short to be useful and therefore cannot be hugely detailed. The important thing is to get the detail right where needed.

Questions to ask yourself when reading them:

- a. Is it possible to get here in 14 years? What signals do you see in the world today that point to this scenario?
- b. Can you imagine yourself in this world? What would you be doing?
- c. What is the role of technology and what are the major needs it meets in each scenario?

THE SCENARIOS

The following pages outline the four FutureScapes scenarios:

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1. HYPER INNOVATION

AN OVERVIEW

This low-carbon world has been created by a rapid and ceaseless process of technological innovation. Lifestyles and business practices have been minimally affected, but against the background of diminishing resources there is growing concern about the long-term sustainability of this ‘innovation treadmill’ approach.

2011: Indicators of Change

‘Weak signals’ which could trail tomorrow’s Hyper Innovation scenario.

- In 2009, **artificial meat** began to be cultured in laboratories. A potentially game-changing alternative food source for a growing population with shifting dietary tastes, in vitro meat produced on a global scale would greatly reduce the world’s traditional reliance on water-dependent crops like rice.
<http://www.guardian.co.uk/environment/2010/aug/16/artificial-meat-food-royal-society>
- In 2010, Andre Geim and Konstantin Novoselov won the Nobel Prize for Physics for their work with **graphene**, an ultra-thin, ultra-strong material capable of replacing construction composites like carbon-fibre and the conductive elements in computer chips, allowing just about anything to be digitised – from crisp packets to clothing.
<http://www.guardian.co.uk/nanotechnology-world/graphene-a-miracle-material-in-the-making>
- In six hours, Earth’s desert zones receive enough **solar energy** to power the planet for a year. The Desertec Foundation aims to turn this concept into reality with massive solar thermal power plants generating electricity and desalinating water. Graphene allows the production of curved solar panels – a key development. Construction of Desertec’s first 500 MW solar farm is scheduled to start in 2012 in Morocco.
<http://www.desertec.org/concept/>
- German designer Anke Damaske has re-energised the concept of **synthesis** by developing a biodegradable, eco-friendly ‘silk’ from milk fibre. Her easy-care material is cheaper and much more water-efficient to manufacture than the real thing. No pesticides are used, boosting sustainability. Best of all, because it’s produced from unwanted substandard milk, Damaske’s business model also neatly addresses the issue of post-production waste.
<http://www.dairy2020.com/cow-milk-couture-fashion-made-milk>
- **Synergising shortages with super-abundances** could signal a new approach to the best use of energy and raw materials. The Solar Sinter project has created a sun-powered 3D printer which melts desert sand into glass, and then moulds it into shape.
<http://vimeo.com/25401444>
- Human resistance to **wearable technology** could well be eroded by **Eyez** eyeglasses. They look exactly like ordinary sunglasses, but record the wearer’s view in HD, streaming video live to online social networks.
<http://kck.st/ITacGw>

2025: HyperInnovation, In Detail

Many 2025 citizens see themselves as fortunate to live in a golden age of technology and freedom – a kind of global Silicon Valley.

It's an individualistic, consumerist and fast-moving world powered by an economy that's been revolutionised by high-tech, low-carbon innovation.

Smart business solutions are helping to fulfill the consumption, wealth and life expectancy demands of many of the world's eight billion people.

Incentivisation of pro-environmental behaviour has made it easier, cheaper and more pleasant to 'do the right thing'. Clever marketing has made energy/water/resource efficiency cool and aspirational. Behavioural changes are also moulded by tailored feedback mechanisms that instantly show the eco-impact of a purchase in whatever way will most appeal to an individual consumer, whether it's on a cost, peer-approval or some other basis.

In general, however, consumers expect most of the eco-work to have been done for them long before they purchase a product or service. The system is working: greenhouse gas emissions are down, levels of economic growth sustainably high. Companies like Desertec's work from the early 2010s has born fruit: solar power is booming. North Africa is using it to desalinate vast amounts of water, exporting its excess energy to Europe.

Growth in the global South has been particularly marked, but overall levels of growth mask a growing divide between rich and poor. Rises in both population and living standards have seemingly taken the world to the brink of overheating, only for novel and ever more sophisticated efficiencies to come to the rescue at just the right moment – albeit with a ramping-up of systemic complexity.

The general population has faith in the ability of businesses to deliver a solution to every challenge – and big rewards await innovators who are first to market. New software and new ways of accessing or curating content are especially hot. It's tougher to make your fortune in hardware, which is rapidly commoditised and therefore less able to generate high profits for individual producers. But there are still more than enough early adopters and market fragments to spur on technology designers.

In this open and fertile environment, micro-factory businesses can hit the motherlode. Business owners task fast-reacting resource algorithms with precise parameters so that they always source commodities at the best prices, but the law of diminishing returns kicks in when the resources dry up – an increasingly frequent occurrence.

Global disruptions such as sudden food shortages are usually accompanied by campaigns from pressure groups for a global slowdown to improve quality of life and environmental impact. But usually the uncertainty about an over-reliance on constant innovation is overcome by the timely arrival of unexpected new solutions. Unfortunately, not every problem can be easily solved by technology. Carbon emissions have declined year on year, although at a slower rate than that recommended by the majority of climate scientists, but there are some disturbing ecosystem scares.

Not every resource has an acceptable substitute, either – and not everyone is connected. If you're not part of the system, you're almost invisible. There's a worrying gap between those who use technology and those who simply absorb the side effects. For many in the latter group, the feeling of being left behind is exacting a high toll on mental health, one that can only be moderated by blockbuster drugs. This world can be a highly volatile place in which wild market fluctuations combine with extreme weather and flashes of civil unrest to create an underlying sense of disquiet.

Business has no time to dwell on such matters. Its only option is to maintain the pace by keeping products simple, keeping them individual, and adding some element of emotion to quell the sense of social disconnection in an 'always on' society. Product personalisation is seen as both an emotional top-up device and a massive market opportunity, but with everyone pursuing the same three-point plan, establishing and communicating points of difference is difficult. So is managing an acceptable work-life balance.

Competition in business is fierce, and constant innovation is required to stay ahead of the curve. New products must not only help to retard society's emotional fracturing but also dodge the trap of digital fatigue.

The thirst for gadgets and online experiences is fuelling the pace of change, creating digital fatigue, a treadmill mentality and (ironically) mechanisms to cope with these problems, including the biggest threat to the stability of society – inequality. Flash riots are common in urban areas. It's an uneasy world of 'innovate now, worry later'.

A 2025 life: Barbara

For 42 year-old Barbara, 2025 is a good year. She lives alone in a new-build two-storey city house which, like most, is connected to the local smart grid. The growth of virtual shopping has replaced most of the old local shops with new live/work properties like hers.

Barbara is the founder of a bio-couture fashion range which uses nanotech, biotech and distributed manufacturing to create actively healthy clothes. Her bestselling 'you are what you eat' range links real-time bio-monitoring to diet. Resource prices fluctuate on a daily basis, so Barbara gets her designs made up by small teams working in a global network of micro-factories. A bespoke algorithm identifies the optimum manufacturing hotspot for each order.

Barbara: *'I'd like to grow my business and move into a house with space for a larger office, but I'm worried that my personal life will take another hit. It's a choice between the fire or the frying pan. If I don't grow at the same rate as my competitors, they'll reduce their resource costs and kill me by delivering the same product, but cheaper.'*

For Barbara, biohacking is a big problem. She has constant worries about bio-security and the potential for contamination – or even sabotage – by unscrupulous competitors. And there's a wider problem.

Barbara: *'I've had to upgrade the security features in all my lines after my security team caught a group of teenagers skimming bio details from some of my clients' clothes. I'm pretty concerned about my own data too, but I've got a virtual security agent to help me deal with that.'*

Barbara's energy-efficient home has long since freed her from the time-wasting tedium of cooking or cleaning. Slow cookers respond to her text messages to produce delicious, healthy meals. Recipes are fine-tuned by mood data collected from her clothing during the day.

Barbara: *'I don't worry too much about sustainability nowadays. I realised years ago that I'd automatically get a green lifestyle as long as I invested in the right gadgets. Following that lifestyle isn't cheap, but I'll take anything that makes my life easier.'*

Though a permanent cure for ageing is yet to be found, rejuvenation clinics offer a proven age-defying solution based on cocktails of micronutrients and vitamins.

Barbara: *'I work most weekends, so my boyfriend Paul and I do have to plan our time together. He came along to my monthly rejuvenate appointment today, then we had lunch, which was lovely – although I did have to keep an eye on one production line feed. I think Paul was a bit annoyed by that...'*

Barbara's boyfriend, Paul: *'I must admit I was a bit peeved not having her attention over lunch. She called me a hypocrite because last weekend she caught me joining in on a VR goal celebration while we were watching a West End play on home-theatre!'*

Some of the energy Barbara saves on household chores is spent on an exercise bike, powering the online immersion that occupies much of her time. Her physical connections to others are poor, but she has thousands of online contacts and friends, or 'virtuals'.

Barbara's mum, Ellen: *'We've not seen each other properly for over a year. I don't count virtual meetings. I was horrified when Barbara chose a virtual mock-up of home when she was a child for our last meeting. It wrecked a perfectly good memory.'*

'Barbara's relationship with Paul is lovely, but they don't seem that committed to each other. I'm sure she hopes for a deep relationship at some point. Barbara's therapist and I have both told her that she needs more in her life than just work. And that doesn't mean working when she's on holiday!'

Barbara: *'A family would be wonderful at some point, but I'm far too busy at the moment.'*

Technology

Technology needs in 2025

- Extreme individualism demands extreme personalisation
- Fast pace of life demands simplicity and ease of use
- Wherever possible, life's drudgeries should be handled by automation and semi-autonomous software
- Technology must be optimised for reduced energy use and maximum resource efficiency
- Entertainment and connection are key, but as human interaction becomes increasingly virtual and isolated there is an additional requirement for technology to deliver emotional engagement and a sense of purpose

Technology solutions in 2025

- **Virtual concierges** using smart control systems to optimise domestic energy use. Turn on the entertainment system and your concierge will compensate by dimming the lights for a while.
- **Virtual curators/PAs** to help people keep up with the latest developments in virtual networks.
- **Algorithm generators** designed to help your house or business meet parameters you set for specified tasks. All the processing is done remotely.
- **Ambient energy harvesting** (such as kinetic energy from walking) to charge devices and hybrid power solutions with multiple charging methods (solar/kinetic/main).
- **Virtual environments and augmented reality** to upgrade your surroundings, enhance urban environments and cut out visual pollution (earning the 'see no evil' nickname for augmented-reality glasses).
- **Data security & management** to cope with the average citizen's massive digital footprint. Simple and instantaneous analysis of data and automation of digital wills.
- **Nuclear generation technology** as a more widely-accepted route to low carbon energy, following up on the 2011 promise of nuclear fusion.

2025 and beyond: how might technology progress?

- Business-friendly consumer attitudes
- Early-adopter culture
- First-to-market rewards
- Energy efficiency, storage and use
- Software
- Content access
- Content curation
- Personalisation/customisation

2. SHARED OWNERSHIP

AN OVERVIEW

In this world, global governments have foreseen climate instability and instigated a strict programme of carbon limitation measures to defuse its consequences. The results are high carbon costs – and an entirely new perception of ownership.

There is both a personal and a business innovation aspect to this future. Creative development of new business and service models is vital and governments have encouraged this by setting a carbon floor price – but this is not a planned economy.

2011: Indicators of Change

‘Weak signals’ which could trail tomorrow’s Shared Ownership scenario.

- Car sharing clubs have been around for a while, but peer-to-peer car sharing is a more recent development. Through online match-up sites like Whipcar, private vehicle owners can share their cars with private renters on a daily, weekly or longer basis. Owners make money on vehicles that would otherwise sit unused, while renters avoid car ownership/ maintenance costs and high carshare club membership fees.
<http://www.whipcar.com>
- Design/material open-sourcing is popularising the ‘personal factory’ movement. Companies like Ponoko create a space for designers to upload their blueprints which customers can license and turn into products – typically furniture, jewellery, or electronically-based, but increasingly embracing other fields such as biotechnology. Localised ‘manufacturing on demand’ replaces wasteful goods transportation with efficient digital shipping.
<http://www.ponoko.com/>
- Open marketplaces like Gumtree, eBay and Etsy are familiar peer-to-peer selling environments, but new social currency sites such as Favabank allow neighbours to share goods and skills through a bartering system. Users create a profile and exchange ‘favas’ with other users for goods and services.
<http://www.favabank.co.uk>
- Virtual supermarkets allow customers to ‘shop’ while waiting for their train by using their mobiles to scan QR codes alongside images of items. Once the order is placed, the food is delivered shortly after they return home. Tesco already has a virtual supermarket running in Korea.
<http://www.geek.com/articles/mobile/koreas-tesco-reinvents-grocery-shopping-with-qr-code-stores-20110628/>
- Augmented reality is here in Aurasma 3D-I, a platform using device cameras to recognise over 500,000 real-world objects or images. Aurasma visually augments the physical world by inserting 3D objects into everyday settings and allowing natural interactions with them, overlaying video and animations – all without barcodes, QR codes or tags.
<http://bit.ly/of9hGk>
- The concept of energy as a service is currently being explored by Bosch in the UK. Backing their claim to produce the most energy-efficient devices on the market, they’re offering to pay your energy costs for three years if you buy one of their appliances. That could mean up to £100 back.
www.yfrog.com/nwjvwxhj

2025: Shared Ownership, In Detail

This is a new type of consumerism, one in which ownership is perceived as cumbersome and ‘sharing with your neighbour’ has graduated from a lifestyle recommendation into a life ethos.

Individual responsibility for full-lifecycle costs and maintenance has been spurned in favour of renting or leasing whatever you want – from bikes and electronics to clothes – whenever you want it.

A new leasing model has emerged for most goods: seasonal wardrobes, handheld mobile devices, and new interactive TVs. Most big-ticket items are either leased and shared between many families, or have been replaced by community services. Manufacturers generate a big chunk of revenue from the provision of backup services and software.

It's a paradigm shift driven by carbon, which has become one of the world's most important and expensive commodities. Lifestyles are dictated by the price of carbon credits, with experience achieving a sub-currency status.

Europe was the first to go down this new path with its Energy Independence Initiative, inspired initially by concerns over energy security. Brazil, India and China signed up once they realised their booming populations were becoming unsupportable. Relatively clean cities are the 2025 legacy of quick decisions on city planning and the environment, but the rising demands of a growing population are a constant challenge.

Mass migration to energy-efficient cities in the 2010s kept pace with continuing tough economic times and helped to spur the ‘shared service’ model that works well when a critical mass of users is reached.

The super-rich can live outside the box, either visibly or through the black market, but for most of the populace sustainability is the only economic option. International travel is prohibitively expensive, leading to a booming market in virtual holiday and leisure worlds. The time of cheap flights and mini breaks is over. People plan to fly every other year and use overland travel where possible.

Urban travel is relatively easy, but longer journeys are too expensive for the average consumer, and cars no longer dominate the cities. Fuel poverty isn't the only problem for many countries. Mass water shortages have made some areas uninhabitable, and water-dependent services like laundry have been made subject to large-scale neighbourhood sharing directives. Other services are being centralised too, stoking the growth of energy- and water-efficient mega-cities – but even they are only just managing to cope.

For the vast majority of the population, reusability and adaptability aren't just buzzwords: they're the DNA of society. It's in manufacturers' interests to work closely with consumers so that they can provide a product which doesn't just meet their immediate needs, but which also brings added functionality – and the potential for repurposing once its primary function has been exhausted.

In order to survive in this production-unfriendly scenario, companies have switched to a more service-based approach. The products they do still make, especially those in electronics, are more durable. Streamlined recycling chains are bringing cradle-to-cradle lifecycles closer to reality while defusing landfill and pollution issues.

Technology has taken a big leap forward. Augmented reality is fully accepted, along with cloud-access devices freed from the constraints of physical information storage. Wireless service is all-pervasive and as natural a part of life as landline telephones were at the turn of the 21st century.

A 2025 life: Rajesh

Bangalore has certainly changed since Rajesh's father moved there as a data analyst at the end of the 20th century. Last month, there was a big celebration when the population topped the 50 million mark, officially qualifying Bangalore as the world's tenth megacity.

32 year-old Rajesh, his wife and two small children are four of the 50 million. They live in a high-rise flat in New Bangalore, about 30 miles outside the CBZ (Central Business Zone). Their community has a garden, a park, and lots of green space between buildings – a positive result of the big decrease in car use over the last few years.

Like most NBers, Rajesh accepts the challenges of a low-carbon lifestyle. Only the small minority who can afford it or who use the black market to procure high carbon items can live outside the carbon economy. For the rest, including Rajesh, sustainable living is the only lifestyle choice.

Rajesh: *'It's fine, really. Most things are designed for a longer life these days anyway. We use and reuse stuff, and after that we'll try to find another use for it. Chucking stuff away is a last resort.'*

Power cuts are a lot less frequent now they've installed the local smart grid. We've got the latest storage gadgets in the high-rise too, and in the flat, so there's usually enough battery power to keep most of our equipment running when we do have outages.'

As a salesman for Healthyme, a personalised health system provider supplying bespoke medical advice to people all over the world, Rajesh does most of his work from home as an avatar. Occasionally, though, he'll go into Healthyme's office in the CBZ.

Rajesh: *'Healthyme suits me pretty well. I'm good at my job, and the hours I work give me plenty of time to spend with my family. The office is nothing special but when we fire up the AR (augmented reality) it looks fantastic.'*

Even when work finishes for the day, connection doesn't.

Rajesh: *'I'm always connected to some sort of social network. Most of my friendships are online, which sounds a bit sad, but it works for me – though I must admit I do miss those friends that are too far away to visit for a kick-around. Whenever life gets dull – which it can sometimes – virtual reality will take us on mini-vacations that I'd never be able to afford in the real world. Couldn't do without the VR really.'*

On Saturday, Rajesh and his wife used the local reputation network to find a babysitter so they could have a night on the town with their childless friends in Virtual Ibiza. Their friends are very experience-oriented, and spent the evening telling Rajesh about the best new virtual worlds and AR games.

One day, Rajesh hopes to see for himself whether the Austrian Alps are as spectacular in reality as they are in ClimbWorld, one of his favourite VR sites. In the meantime, he's happy to save up for a high-speed rail trip to Himalayan hill stations.

Rajesh is comfortable with NB's service-based economy. Rather than buying or renting his own car, he'll pick one up from the local peer car pool.

Rajesh: *'I've got no problem with that, in fact I like it because you're not stuck with the same car all the time. If we need something different, for a long journey or to help with a removal, we can generally get just what we need.'*

On Sunday, while his wife chose and rented her new season's wardrobe, Rajesh took the kids to the park on the electrically-assisted family bike he's leasing.

Life is good. Rajesh's only real worry is being blacklisted by his favourite sharing hubs, but that's only happened once when he returned a neighbour's car with a dent in the front bumper.

Technology

Technology needs in 2025

To meet a step change in how we monitor and use energy, technology products should deliver 'cradle to cradle' –

- Multifunctionalism and versatility when new
- Adaptability and reusability in use to extend a product's lifespan
- Optimised power usage for a mass of handheld devices delivering 24/7 connection
- Access to cloud-based services, information and programming
- Realistic telepresence or virtual experiences to replace real high-carbon travel
- Connectivity and inter-communication (for example, between domestic energy monitoring and management devices)
- Service elements to enable businesses to increase their revenue

Technology solutions in 2025

- Mainstream acceptance of **augmented reality and virtual reality** allowing widespread adoption of online personae for work and socialising.
- AR **fashion** creating facial enhancements and fabulous effect-dresses.
- High-quality **hardware** providing access to new cloud-based software/platforms.
- **Multi-use devices** leased to customers and generating revenue through service, maintenance, support and software upgrades.
- New ways of **generating, sharing, and transmitting power**, for example through renewable sources such as solar cells on mobile devices, to circumvent high carbon-credit expenditure and feed excess power back to the (wireless) 'grid'.

2025 and beyond: how might technology progress?

- Customisation
- Product development through leasing, not selling
- Better profiling = better product/service tailoring
- Intellectual property
- User-friendly infrastructures for accessible low-carbon lifestyles
- Personal services

3. CENTRALISED SURVIVAL

AN OVERVIEW

Stunned into a belated response by a series of severe climate shocks, governments have taken tough measures to combat climate change, pushing technology to its limits to impose sustainability on the population and provide some relief from restrictions on personal freedom.

2011: Indicators of Change

'Weak signals' which could trail tomorrow's Centralised Survival scenario.

- Europe's record **heatwave and drought** of 2003 caused over 30,000 deaths, hit crop harvests hard and sparked enormous forest fires. Studies indicate that we can expect more of these extreme events if climate change bites harder. Texas is currently experiencing its worst one-year drought on record and the hottest and the driest summer on record.

France: http://www.grid.unep.ch/product/publication/download/ew_heat_wave.en.pdf
Texas: <http://www.onearth.org/blog/texas-global-warming-drought-wildfires>
- A new study **linking food prices with unrest** suggests the existence of a 'flashpoint' food price above which civic turmoil becomes far more likely. While the Arab Spring was politically motivated, its timing did coincide with high food prices. The study's authors expect global food prices to be more or less permanently over the flashpoint figure by 2012-2013 unless rapid action is taken.

<http://www.guardian.co.uk/environment/damian-carrington-blog/2011/aug/25/food-price-arab-middle-east-protests>
- The UK All Party Parliamentary Group on Peak Oil released a report in 2011 that recommended Tradeable Energy Quotas. "This electronic system would ensure fair access to energy for all, guarantee that we meet our national emissions reductions targets, and support the active participation and cooperation of citizens and all energy users in rapidly reducing our reliance on fossil fuels."

<http://www.teqs.net/>
- By harnessing the **kinetic energy** generated by rocking, the Empower Rocking Chair charges electrical devices like mobile phones and MP3 players. Its simple USB tech could be added to bus and tube stops, train stations and airports.

<http://www.ecofriend.com/entry/empower-rocking-chair-concept-generates-renewable-energy/>
- The Eco-factor **proactive home energy management** system combines a smart thermostat with online software to find the most efficient way to heat (or cool) your house. Pilot projects using weather forecast and local energy pricing data to tweak thermostat settings and make other energy-saving changes have shown an average 17% drop in energy bills, with no loss in comfort.

http://www.lightreading.com/document.asp?doc_id=211214
- The Piezing is an **energy-generating** designer dress using piezo-electric discs to harvest energy from the wearer's movements. Generated electricity is stored in a tiny battery which can then charge personal gadgets.

<http://www.theatlantic.com/magazine/archive/2010/06/the-little-black-piezoelectric-dress/8107/>

2025: Centralised Survival, In Detail

This is a world that has woken up late to climate change. Attempts to secure a global agreement on climate failed to extend much beyond national borders, until the effects of climate change started to seriously impact on North America and Europe.

2018's catastrophic Atlantic hurricane season was followed one year later by a Europe-wide drought and heatwave that brought extreme water shortages, massive crop failures, and thousands of deaths.

Dwindling reserves drove food prices up to stratospheric heights and provoked global unrest. Only then was the planet galvanised into concerted action, but the 2019 Pact came too late to head off draconian government edicts which fundamentally reshaped how businesses were to operate – and how people would live their lives.

Almost overnight, energy-guzzling vehicles and technologies were phased out and energy efficiency standards hiked. As the effects of climate change continued to bite, many states tightened the screws still further, slashing speed limits, installing energy monitors in homes and cars and forcing whole industry sectors onto strict carbon diets.

The near-universal wish for decisive action, allied to a resigned acceptance of the need for strong medicine, reduced public resistance to these life intrusions and (in Britain at least) saw the welcome polishing-up of some slightly rusty national traits. Political parties and the media formed an unlikely alliance in calling for solidarity, a call that was answered as it had been in times of war.

The process of acceptance went less smoothly in North America until a carbon quota market was introduced, giving individuals some freedom but also causing concerns about double-counting, corruption and the rise of 'carbon tycoons'. Emerging nations were given less onerous targets, and have yet to run into opposition, but in the West energy monitoring has become extremely important to everyone, from the corridors of power right down to street level.

Energy use conditions every thought. Pressure groups campaigning for fairness and transparency still battle over appropriate carbon quotas for rich and poor, old and young. Even having children is so carbon-intensive that some countries run state lotteries of 'free second child' carbon allowances to try to limit a growing black market.

Continuous 'carbon watch' is the norm, and not just on a personal level. A new global organisation, the World Energy Monitoring Corporation (WEM), keeps the planet on a safe carbon track by managing vast data flows.

Public worries about a world without WEM outweigh openly-voiced misgivings about its all-seeing eye. There is a growing digi-punk movement which believes that more 'human' hands-on control is desirable, not only for the long-term safety of mankind but also because it offers better opportunities for life/carbon management.

Generally, though, the public accepts WEM's control. Nations, corporations and individuals left to their own devices are seen as unlikely to pursue the strategies needed for the welfare of the world. This healthy cynicism comes to a natural conclusion that, without collective action, individual quality of life would nosedive.

Technology is the crucial link between happiness and mere survival. Besides instantly awarding discounts or credits to households which make it into the top 10% for efficiency, and creating failsafes to prevent seasonal overselling of individual quotas, it also fulfils an escapist role. Creative spikes in the virtual worlds of art, music and writing have helped to create a sense of liberation from the constraints of the real world.

There's also a growing trend for self-reliance as people try to cut living expenses in a sluggish economy by growing their own produce or generating their own energy. In many countries, companies that help people save energy and carbon are rewarded.

Strong common purpose keeps mainstream public opinion behind the global agreement. The 2024 announcement of the first global decline in carbon emissions was widely celebrated. Anything that positively chimes with collective effort – community, localism, patriotism, fairness – works well. As scientists discover how close the world came to triggering runaway climate change, there's a sense of having collectively dodged a bullet.

This world of 'unity in adversity' works, because most have seen the need for it.

A 2025 life: David

David (27) lives in a 2-bedroom urban maisonette with his partner Juma. The flat has high levels of insulation and a highly-prized south-facing roof with a few solar panels (shared with upstairs).

Their small garden has made David and Juma the heroes of the neighbourhood food group. Despite its tiny size, it always seems to produce a bumper harvest of fruit and veg.

David: *'Ah yes, it's all skill you know. Or chemical fertilisers. They're like gold dust these days, unless you're a state-registered farmer, but Juma seems to be able to get hold of the odd sack. I don't ask too many questions!'*

A self-employed consultant for Theos home energy optimisation services, David boosts his income by swapping goods and services with his friends and contacts. Last week he traded a spare virtual Glastonbury ticket that he managed to wangle at work for an amazing aeroponic* system for growing tomatoes. Inside the flat, David's pride and joy is his new WEMatic 700c.

David: *'It's the latest thing in energy-imaging technology. It lets you see energy consumption in real time. It's on a live link to WEM, too, so I get extra energy credits for using it, especially when I go to places with ropey WEM data feeds. A lot of the flats in the estates round here seem to have had their master monitors hacked to churn out some dodgy extra credits.'*

For David, sustainability basically means low-carbon energy, though he is starting to think a bit about water too. He thinks that WEM does a pretty decent job of keeping nations honest through the independent measuring and monitoring of carbon emissions, though he thinks they should be much stricter on the high-birthrate countries.

He's intrigued and slightly worried by the upsurge in 'pro-people' parties in some states, and their calls to cut people free from what they see as the tyranny of WEM. He can't really imagine a workable alternative.

Juma: *'Our solar panels are an absolute godsend. We've been able to save and trade quite a bit of energy. David's trying to save some carbon to fly out to see his sister and her newborn baby. He's putting in extra hours on his rowing machine – our neighbour Trevor has hacked the machine so that it feeds straight into the household system.'*

Last weekend was Juma's birthday, so they threw a virtual Pacha club night. It used up a major chunk of their carbon savings, even with the bring-a-carb donations from their friends' quotas, but it was worth it just to get back to the hedonistic heyday of the '90s.

Juma: *'We hired state of the art projectors to boost the home system. It really did feel like we were there.'*

David tries to be optimistic about the future, but he's got a sneaking suspicion that this energy and carbon crisis could last for decades. He admits he'd be lost without his personal monitor.

David: *'It's a love-hate thing. I'd prefer not to have to share quite so much of my life with WEM – where I go, how I get there, what I buy, my heat and light profile – but the benefits in discounts, credits and free entertainments are just too tempting. All my friends feel the same. The monitor is what connects us all up. It's my library, my memories, my music, and everything else that brightens my day. Wouldn't fancy life much without it.'*

David hopes that he and Juma will eventually become energy-independent. If they can score some more solar panels, he might even be able to make enough money trading spare carbon on the markets to give up his day job and concentrate on his passion – music.

David: *'There's a bit of a boom in old-style acoustic music at the moment. Juma used to laugh at me practising on my old six-string but now I can use it to earn a few credits gigging at the beerplatz.'*

Technology

Technology needs in 2025

Overarching requirements from technology are that it should

- Reinforce human interaction and community spirit, by connecting people
- Reassure people that their actions are having an impact on the global problem
- Be perfectly pitched to meet a need (hardware is expensive and new product launches rare)
- Achieve the right balance between self-determined, 'automatic' operation and manual operability
- Achieve the right balance between monitoring and prying

Specific technology needs to provide:

- Simple interfaces, seamless integration, utilitarian, 'no-frills' design
- Escapist, high quality immersive entertainment, centralised to maximise energy efficiency and to avert the need for personal ownership of expensive, power-hungry hardware
- Long-lasting hardware that minimises expensive development and distribution
- Devices that provide some 'time off' for the owner by (efficiently) taking care of energy optimisation
- Devices that can capture, store or sell on energy
- Greater functionality through software upgrades
- **Extreme energy efficiency** banishing superfluous lights, power-hungry screens or mechanical hard drives.
- **Solidity, reliability and functionality** are must-haves.
- **Energy-saving and storage solutions** that replace more energy-hungry activities (like travel) or actively harvest 'free energy' (for example, solar panels or pads that absorb energy from movement or sound to reduce consumption).
- **Escapist virtual worlds** that run from centralised, ultra-efficient servers in cafes with special booths, or are occasionally hired in for a party. Often government-subsidised to keep young people occupied.
- **Convergence** – a home hub managing all domestic technical needs and entertainment, complemented by 'on the go' small portable devices.
- **Energy monitoring and management** technology to track carbon quotas and share collective reduction targets. WEM uses sophisticated facial/gait recognition technology to track individuals' actions.
- **Energy data collection** built into all consumer electronics, with interfaces in home hubs and personal monitors to manage and forecast a consumer's use, and software to help ration management.

Technology solutions in 2025

2025 and beyond: how might technology progress?

- Energy micro-harvesting
- Ultra-efficient batteries
- Piezo-electrics* in clothing, floors
- Solar paint
- Advanced energy storage
- Advanced smart metering
- Energy optimisation
- Low power draw
- Ambient light-collecting displays
- No-refresh e-paper displays
- Individual carbon trading
- Trading algorithms
- Personal trading assistants

Glossary

Aeroponic – a system for growing plants without soil, using exact doses of nutrients delivered by water mist. The plant roots are literally in the air.

Piezoelectricity – electricity generated when pressure is applied to certain solid materials.

4. PROSPERITY REDEFINED

AN OVERVIEW

After an extended recession, new priorities of 'wellbeing' and 'quality of life' are bubbling up across the world as more sustainable forms of living become established. Society's new values are built on this sustainability, and on stronger community ties. Technology facilitates collaboration at both local and global levels.

2011: Indicators of Change

'Weak signals' which could trail tomorrow's Prosperity Redefined scenario.

- A growing interest in **doing good** is being facilitated via mobile. An Orange app signposts bite sized mobile volunteering opportunities whilst Vodafone's JustTextGiving app enables free text donations to UK charities.
www.mobilevolunteering.co.uk
- A **quality of life shift** has been identified in post-earthquake Japan, with increased value placed on personal relationships and the good of society, and less value attached to material goods ownership. Sharing models are viewed more favourably, and there's much more emphasis on energy conservation and optimisation. Simple, durable material goods are favoured.
<http://bit.ly/n5kOfb>
- Denmark often tops the **quality of life** lists. Taxes are very high, but in exchange the government covers all health care and education, prioritises equality and administers the world's highest per capita spend on children and the elderly. The result is a happy population.
<http://abcn.ws/plfDXB>
- California-based adventure equipment company Patagonia is asking its customers to **buy less** of its products. They have teamed up with eBay in the Common Threads Initiative which aims to supplant new-product purchasing with participation in a dedicated used-clothing marketplace for Patagonia gear.
<http://bit.ly/oDsP5j>
- Greeks are responding to hard times by using **local trading systems** in lieu of structured currency. The Volos network has grown by 800% in the past year, with users expressing a sense of freedom when using the new 'part alternative currency, part barter, part open-air market' system.
<http://nyti.ms/pAqi6v>
- The geographically-limited Vibe **local social network** is designed to allow students at colleges or people at outdoor events to post the kind of things they wouldn't post on Twitter, because it wouldn't make sense to wider follower groups – it's very local.
<http://bit.ly/nXBPDq>
- According to the latest US Census, **communal living** is on the increase, with the number of 25-34yr-olds living with parents up by 25.5% from 2007 to spring 2011.
<http://bit.ly/pEm2iB>
- Jawbone has released a **health-monitoring** wristband which allows you to transmit eating, sleeping and general activity data back to your smartphone. Combined with manually-entered data on meals, it gives you nutritional information and suggests healthy activities.
<http://bit.ly/o8w8ez>

2025: Prosperity Redefined, In Detail

In this value-shifted world, people care much more about well-being and quality of life than they do about conspicuous consumption.

It's the fallout from the lost decade of 2009-2019, when financial crisis and austerity forced many countries to trial new economic models. As economies flat-lined, key resources like oil declined, and China continued to rise, more and more Western people shifted into part-time working patterns in a bid to keep their jobs.

By 2020, the concept of unthinking consumption had been consigned to history's dustbin. Times were hard, but the surprise silver lining was a gradual reconnection with neighbours, and the rediscovery of richer relationships. Community networks and co-operatives came into their own as people across the developed world sought better value goods and services and scaled down consumption.

Young people pioneered and popularised exchange networks for time, skills, goods and services, taking money out of the equation and creating more time for families, volunteering and outside interests. The expense of international flights helped to strengthen local community ties. The world was still vibrant and connected, and adventure-seekers still travelled long distances – but mainly by train and ship.

Research suggested that most were happy to leave the old ways behind in favour of well-being, quality of life, and community vitality. A continuing emphasis on cross-cultural learning, international collaboration in research and development, and a world culture of music, games and film (increasingly influenced by Chinese tastes) didn't brake a parallel resurgence in regional cultural expression.

Now, in 2025, there's a much greater interest in contributing to society than there is in taking from it. The old focus on GDP and the growth treadmill has been replaced by an interest in the idea of 'prosperity without growth'. These days, countries compete for bragging rights to the highest quality of life, cleanest air, and most creative populace.

Technology is often used to make the invisible visible, and to help people make better decisions. Poor usage patterns of energy and water at both household and neighbourhood levels can be identified, prioritised and remedied. Admittedly, the pace of technology development has been slowed by higher durability expectations for hardware, but that's often shared anyway to save money.

Traditional interest in goods ownership is inexorably being replaced by a new and greater interest in goods access as most people can't afford to keep buying hardware. Gadgets take second place to beneficial software, apps and services. Traditional jobs are no longer the central focus of daily life. Most people prefer to spend more time on personal development, learning, creativity, and reconnection to the community.

But not everyone buys into the new measures of personal and national success. Some countries are trying to lure businesses by advertising themselves as proponents of old-style growth and an alternative to the 'stagnating economies'.

A 2025 life: Ulrike

50 year-old Ulrike lives in a four-bedroom house with her son Stefan (17), her father Niklas (78) and her grandmother Lena (99).

She remembers only too well the economic instability of the 2010s. Now she strongly believes that mutual support is a pre-requisite for social cohesion.

Ulrike: *'My first priority is definitely my family, and then the local community.'*

She relies heavily on a Virtual Window* bought three years ago with a low-interest loan from the regional bank. By allowing her to chair online meetings and present detailed designs without having to travel, the Window has paid for itself many times over.

The terms of the loan stipulate that it should be made available for wider community use for 3 hours a week. She's happy to fulfil that condition, often to the benefit of the local community design group which she leads.

Ulrike: *'We're planning to build another makerspace with some other groups in the area, so we used a simulation on the Window to check out the best sites for water, energy and travel.'*

Ulrike's frontline occupation is design for health and well-being. Working freelance from home, she assembles teams on an ad-hoc basis from a massive worldwide network of contacts.

Ulrike: *'I can't imagine life without the Window, to be honest – it keeps me connected and lets me make sense of my hectic life!'*

Ulrike is the hub of the family in more ways than one. Both Niklas and Lena are monitored 24/7 by basic biosensors supplied by the local doctor. Ulrike tracks the data to make sure that any meds they're taking are working correctly.

Niklas keeps pretty fit. He has a small workshop at the back of the house where he keeps his pride and joy, a 3D printer that he built himself from an open-source design. His cottage industry produces spare parts for the neighbours and the local repair shop, and trades designs with other 3D printing enthusiasts. Niklas remembers the 2017 pension crisis. He feels that he still has something to contribute and loves being part of the open-source community.

Stefan is the household's most avid technology user. He loves virtual games and virtual travel, though he still spends most of his time in the real world because he can only use the Virtual Window when Ulrike has finished with it.

Stefan: *'I'm just back from a school climbing and camping trip. Tonight I'm hoping to grab half an hour in the virtual Amazon with my mate, learning how to be a tracker.'*

Stefan earns timebank credits by helping out at a community centre once a week, and has weekend access to a shared electric driverless car in exchange for doing chores like picking up Lena and Niklas' favourite ale from the neighbourhood microbrewery.

Stefan: *'I'm happy to do stuff for Granddad and Grandma. I know they'd do it for me.'*

Yesterday, after an eye check via the Virtual Window, Lena picked out some old photos for Stefan to take into school. Ulrike laughed at shots of a fondly-remembered exotic holiday, and then felt a momentary pang when she realised that what had been an everyday experience for her will be a once-in-a-lifetime experience for Stefan.

Ulrike thinks deeply about sustainability at both the household and community level. The family belongs to several sharing networks, and her well-insulated house has a rainwater tank for flushing the toilets and watering the vegetable garden, and solar panels bought through a mass community-purchase scheme.

Ulrike: *'I'm so thankful for the solar panels – we'd have to get by on half the amount of energy if we didn't have them. Energy is so expensive now.'*

Technology

Technology needs in 2025

Overarching requirements from technology are that it should

- Help people live healthy lives
- Help people stay connected to friends and family
- Facilitate active, involved and useful community roles for older people
- Be easy to upgrade, durable, repairable, recyclable and efficient
- Connect and enhance human potential, without being overpowering

Specific technology needs:

- Biofeedback* measures to hold off ageing and disease: brain-training games, tailored diets and exercises to match biosensor information
- Plan visualisation and cause-and-effect diagnosis technologies to help large groups of people make long-term decisions
- Time-effective creativity enhancers
- Channels for learning from, and contributing to, other cultures
- Channels for open-sourcing
- Early-warning systems for extreme climatic phenomena
- Easy accessibility to suit sharing across a wide range of people and age groups
- Long-term affordability through durability

Technology solutions in 2025

- The **cloud** reduces dependence on unattainable hardware upgrades and allows the use of simple, durable devices.
- **Algorithms** and **simulators** help communities visualise and collectively resolve problems about building houses, local energy generation etc.
- Energy, resource and water **optimisers** at the community level, eg. local smart-grids and dual-use technologies.
- Low cost, energy-efficient **health monitoring devices** and **preventative medicines** for ageing populations.
- **Location-based social networks** for communication, skills exchange, sharing and renting.

2025 and beyond: how might technology progress?

- Healthcare, preventative medicine, telemedicine
- Understanding and improving psychological and emotional well-being
- Promoting interpersonal understanding and communication
- Community resource sharing
- Community collective decision-making
- Meeting energy storage/management needs

Glossary

Virtual Window: a combination of TV, computer and telepresence device.

Makerspace: a community space with 3D printers, laser cutters, advanced design software and other technology needed to make complex items.

Biofeedback: technology that reads signals from the brain and (through a headset) allows you real-time control over devices and focus-boosting brain activity games.

GET INVOLVED

Join the FutureScapes collaboration

Now that you've read the scenarios, we'd really like to hear your response.

How did they make you feel about the critical challenges ahead? Do you have your own examples of weak signals that trail the scenarios today? Which areas of potential future technology did you find most interesting and exciting?

If you do join the FutureScapes collaboration, you'll be in the company of a growing and eclectic mix of thinkers, forecasters, policy makers, artists, designers, technologists and environmentalists from across Europe.

Forum for the Future and Sony would like to thank everyone who has been involved in the FutureScapes project so far. And we're only at the beginning of our exploration. We look forward to the next stage when we'll work openly to crowd source ideas for new technology areas that might help people enjoy better, more sustainable lives in 2025.

Share your thoughts and follow the journey at:

www.sony.co.uk/futurescapes

About Sony

Sony is a leading global innovator of audio, video, communications and information technology products for both the consumer and professional markets. Offering a complete end-to-end HD value chain and with its electronics, music, pictures, game and online businesses, Sony is one of the world's leading digital entertainment brands, employing approximately 170,000 people worldwide.

Sony recognise that our businesses have a direct and indirect impact on the societies in which we operate and we see sustainability as a critical part of our company ethos and activities. Our

partnerships with NGOs such as WWF, UNICEF and Save the Children ensure we play our part as a responsible global company. Our "Road to Zero" global environmental plan sets out a long-term goal of achieving a zero environmental footprint (through curbing climate change, resource conservation, control of chemical substances and biodiversity) throughout the life cycle of our products and business activities by 2050, as well as specific mid-term targets in line with that goal.

Sony believe that technology can make a positive contribution to tackling social and environmental issues, both

today and in 2025. We have a strong track record in open innovation for sustainability with our Forest Guard and Open Planet Ideas initiatives.

Sony's role in FutureScapes is to use our brand's reach and our expertise in technology, imagination and innovation to engage the widest possible audience in an open collaboration to help everyone better understand – and innovate for – an uncertain future.

To find out more about our corporate sustainability activities, visit:

www.sony.co.uk/eco

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About Forum for the Future

Forum for the Future is a non-profit organisation working globally with business and government to create a sustainable future. We have 15 years' experience inspiring new thinking, building creative partnerships and developing practical innovations to change our world. Our aim is to transform the critical systems that we all depend on, such as food, energy and finance, to make them fit for the challenges of the 21st century.

Forum works with more than 100 partners across business and the public sector. We specialise in a 'system innovation' approach to sustainability and use powerful tools such as 'futures', innovation and sustainable business model development to help companies succeed. We communicate and share our thinking and tools widely, including running a Masters course for future leaders and publishing the leading magazine on environmental solutions and sustainable futures, Green Futures.

Forum for the Future's role in FutureScapes is to design and deliver the futures process and provide sustainability expertise.

www.forumforthefuture.org

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