

Hydrock 

a Vision
for the 2020s

the report

by CHRIS BOWIE-HILL, DIRECTOR, HYDROCK

foreword

As engineers, and also members of society, what is our role and how can we help define a vision for the future?

When we picture ourselves raising a glass on New Year's Eve 2029, what will we look back on that has changed and shaped the previous years?

As the new decade began, at Hydrock we felt this was the ideal time to ask ourselves these important questions in order to define some of the opportunities and also challenges which are set to present themselves.

We already have some idea of the issues we are taking into this new decade, not just on the horizon but impacting us in the here and now. Climate change in particular dominates, alongside the loss of biodiversity and scarcity of natural resources, and of course the impacts felt from Covid-19. These are huge issues which are shaping the entire world. Indeed, the impacts of Covid-19 were barely conceivable when we spent time debating the big issues for the 2020s in the first two months of the new decade. Extraordinary how things can shift so fast. Of course, as engineers, we don't think we can solve these problems on our own, but we have to believe we can contribute to the group effort and our ideas have value.

Major trends set the agenda

Our existing society is being shaped by major trends which will carry through to the coming years, such as the widespread emergence of digital technologies, bringing new jobs and the loss of jobs, both more communication and less. Alongside, we have increased urbanisation, with cities becoming denser, perhaps leading to a more sustainable way to live, but bringing its own challenges as witnessed by the Covid-19 pandemic.

We're faced with a changing demographic, with an ageing population, and now fresh concerns about vulnerability towards illness as a result of the coronavirus outbreak. In the midst of all this, there's a housing crisis, with more homes of different types and a greater affordability needed in order to support more than just the most privileged in our society.

It's quite a picture, so as we looked to what this *Vision for the 2020s* would be, we gathered ideas from our people across Hydrock which were then expanded upon in a series of workshops across key cities in the UK involving some of Hydrock's most future-thinking minds.

The ideas brought to the table covered a range of concepts, from how we travel, how we live, how we use energy, how we source our goods. Understandably, the green agenda and climate change were a dominant feature.

Shifting mindsets on existing ideas

We recognised that 10 years is not that far away, and many ideas which could revolutionise how we live have already been discovered. In these cases, we questioned how they could be used differently, or perhaps why they hadn't been implemented to greater success.

A lot of this comes down to mindset. In many ways the answers to the hardest questions are not what new discoveries need to be made, but how society, and the development community, needs to think differently and be a more fertile ground for new ideas. In some cases, we acknowledged the difficult balance required – could

society really continue with its 'have it all' syndrome, or would some aspects have to be let go? But how to walk that fine line when it comes to developing communities, while also protecting the planet?

While at times it could feel like there was nothing new under the sun, leading to a sense of frustration that perhaps we already had the tools at our disposal but were not brave enough to use them, in the realm of technology we could see that revolutions were still possible, and it is a world of exciting 'unknown unknowns'.

Societal behavioural change

Looking back on the eve of 2010, we were only starting to get an inkling of how far the rise of the smartphone was going to impact our lives. Instagram hadn't even launched. The emergence of vast pools of data, the interconnectivity between people and companies, the dominance of social media, was only really beginning. Could there be another concept which emerges as the iPhone of the 2020s?

Ultimately though, with the many challenges we face, there is no silver bullet, even from the realm of technology. The biggest impact can be made through changes in behaviour, both individual and societal. We may be happy and comfortable and averse to change. But a lot of the methods and technologies are already there, and if we feel empowered to use them, we can fix a lot of the damage we're taking through into this next decade.

As responsible businesses and employers, we're going to have to.

Greta Thunberg's visit to Bristol earlier this year brought together so many passionate teenagers, and these 15-year olds of today will be 25 in 2029, deciding who they want to work for.

In a developed 21st-century society, work is no longer about providing food and shelter, but is becoming more about self-actualisation and fulfilment. The ethos of a company is a major consideration when choosing to apply for a role, and this information is becoming easier to access as greater corporate transparency is being demanded.

These are also kids for whom by 2030 coding will have become as integral as reading and writing; they'll be able to programme robots and move into roles shaped by automation. Rightly, and hopefully, as inhabitants of a data-rich environment, they will also be scrutinising what happens to that data which connects to all of this technology, and who owns it.

Covid-19 speeds up change

Of course, our discussions around what trends will be shaping the 2020s took place before the world was shaken by the Coronavirus pandemic. We had touched on topics which bordered on the issues of healthcare, antibiotic immunity and medtech, while also discussing the environmental benefits of reducing travel, increasing homeworking, and the psychological impact of returning to closer knit communities where we have regular contact with our neighbours, and ways technology could be used for the greater good. We couldn't have predicted that so many of these ideas would become a reality within a matter of weeks.

Although in places we now see pollution levels dropping, and natural life returning, thanks to the Covid-19-decreased human activity, this doesn't mean our problems are solved. Once the world returns to 'normal', whatever that may be, chances are old habits may return.

So, while we're in this 'pause' period, now is a good time to consider what some of the new habits should be, to take us through the rest of, one hopes, a less eventful and more sustainable decade.

Chris B-H.

“

...the impacts of Covid-19 were barely conceivable when we spent time debating the big issues for the 2020s in the first two months of the new decade...

”

“

So, while we're in this 'pause' period, now is a good time to consider what some of the new habits should be...

”



big ideas

How we shaped our

In order to create our **'Vision for the 2020s'**, we turned to the many great minds within our organisation, to highlight ideas, both new and existing, which our employees believed would be transformational but commonplace by the turn of the next decade.

We ran an **internal competition**, '20 Big Ideas for the 2020's' and this yielded ideas that varied between talking about the 'all electric city', to lanes on motorways that power your vehicle, to harnessing power from wastewater, to amazing inventions to place heat and power systems in redundant chimneys, to totally new ways of agreeing planning permission for developments.

These ideas catalysed our **workshop discussions** in Manchester, London and Birmingham, and we expanded upon them into wider points and themes, dividing the resulting content between **Buildings, Placemaking & Communities, Transport, Energy & Environment**.

These **original ideas**, plus a few more we had along the way, are highlighted throughout this report.

buildings thinking about...

Energy efficient homes

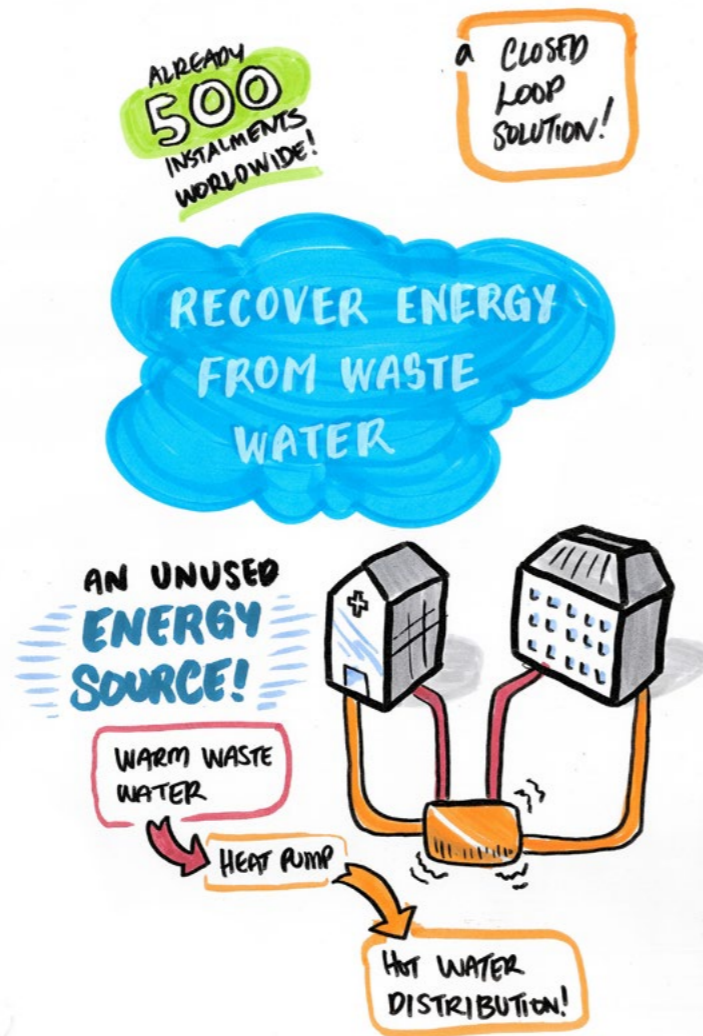
Facing both a housing crisis and a climate crisis demands that the next decade sees a widespread change in how both we build, and power, our homes.

Passivhaus has been around for some time, and as the pressures around the climate emergency build, the 2020s could be the time we see energy efficiency brought to all residential properties.

Implementing energy saving processes means, in concept, these homes are more comfortable, less draughty, and cheaper to run, so the appeal to the occupier is clear.

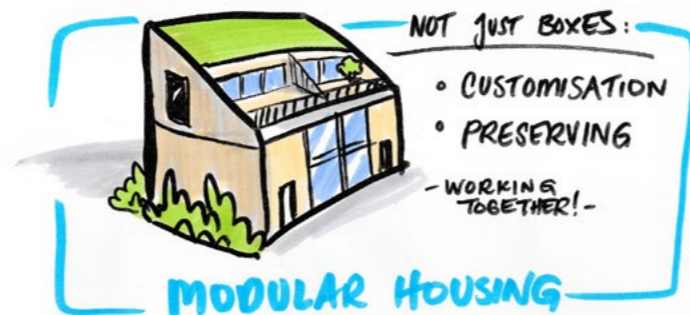
In practice, Passivhaus hasn't always been well received, due to issues with its delivery. Over-insulated and overheated, the insides have had a tendency to become uncomfortably dry. Defendants of Passivhaus have raised the point that there is a distinction between Passivhaus principles, and meeting Passivhaus standards, and these are two different, and arguably less effective, concepts.

Once we get the implementation of naturally structured, energy efficient homes right, they should become commonplace across the next decade, echoing countries such as Austria where the construction and materials around Passivhaus delivery has already created a massive industry.



big idea

All new homes will be built to Passivhaus standards, and a major retrofitting programme will have been completed, creating new opportunities.



buildings

Modular momentum

Meanwhile, at long last the momentum is starting to build around modular construction methods, which taken hand-in-hand with Passivhaus standards could enable the mass roll-out, at speed, of affordable, greener homes.

By building offsite, the construction process is also made more efficient, and less risky, before the property has even got on site.

Modular and modern methods of construction are also starting to shed their perception challenges. In order to ensure greater take-up in the 2020s, retaining a sense of individuality in design will be important, avoiding cookie cutter estates of the future. The idea of ownership and customisation is still well embedded in the UK's mass consciousness, and allowing residents a sense of pride in their home also leads them to make better, more energy and community conscious choices.

Modular need not mean generic, and customisation need not mean expensive. Think more about the Victorian terrace, consistent in style, but each home reflecting their occupiers' style and personal tastes. If you want a more modern case study in affordability, flat-pack construction, and mass popularity, look to IKEA. Once people see the quality they are able to obtain, and the prices, the option of a more sustainable home will appeal more than a traditionally made home.

As to our existing stock, the 2020s will see retrofitting as far as possible. Doing up all houses en masse is set to be an expensive endeavour, but also an imminent one given impending targets around carbon emissions. This needs Government support, in hand with some strategic, quick wins around energy consumption in our homes. Could such efforts see a massive over-cladding campaign implemented, alongside enforced solar panels on all roofs, the bricking up of all fireplaces? And how should we square that with the protection of our residential heritage, without becoming the parquet floor-destroyers of the future?

Breaking the cycle

As an industry, we need to get our heads around the fact that things will be different in the next decade, and given the many pressures we are under, they have to be different especially in the light of Covid-19.

The carbon impact of demolition is really high, so the sector needs to think innovatively about the reuse of what is already existing, as well as thinking about how new buildings can be adaptable for the future. An office could become a home; high street retail units could become homes; a car park could be a hotel or even a vertical farm; and a large house could be broken into smaller apartments, then converted back again.

The 2020s could see us moving into a more flexible, adaptable 'Hermit Crab Age', where we appreciate that a building may not always have the same occupier, but is handed over to other, more appropriate uses as demand requires.

One of the biggest barriers to this approach comes down to mindset, both of the occupier, whether residential or commercial, and of the development sector. How do you create a widespread feeling that property is not an asset owned by an individual or company, but can be shared by the community?

The argument comes down to whether this can be enforced through legislation, or motivated through education. The green roots are already showing, with so many children on board with the green agenda, and consumerism dying away. The MTV Cribs generation, which coveted flash pads as a demonstration of wealth, could fade out in the coming years, to be replaced by an impact-savvy, energy conscious community.

big idea

The now-defunct traditional chimney space on homes will be repurposed for water storage, heated using solar thermal and hot water panels on the roof.

big idea

Modular, self-sufficient and sustainable homes will be the norm, with flexible layouts to allow the repurposing of the structure in the future.

Delivery dilemma

In the residential sector in particular, we face a delivery dilemma. This is a market dominated by a smaller selection of key players, who are able to tap into the conventional wisdom that buyers 'need' a certain-sized home, want a certain type of lifestyle, and are only prepared to pay a certain price to get it.

Where land costs remain high, in order to achieve the profit that has been enshrined by law, developers justify using cheaper materials, or avoid trialling energy-saving innovations which may be costly, without any legislation to force them to do otherwise. Consumers are left with no choice, even if they did want to choose a lower carbon product. Bringing taxes or incentives to bear on the individual is unfair and pointless if there is no variety in the market to enable them to make better decisions.

However, the clock is already ticking on this dynamic, with the 2020s the decade this complacency has to run out of ground. There are low carbon emission targets set to hit all new developments by 2025, only round the corner in planning terms, and these will be the legislative 'stick' many have been looking for. Alongside wider accountability this is set to bring about the wave of innovation which will shape homes in the decade to come.

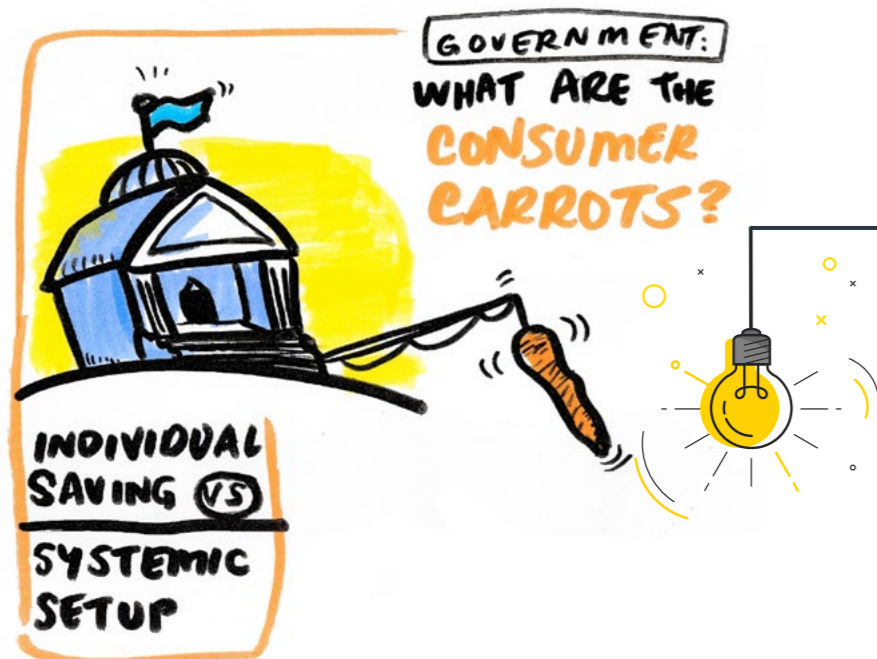
Follow the money

It's not all doom and it would be unfair to suggest that the market is wholly dominated by companies who care about profit over quality.

Developers are becoming increasingly conscious around design quality and energy use, partly driven by the growing appetite for greener products within their target markets, and partly driven by the shifting mindset of their investors as ESG (environmental, social and governance) factors begin to play a more important role in investment decisions.

Pension funds in particular are investing in more eco-friendly ways and need to report back to their shareholders who care that environmental factors are being incorporated in their decision-making. Climate change factors are increasingly becoming a necessary financial disclosure, with banks urged towards a greater transparency around how investments will impact on the environment, and pushback against investments which are seen to be less 'green'.

As the 2020s continue, the footprint of these eco-investments is set to build, and there is an opportunity for more funds to invest and support change, particularly in backing smaller, agile, more innovative developers. This creates a 'carrot' for consumers, who are incentivised by the creation of more affordable, eco-friendly homes which give ethical investors reliable returns, and creates a corporate 'stick', as companies who refuse to move with the times find their sources of finance drying up.



big idea

There will have been a shift away from valuing buildings by solely financial measures, into more qualitative benchmarks including social cohesion, cultural enhancement, microclimate effects, community amenities.

Benchmark buildings

As the appetite for these green credentials emerges, the 2020s could be the time a building wears its eco-heart on its sleeve. While buildings are currently defined by their size and their value, by 2029 they may be measured in a variety of ways, for instance socially.

Of course, benchmarks for buildings are not new, with systems such as BREEAM, WELL and WiredScore measuring attributes such as energy efficiency or internet connectivity, which are having some impact on the value of the asset.

We are all consumers of buildings, and in the same way that it has become commonplace to advise consumers of the contents of their chocolate bars, so too should we reveal the ingredients which make up a building. Marking it with a traffic light system which shows energy, health and wellbeing, ecology, social and environmental factors would be a way which is easy to digest and also draws interest from passers-by in the street.

Without Government enforcement though, would we see widespread take-up of such an idea in the coming years? A small change may be a big one, as having to be honest about a building's ingredients may be the incentive many developers, and their advising designers, need to ensure their potential occupiers don't pass it over in favour of another building. It's important to highlight the role of the engineer here. We are the professionals who are supposedly experts in these areas, so rather than shifting the blame to clients who pay us to advise, we should look at the advice we are giving. We may have gotten used to quietly shifting the blame back to the client when they reject our ideas, due to cost complaints largely, but perhaps it should be on us to sell our ideas in a different way, which people can comprehend and get excited about.

Of course, we don't live in a utopian, Star Trek-esque world where money no longer has value. To connect with a client, you need to work on their triggers which can often be the final value and expected income of a building. Investments in energy efficiencies and other technologies can be justified when you demonstrate the final outcome is more liveable or usable, and is likely to result in longer term tenancies, equating to more consistent and reliable returns.



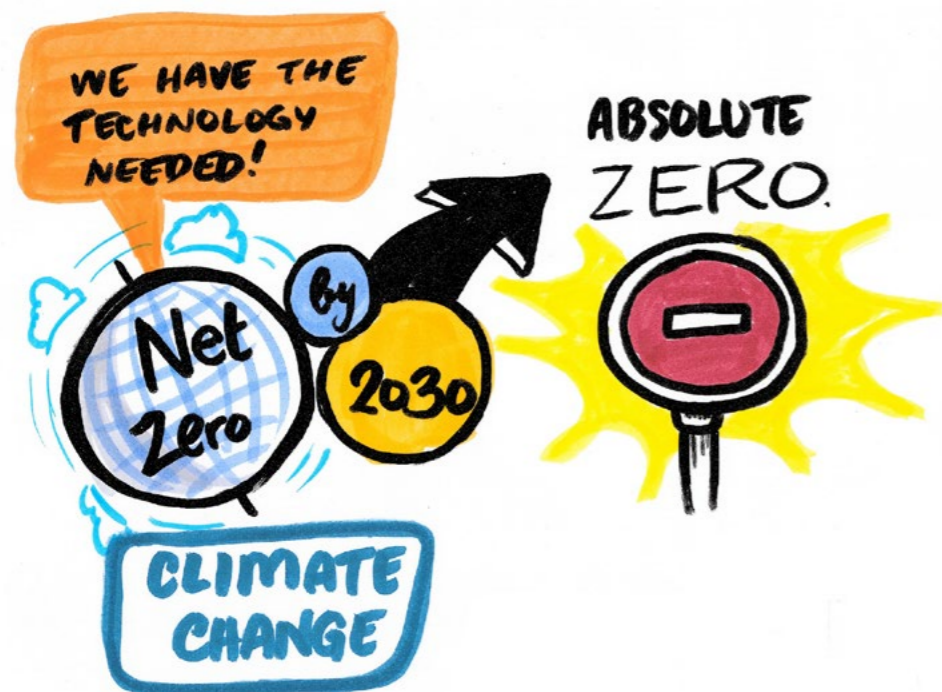
The end of obsolescence

Engineering used to be about creating products that would last. With the rise of consumerism, the model of built-in obsolescence became more commonplace, to ensure the buyers always needed to come back for more.

When it comes to buildings, planning for a shorter lifetime not only shows a lack of innovation, but is also irresponsible in the face of the net zero carbon targets the world is aiming for, with the amount of embodied carbon released when a building is demolished.

As we face a society which potentially adapts and changes habits throughout the 2020s, throwaway buildings are not the answer. Demand is turning towards buildings which are light, long-lasting, and don't become obsolete in a matter of decades. More weight needs to be given to retrofitting, which can enhance the existing elements in a building while bringing in new aspects which respond to the demands of the time.

The Pompidou Centre in Paris was ground-breaking in its time, designed by Richard Rogers to wear its 'guts' on the outside. Working alongside architects throughout the design process, this greater emphasis on and visibility of the M&E and other systems is another way of advertising a building's credentials. These elements are what makes a building energy efficient and functional, and should be worn with pride, while also adding to the education of the users of the space.



Harnessing history

We know historic buildings can be reused to great acclaim, such as the Battersea Power Station, built by the Victorians as a Temple to Energy. Yet we seem to have lost the ability to plan for our buildings to have the same resilience and long-term flexibility.

It used to be the greatest tragedy for an architect to see a building they designed destroyed in their lifetime, nowadays that happens regularly.

Thinking about quality materials and quality build processes from the outset ensures a building is built to last and is appreciated over many generations. Some clients are on the front foot with this; financial services giant Bloomberg ensured its London headquarters were crowned the most sustainable office in the world. However, it is the most expensive in the world with Bloomberg affording a budget of £1.3bn, an eye-watering figure for most clients.

How can we bring an essence of Bloomberg to the average developer and building in the 2020s? Quality and sustainability shouldn't be defined by money. With some creative thinking, an appreciation of how human beings really want to interact with their buildings, and introducing any cost elements into the conversation with the client as early in the planning process as possible, we can encourage the creation of buildings which are energy efficient and cost effective. The rise of biomimicry has shown that controlling elements most common in nature – light, ventilation, humidity – have some of the biggest impacts on a building's effectiveness, and can also be drawn from the simplest interventions.



Of course, the lowest common denominator often prevails, in line with the societal tendency to take the most trodden path and be shy of what is new. How do we legislate against that reaction in this coming decade? Do we raise taxes, impose laws, and block developers from building in the UK if they aren't prepared to raise their standards? Should rents be raised so the end users fund the advancements in technology? Do we, as engineers, refuse work?

Some may think so, but at Hydrock we don't believe draconian measures are the answer. Legislation only sets minimum standards, not high standards. Turning people away from development only fosters a feeling of resentment, and creating a confrontational environment with clients is never going to create the fertile ground for innovation this industry really needs.



A Vision ^{FOR THE} 2020s

- CLIMATE CHANGE
- EMERGENCIES
- POLLUTION

WE FACE BIG CHALLENGES...

WE NEED TO BUILD PROACTIVELY

- MASTER PLANNING
- SOLUTIONS TO SOLVE CAUSES



WAIT! WILL I STILL BE AROUND?

... AND THE PACE OF CHANGE IS GETTING QUICKER!



WHAT CAN US ENGINEERS DO?

INCREASING DENSITY IN URBAN AREAS

GAMIFICATION OF TOWN PLANNING



CLEVER USE OF A.I.?

GET THE PUBLIC INVOLVED!

KEEP IT HIGH LEVEL?

HOW WILL IT REMAIN REALISTIC ENOUGH?

WHO MAKES THE DECISIONS?

RETURN TO ARTISAN & INDEPENDENT COMMUNITIES



JUST LOOK AT WHAT INVESTING IN RAIL HAS DONE ELSEWHERE!

IT'S OLD TECHNOLOGY - WE HAVE SO MANY CLOSED AND REPURPOSED RAILWAY LINES!

DON'T WE NEED THIS INVESTMENT?

HS2



EVOLUTION OR REVOLUTION?

COMBINED APPROACH

- MULTI-MODAL!
- MORE SPACE FOR BICYCLES



BABY STEPS: BUILD ON EXISTING TECHNOLOGY



COMPULSORY ENERGY FEATURES

ENERGY BRICKS

HAVING A SAY

- PENSIONS & INVESTMENTS!
- DEMANDING BETTER HOUSING!



nurture



CULTURAL OFFER!

IT'S WHAT BRINGS PEOPLE IN!

PLACE KEEPING

JUST PUTTING A BAND-AID ON PROBLEMS?



WE'LL GET BETTER COMMUTE TIMES!

WE HAVE AN OVERALL PROBLEM WITH

PUBLIC TRANSPORT

INCREASE CONNECTIVITY

PLACEMAKING

PLASTER ON PROBLEMS?



MONEY GOES TO THE RIGHT PLACE

GOVERNMENT GRANTS AND TAXATION



TAX



TO PAY FOR THEIR OWN LANES

ROAD SAFETY

WHAT ABOUT DISTRIBUTING GOODS?

AUTONOMOUS VEHICLES



- MORE HASSLE OR CONVENIENCE?
- SAFETY
- SPEED
- VARYING CONDITIONS?



CARBON LITERACY

UNDERSTANDING IMPACT

EDUCATION

- CONSEQUENCES OF OUR CHOICES
- COMPANY INCENTIVES/FINES



CARBON LABELS?

PLACE AWARENESS



VALUE SHIFT



ETHICAL TECH?

thinking about... placemaking & communities

The return of community

If Covid-19 has taught us anything, it's the value of community. As we emerge from this pandemic there is a hope that the communities we have built, both as online and offline connections, will remain.

Even prior to Covid-19, there was a growing sense that more community was needed within developments, hence the increased use of the term 'placemaking' i.e. creating a real sense of place, community, and history. However, alongside placemaking, the 2020s should see a return of 'placekeeping'; remembering the uses which add value in an existing area, and enhancing them.

Pubs, music and cultural venues, have not typically been nurtured within grand masterplans, meaning that places have sometimes lost their heart and significance. As high streets and offices across the country shut down during the Covid-19 lockdown and we became largely home-based, we realised that it was the uses on our own doorstep which were of the most value; the local shop, the local park.

In, hopefully, a post-Covid world of the 2020s, we have a chance to get this right, and not only build new communities within our masterplans, but protect existing communities. Key to this, is shifting consultation methods to include what communities actually want, in a cross-sector sense rather than being dominated by certain age groups or demographics.



big idea

The public will design spaces through gamification and crowdsourcing designs. Planning decisions will be generated and decided through digital modelling, which people contribute to online, and not at the village hall.



Broadening the scope, almost crowdsourcing design by bringing a variety of options to a community and allowing them to choose and develop, could bring about a new era of democratised urban planning, which means local residents are brought on board with the development process rather than left behind.

Allowing more variety and innovation around the ways we consult leads to more young people, different genders, and different backgrounds all feeding into the build process, bringing the heart back into placemaking, as a true place is somewhere which is valued and experienced by the many, rather than the few.

The power of technology will come into play here. No one is expecting, or saying it is appropriate, that the community become planners, architects or engineers.

By using technology and AI to predefine certain parameters, including typologies, uses or budget constraints, hybrid developments could be created which blend practicality with community. With 3D printing, modular construction methods and reducing costs, it will be easier than ever to bring the community in earlier to the design process, and allow the finished products to reflect their needs and tastes.

No collection required

Changing the methods around how we get our goods is the key to not only returning that sense of community, but also tackling the issue around transport-related carbon emissions.

The ease of buying products online has contributed to the rise in vehicle emissions, and due to its novelty in the past decade has led to a glut of purchases. We have been in the adolescent stage of online ordering, and as we move to the more adult phase in the 2020s, the whole world consciousness could be ready to change when it comes to how we buy goods.

Although we've already started to see a shift in the trend, with e-commerce giant Amazon opening high street stores, returning to a city centre, or shopping centre-centric retail life is not likely to be the answer to our community or congestion woes. Bringing shops closer to the local area, within walking distance and peppered throughout residential locations, while adding more sustainable transport methods to access retail hubs where needed, would make a significant impact on carbon emissions and air quality in the 2020s.

This will not stop the prominence of online purchases; as we saw during lockdown, online businesses were some of the few who reported sales surges and profit rises, and Amazon had to recruit 10,000 more staff to deal with demand. Shifting the emissions problem away from the individual, onto a heavy goods vehicle or a van making a parcel delivery however is not the solution. In the transport section of this report, you can find further insight into what innovations could be seen in this sector to continue to assist with the passage of goods in a more sustainable way.

Home is where the heart is

In the rush to solve the housing crisis, in some areas this has led to dense developments with amenity far away from where residents are actually living. As communities and consultation are brought back into the centre of the development process, a more communal way of thinking is likely to emerge.

This would reflect international trends, such as in Doha in the Middle East, where following an influx of high-rise regeneration the Government called for a return to a more organic, integrated approach to development, including homes and gathering places for different generations, putting schools and the elderly around a central hub. The houses are brought closer to the shops, and some of the challenges around the ageing population and their welfare are solved as they benefit from being located next to the young, as well as amenities which keep them engaged, active and independent.

Resident-led development often incorporates communal buildings, where people can work together and eat together. Including these hubs in and around existing estates does not involve massive intervention; buildings included with co-working spaces and social spaces don't need to be expensive to build. However, the cynic among us may point out that spaces which aren't income-generating may not make it far up the average housebuilder's priority list. Will this be enforced through the planning system in the 2020s, in the same way as section 106 agreements guide money towards schools or parks? Does a national benchmark for developments need to be established which sets the standard for what uses need to be included per number of homes, beyond the most basic needs?



big idea

Developers will be the residents themselves; modular construction will reduce costs and make community-led housing more prevalent.



Diversity of ideas

Einstein's definition of madness was doing the same action again and again and expecting a different result. Having design emerge from the same demographic of people, whether engineers or consultees, will also always end up with the same solutions.

The next decade is set to see greater diversity, as different types of people move into professions such as engineering. These people will make more varied design decisions, removing some of the tendencies towards unconscious bias which may have defined buildings of the past. We've seen this emergence already in some product design, for instance sticking plasters, with the realisation that a variety of skin tones might be more appropriate for a wider audience. For transport this might mean more buggy spaces built into a street-scene and spaces to manoeuvre on pavements, following the Nordic approach where there's more consideration of where to salt the roads, thinking about different types of pedestrians rather than just commuter walkers.

Even as STEM campaigns attract a wider variety of people into the sector, it will remain the growing responsibility of individual designers to think outside of themselves to imagine how a space or service might function for different types of people. By doing this, and getting a variety of people around a table to test out these theories, without relying on assumptions, spaces can be created which are accessible and functional for all. This also returns to the concept of expanded public consultations, discussing designs in a flexible manner early in the process, for views on how they might impact the young, the old, people with disabilities, different genders, religions, and beyond.



big idea

A more diverse industry means there will no longer be unconscious bias in the design of public spaces and buildings.



A Vision For THE 2020s



FROM FINANCIAL VALUE... £££

TO BENCHMARKS:

- SOCIAL HOUSING PROVISION
- ENVIRONMENTAL IMPACT
- LOCAL AREA CONTRIBUTION
- SUSTAINABLE SOLUTIONS
- BUILDINGS THAT LAST!



QUALITATIVE BENCHMARKS

ACCESSIBLE TO THE PUBLIC!

WE NEED TO SELL THE STORY

WE LOVE LIVING HERE!

HOUSING IS A RIGHT!

RESIDENTIAL DECISION MAKING

EDUCATING RESIDENTS

- ENERGY EFFICIENCY
- CLADDING OPTIONS
- PERSONALISATION

DIALOGUE

GROWING RESIDENTIAL MOVEMENTS

WILL A STRONGER SENSE OF COMMUNITY RETURN... WILL CLIMATE CHANGE FORCE US TO WORK TOGETHER BETTER?

HAVING A SAY IN LOCAL DEVELOPMENT!

VIA:

- HOUSING ASSOCIATIONS
- CO-OWNERSHIP

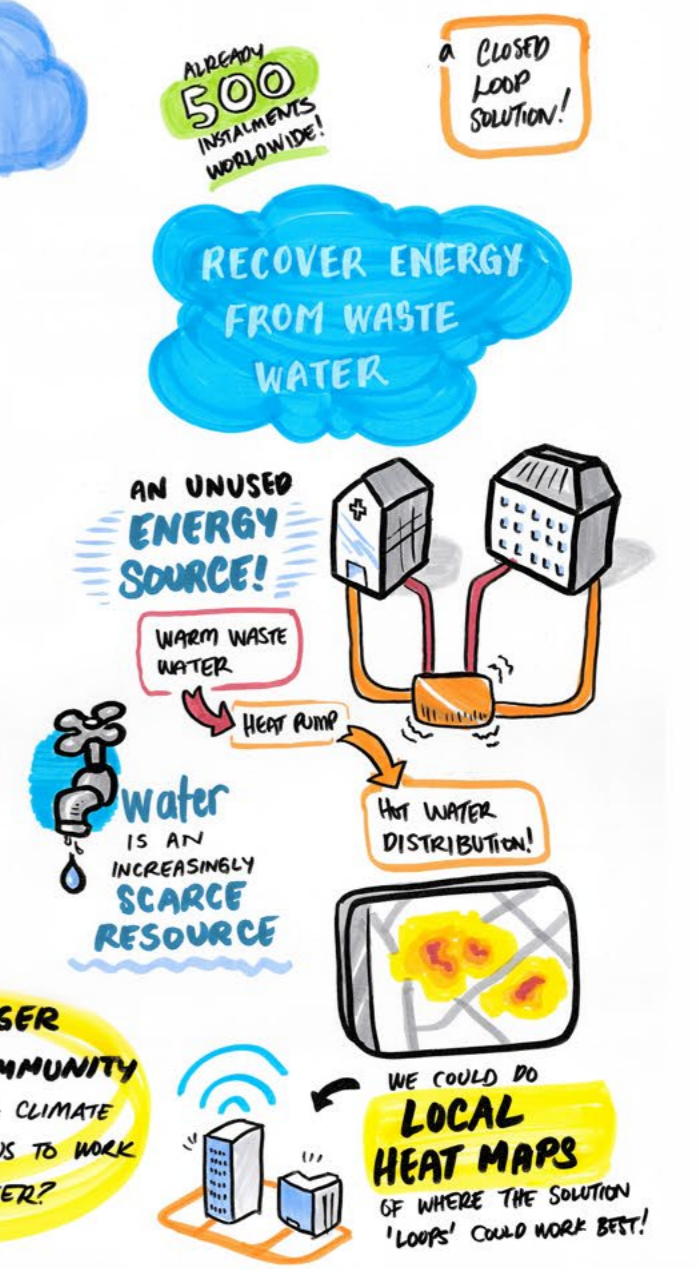


FIGURE OF SMART GRID AND BUILDINGS?

USING NEW TECHNOLOGY AND POWERFUL A.I.

ENGINEERING FEATURES

IT HAS TO BE AFFORDABLE!

BRING THE NATURE INSIDE

biomimicry

WORK WITH ARCHITECTS - SHOW THE FEATURES THAT MAKE THE BUILDING WORK!

DIVERSITY DRIVER

DIVERSE DECISIONS

STEM INCREASINGLY...

DIVERSE WORKFORCE

PUBLIC CONSULTATION NEEDS TO BE DONE RIGHT!

AND FROM THE START!

ENGINEERS COULD BE ETHICAL GATEKEEPERS:

YOU CAN ONLY PASS AFTER 'X' CONSULTATIONS!

ROLE OF ENGINEERING

EFFICIENT USE OF SPACE, RESOURCES, ENERGY

ENGINEERS HAVE A ROLE TO PLAY IN PERSUADING CHANGE BLUE SKY THINKERS!

WE CAN USE OUR INFLUENCE!

SUSTAINABLE SOLUTIONS!

WE NEED GOVERNMENT POLICIES TOO!

transport

thinking about...

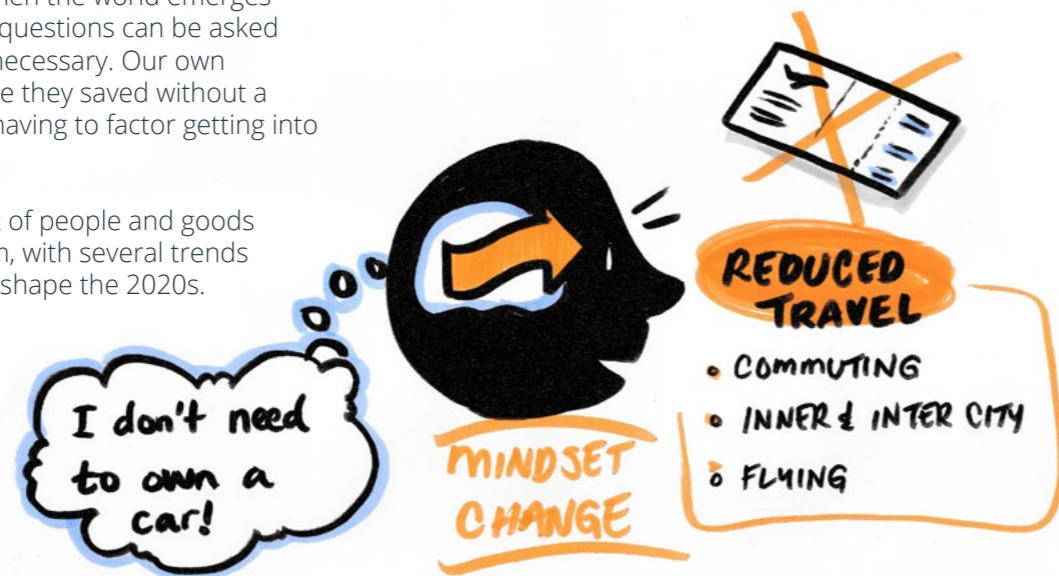
Lockdown positives

The transport sector is shaped by a complicated range of factors, involves many modes, and relies on costly infrastructure which takes a long time to change. However, as we go into this next decade the prevailing sense is that something has to change, in both how transport is powered, and how it is used.

The answers to these questions seemed a lot more complicated prior to the Coronavirus outbreak, and the chance of delivering a widespread change in behaviours when it came to consumer transport use seemed unlikely, even over the next decade. However, lockdown has proved people are prepared en masse to make consistent change to their behaviours, if given the right reasons.

This hasn't only been because of Government intervention; the lockdown has demonstrated that working from home and experiencing leisure in the surrounding areas is possible after all, especially with the increased use of technology. As remote working becomes the norm, with meetings held via video link, this means that when the world emerges from lockdown more critical questions can be asked as to how far travel is really necessary. Our own staff reported how much time they saved without a commute, and also without having to factor getting into office-appropriate clothes!

Nevertheless, the movement of people and goods has to continue in some form, with several trends already in place which could shape the 2020s.



transport

Delivery dilemma

As the urgency has built around carbon emissions and the urban environment's poor air quality, the last decade has seen a greater emphasis on investment in non-combustion engines in an attempt to tackle the transport sector's contribution.

While a combined approach between energy sources is likely to be the most effective response, the 2020s could be the time a 'winner' emerges in what many see as a VHS vs Betamax competition to dominate the low carbon engine market.

Electric vehicles are currently in the lead, as opposed to biodiesel or hydrogen. Yet this model needs development, and the glitches may be ironed out over the next decade. The public perception of 'range anxiety', the need to switch hybrid models quickly to petrol, and the crucial point that using carbon fuel to create the electricity only shifts the problem elsewhere, will need to be solved.

Could we see the roll-out of electrified roads as a partial solution? Sweden has set the first example, with a dynamic charging process which uses electrified rail set within roads to charge vehicles as they drive. Meanwhile, BMW is investing in wireless pads for charging vehicles. These power innovations already feel close to going mainstream, so could be commonplace by the eve of 2030, and have the potential to be tied to renewable energy sources such as photovoltaic panels on the roadside, or the cars themselves, which further reduce the carbon footprint.

big idea



All roads will be electrified, powering autonomous vehicles, and land adjacent to highways will be used for solar panels to energise the roads.

Car scarcity

The rise of automation, and greater capacity for data sharing, will mean that the car journey changes significance. No longer purely as a means of getting from A to B, as you sit in your self-charging, self-driving vehicle, this time is now an opportunity to work or enjoy at your leisure.

Dedicated lanes will add to the efficiency of the journey, and with all of the vehicles keeping to set speeds and powered by AI which monitors the position in relation to other vehicles, the risk profile of driving is lowered.

Given the increased density of urban communities and an already-falling rate in car ownership, the 2020s could see a rise in car-sharing of autonomous vehicles. With a rise in restrictions on city centre driving and taxes on vehicle emissions in built-up areas, car ownership becomes increasingly less attractive, especially with the temptation of an Uber-like service which brings a car to your door.

This drop, or at least increased efficiency, of car use, releases valuable road space which could be allocated to public transport or freight, a sector under its own pressure to innovate with self-charging and autonomous vehicles.

The car-less world may be less possible in rural locations, where communities need to remain connected, and where 'on demand' car ordering may not be practical. However, an increase in electric or hydrogen vehicles, as well as investment in public transport services, can ensure in the next decade inter-city, as well as inner-city connectivity is improved. Increasing the attractiveness of public transport is key to changing of habits. If a mode of travel is inconvenient, people will use another way. We have seen that to our detriment as people have turned away from late-running and costly buses or trains, to get in their private cars, preferring to tolerate traffic jams which at least they can predict.

This rule can work the other way though, if public transport is improved to shift the current transport dynamic from the private luxury of owning a vehicle, and the public scarcity of good transport, to the public luxury of a well-timed, modern bus or train service.

Commercial travel

The 2020s will see a variety of approaches emerge, as 'one size fits all' will not work for the decarbonisation of both the transport of people and the transport of goods. The latter presents some major challenges that may only start to be untangled as the decade develops.

There may be some technology which already exists, but the shipping and air travel industries in particular have struggled to upscale quickly enough, or have been resistant to investing in huge tranches of new fleet. However, as international travel restrictions during coronavirus have seen activity plummet, to the benefit of pollution levels across the world, the aviation sector in particular is going to see more pressure than ever to innovate.

A reduction in flights is the most likely short-term action in the battle against climate change, before a more sustainable energy solution is found, but requires a mature response and a sense of corporate responsibility. Rather than shifting all of the cost onto the traveller, taxes could be imposed incrementally, so the more someone flies, the more they pay. The aviation sector could also be pressured, or incentivised, to use profits to invest in R&D.

When it comes to freight, the creaking rail infrastructure could be eased by moving more vehicles onto the roads, using the increased capacity released by the reduction in cars. Transporting goods by rail does have some benefits, such as the air efficiency of moving blocks in tandem, and this concept could be emulated through driving HGVs in tandem on the roads.

By taxing the transference of goods, particularly those using less-sustainable transport modes, as well as encouraging the return to locally grown and produced goods, the pressure on the transport network could be eased in the coming decade. With the number of avid vegetable growers who emerged during the lockdown, this doesn't seem as unlikely as it may have done.



Rail revolution

As we move through the 2020s, are we too late to overhaul the rail network? Electrification has been slow, and hydrogen take-up may take a lot more time.

Although it still attracts heated debate, and is expected to do so long into its delivery phase into the 2030s, the goals of High Speed 2 are largely right, although it remains to be seen if the method is correct. Alleviating congestion, creating faster connections, and adding capacity for freight are all required in the UK. However, is HS2 the right response which will give us the lasting investment in infrastructure we need to carry us through the following decades?

Trainlines are a 200-year-old idea which we have the Victorians to thank for, so many people might question why we are still building them. The UK has been slower to adopt transport innovations than other countries, who are particularly motivated by stringent targets around reducing car ownership. We are seeing evolution and not revolution in the rail sector, and HS2's speeds will already seem slow compared to trains in places like Shanghai, and alongside the possibility of hyperloops, it risks looking quickly antiquated.

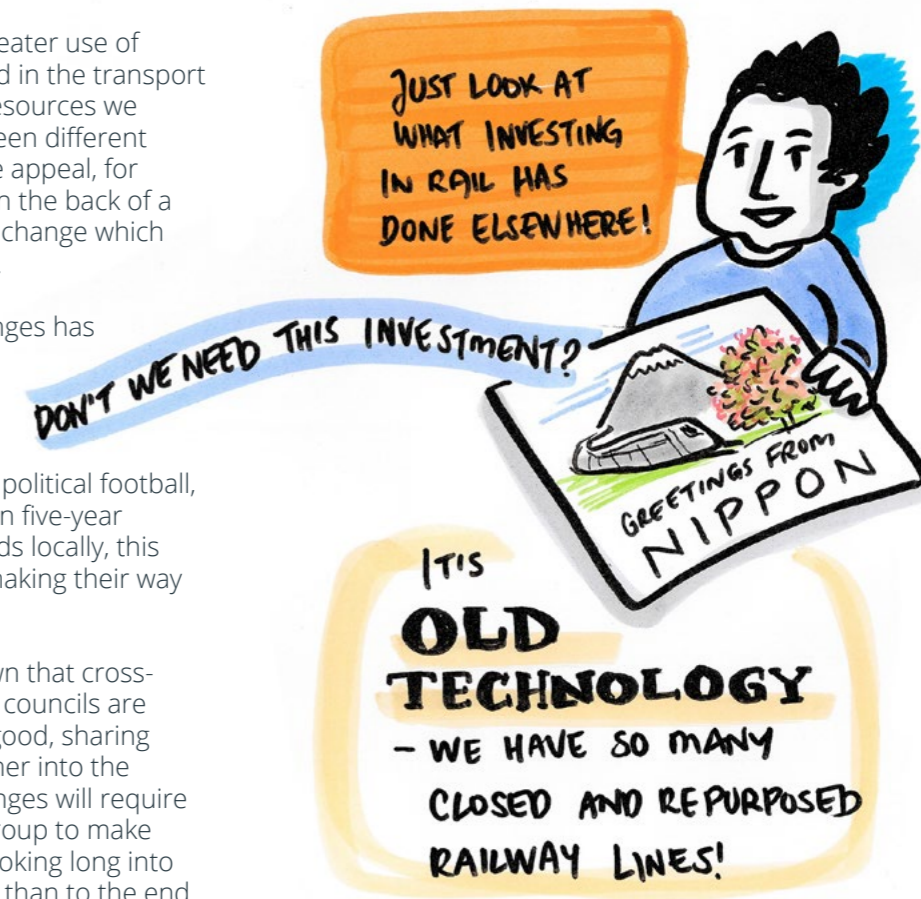
To increase efficiency and appeal, a greater use of technological advances will be required in the transport sector, as well as a better use of the resources we already have. Joining up thinking between different transport modes would vastly increase appeal, for instance installing a smaller carriage on the back of a train for bikes or wheelchairs, a minor change which makes a big difference to functionality.

Implementing even these smaller changes has proved difficult over the past decades, due to the lengthy procurement, consultation and delivery timescales which the transport sector attracts. Transport has also been turned into a political football, and as the UK's political system runs on five-year periods nationally, and one-year periods locally, this can be a barrier to schemes actually making their way from concept to completion.

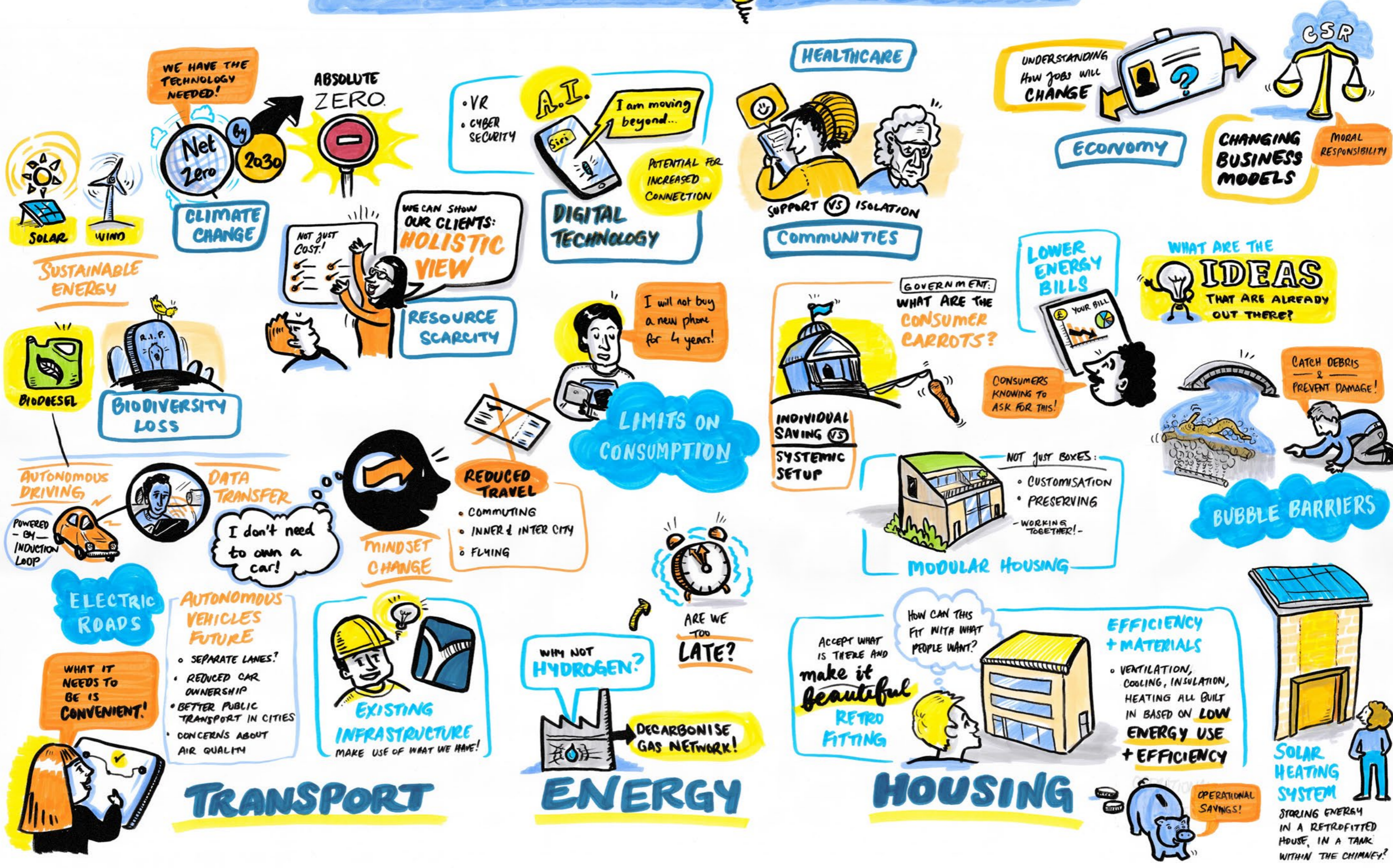
The response to coronavirus has shown that cross-party consensus can be achieved, and councils are able to work together for the greater good, sharing resources and ideas. As we move further into the 2020s, responding to transport challenges will require the establishment of a non-partisan group to make decisions on transport investments, looking long into the future as the Victorians did, rather than to the end of a political term.

big idea

Is HS2 the wrong answer to an old question? Rail travel will embrace forward-thinking technology, such as hyperloops.



A Vision FOR THE 2020s



energy & environment

thinking about... energy & environment

Self-generating cities

The wholesale replacement of our existing energy infrastructure is unlikely, especially within the next decade. So, the 2020s will see us looking at how to adapt the current networks we have, hopefully for greener energy uses.

Of course, there are challenges here. Moves to decarbonise the gas grid have proven difficult without expansion, as the existing network is set up to deal with largely the heating of buildings which is already at capacity and might struggle with further demand. Schemes looking at hydrogen generation are already studying the potential for blending hydrogen into the existing gas network, with a gradual move to decarbonise.

Meanwhile, the electricity grid is also creaking and is at capacity, making it difficult, even if renewable forms of electricity are brought online, to fully use it or store it, as can sometimes be the case with wind energy. Sustainable forms of electricity generation may be more likely to be implemented than hydrogen plants in the next decade, but without either a shift in electricity demand, an expansion of the existing grid, or a phased transition from combustion-formed electricity, this energy will have nowhere to go. Hydrogen may come into its own here as we move more into the 2020s, as a way of storing and later releasing power.

There's no use waiting for the silver bullet, so a lot of movement can be made over the next decade by using what we already have. Our existing buildings and cities have significant power to generate and use energy more effectively, leading to a national reduction in what needs to be produced. Solar panels on buildings, wider roll-out of electric charging points in houses and motorways, and newer interventions such as solar strips or pressure strips along walkways, to maximise the energy-generating potential of our roads.



big idea

The all-electric city, including footpaths with solar panels to light the streets, and kinetic power panels when travelled over by foot or bike.



Urban resource management

big idea

Recovery of energy from sewer water, a neglected energy source flowing beneath our cities.



In the sustainable energy discussion, there has been an increased focus on heating, but less so on heating water.

This is a double-edged point; not only does heating the water release carbon, water itself is going to become a scarcer resource as we move into the 2020s and beyond. By 2050, the world will have a nine billion population, many living in water stressed areas. The next decade will see an increase in careful consideration over the water we use, and reuse, for instance copying the Middle East where grey water, rather than fresh water, is used for irrigation.

Like the electricity grid, the water grid will need to be managed, and we may see the creation of water microgrids, where water tanks are shared between neighbouring residential or commercial buildings. The onset of AI and the Internet of Things will make it easier for these buildings to 'talk' to each other, and automatically allocate the resource according to need, as well as harnessing the waste from one building to power the heat requirements of another.

The irony that parts of the UK face droughts is not lost on the many who have to deal with floods, sometimes on an annual basis.

Given the UK's varied but generally predictable weather range, by 2030 there could be more joined-up thinking around this resource management, and methods for the potential diversion and storage of water during times of heavy rainfall for release in the hotter months.

This will need proactive, rather than reactive design, planning around the events we know are likely to take place in advance, and sharing learning between areas which have built up transferable expertise. What can we learn from fires, floods and droughts, and vice versa? Not all emergencies can be planned for, but a greater emphasis on joined-up thinking and resilience will mean responses are likely to be more effective when the incident occurs.

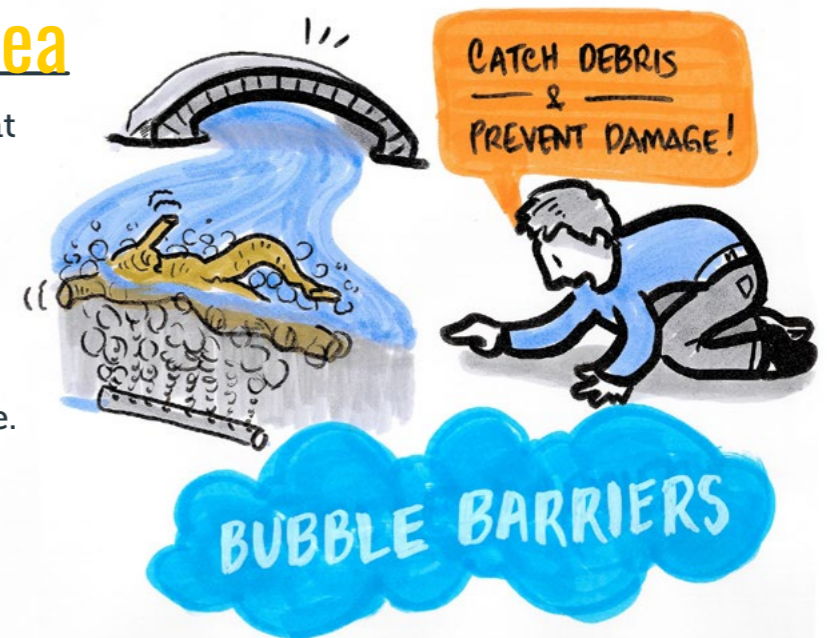
big idea

Bubble barriers will be installed in rivers, to capture debris and reduce flooding risks.



big idea

Specialists with different expertise will work together to learn from extreme environmental episodes and create better emergency resilience planning to prepare for floods or fire.



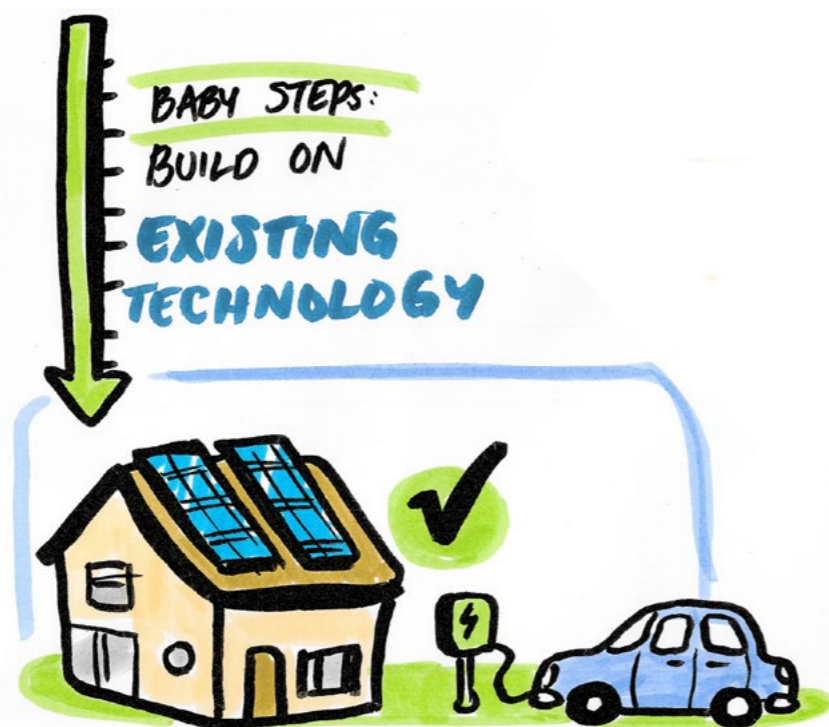
Micro-markets

Individuals can become part of the energy market, with sharing electricity peer-to-peer through apps becoming commonplace.

This will help to even out the grid, creating more capacity nationally for when renewable energy forms come online. This also means, at a corporate and personal level, the energy market can be subtly manipulated, by taxes or incentives, to encourage more or less use at certain times, and the prominence of different forms of energy.

In the world of energy generation, we have seen the effectiveness of Government involvement and incentivisation. Solar thermal was a concept overtaken by photovoltaic panels competing for our roof space once Government subsidies were brought in, leaving a household's high heat requirement by the wayside for the sake of electricity. In the offshore wind sector, by 2025 development will be a third of the price per megawatt hour compared to 2015 due to Government support, while Carbon Capture, Utilisation & Storage, without Government endorsement, has been slow to catch up.

To avoid the abuse of power or a fall into market-driven rather than climate-driven habits, there needs to be a political mandate and cross-party groups, at a national and local government level, to figure out what parts of the energy market should be encouraged, and action then taken to implement change. On a personal level, individuals can feel empowered to contribute to wider energy creation and dispersion, and understand the gains that can be made from more sustainable sources. Energy no longer becomes solely about consuming, but balancing out your use by creating.



Education & appreciation

big idea



Carbon literacy will drive down carbon use through heightened public awareness and education programmes, more so than regulation – we may even see the advent of the 'low carbon sausage roll'.

big idea



The advent of the 'Meaning Consultant' – we will optimise spaces for meaning, focused on how you engage with a space, using ethical technology to assist, to anticipate our desires and integrate them into spaces.

Personal values are changing, particularly in response to the greater coverage around the climate crisis, and also following coronavirus, where we have realised our actions do impact on other people, even on the other side of the world.

There's an opportunity for this shift to be supercharged as we give consumers more tools to make ethical and sustainable decisions, particularly around what they eat, which has a major implication around how land and water is managed. Showing carbon, human and water cost on products, buildings and services makes it easier for people to make educated decisions, drive demand for those producers who are the most considerate, and shame the ones who don't.



The experiences during lockdown have also led to a greater appreciation of the natural assets many of us have on our doorstep but might never have noticed before. Looking at our locality gives us a greater respect for what we have, and motivates us to protect it.

The next decade could see technology harnessed to highlight our local amenities better. Many of us use the maps function on our phones regularly, and with added features this could be used to extend our journeys, in order to take us down unexpected routes to enjoy and be fulfilled by seeing historic buildings, hidden parks or other lesser-known attractions.

For those living in urban environments in particular, driven out of their garden-less apartments into surrounding areas, this would encourage greater community awareness, and therefore demand, for investment in our local areas. This could be a dilapidated building which needs saving, a street which needs greening, or a park which needs cleaning.

As our society moves up Maslow's hierarchy of needs, from survival to self-actualisation, the places which surround us are less about meeting practical needs such as food or shelter, but instead take on a greater significance, satisfying a need for meaning and happiness.



with thanks

There are a significant number of people who have contributed ideas to this thought piece and below we are delighted to recognise all of them – thank you!

Megan Adams
Lucia Alessandrini
Will Bailey
Dave Bathurst
Chris Bowie-Hill
Lewis Cullinane
Jonathan Derwent
Paul Eastwood
Scott Elliott
Stuart Evans
Josh Giddings
Sophie Gittins
Eddy Goldsmith
Matt Hall
Sarah Hey
Michael Howarth
Luke Hutcheson
Andrew James
Hannah Jane
Sam Jones
Blaise Kelly
Tim King
Sarah Langhorne

Ruby Lowe
Rebecca Lydon
Brian McConnell
Heather McKay
Scott Mills
Graham Munday
Mark Pearce
Emily Pearson
David Pethica
James Pitcher
Chris Randall
Chris Rushton
Chris Scott
Mark Seberry
Keira Sidford
Graeme Smith
Karen Southern
Lewis Stonehouse
Ted Stokes
Jack Tasman
Anuran Wickramasinghe
Harry Williams
Eleanor Wratten

*Facilitation and Foreword: Chris Bowie-Hill
Facilitation and copywriting: Jessica Middleton-Pugh
Illustrations: Laura Sorvala
Graphic Design: Joanna Young*

Hydrock 

Engineers. Designers. Consultants.

hydrock.com