



The land use challenge: Creating a system to deliver net zero

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Introduction

The clock is ticking on the UK's journey to net zero. A comprehensive re-wiring and re-plumbing of the country is needed to support increased renewable generation; energy distribution, storage, and stability; and complimentary technologies such as hydrogen electrolysis and carbon capture. Balancing these competing priorities to maximise land use and support net zero is an enormous challenge.

We are pleased to bring you fresh insights from the experts leading the necessary changes in land use to deliver net zero. We have partnered with Gerald Eve, real estate consultants and experts in the energy transition, to understand more about the issue and we are grateful to all our interviewees for sharing their insights and expertise.

The electrification of the economy, and the necessary transformation in land use, has profound implications across the real estate sector for occupiers and investors. This is a critically important topic and as our report shows, the industry will need to come together to make real progress. This report starts to unpack the complexities and challenges involved – but also the opportunities. We hope you find it interesting and useful.



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Executive summary

It is widely recognised that to tackle climate change and meet the UK's net zero by 2050 target, there needs to be a significant shift in the way we optimise land use. But with so many competing land use priorities, from renewable generation and green infrastructure, to industry, affordable housing, food security, and biodiversity, how do we determine what should take precedence?

This is the question the future energy sector has been trying to address, while still making significant inroads into deploying the renewable generation assets and balancing projects that will provide the UK with clean energy security.

We have already seen that renewable generation assets don't need to operate in isolation; dual use with farming and biodiversity projects are becoming common place. However, one of the challenges is the sheer volume of projects and the different technologies competing for land and grid connections. The knock-on effect of this is intense competition for prime sites and an increase in landowner expectations.

Alongside the well-known challenges of greenfield sites, our industrial estates and logistics parks are not yet net zero ready. There is a rising energy demand gap to be met; buildings need to be adapted; and the decarbonisation of commercial vehicles, using alternative fuel sources such as hydrogen, creates spatial challenges as the associated infrastructure is developed.

With such a challenging agenda, what needs to be done to create the market conditions for real change to happen quickly? It is crucial that different land use stakeholders keep the collective goal of net zero for the UK front of mind, but are more fundamental changes needed to accelerate change?

Key findings

- Grid capacity and constraints are one of the biggest challenges facing the sector. To solve this there needs to be significant investment in updating grid infrastructure, supported by an increase in grid balancing projects.
- Clear regulatory and policy direction is needed to incentivise investment into grid infrastructure and provide clarity around the weight and importance placed on renewable generation projects.
- Local and central government are key decision makers in driving local and national opportunities, but without continued support from private sector funders and investors the sector will not grow at the pace needed.
- Net zero is a business opportunity, and while increases in grid and land costs are impacting on land values they are not necessarily seen as a cost liability.
- Changes to national and local planning policy could be the key to allocating land to renewable generation projects, however this needs to sit hand in hand with investment in the grid.
- Regulatory and policy changes, grid upgrades and continued funding – both private and public – are all critical, but without increased public support and a more connected sector they won't deliver the change needed.

Chapter 1: Market drivers

The war in Ukraine has brought the issue of energy security into focus and highlighted the need to significantly upscale renewable generation in the UK. However, this is just one piece of the transition to net zero and the challenge will be balancing an increase in renewable generation with other competing land priorities such as biodiversity and rewilding projects and modern food production.

Simon Wheeler at Enso Energy suggests that competing priorities for land use is currently one of the biggest market drivers. “There’s a whole debate around what’s appropriate, what’s acceptable, and what the communities want and will accept. It’s a difficult balancing act to work out what those priorities are and what should take precedence. Net zero and climate change are very important and should carry significant weight, and affordable housing, food security, biodiversity are also important issues.”

That said, renewable energy generation doesn’t have to work in isolation. “The interesting thing from a land use perspective is how renewables technologies can be harmonised with other land uses such as farming and

biodiversity,” explains Thrive Renewables’ Monika Paplaczky.

TLT’s Matthew Grimwood suggests that “solar and other technologies such as battery storage can be deployed in a way which also supports sustainable food production and promotes longevity.” Liz Bartlett at P3P Partners points to studies¹ which have shown that solar panels can sometimes help crops grow by protecting them from adverse weather conditions. She goes on to say that “there are always competing priorities, but they can sometimes work together.”

In fact, dual land use where the projects are jointly developed on the same land for solar and agriculture, allowing the cohabitation of two key sectors, are becoming so common that there is now a term for it – Agrivoltaics. While more of these projects are currently undertaken in Europe and Africa, it is only a matter of time before the UK follows suit.

In addition to the climate emergency, there is a biodiversity emergency, and solar farms support biodiversity – in some cases more effectively than traditional farmland. This benefit is sometimes overlooked. However, with their own net zero goals in mind, local authorities are increasingly challenging developers to improve the ecology on site and making this a stipulation of planning approval.

¹ What’s agrivoltaic farming? Growing crops under solar panels | World Economic Forum (weforum.org)



Greenfield v brownfield

The demands in greenfield and brownfield environments are very different. In a greenfield environment the competition for sites is fierce and with the latest gigawatt scale solar and battery projects, land use is increasing on a per project basis. Landowners of prime sites near a substation with good grid capacity are being courted by numerous energy developers each wanting to secure the land for their project, which in turn pushes up the price. Unfortunately, this doesn't always lead to the best outcome or the best use of land. John Howells at Gerald Eve comments, "the landowner will be drawn to the highest price, but this could result in an option being granted to a developer who does not see the project through." The knock-on effect is that projects are not being developed quickly enough in the right locations and that is impacting the amount of renewable generation coming online.



Old power station sites can present a real opportunity, they have excellent utilities and infrastructure, the sector needs to maximise these sites.

There is also the issue that in the South East and South West the sites with the best irradiance have already been developed. While there is a growing trend for repowering / asset life extension of operational projects, the land left is not always viable for solar projects. This is causing developers to look further afield. For example, projects located on land surrounding old coal power stations come with the benefit of grid capacity and a local community who appreciate the need to re-use the land. "Old power station sites can present a real opportunity, they have excellent utilities and infrastructure, the sector needs to maximise these sites," comments Adam Archer at Uniper.

In a brownfield environment there are more corporate landowners, and while there are renewable generation and grid balancing projects being developed there are also different land use challenges. Not only are the energy projects competing amongst themselves but there are other competing land uses such as industrial and logistics, data centres, residential, hotels, roadside use etc. Developers are paying more to secure prime brownfield sites and this increase in costs mean that some sites are unsustainable for energy projects. There are however innovative solutions to this issue. By integrating energy infrastructure into the wider development such as solar rooftops with battery storage, this can make the project stack-up, decarbonising the wider development and benefitting a wider cluster of properties.

The technology mix

Battery storage is a growth technology and investors recognise the benefits of flexible generation given the current market volatility and electricity prices. "The UK is seen as one of the best opportunities in Europe for battery storage. Just under 2GW had been installed by the end of 2021 and the forecasts are predicting massive growth – it's currently a very buoyant market with high prices for battery storage preconstruction assets," comments Victoria Smith at PKF Francis Clark.



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Battery storage projects are competing for land and grid connections in both greenfield and brownfield environments where there has been a shift towards battery storage development. "There has been a huge shift towards industrial land use and re-repurposing industrial land use

for batteries. This has evolved over time with batteries being better understood in terms of the area required, the surrounding ecology impacts etc," explains Philip Elborne at P3P Partners.

Another key market driver is the development of electric vehicle (EV) charging infrastructure. Vehicle electrification is indicative of the UK's net zero future, but it is also another pressure on land use and the need to increase renewable generation – for an EV to be truly green it needs to be charged via a renewable energy source. TLT's Nick Pincott comments, "EV charging infrastructure is a very different type of land use – it's not renewable generation but it falls into the bracket of reducing carbon emissions. Again, there is a huge demand for suitable sites, and they will range from existing drive-through supermarkets and car parking spaces, to retail parks and dedicated EV infrastructure on new land."

There is then the role of green hydrogen, and how that is applied. This is an area where further clarification from the government would be welcomed. Steven Boughton at RWE comments, "there is a mechanism in place to support hydrogen production, but industry also needs support on the hydrogen demand side. The government should focus on giving support to different industries to make that swap from fossil fuels into hydrogen (or electrification)." There has been some work to create the infrastructure needed to support the development of hydrogen powered commercial vehicles and there has been a land grab for suitable production and hydrogen refuelling station sites in recent months.

However regardless of the technology, the market is being driven by a focus on substations and grid connections. Boughton summarises, "the biggest market driver is availability of grid and suitable land near a grid connection. Whether you are developing onshore wind, offshore wind, batteries, or hydrogen, every project needs timely and cost-effective grid."

Chapter 2: Net zero infrastructure

One of the biggest challenges facing the energy sector is grid capacity and constraints. Putting this in context, Wheeler comments, “you can have the best solar farm site in the world with the best landowner and a planning authority that loves it. But if you can’t connect it to the grid, it’s not worth anything.” Bartlett agrees saying, “it is a challenge to find land in the right place that also has capacity, where you don’t have to pay extortionate upgrading fees – finding the extra capacity in the grid is going to be absolutely vital to hitting net zero.”



5x

...over the next 7-8 years, National Grid will need to deliver at least five times the amount of network infrastructure than they’ve delivered in the last 30 years.

To scale up renewable generation to the levels required to provide energy security and achieve net zero, a complete overhaul of the antiquated grid infrastructure is needed. National Grid has said that in the UK alone, over the next 7–8 years, they’ll need to deliver at least five times the amount of network infrastructure than they’ve delivered in the last 30 years. This needs to be supported by more flexible policies from the district network operators (DNOs) and regulatory changes that streamline the rewiring and replumbing of the UK by removing the planning restrictions and limiting landowners’ ability to block new cables or expect high fees for allowing access.

Intermittent generation

What happens when the sun doesn’t shine, or the wind doesn’t blow? If renewable generation is going to power the UK, its variable nature needs to be supported by grid balancing infrastructure. “To accommodate the variable nature of renewables, we need a system which is reflective of the fact that electricity is not generated by just flicking a switch and turn it on. There needs to be increased grid capacity combined with more grid balancing infrastructure to take the network that we need to support distributed generation all over the country,” comments Wheeler.



And this is where energy storage can play such an important role in supporting grid balancing. Smith explains, “not only do we need to increase the amount of energy storage and find ways to improve energy storage, but we need to make it easier to connect storage to the grid. There is talk in the market of battery specific grid connections which consider net capacity rather than maximum import capacity. As net capacity for a battery is zero this could significantly boost the market.” This could in turn open up new locations for development of energy storage projects.



Changes in planning legislation to enable 50MW+ energy storage projects have been a real game changer.

The way that the grid is being utilised in the context of energy storage is also changing. Changes in planning legislation which have enabled large energy storage projects, have led to a rise in transmission connected as well as distribution connected schemes. “Changes in planning legislation to enable 50MW+ energy storage projects have been a real game changer. We’re seeing schemes upscaled by quite a margin and that is really unlocking those transmission connected projects,” comments Grimwood. The largest Lithium-Ion battery storage project currently being promoted in the UK is 2.8GWh, with several pumped hydro storage schemes in Scotland of even greater capacity, with one scheme providing potentially up to 60GWh.

Battery storage is also being used to reduce demand pressure on the grid through innovative solutions which combine solar with storage and EV charging infrastructure.

“If you have an older bus station, for example, its electricity connection will power the basics but not six new electric bus charging stations. If you add a behind-the-meter battery, it can provide ancillary power and be ready to charge the buses,” explains Pincott.

Integrating new net zero technologies

There is the new challenge of developing other net zero infrastructure to support emerging decarbonisation technologies. There are several projects underway. Project Union – a National Grid Gas Transmission project – looks at exploring the potential to repurpose sections of the gas NTS to develop a hydrogen backbone network. Carbon Capture & Storage (CC&S) projects are being integrated into parts of the UK where there is a lot of heavy industry. Elborne recognised the progress that has been made so far, “the industrial cluster areas are a great way to support net zero and generate investment and redevelopment, but more governmental support is needed.”

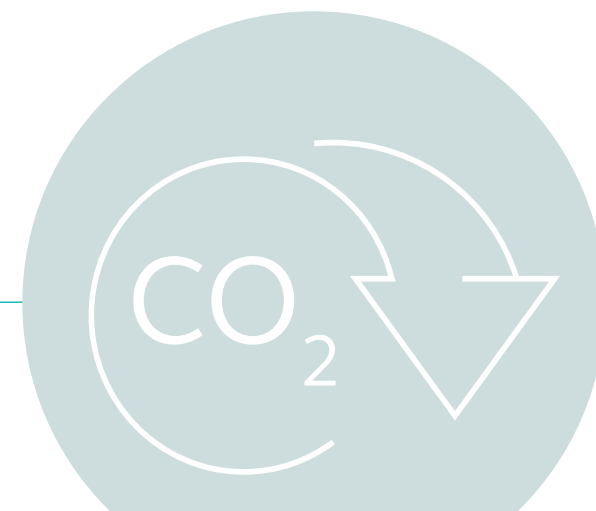
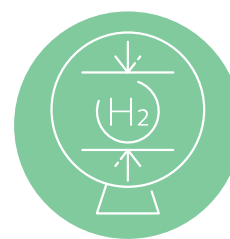
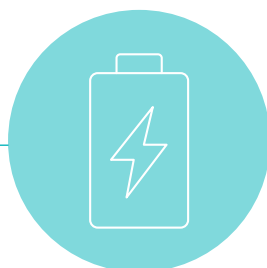
The space needed for these projects may not be as land intensive as other technologies, but they do need to be located adjacent to the demand, near grid and water supplies and they require their own specific infrastructure. “New linear infrastructure including pipelines and power lines along with compression equipment and storage locations for hydrogen and carbon dioxide are needed to facilitate development of hydrogen and CC&S projects. The funding mechanisms that are needed to support these linear projects need government intervention,” comments Boughton.



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The colossal investment needed to install the infrastructure presents a bit of a conundrum - the dedicated infrastructure needs to be in place before the market can really grow. Alasdair Wilson at SSE, who are looking to develop carbon-abated and hydrogen fuel power stations, suggests that “site development is linked to where the government installs the related infrastructure and of course grid. With the costs involved, projects will not reach Final Investment Decision on hope that infrastructure will come later.”

Boughton and Wilson are not alone in trying to figure out how this project sequencing will work in practice. Adam Archer at Uniper poses an interesting question. With development being led at a largely national level does the infrastructure go to the existing demand or do the customers go to the infrastructure? “Will future industry move to those locations because that is where the infrastructure is, or will the infrastructure expand?” he asks. This uncertainty is an emerging theme.



Chapter 3: Decision makers

Which parties should be taking a lead role in determining the best use of land? Considering the number of stakeholders involved, from local and national government, to funders, engineers, and communities, this is not an easy question to answer.

National policy

One of the challenges the renewable energy sector has faced is the lack of stable regulatory landscape – from the changing landscape around FiT and ROC subsidies, to the more recent ‘will they, won’t they’ in relation to easing onshore wind restrictions in England and Wales. “The sector needs clear and consistent regulation which engenders consumer confidence and opens up the market for more renewable generation. The December 2022 decision to ease restrictions on onshore wind is a big win but one which came after months of uncertainty. And this uncertainty is hampering growth,” says Grimwood.

There is also the suggestion that National Grid and the regional electricity distribution companies should have clear regulatory incentives to plan. Boughton comments, “currently our grid connection process is reactive. The grid companies need to be fully empowered to plan for the future, to proactively go out and secure land to give them options for substation expansion.” This is not a short-term solution, but it could help to solve longer term grid issues.



The grid companies need to be fully empowered to plan for the future...

Planning is one area that needs clarity on the importance and weight placed on renewable generation projects, and a systemic approach to making planning decisions. Wheeler explains, “renewable generation projects need to work with the landscape they are developed in, and land use decisions should sit with those who understand both planning and what is needed to move towards net zero.” Taking a combined view results in the land allocated for renewable generation projects also having grid access, but if decisions are made in isolation, then sites can be ringfenced, but are completely inaccessible to the grid – for example in Wales where sites have been identified which will support onshore wind projects in theory, but in practice there is no viable grid connection.



Local decision makers

Local government has a clear role as a decision maker. Supported by the guidance around best use of land and the right metrics, local government is ideally placed to balance their own local requirements and needs with larger scale strategic needs. “If you look at Lincolnshire, there is little space for large solar schemes because it’s all viable farmland. But local government still has its own net zero targets to meet so they need to be able to make the decision on what is the right technology for them – that could be onshore wind or bioenergy – to produce more renewable power,” explains Elborne. Archer agrees, “land use should be managed through the local development plan but at the same time local government needs more expert support and guidance to balance its local needs with its net zero requirements.”

Funding the change

Financial support from the government for emerging technologies is also a must. The Local EV Infrastructure (LEVI) pilot scheme provided £20m of government and industry funding to support the creation of new commercial EV charging infrastructure, including on-street charge points and petrol station-style charging hubs. This is just one example, but the sector needs to be able to call on more funding like this.



£20m

The Local EV Infrastructure (LEVI) pilot scheme provided £20m of government and industry funding to support the creation of new commercial EV charging infrastructure

It is not just government funding that influences the market; banks, funds and investors are also innovating. The London Stock Exchange announced its Voluntary Carbon Market designation at the end of 2022, and debt and equity funders are playing an increasingly important role in determining the technology mix by actively channelling funding into specific technologies. TLT’s Simon Courie comments, “there have already been some significant developments in modelling bankable debt funding solutions such as Santander’s first to market multidebt tranche approach to the tiered risk profile of the battery energy storage system revenue model.”

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The sector needs to look to monetize newer, nascent technologies so that they can quickly be upscaled and included in the generation mix.

But that innovation needs to be applied more widely. The sector needs to look to monetize newer, nascent technologies so that they can quickly be upscaled and included in the generation mix. And like with EV Charging Infrastructure – which is still very much an equity play – that may require a mix of government and industry funding in the first instance to cultivate confidence and accelerate the funding transition.

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As investor confidence in net zero projects grows this creates a global tipping point and suddenly those unusual projects become the norm.

There is also a role for economists and researchers to show the compelling kind of return profile that a joined-up land use transition can generate and to demonstrate the short-and-long term benefits to the industries and businesses which are leading on net zero. “Well developed thought leadership and research gives funders comfort that this is a proposition that they can take to their shareholders and investors,” explains Matthew Gingell at Oxygen House. “As investor confidence in net zero projects grows this creates a global tipping point and suddenly those unusual projects become the norm. To achieve net zero, we need to stimulate unusual projects to make them the new business as usual.”

Chapter 4: Valuation impact

Net zero is not a short-term proposition – it is a long-term journey and should be viewed as a value driver. Businesses want to work with counterparties who have similar values, who are aligned in terms of net zero, sustainability and of course wider ESG. Therefore, net zero becomes a cost of doing business – get it right and the value of the business (and the real estate) will increase but get it wrong and there could be a negative impact. Even though there is an initial cost outlay, the direct and indirect benefits over the medium to long term will deliver value.

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The need to not only increase renewable generation, but to introduce rewilding and biodiversity projects alongside farming, is impacting on land values.

Increasing land values

The need to not only increase renewable generation but to introduce rewilding and biodiversity projects alongside farming – in short, all the elements needed to support businesses, communities, and individuals in making the fundamental changes to achieve net zero – is impacting on land values.

Both greenfield and brownfield sites for renewable generation projects are at an all-time premium and land rents are higher than they have been at any other time – this is not a trend which is going to reverse in the short term. But developers don't see this as a cost liability as the land may not be the determining factor in what makes a site viable. A market reputation for seeing projects through, working collaboratively, access to funding, and the ability to secure grid connections should tip a project in a developers favour with landowners taking a more compelling overall offer over a higher offer for a project that may not progress.



Newer technologies are not necessarily impacted to the same extent by high land prices because of the limited number of interested parties. Wilson comments, “The numbers are still stacking up. At the moment there are not many players in new power CCS plants, and the main play is retrofitting of existing sites rather than finding new sites, so competition is not as fierce.”



Farmers who have had their business models impacted by Brexit and climate change, often see the benefits of renewable generation projects.

Farmers who have had their business models impacted by Brexit and climate change, often see the benefits of renewable generation projects. “The addition of a renewable generation project can support their business and allow them to continue working the land and investing in their core business,” comments Wheeler.

In a brownfield environment the benefit of having onsite renewable generation, EV charging infrastructure etc, is that it enhances the net zero credentials for both the landlord and their tenants; an important benefit as occupiers and investors are demanding higher sustainability credentials from buildings. While there may be a cost associated, particularly with retrofitting, once those improvements have been made, the owner could see reduced void periods and an increase in market rent. “If your property isn’t energy efficient or doesn’t have a good EPC rating then there is a risk in terms of market obsolescence. If you look at most of the occupiers, they are demanding energy efficient, sustainable buildings, and will pay to secure them,” explains Delia Batt, of Gerald Eve.



EV charging infrastructure enhances the net zero credentials for both the landlord and their tenants

Connection costs

The cost of connecting to the grid also comes up in the context of the valuation impact. Bartlett comments, “because grid capacity is low, you often need expensive upgrade works or you can’t find a site next to the point of connection and you have the costs of running cable for miles rather than metres to get to the point of connection. All of those things contribute to higher costs.”



Higher market project valuations mean that projects with higher grid costs can start to become financially viable.

While rising costs coupled with delays in connecting to the grid could mean that modelling a viable future energy project becomes even more complicated, Smith points to continued investor interest in renewable generation and grid balancing projects, the high levels of capital deployment and an increase in new investor/developer JVs as market balancers. “Higher market project valuations mean that projects with higher grid costs can start to become financially viable, especially if they have a firm nearer term connection date, which further drives the importance of securing that land and potentially paying your landowner more to get it,” says Smith.



Chapter 5: The impact of net zero on real estate

Net zero is playing an increasing role in real estate strategies. Businesses are looking at their ESG strategies which in turn is driving a growing trend for green buildings and sustainable infrastructure. Individuals are more aware of their impact and want to support real change both in the workplace at home and in their communities.

From the ground up

With sustainability (and ESG more widely) becoming a business imperative, businesses have an opportunity to influence real change. “Occupiers are demanding energy efficient, sustainable buildings and that means the building needs to provide energy from renewable generation, EV charging infrastructure, biodiversity and so on. This is resulting in an increase in green buildings – both retrofitted and new build,” comments Batt.

Employees are also putting pressure on businesses to do the right thing. The war on talent is not letting up and employees don’t just join an organisation for a job, they join because of the company values – its aspirations around sustainability and climate change are front and centre alongside things like equality, diversity and inclusion, and wellbeing.



While many local communities don’t have the knowledge or funding to develop a project from the ground-up, if those operating within the sector offer to collaborate with them, everyone benefits.

Another influencing factor is local communities themselves. “If you give communities empowerment and ownership of renewable generation schemes, then they can see the benefits,” comments Paplaczky. While many local communities don’t have the knowledge or funding to develop a project from the ground-up, if those operating within the sector offer to collaborate with them, everyone benefits.



Accelerating change

This presents a real opportunity to accelerate growth particularly in the built environment sector, but is that happening and if so, is it happening fast enough?

Gingell believes that while some transition is happening it is not at the scale needed. “We’re not in transition mode at the moment so the scale of transformation in land uses is not happening. Take the built environment sector, many new build housing estates don’t have solar panels because we’re operating as business as usual, and that is not going to get us to net zero,” says Gingell.

Part of this could be down to the way the land is valued through traditional methodologies; ecosystems and nature are difficult to financially quantify. Could the way to accelerate change be to create a land use system which retrofits buildings for energy and nature? The theory being that connectivity with biodiversity creates better places to live, which people value more, and that changes the land value proposition for developers, investors, landlords, tenants, and occupiers.



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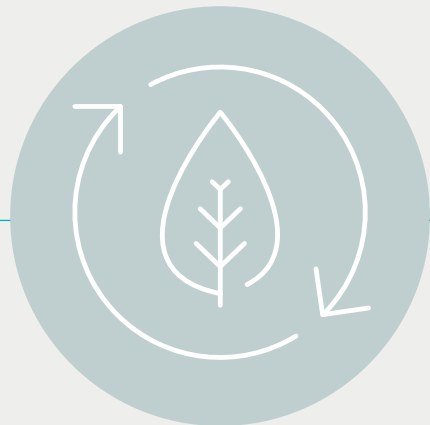
Decentralised energy

The changing nature of the built environment sector has a far wider impact than green buildings – infrastructure, reintroducing nature to our cities, changing the way we move around all impacts on our future towns and cities. However, this in turn creates another grid conundrum with increased demand for renewable generation putting increased pressure on the grid. However, there are more flexible solutions such as different types of schemes which look to promote a decentralised system. “We need to factor in smart local energy systems. If you have a town which is powered by an integrated and connected multi-technology embedded energy, then that reduces reliance on an already pressured infrastructure,” says Paplaczky.



...integrated and connected multi-technology embedded energy reduces reliance on an already pressured infrastructure

Courie comments that “private wire projects which take the energy directly from the renewable generation assets to the end user, can also be of real benefit to large energy users; providing energy security, a cheaper source of electricity and once again reducing impact on the grid.”



Beyond generation

Net zero infrastructure is not all about keeping the lights on or heating our homes. Dynamic food production which provides local produce to local shops is another element as is active transport and how we use land for transport. Gingell explains how Oxygen are looking to buck land transport trends, “we’ve been looking at how to show that you don’t have to put the road infrastructure into a housing development. If you make it car free, how much money do you save by not putting in the road infrastructure? Or having to do the highways planning and searches? And how much nicer is it to live there?”



...it is likely that in 20 years, society will look back and wonder why so much land which could have been repurposed for net zero projects was used for parking.

Looking at the cost of land in this way calls into question the current use of land for transport, particularly given changes in vehicle ownership models. While the UK needs to continue to create more locally interconnected active transport solutions and improve national public transport options, it is likely that in 20 years, society will look back and wonder why so much land which could have been repurposed for net zero projects was used for parking.

Chapter 6: Policy drivers

What policy and regulatory changes are needed to support the determination of the best use of land in an urban environment or rural environment? There is a risk that without a clear determination the competition for sites will be driven purely by commercial factors, meaning that some important net zero technologies cannot compete.

Radical change

Howells suggests that the solution could be to have land allocations in local planning policy which are derived from national planning policy. He goes on to explain, “National Planning Policy says that local authorities have to allocate certain amounts of new residential plots within each borough or district or city within the UK. Why not have something similar for renewable generation projects?”

Howells’ suggestion could mean that National Policy would obligate local authorities to designate certain sites for renewable generation projects. This could open up new development sites in highly sought-after brownfield city locations and quickly increase the amount of generation available.

Batt supports Howells’ suggestion. “To see real change, we need to be radical. If we accept that it is a climate emergency, and we’ve got to deliver solutions quickly across the entire country, we need to do things that haven’t been done before.” She goes on to suggest that “a change to planning which supports a presumption in favour of renewable generation, even in rural environments, if you’re within a kilometre of a substation, could be the difference to delivering against net zero or not.”



...a presumption in favour of renewable generation, if you’re within a kilometre of a substation, could be the difference to delivering against net zero or not.

Planning provisions

Planning committees are made up of elected officials who don't necessarily have a background in renewables, and they are elected by local people who might like the idea of renewable generation but not near their homes. Wheeler comments "this can lead to planning decisions which counter the recommendations given by their advisers and experts in their fields – they may feel they have to find a reason to refuse a planning application because it is not popular locally." If this happens the next stage is to appeal the decision with the Planning Inspectorate, and the Council could be put in a position where it must defend that decision, which was counter to its initial recommendation. This system is hampering development and while a policy or regulatory change may not be needed, a structural change around planning could negate this issue.

Another welcome change to planning would enable the connected beneficial ecological, community and landscaping provisions to be recognised. "If you could identify areas of land that could be bolted on to a scheme to enhance its benefits from a cultural & ecological perspective that would be a positive, but at the moment different land uses require different planning applications. The introduction of a community infrastructure levy but for rural land, with ecology replacing infrastructure, could be a game changer," suggests Elborne.

Newer technologies also present a planning challenge. Archer explains, "a lot of new infrastructure projects don't fall within the NSIP regime so there is no hook to hang your planning application to. That presents a barrier to development, one which the government could do more to address so these projects can move forward more efficiently."

Industry handbrakes

Planning policies around net zero decarbonisation are not always the main issue, it is often grid which is the constraining factor. "If you continue struggling to get grid connections, and if you continue struggling with local authority planning committees, then that's a massive handbrake on the industry," comments Wheeler.



Planning policies around net zero decarbonisation are not always the main issue, it is often grid which is the constraining factor

The distribution network operators (DNOs) are struggling to support renewable generation developers looking to bring projects forward because there has been no recent investment in the grid infrastructure. Paplaczky puts this into context, "the challenge is that if you are going for a grid connection agreement, you will probably be offered a connection date in 10 years. That means you won't start building the project right now because you would have to then wait 10 years before you can actually connect it." This is slowing down development across all technologies. The UK needs a grid network that can support the levels of renewable generation needed to achieve net zero – there is an urgent need for more capacity, more reliability, and upgraded infrastructure. This is relevant at all levels, from the national transmission network down to the suburban street level.



The UK needs a grid network that can support the levels of renewable generation needed to achieve net zero – there is an urgent need for more capacity, more reliability, and upgraded infrastructure.

A solution could be to introduce a flexible system which allows technologies to better share grid capacity. "Wind and solar projects only produce electricity when the wind is blowing or the sun is shining, meaning they are never really at full capacity, but you have a grid connection which is able to cope with full capacity 100% of the time. If the technologies could be co-located and share grid connections there could be a real benefit," explains Paplaczky. While this is already happening to some extent there are still several barriers to this being an industry norm.

Closing the gap

With newer technologies like hydrogen there is also the balance between supply and demand. "Unlike electricity, not many organisations or individuals in the UK currently use hydrogen. It requires end-users and potential customers to make the decision to switch to low-carbon hydrogen from existing fuels. And that needs some government support and incentives to encourage the switch from fossil fuel to hydrogen," explains Boughton.

And that might be a wider message: while the sector is trying to move in the right direction, uncertainty is hampering growth. Clearer policy and regulation are needed to support the right projects in getting off the ground and accelerate the transition to net zero.



Chapter 7: Market conditions

With several different stakeholders needing to come to together to foster the right market conditions to create a land use system to deliver net zero, it might seem like an unreachable goal. However, with the imperative that we must find a way forward, perhaps the solution is not as complex as first thought. If each stakeholder makes small changes, we can create the right market conditions.

Stepping up

Rapid progress can only be made under a stable regulatory and policy framework that will give confidence to all those involved in net zero – both consumers and businesses. Policy could also do more to encourage the take up of net zero solutions. The updated Building Regulations, which meant that from June 2022 all new build homes with associated parking need to have EV Charging Infrastructure installed, are a good example of this, but similar could be applied to boost other technologies.

Increased market confidence and the creation of a consistent, clear and certain environment will support debt and equity funders in developing innovative new products to fund the schemes that will deliver on net zero. “There is a real appetite to fund new projects, to fund new technologies but uncertainty around revenue streams makes it difficult to create debt funding. Greater clarity and certainty about a technologies role in the energy mix will help bring new solutions to market,” comments Courie. However, industry funding needs to be matched by government funding to support pilot schemes and deliver newer technologies to market.



06.2022

...from June 2022 all new build homes with associated parking need to have EV Charging Infrastructure installed.



Net zero PR

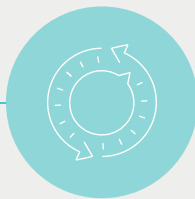
Making changes to policy and regulation may not be enough. As demonstrated by the challenges of going through a planning committee, not everybody is onboard with renewable generation in the same way that they are with say building sustainable housing. It could be that the missing piece of the puzzle is a PR campaign showing the integral role that renewables will play in net zero. "Policy and regulation need to be supported by a government PR campaign to show people that we're not destroying farmland by installing PV arrays, we're doing something to create a better future for our children and for the country," comments Bartlett.



1–3%

Solar currently takes up 1% of land and even if the UK's hit its solar targets it will only take up 3%. Golf courses take up double that

Maybe the solution is to compare solar farms and golf courses. Solar currently takes up 1% of land and even if the UK's hit its solar targets it will only take up 3%. Golf courses take up double that, but nobody ever objects to a golf course, even when they don't have an active role in achieving net zero.



Connecting the sector

One of the challenges is the slightly disconnected nature of the sector; the major energy companies, developers, funders, DNOs all operate independently and have different priorities. While there is a genuine desire to move in the same direction, what is needed to really drive this forward is a whole system approach. Howells comments, "there needs to be more collaboration, more integration. This could be achieved by a mix of overarching policies, or the sectors trade bodies continuing to work to pull everyone together."



The introduction of a community infrastructure levy but for rural land, with ecology replacing infrastructure, could be a game changer.



Renewable energy developers are already leading the way. "We want to protect our interests and our reputation, but we don't want to create a negative competitive environment by blocking other developments - if there's a way of cooperating and allowing somebody else's development we will do," comments Wheeler. "Just by the industry cooperating and being more aligned we can focus on delivering good projects in the right areas."

This is also being reflected in emerging technologies like CC&S and hydrogen where clusters are forming. "The demand market, whether from a power station or other industrial emitters, are coming together as clusters and going to the government to say we've got this big regional scale demand, now please connect us to the infrastructure so we can deliver on net zero," explains Wilson.

Could it really be that simple? Perhaps it could be - take GRIDSERVES' electric forecourt model which brings together renewable generation, EV Charging Infrastructure, retail, and leisure – you can charge your car from renewable sources, get a coffee, do a bit of shopping, put the children in soft play. That is a multi-industry approach to both net zero and the land use challenge.



Conclusion

Change is happening but not at the scale needed – the UK needs to move quickly from ‘business as usual’ into transition mode. But what does this actually look like? Clarity, certainty, connection, and pace of change are all vital to making progress.

Clarity around the priority given to different land uses. This, supported by a more robust national and local planning policy, can empower local authorities to make land use allocations which deliver net zero and benefit local communities.

However, it is unfair to expect local authorities to shoulder the burden of net zero alone. Not only should local authorities be supported through expert support and guidance; funders and investors will play a key role in driving the market – dictating future net zero trends and stimulating the ‘unusual’ into business as usual.

Certainty is needed in a sector which has been buffeted by continually changing regulation, policy, and appetite. While the sector has without a doubt weathered this by continuing to innovate and develop renewable generation assets and grid balancing projects, a more stable landscape will enable the upscale needed.

A more stable regulatory landscape could also support critical upgrades to the grid infrastructure which will continue to hamper development if not addressed.

And an upgraded grid could also help address the land use challenge - competition for “easy to develop” sites would be reduced; grid connection costs would come down, and a whole new tranche of sites could come to market.

Connection is not just about grid. While the importance of grid cannot be underestimated and is a recurring theme, there is a need for a collective, connected voice in the sector. Sector trade bodies, developers and funders all need to move in the same direction to create the overarching policies needed to transition.

Connectivity across the sector is also going to be a driver for newer technologies such as green hydrogen. Without connected infrastructure to serve the major demand hubs in our industrial clusters and cities, it will be very difficult to get capitalise on the huge appetite for private sector investment.

Pace of change is one of the biggest challenges and one of the hardest areas to address since it impacts so many strands from policy to regulation to consumer demand to funder appetite. However, it is here that those at the forefront of the industry are going to need to dictate what happens next. We can’t simply wait for a stable environment, for an ideal policy and regulatory landscape to be created. We must demand it and lead the change together.

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