

Routemap to Carbon Negative:

Summary of Roundtable Sessions & stakeholder discussions May – Oct 2021

Between December 2019 and March 2021, the Y&NYLEP have been leading the development of the Carbon Abatement Pathways report, a study which explored potential pathways to net zero carbon across key sectors – transport, buildings, industry, power, and land use and agriculture. Over 200 stakeholders have been engaged to date in the development of the research, through expert consultation on the modelling parameters, through policy co-design and more detailed input on priority projects over the space of a year.

As the delivery of net-zero requires unprecedented collaboration between organisations, businesses and communities, the technical research findings from the CAP study need to be translated into a plan that stakeholders can collaboratively own and feasibly deliver– York and North Yorkshire’s Routemap to Carbon-Negative. The purpose of the Routemap is to provide a clear, co-owned plan to accelerate the transformation to a carbon-negative York and North Yorkshire. The specific aims of the Routemap are:

- To provide strategic direction and a coordinated approach to decarbonisation;
- To catalyse collaborative action at pace and scale;
- To harness the economic opportunities of net-zero, leveraging public and private sector investment;
- To build confidence that reaching net zero and beyond to carbon-negative is feasible; and
- To position York and North Yorkshire at the forefront of national climate action and provide a platform to influence Government policy and funding.

In May and June 2021, the LEP hosted a Roundtable Series designed to challenge and validate the Carbon Abatement Pathways study findings, alongside consolidating prior stakeholder engagement to agree key actions within the Routemap to Carbon-Negative - starting to identify the “what”, “how” and “who”. While input on the “what” was prevalent within the sessions, specifics around the “how” and “who” were difficult to attain, partly due to the time allocated for such an extensive subject and partly because the attendees were not necessarily in the position to commit resources to the routemap at this point. For some sub-sectors, follow-up one to ones and small focus groups were held, and others are in planning for later this year.

In each section of the report, the “what” is discussed in brief, with more of the content from the roundtables captured within the tables. Each table outlines the targets and measures that were discussed, the level and context of stakeholder support for each measure (which is a reflection of the Roundtables but also the surveys and workshops from the previous rounds of engagement in 2020), and a summary of strategic risks and opportunities.

Dependant on stakeholder feedback the targets have been allocated a RAG rating:

- ‘Green’ – indicates strong stakeholder support and the LEP team recommends that these are included in the Routemap

- ‘Amber’ – indicates that there is support for the target, however, there are concerns associated with it. These are recommended to be included in the Routemap with adjustments or caveats.
- ‘Red’ – indicates significant stakeholder concerns around these targets, largely due to potential unintended consequences and limited ability to actually deliver the projected carbon reduction. These measures are recommended not be included in the Routemap, and in some cases a replacement target is suggested.
- ‘Grey’ – indicates where the team has not been able to obtain sufficient stakeholder input to make a clear recommendation.

The final Recommendations column outlines the decisions reached with stakeholders at the Roundtables (and sometimes informed by follow-on conversations with specific experts), detailing what should be included in the first Routemap to Carbon Negative. We appreciate your consideration of this document, including if you have any comments on the recommendations to further inform our thinking before drafting up the Routemap.

Marine, Land Use & Agriculture Roundtable

Key sentiments

- Localised, flexible and holistic approach
- Farmer first initiative with dedicated on-ground advisors
- Consideration of biodiversity crisis and climate change impacts
- Focus on unintended consequences
- Look at root cause not symptoms

“What”

Table 1 summarises the conversations and sentiments expressed by attendees at the workshop. Some topics generated more discussion than others, given the expertise in the room – the more in-depth and nuanced conversations are captured in the narrative below.

Marine: This would be a new addition (outside the scope of the Carbon Abatement Pathways report) but huge opportunity area for Y&NY. Further study is needed in this area to evidence the potential impact of improving marine environments.

Woodland: It was noted that, although feasible, the target is very ambitious, and engaging landowners to implement will be a delicate and time-consuming job. Locations must be carefully considered, incentives need to facilitate long-term commitment, and planting needs to be on a voluntary basis. Once landowners decide to plant more trees, they need to be able to access intelligence on planting the right species in right places, source British saplings, and have access to a wide skills base to support planting and maintenance.

The focus on new trees should not be done at the expense of protecting and enhancing existing woodlands. The target number should be regularly reviewed as more data from other studies come out, for example, the detailed GIS and satellite mapping information being collected by the White Rose Forest project.

Food Waste: Strong support for this target due to the impacts beyond the Scope 1 and 2 bounds of the CAP study, as reduced wastage will lead to reduced food imports and related positive impacts on transport emissions, food resilience and local economy. There was a strong thread of support for encouraging local and seasonal food production and consumption to maximise impact, such as encouraging seasonal produce, creating a regenerative farming/regenerative food growing plan for the region, and potential to develop local abattoirs for better for animal welfare (although economics of supply chain was seen as a limiting factor).

Red Meat and Dairy Production and Consumption: Some stakeholders expressed a concern that the comparative environmental impact of red and white meat was not representative of the true picture in North Yorkshire, and that shifting focus from red to white meat may have unintended consequences beyond carbon (i.e. other pollutants, health impacts). Attendees broadly agree that there would be some reduction in consumption, but that the strategic direction should instead be to improve the production practices to reduce carbon intensity and improve other environmental services. There were also concerns expressed over food poverty if a local sourcing approach meant that meat prices increase – we don't want to create a 'middle-class' solution.

“How” and “Who”

In the “How” section, there was a specific focus on the overarching principles that the routemap should adhere to for this sector. Attendees agreed that the targets need to be flexible and iterative; that farms should be treated as a full ecosystem rather than a collection of carbon emitters and sinks; that farmers should be fairly rewarded for using sustainable methods, and that the importance of natural capital should be emphasised.

It was recognised that national policy has disproportionate impact on this area of the economy, in particular around ELMS, and so local actions were centred around pushing for early guidance on grants and payments, making sure private markets work in conjunction with public funding. A popular local intervention suggestion was for regional partners to work together to improve provision of information for farmers and how to plan for their businesses.

A wide range of existing projects and programmes were brought forward as potential elements of the Routemap, including:

- Exploring the Maximum Sustainable Output (MSO) approach - addresses multiple issues on carbon/nature/rural community sustainability.
- Farm Carbon Toolkit - allows each farmer to understand carbon levels and provides expert advice, important to help farmers navigate through lots of information.
- Farming Innovation Pathways (Innovate UK) - projects recording at an individual farm level, including other farmer and supply chain data.

It was noted that more data was likely to be required to properly evidence the GHG footprint of livestock systems and how to reduce these, to better inform the recommendations and messaging around livestock numbers and meat consumption. On the other side, some participants cautioned against spending too much time on data gathering and instead working on the best available data to make changes and monitor the impacts, to reduce delays.

Regarding the question of who needs to be involved in delivering this section of the Routemap, it was clear there was a wide range of potential partners already active in advising, advocating and innovating in the region. It was agreed that farm advisors with deep ecological and local geographical knowledge would be really valuable to provide input at a farm-by-farm level. Research and knowledge exchange organisations such as Harper Adams, CIEL and AHDB can advise on SMART farming and improving knowledge exchange with and between farmers. Specific ongoing projects on regenerative farming (by the Yorkshire Dales National Park Authority) and remote sensing for hedgerow improvements (NY&Y LNP) can better inform the next phases of the agriculture section of the Routemap. Key partners such as the National Parks, AONBs, Yorkshire Peat Partnership and the Tees Swale Project could bring in complementary work towards similar targets and specific learning from ongoing projects regarding peatland restoration.

Table 1: Summary of the Marine, Agriculture and Land Use roundtable, 6th May 2021

Targets & Measures from CAP report	Stakeholder Support	Roundtable Outcome	Strategic Opportunities	Strategic Risks	Recommendation
Restore 100% of York and North Yorkshire's peatlands by 2038		Strong stakeholder support for target. Concerns around achievability relating to authority and access, but stakeholders keen to be ambitious, recognise our peatlands are our 'amazon rainforests'.	<ul style="list-style-type: none"> • Prevent existing carbon leakage from peatlands • Improve biodiversity and ecosystem resilience 	<ul style="list-style-type: none"> • Potential impact on food production • Highly ambitious target – reputation risks associated with not delivering. 	To include 100% peatland restoration target by 2038 – with clear action plan to deliver. Strategic work to be undertaken on potential impact of food production and mitigation.
Increase amount of hedgerows in the region by 10-20% by 2038		Strong support - 'no regrets' option, supports biodiversity. Keen to maximise this to aid issues around woodland creation; potential to increase target to include planting hedgerows on boundaries. Support width and health as well as length.	<ul style="list-style-type: none"> • Improve biodiversity and support nature recovery, alongside increasing carbon sequestration. 	<ul style="list-style-type: none"> • No significant strategic risks identified. 	To include target to increase hedgerows by 20% by 2038, alongside improvements in hedgerow width and overall health.
Increase bioenergy crops to reach over 5000 hectares by 2038		Support for the target, although stakeholders questioned the method for estimating the number.	<ul style="list-style-type: none"> • Industry growth in bioenergy crops, links to BioYorkshire proposition 	<ul style="list-style-type: none"> • Risks associated with displacing food production (food v fuel) 	To include target on bioenergy crops, but review impact.
Improve manure management and decarbonisation of on-farm machinery		Support for the target and perceived as 'low-regret', with Government policy in place to support improved manure management processes.	<ul style="list-style-type: none"> • Potential to reduce water pollution from farm runoff 	<ul style="list-style-type: none"> • Costs and carbon associated with purchasing new agricultural machinery 	To include proposed target on improved manure management and decarbonisation of on-farm machinery.
35% reduction in food waste by 2038		Strong support for need to address food waste and stakeholder consensus that the target could be more ambitious.	<ul style="list-style-type: none"> • Reduced business costs • New business opps to tackle food waste • Consumer food savings • Better market use of UK seasonal produce • Develop local abattoir strategy • Opp to create Y&NY regenerative farming plan 	<ul style="list-style-type: none"> • Reduction in food waste available for anaerobic digestion 	Include target on 35% reduction in food waste by 2030 – bringing forward recommended target to ensure it is more ambitious.

<p>Plant 37,000 hectares of new woodland by 2038 (~an increase over the 54,000 hectares currently planted in the region, at a rate of over 2,000 hectares per year)</p>		<p>Strong support for woodland planting. However, significant concerns around the scale of planting and land required. Consensus around the importance of planning (i.e., ‘right tree, right place’) and management of woodlands; whole ‘systems approach’ is required ensure an effective approach and to identify unintended consequences.</p>	<ul style="list-style-type: none"> • Carbon sequestration from tree planting is essential to achieving carbon-negative ambition • Potential economic opportunities for the region from developing supply chain for tree planting. • Potential to improve biodiversity and flood resilience with careful planning. 	<ul style="list-style-type: none"> • Displace food production if planted on agricultural land • Risks associated with trees planted in inappropriate places • Risks associated if tree species is not suitable for area • Costs associated with management and maintenance of woodlands. 	<p>To include 37,000 hectares of new woodland as a flexible, aspirational target for 2038. Work with key stakeholders to establish ambitious, yet deliverable tree planting targets up to 2030. Ensure a ‘whole systems’ approach is used in planning and management of woodland.</p>
<p>Improve crop yields to assist in reducing agricultural emissions through reducing the area of cropland required to maintain existing yields</p>		<p>Support for measure, however, stakeholders concerned how this will be achieved in an environmentally sustainable way. Stakeholder consensus that improving crop yields must improve soil health.</p>	<ul style="list-style-type: none"> • Regional USP in regenerative agriculture • More profitable farms • Improved soil health 	<ul style="list-style-type: none"> • Increased use of fertilisers and pesticides – if synthetic chemicals increased, rather than taking a regenerative agricultural approach 	<p>Include target on improving farm productivity, linked to improving soil health and ensuring targets are achieved with a positive impact on the environment. Further discussion with key stakeholders required to specific target.</p>
<p>9% cropland required to incorporate on-farm trees/alley cropping, and 11% of permanent and rough grazing converted to woodland grazing by 2038.</p>		<p>Concerns around agricultural land taken out of production and being used to plant trees. Consensus that farmers should be able to make their own decisions about what their land is used for.</p>	<p>(as above)</p>	<p>(as above)</p> <ul style="list-style-type: none"> • Lack of authority to deliver measure; farmer disempowerment 	<p>To not include targets around farmland being converted to woodland, recognising that the target for 37,000 hectares of new woodland will require farmland conversion – but this will be farmer-led and dependant on Government policy (e.g., ELMs).</p>
<p>Between 6% and 28% of horticulture will be required to move indoors by 2038 depending on the pathway</p>		<p>Limited support for the measure, with stakeholders commenting that the measure was bizarre and unintended consequences in terms on energy use must be considered.</p>	<ul style="list-style-type: none"> • Potential industry growth opportunity 	<ul style="list-style-type: none"> • Productivity may not improve • Increased energy consumption • Carbon emissions associated with building greenhouses 	<p>Further stakeholder research required to understand if proposed shift indoors is necessary and will deliver productivity benefits.</p>

<p>Reduce red meat and dairy consumption by 32% by 2038 (Max Ambition pathway)</p>		<p>Whilst there was consensus amongst stakeholders that the consumption of red meat and dairy needs to decrease, there were concerns that it's not the role of the LEP or local authorities to promote diet changes as this is consumer choice.</p>	<ul style="list-style-type: none"> • Opportunity to prioritise locally and sustainably sourced meat. 	<ul style="list-style-type: none"> • Reduced demand for red meat and dairy consumption may impact on local farmers • Reputation risks 	<p>Not to include a specific target on red meat and dairy consumption, but include a priority on local, sustainable sourcing. Also include in narrative the need to reduce red meat and dairy consumption as part of a healthy diet. (incl. food miles)</p>
<p>Numbers of dairy cows, beef cattle and sheep in York and North Yorkshire must decrease by up to 45% in 2038 as numbers of pigs and poultry rise (by up to 15% in 2038).</p>		<p>Significant stakeholder concerns around this target. Serious concerns that reducing the number of dairy cows, beef cattle and sheep would have economic impacts within the region and may lead to Y&NY exporting our emissions. Concerns around increasing numbers of pigs and poultry and the environmental impact of doing so.</p>		<ul style="list-style-type: none"> • Y&NY exports food production emissions • Environmental risks associated with pigs and poultry • Processed meats are categorised by the WHO as carcinogenic • Reputation risks – potential conflict with other LEP agendas 	<p>Not to include a specific target, but include a priority on ensuring every farm is carbon-negative (as part of a healthy, circular system). Support should be made available to farmers to respond to market trends (e.g., reduction in demand for dairy and red meat). Developing local supply chains should be included as part of the approach.</p>
<p>7% increase in animal stocking density by 2038 (max ambition pathway)</p>		<p>Serious concerns over increasing animal stocking density, due to concerns around this reducing biodiversity, reducing productivity and issues around animal welfare. Local evidence suggests that reducing animal stocking density can improve farm productivity and reduce overall costs for farmers.</p>		<ul style="list-style-type: none"> • Reduction in biodiversity and soil health • Potential to reduce farm productivity 	<p>Not to include a target on increased animal stocking density due to concerns around biodiversity, farm profitability and animal welfare.</p>

Place Roundtable Report

Unlike the other Roundtables, there was not a table of policy recommendations specifically for Place within the Carbon Abatement Pathways document; rather, the recommendations relating to place-based approaches were spread across the sectoral breakdowns. Thus there is no recommendations table for this section, but the input below will inform further development of the other sectors.

Key sentiments

- Focus on positives, e.g. not disincentivising private car use, but incentivising the alternatives
- Viability and economic impact in planning not always aligning with low carbon plans
- Key distinction in 'place' between urban and rural in terms of plans and policies, actions and targets

"What"

The **15 minute neighbourhood** has been touted as a great starting point for reducing travel needs, and was seen as a great hook to engage communities and stimulate collaboration, but there was a concern that the aim is not achievable in rural areas of North Yorkshire, with a 45 minute neighbourhood a more likely target. It was noted that these neighbourhoods probably already exist in some places, but that messaging is needed to inform people of what is on their doorstep. It was suggested that local groups capitalise on the 'work from home' trend to engage people with local high street. Encouraging people to live within towns and closer to town centres may make the target more achievable and revive town centres – in areas of higher rurality, this may be reimagined as a hub village between a number of smaller villages/hamlets. Sustainability appraisals for new developments need to be reviewed to allow planning policy to enable these neighbourhoods.

Place-based travel conversations revolved around trying to get people out of their private cars by matching every disincentive for private car use with an incentive for the alternatives (public transport, active travel). Key themes were around making alternatives cheaper, safer, more comfortable, more convenient and more equitable, for example:

- Providing safe and dry places to wait for buses
- Prioritising transport networks to connect people to health services
- Encouraging government to make funding available for safer walking and cycling routes, particularly surrounding schools
- Safe parking for E-bikes and E-scooters
- Reduce waiting times at pedestrian crossing to incentivise walking, as well as footway repairs and considerations for those with reduced mobility.

Some suggestions included ways to bring community organisations and businesses into **nudging behaviour change**, such as using planning policy to ensure new workplaces have cycling 'hubs', including safe parking, lockers and changing/shower facilities (see BREEAM assessments for new non-domestic builds), and encouraging business parks and premises to install EV chargers, enabling both personal and fleet switches to EVs.

Finally there was a lot of consideration of the **role of tourists in travel** sustainability and how this might be addressed. It was recognised that EV charging for tourist hotspots was a big area of potential expansion and refunding of rural public transport would support low carbon leisure access.

When talking about **new developments**, the main issue covered was the balance of viability, especially for residential, and the trade-offs that will be in play between crucial issues such as affordable housing needs and sustainability. As well as noting the need for a fabric first approach in new buildings and using on-site energy and heat generation (e.g. solar, geothermal, district heat), it was identified that links between new developments and their local context must prioritise active and public travel at planning stage, and be linked into travel to work plans for employers.

There was also an engaging discussion about **green infrastructure**, both on improving existing land use and in the planning of new developments. To improve green infrastructure on land already in use, community gardening projects on waste land and improved management of grass verges could produce positive impacts on biodiversity, council maintenance costs and the health of residents. In new developments, better planning and design could be encouraged by use of the Yorkshire Wildlife Trust's Building With Nature accreditation scheme, or the '3-30-300 rule' - everyone should be able to see at least 3 trees from home, with a 30% canopy cover in each neighbourhood and the nearest park being a maximum of 300 metres away. Specific actions within the design of neighbourhoods included edible landscaping, increased use of SUDS ponds to increase biodiversity, and community composting and growing spaces.

“How” and “who”

Community groups were recognised as catalysts for action when taking a place-based approach. For example, linked to 15 minute neighbourhood, Community First Yorkshire have been working on how voluntary groups to avoid people in isolated rural areas experiencing significant health difficulties, and the issue of distance from GPs creates delays in treatment. Community-led housing can facilitate low carbon developments, but work is needed to improve policy and financing to address local housing needs in this way. It was noted that there was an opportunity to enhance reach and collaboration via communication around existing events and networks, such as Big Green Week (national event in September) and RSN events (e.g. [Rural decarbonisation event, 28th April 2021](#)).

Community approaches should lead to personal behaviour change, but to achieve this, a strong and sustained communication plan is needed across multiple years. The communication plan must be two way, providing a feedback route for the local community and allowing communicators to better understand and acknowledge barriers to behaviour change.

The conflict between local enthusiasm for more ambitious action, particularly in planning, and the tortuously slow progress at a national level was a major talking point, with comments that the recommendations on more sustainable buildings were both not ambitious enough and unachievable in the current national policy context. Some suggestions to improve local policy around building standards were to refer to MHCLG's National Design Guide and Model Design Code for Local Authorities, and York's new Design Guide.

In order to deliver any of the changes above, local leadership groups who can take charge of a series of interventions at a place-scale will be vital. Example groups highlighted in the workshop were YoCo at the York Central scheme (who are looking at carbon negative 15 minute neighbourhoods and sustainable transport), Neighbourhood Planning Groups, CaVCA (as part of the Health Creation Alliance which looks at how to create the conditions in which people can take control of their health, and the [Let's go zero campaign](#)).

Transport Roundtable Report

The contents of this section are from both the initial roundtable session in June, and further rail industry deep dive sessions conducted in August and September.

Key sentiments

- Targets to be broken down to local levels with localised approach to governance
- Need for compelling and overarching vision for decarbonising transport to inspire behaviour change
- Further granularity required in sections

“What”

Table 2 summarises the conversations and sentiments expressed by attendees at the workshop. Some topics generated more discussion than others, given the expertise in the room – the more in-depth and nuanced conversations are captured in the narrative below.

Active Travel: Concerns were raised around the lack of space available in towns that would be necessary to improve infrastructure to facilitate this. There was a strong theme throughout this section of the need for local targets: to have granularity between rurality. Significant investment for cycling infrastructure, and electric bike storage and security needed, as well as investment into showering/changing facilities at workplaces.

Bus and Rail: Overall, the consensus for this target is that there is a need for more investment and further specificity. Contributors expressed a need to distinguish between short and long rail journeys as well as between the rail route and capacity of electrification in the targets. Further, participants spoke of electrification of existing bus fleets, however, this would be a financial issue for those small and medium bus operators. Also relating to buses, the importance of reliability, punctuality and information available was highlighted to ensure a greater uptake of their use by the public. There was also appetite to assess the effect on other modes if bus use increased.

Vans and HGVs: For this target, it was mentioned that the increase in delivery vans could be tackled by switching deliveries to rail.

Behaviour Change: It was noted that, this section would need huge investment, in particular to create a clear and compelling narrative to overcome the view that decreased private car use is less attractive and convenient.

“How” and “Who”

In the “How” section, specific actions were suggested for different sections. For example, changing ticketing methods has the potential to facilitate ease and convenience in public transport - some of the suggestions made were: a monthly all-in pass, a Yorkshire-wide pass, a touch on touch off contactless format and a maximum contactless fare. Joint ticketing was also mentioned, and could be helped by bus service improvement plans.

For behaviour change, participants expressed a need for a strong PR and communications plan, and information that is simple and accessible. There was also notion to utilise change management methodologies, and it was brought to attention that different psychological approaches would be required to influence change in shorter or longer journeys. A rise in awareness of available integrated transport options was also mentioned.

With bus and rail targets, themes of a need for reliable and efficient services were prevalent; this included ideas of integrating systems to allow passengers to complete a whole journey knowing the cost, as well as line speed improvements. However, it was noted that some members felt the conviviality of using trains should be a priority over the improvement of journey times. The importance of decisions in early planning was also said to be vital in ensuring good links between housing and transport routes. Participants voiced the necessity of not focusing solely on electrification, but rather on the decarbonisation of the rail as a whole, using bi-modal fleets or even hydrogen and batteries as alternatives – however, due to the infancy of the hydrogen technologies and the need for the supply to be at close source, this seemed to be less favourable. Also regarding rail, the importance of the identification of poor infrastructure such as bottlenecks on routes was noted to reduce burden on fleets, as well as potential line re-openings to improve efficiency. In regards to the electrification of buses, pilot schemes using less commercial routes arose as a way forward.

In terms of the “how” of active travel, members mentioned the importance of the upkeep of cycle routes and pavements to encourage these activities, as well as implementation of further fast cycling routes and safe bike-to-school routes. Focus on improving short journeys proved a notable point as participants believed this would be a more achievable target.

With freight, participants mentioned splitting the shift to rail out between HGVs and delivery vans (encouraging the use of EVs). There were ideas of using rail stations as hubs for freight, having space on passenger trains for freight, as well as intermodal containers for ease of transferring between modes of transport. In York, there is also the potential for cycle freight for last mile deliveries.

A point that was keen not to be overlooked was the significance of skills, and in particular identifying existing skills that can be repurposed, in addition to new ones that need to be developed. Especially, a skills plan regarding electrification, and skills relating to the cycling industry.

In terms of “who”, several plans and strategies arose in the session, highlighting certain projects that could be used as modelling to inform the next stages of the Routemap; for example, the Transport for the North’s social exclusion project, as well as [West Yorkshire’s Connectivity Infrastructure Plan](#). York Hospital’s draft Green Plan and draft Sustainable Travel Plan was also mentioned. In terms of active involvement, LNER are happy to work with the LEP on joint activity to promote behaviour change in relation to public transport.

Table 2: Summary of the Transport roundtable, 12th May 2021, and including inputs from follow-up sessions focussing on rail in August-September 2021

Targets & Measures	Stakeholder Support	Roundtable Outcome	Strategic Opportunities	Strategic Risks	Recommendation
<p>Increase active travel: Increase in Walking km of 46% Cycling km of 750% by 2038</p>		<ul style="list-style-type: none"> • Strong support for targets. • Stakeholders keen to promote travel hierarchy approach. Concerns around town centre spaces which cannot accommodate specific cycle lanes due to historic road layouts. • Keen to promote co-benefits (air quality, health, finance). • Support for cycle freight 'last mile deliveries'. 	<ul style="list-style-type: none"> • Promotion of co-benefits of air quality, health and finance • Closely linked to the 'Place Agenda' and the planning of '15 minute neighbourhoods' and freight consolidation hubs. 	<ul style="list-style-type: none"> • Awareness of resistance to behaviour change and potential scale of cost to reverse 70 years of private car usage. • Significant challenge in rural areas 	<p>To include proposed ambitious active travel targets and to fully support investment in implementation at all levels. Requires localised targets and differentials between deep rural through to urban areas.</p>
<p>Increase in bus passengers km by 49% in 2030 and 56% by 2038.</p> <p>Increase in Battery Electric Bus as a proportion of fleet by 66% by 2038.</p>		<ul style="list-style-type: none"> • Support for ambitious targets to public transport use. Support for targets, although recognising very ambitious and reliant on national policy. • Recognise role of SMEs and Community Transport Operators have limited investment opportunities to make infrastructure shifts. • 'Door to Door' journey planning & integrated ticketing needed to improve confidence in low carbon travel choices. 	<ul style="list-style-type: none"> • Regional strategies such as Transport for the North and private sector bus companies. • Links with Active Travel to enable convenient and integrated door to door journeys. • Links to 'Place Agenda' to facilitate local public transport infrastructure to improve comfort and convenience of public transport modal shift. 	<ul style="list-style-type: none"> • Competition between bus and rail. • Skills agenda – to keep pace with technological change required. • National and local infrastructure strategies will dictate the pace of change, including those relating to private car use such as new road building. 	<p>To include proposed targets. Support the targets to increase public transport use, recognising the investment in public transport infrastructure and behaviour change that will be required. (A systems approach to cover cost, convenience, confidence, connections, comfort and communication)</p>
<p>Increase in rail passenger KM 2038: 157%</p>		<ul style="list-style-type: none"> • Support for ambitious targets in public transport use. Support for targets, although 	<ul style="list-style-type: none"> • Regional strategies such as Transport for the North and Train Operators / Network Rail. 	<ul style="list-style-type: none"> • Competition between bus and rail • Competition for freight between rail 	<p>Whilst the targets are evidenced based, there is a requirement for greater stakeholder involvement from the rail industry to achieve consensus.</p>

Targets & Measures	Stakeholder Support	Roundtable Outcome	Strategic Opportunities	Strategic Risks	Recommendation
<p>Increase in rail passengers on electrified lines KM 2038:90%</p> <p>Increase in freight modal shift to rail (tonne/km) 2038: 20%</p>		<p>recognising very ambitious and reliant on national policy.</p> <ul style="list-style-type: none"> Concern over generalisation of fuel type e.g. rail electrification, which may not be appropriate in all cases and alternatives such as improved rail infrastructure, and other low carbon fuel options such as H2 and batteries should be considered concurrently to decarbonise journeys. Concern over use of ‘tonnage shifted to rail’ as may be high volume low weight in small freight area. 	<ul style="list-style-type: none"> Links with Active Travel to enable convenient and integrated door to door journeys. Links to ‘Place Agenda’ to facilitate local public transport infrastructure to improve comfort and convenience of public transport modal shift and freight ‘last mile deliveries’. 	<p>transport and road haulage, particularly SMEs.</p> <ul style="list-style-type: none"> National infrastructure strategies will dictate the pace of change for national rail network. Long term investment horizons. Link to Skills agenda – keeping pace with technological changes. 	<p>This will be based on a ‘line by line’ approach as the rural nature of the region requires a range of solutions.</p> <p>Recommendation is to keep the targets associated with an increase in passenger kms. For electrification and freight modal shift, the targets outlined will form the basis of further work with the rail industry and be confirmed by 2022.</p>
<p>Decrease in private car usage* (KM) 2038: -40%</p> <p>Increase in Battery Electric Vehicles as a proportion of the fleet. 2038: 76%</p>		<ul style="list-style-type: none"> Strong support for the decrease in private car usage as the key priority for decarbonising transport and also for improving air quality. Support for investment in alternatives to private car use was priority – active travel, public transport. Travel hierarchy strongly supported – whereby BEVs supported where alternatives are not an option. (Recognising BEVs continue to contribute to poor air quality) 	<ul style="list-style-type: none"> Use of infrastructure funding to invest in alternatives to private car use. Link to the ‘Place Agenda’ to promote car free town centres. Link to public health agenda; air quality and obesity. 	<ul style="list-style-type: none"> Awareness of resistance to behaviour change and potential scale of cost to reverse 70 years of car usage. Deeply rural areas will realistically require higher levels of car travel. (Although mileage could be reduced by car share / clubs models.) 	<p>Support the targets for decreasing private car travel and increase in the BEV fleet.</p>

Targets & Measures	Stakeholder Support	Roundtable Outcome	Strategic Opportunities	Strategic Risks	Recommendation
<p>Limit the increase in freight modal shift to vans, with increase of Battery Electric Vans as a proportion of the fleet. 2038: 55% Decrease in freight modal shift away from HGV (tonne/km) 2038: 51% Increase proportion of Battery Electric HGVs to 59% and hydrogen fuel HGVs to 19% of feet by 2038 (Balanced scenario) 2021/22: Targets set for public fleet conversion</p>		<ul style="list-style-type: none"> • Support targets for public fleet conversion. • Support freight modal shift targets (coupled with 'last mile deliveries' actions) in principle, although more discussion required with rail and road industry. • Support for <i>green</i> hydrogen as transport fuel. This is a fast moving emerging technology. 	<ul style="list-style-type: none"> • Link to Transport for the North Decarbonisation strategy • Links to private sector industry and rail (freight) industry decarbonisation strategies 	<ul style="list-style-type: none"> • Green hydrogen roll out predicted timetable. • 'Bridging' fuels such as Bio LPG could be stranded assets. 	<p>Support targets for public fleet conversion. Further work required with freight industry and Transport for the North regarding targets and fuel types and the emerging hydrogen fuel market. (Supply and demand.)</p>

*Even with the maximum feasible rate of zero-emission vehicle roll-out, limited vehicle supply and stock turnover rates mean that rapid emissions reduction cannot be achieved through technology alone and must be supported by measures to reduce demand for travel and to shift journeys to more sustainable options

Decarbonising Energy Systems Roundtable Report

Key Sentiments

- Energy efficiency and demand reduction underpins all progress
- Fabric first approach to retrofit
- An integrated solutions approach
- Focus on no regret solutions
- Right solutions in right places
- Energy monitoring crucial

“What”

Table 3 summarises the conversations and sentiments expressed by attendees at the workshop. Some topics generated more discussion than others, given the expertise in the room – the more in-depth and nuanced conversations are captured in the narrative below.

Hydrogen: In discussing hydrogen for heating in homes and businesses, there was a difference in opinion between those who thought targets for deployment were too low and those who worried that gas-grid hydrogen would not materialise on time for the modelling. There were also concerns raised around consumer take-up, and the process energy efficiency of translating electrical energy from renewables. Regarding production, the need for more research was identified, both on the potential impacts of blue and green hydrogen, and on how land availability and suitability for renewables could be translated to potential volumes of green hydrogen.

Heat pumps: Although attendees were broadly supportive of the target, it was recognised as being very ambitious, and it was noted that the installation of heat pumps would also require significant extra works in many contexts (insulation, radiators, underfloor heating, hot water tanks). There was also a worry that smaller properties would not be suitable, although counter evidence was provided with examples from Broadacres. There was a recommendation that we should conduct research to understand where to focus early installations before policy decisions on heat released (e.g. <https://eua.org.uk/uploads/608167B5BC925.pdf>)

Flexibility and storage: There was enthusiasm for installing building-level batteries, especially in rural areas and linked to solar deployment, to improve electricity grid resilience and provide energy security for off-gas rural areas. There was extensive discussion on whether the energy monitoring (via smart meters), wider promotion of LEDs, energy management plans, circular economy transition and increased automation could enable even higher levels of demand reduction, although there was the concern that deploying these measures would be very dependent on high levels of behaviour change.

“How” and “who”

There was widespread recognition that national policy plays a huge role in this sector and that current national policy is woefully below the standard needed – even the upcoming Future Homes Standard is below the level needed for us to achieve the carbon reduction required, in order to ensure retrofit is not needed within 5-10 years of construction. There was an interesting discussion

on requirements for new developments to be energetically independent, although recognition that this may be beyond the immediate actions to influence government. There was also extensive support for long-term continuity on retrofit schemes, and twinning with 5+ year funding for education and behaviour change to deliver domestic and non-domestic energy use reduction.

At a community level, community energy management plans based on smart metering was suggested as a novel idea to engage residents in reducing emissions, and could link in with local energy networks, allowing peer-to-peer trading and reducing grid-level capacity worries. It was also noted that local authorities should be a catalyst for change, leading the way and advising their residents to help deliver a local economy that can thrive and contribute to reducing the UK carbon emissions. Examples of local policy that could demonstrate that could be looking at business rates reductions for lower carbon businesses, or a tariff for commercial high carbon energy use.

In this session, there was time to allow attendees to detail their current strategies and programmes that are contributing to the carbon negative York and North Yorkshire in the virtual meeting chat box. 15 organisations contributed significantly to this, including renewables developers with active and developing assets (Third Energy, Energy Oasis, Drax); heat providers (Daikin, NGN); national NFPs (CPRE, Broadacres), and local authorities and community action groups (City of York Council, Richmondshire Climate Change Action Partnership, Harrogate District's Climate Change Coalition, Ryedale District Council, Askrigg Community Energy, village halls). This gave the group a sense of the extent of ongoing work, and during the next phase of Routemap development work, we will be trying to quantify how far these programmes get us towards the targets (see Table Y) and how far we have left to go. Some other organisations were highlighted as being useful to bring to the discussion, including Climate Hero and Energiesprong. 11 of the organisations present agreed to directly support the development and delivery of the Energy Systems section of the Routemap, and will be contacted in due course to discuss next steps.

Table 3: Summary of the Decarbonising Energy Systems roundtable, 9th June 2021

Targets & Measures	Stakeholder Support	Roundtable Outcome	Strategic Opportunities	Strategic Risks	Recommendation
Buildings					
Retrofit existing private buildings: 250,000 homes to be retrofitted to at least EPC C rating by 2030		Very strong stakeholder support for target. Needs to be considered as the backbone of decarbonising buildings – fabric first.	<ul style="list-style-type: none"> • Multiple wins across fuel poverty, jobs growth and carbon reduction • Potential for world-leading biobased retrofit market 	<ul style="list-style-type: none"> • Current rollout reliant on sporadic government grants which have distorted the market – could affect deliverability of such an ambitious target (way ahead of Gov level projections) 	Include max ambition target for 250k retrofits by 2030 (<i>as the High H2 target is actually higher</i>); further work needed to assess how to evaluate progress.
Retrofit existing public buildings: 100% public buildings retrofitted by 2027		Very strong stakeholder support.	<ul style="list-style-type: none"> • Savings for LAs and public bodies • Skills funding coming into the sector, strong target should help drive activity • Links into sustainable procurement and LA climate action plans. 	<ul style="list-style-type: none"> • Short term target, especially considering impacts of LGR • Possible lack of upfront finance for capital 	Include the target, review after LGR.
Large-scale deployment of heat pumps: 203,000 homes by 2030 and 274,000 by 2038, 47% non-domestic heat		Strong stakeholder support for target, but stakeholders questioned whether a more balanced approach with H ₂ should be considered. Stakeholders suggested providing ranged targets to allow flex between HPs and H ₂ dependent on government policy. Consensus that the rate of installation will be a significant challenge – will need strong market growth and that will be difficult to deliver and to manage.	<ul style="list-style-type: none"> • New industry to provide jobs as well as reducing fuel poverty (as evidenced by emerging successes in social housing) 	<ul style="list-style-type: none"> • Needs to be well-planned, well-communicated and with clear, long-term planning and support for the burgeoning industry – otherwise, costs will continue to balloon and the promise of cost-effective decarbonisation will be lost. 	Target of 130,000-200,000 domestic heat pumps by 2030 (<i>aligns with Balanced – Max, High H2 target only 99k</i>), reassess pathway at 2025 and revise target up or down in line with government heat decarbonisation pathway.

<p>Deploy district heating: District Heat to cover 75,000-86,000 homes and 22-28% of non-domestic heat by 2038</p>		<p>Stakeholder support for measure. Stakeholders identified the need for energy master-planning to identify most appropriate sites and linking to other major infrastructure upgrades to reduce costs.</p>	<ul style="list-style-type: none"> • Opportunity for LAs, social housing providers and business park owners to support their residents while generating a small internal profit. 	<ul style="list-style-type: none"> • Difficult to manage and market heat networks outside of urban areas and large estates – without significant policy support (i.e. planning must consider in options analysis), won't be deliverable 	<p>An overall target of >18% of buildings on heat networks by 2038. <i>Fits with all pathways, preferable to mention 2038 target as 2030 target seems very stretching right now.</i></p>
<p>Encourage heat switching: phase out oil boilers</p>		<p>Support for oil boiler phase out</p>	<ul style="list-style-type: none"> • Fuel poverty win (if associated with fabric first retrofit) • Opportunity to lead in a highly rural context – this shift would be news-worthy • Reduced air pollution 		<p>Routemap should include strong target around oil boilers (phase out completely by 2030, <i>matches all scenarios</i>).</p>
<p>Deploy rooftop solar PV: up to 101,000 domestic installations and 48 GWh/yr on non-domestic by 2038</p>		<p>Strong support, more of an appreciation of how rooftop solar fits into hyper-local energy provision, microgrids, and in combination with batteries etc. Very strong support for non-domestic too, especially large spaces e.g. warehousing, and to be linked with storage – great for local load balancing due to difference in peak times between businesses and nearby homes.</p>	<ul style="list-style-type: none"> • Benefits of co-locating generation with demand in towns/cities, peer-to-peer energy trading 	<ul style="list-style-type: none"> • Risk of industry collapsing if clear provision not made in planning policy (i.e. solar PV on all new buildings, which is expected in Future Homes Standard) 	<p>Include target as in study – over 70,000 homes by 2030 and 101,000 by 2038 (<i>same across all scenarios</i>)</p>
<p>High standards for new housing: Adopt regional high efficiency standards from 2021, ahead of Future Homes Standard</p>		<p>Strong support for the target, but concern that local planning teams do not have the power they would need to drive ambition ahead of national policy, and that going early on high cost low carbon standards may reduce investor potential.</p>	<ul style="list-style-type: none"> • Show leadership, especially amongst rural areas • Fuel poverty reduction 	<ul style="list-style-type: none"> • Pushing for higher standard could reduce number of homes being built (viability arguments) • Committing to something some people currently think is impossible 	<p>Include an action to work with housing planners and commissioners, e.g. Homes England and LAs, to push for higher standards, e.g. via the Housing Design Guide. Potential for 2023 date in line with securing a devolution deal and MCA.</p>

<p>Deploy H₂ boilers: Hydrogen rollout (61,000-183,000 homes and 11-27% non-domestic heat) by 2038</p>		<p>Mixed opinions, general disbelief that H2 targets will be met (Trojan horse for oil and gas). Awareness that industry, power and transport will benefit first, then gas-grid homes – most of Y&NY off-gas.</p>	<ul style="list-style-type: none"> • Possible lower costs for residents (dependant on generation model decided by government) • Potential for less disruption to homeowners than heat pumps 	<ul style="list-style-type: none"> • Future business models for production still unclear so business case for homeowners still unclear. • Very dependent on central government policy. • Risk around challenges generating sufficient green hydrogen 	<p>Work with key industry stakeholders and national government to aim for first domestic H₂ boiler installs in the late 2020s and between 60,000-180,000 installs by 2038 (dependent on Heat and Buildings Strategy). <i>Fits 'High H2' timeline, and balanced-high H2 range.</i></p>
<p>Encourage heat switching: Reducing biomass boilers</p>		<p>Stakeholder raised that biomass boiler phase out is confusing and slightly contradictory. Consensus not to include target given this and that the CO₂ savings will likely be relatively low. Consensus to leave to national government to influence, support external narratives of biomass as a bridging technology.</p>	<ul style="list-style-type: none"> • Reduced air pollution 	<ul style="list-style-type: none"> • Need to ensure what you're moving towards is definitely better (carbon and £). • Discouraging biomass boilers will provide confused messaging and will have a relatively low carbon reduction impact 	<p>Routemap not to mention biomass boiler cut-back (<i>low priority, risks unnecessary confusion</i>)</p>
<p>Power</p>					
<p>Solar PV and onshore wind deployment: solar PV and onshore wind capacities in the region must increase by 108 MW and 66 MW every year until 2030</p>		<p>Agreement that this target is correct – however, LU&A session highlighted the max ambition target could remove significant swathes of land from agricultural production and this is undesirable. Opportunities to be realised as banks green their lending, can remove capital upfront costs for developers to grow industry.</p>	<ul style="list-style-type: none"> • LAEPs and associated investment portfolios should help to drive this investment. 	<ul style="list-style-type: none"> • High targets and rapid growth possible to achieve technically, but planning and stakeholder relationships could be major hold-ups for the deployment. 	<p><i>Merge targets to allow flex between solar, wind and hydro, and hit between balanced and max ambition</i> – Include integrated target for installation of 1,500 MW of capacity from solar, onshore wind and hydropower by 2030 and over 2,500 MW by 2038</p>
<p>Expansion of AD and small bioenergy: by 2038, take the regional</p>		<p>Very few comments at the DES Roundtable, some comments at Business roundtable. Previous</p>	<ul style="list-style-type: none"> • Strong regional research capabilities – opportunity to work 	<ul style="list-style-type: none"> • Risk of expansion beyond the sustainable limits of the landscape (e.g. importing 	<p>Maintain the targets, with proviso take opportunities to examine the</p>

<p>electric generation capacity from 10 and 33 MW (2019) to 26 and 97 MW respectively; more than doubling the regional biomethane production from AD; increasing heat from AD CHP by 2.5x</p>		<p>conversations have indicated strong support for this measure. Discussion on biomass gasification at Drax to create negative-emission synthetic fuels for e.g. aviation.</p>	<p>closely with e.g. FERA, BDC, Yorkshire Water, to maximise regional rollout and be a world-leading region.</p> <ul style="list-style-type: none"> Waste collection reforms (2023) may provide more readily-accessible feedstock. 	<p>waste from further afield) would have negative carbon impacts.</p> <ul style="list-style-type: none"> Facilities based on post-consumer food waste should not be economically viable in a circular economy – underpinned by poor consumer waste behaviour. 	<p>sustainability (economic and environmental) of new installations.</p>
<p>Flexibility and storage: reduce peak demand by 10% and deploy up to 736 MW battery storage by 2038, from a 2020 baseline of 27 MW.</p>		<p>Underestimate potential for peak demand reduction and energy conservation – Denmark reduced consumption by 14% through smart meters alone. Point made that storage target does not seem to consider the capacity of thousands of EVs – vehicle to grid technology could increase this figure hugely. Some points that hydrogen generated by renewables is a better storage medium than batteries. 10% peak reduction is reasonable according to NPg.</p>	<ul style="list-style-type: none"> Opportunity to overcome grid capacity issues with significant localised storage, thus creating more marketable business parks in rural areas. 	<ul style="list-style-type: none"> Sustainability issues twinned with booming demand in battery supply chain could have impacts on battery availability in future. Current modelling includes a Drax 200MW grid-level battery which is now not in their future plans – need to find alternative large sites (e.g. Monk Fryston). 	<p>Include battery storage target, with re-evaluation beyond 2025. <i>Add an energy monitoring and management target to Buildings sector, suggest:</i> Provide significant consumer support for reducing energy use via awareness raising and working with energy companies to drive uptake of smart meters, to facilitate a 10% reduction in peak demand by 2038.</p>
<p>New infrastructure: Electricity infrastructure investment enabling up to 102% higher annual demand by 2038</p>		<p>NPg think it's reasonable. Green Recovery Scheme has made some ground – demonstrated an approach outside the business planning cycle. Anticipating £100m's of investment in new capacity, especially on LV network, for smart tech (LV monitors and smart meter data integration), plus infrastructure like street cables or unbundling of shared cables (services) that feed individual properties.</p>	<ul style="list-style-type: none"> Opens up other opportunities (renewables generation) 	<ul style="list-style-type: none"> Currently grid infrastructure is holding up greening the regional grid. Possible financial and carbon implications of over-investing in assets that could become stranded – LAEPs should help overcome this. 	<p>Include proposed target on improving electricity infrastructure, but emphasise that it's an enabler not a solution.</p>

<p>CCS retrofits to large biomass and fossil plants, with 4 biomass turbine retrofits at Drax by 2034</p>		<p>Continued concern that BECCS not zero carbon as ‘advertised’ (sourcing and logistics). Necessity for any business models to reflect that it is a medium term technology – don’t lock into combustion and capture as a long-term solution.</p>	<ul style="list-style-type: none"> • Would be the first in the world to do this at this scale. • Massive emissions savings possible. • Without this, reaching net zero is unlikely until early 2040s. 	<ul style="list-style-type: none"> • Very little influence on if CCS gets the financial support it will need, gov decision • Changing Drax plans have massive impacts on the study, may need to provide a regional competitive edge to keep 4 BECCS sites in Y&NY. • Reputational risks as BECCS process quite expensive (to taxpayer) and not without environmental impacts (importing huge biomass volumes from N. America) 	<p>Include target on CCS, but emphasise dependence on Government to find a model that works.</p>
<p>Decarbonisation of EfW: CCS retrofits by 2030, require any new EfW to be CCS-ready;</p>		<p>Commercial interest in the development of Allerton Park. Retrofit of existing EfW CCS considered a no-regrets option.</p>	<ul style="list-style-type: none"> • CCS on EfW could contribute to negative emissions. 	<ul style="list-style-type: none"> • Risk locking in production of waste and thus counteracting circular economy transition. 	<p>Include target on CCS retrofits by 2030</p>
<p>Deployment of hydrogen generators: 300 MW first-of-a-kind H2 turbine online by 2030, +300 MW every 3 years</p>		<p>Gov are targeting 5GW generation by 2030, industry say they can deliver significantly more. Demand will mostly be from industry to begin with. Consultation on 10 point plan imminent – may help unlock further progress. Green hydrogen costs currently £6/kilo – should be £2/kilo by 2030.</p>	<ul style="list-style-type: none"> • Use our regional assets (land, potential CCS) to be a leading region on blue and green H₂ production. • Opportunity to create energy-independent islands, with green H₂ as energy storage 	<ul style="list-style-type: none"> • Currently risky to take decisions on this as UK Gov will have significant power over the decision (Hydrogen strategy expected this year) 	<p>Include hydrogen target as is, with a caveat that it is highly dependent on Government decisions, and that the production will be limited to electrolysis or CCS sources.</p>
<p>Double EfW capacity to 57 MW by 2023 and install new 11.5 MW EfW CHP</p>		<p>Need to make the most out of existing EfW capacity. Stakeholder concerns around increasing EfW capacity undermining reducing waste ambitions.</p>	<ul style="list-style-type: none"> • CCS on EfW could contribute to negative emissions. 	<ul style="list-style-type: none"> • Risk locking in production of waste and thus counteracting circular economy transition. 	<p>Not to include aim to double EfW capacity at this stage. Further research required to understand existing waste streams and sustainability of EfW in Y&NY.</p>

Business Roundtable Report

Key Sentiments

- Controls and management of energy use in buildings not to be overlooked
- Heat recovery in buildings and industry

“What”

Table 4 summarises the conversations and sentiments expressed by attendees at the workshop. Some topics generated more discussion than others, given the expertise in the room – the more in-depth and nuanced conversations are captured in the narrative below.

Heat and buildings: There was a clear need to separate out a recommendation on the construction of new business premises as a standalone target, with strong support for higher standards in new buildings, including requiring heat networks to be explored as part of the initial planning phase. There were repeated concerns around the cost of the switch from existing systems and newer, cleaner ones, and who will bear the brunt of this – businesses need financial and policy support make the transition. Hybrid heat pumps could be a lower-cost stepping stone, and novel interventions such as servitisation of heat (buying heating or cooling as a service rather than buying the equipment) could help overcome this – [Baxi have been running a trial](#).

Energy efficiency: There were some outspoken advocates for an even higher target here, with a strong theme of the importance of energy controls to reduce the burden of behaviour change. There may be data to back up the claim of the potential size of the prize within resource efficiency schemes carried out by Leeds LEP. It was also suggested that proximal businesses could make use of waste heat in district heat-style schemes.

Material efficiency: Anaerobic digestion (AD) and burning of biological wastes (e.g. forestry residues, municipal solid waste) can increase circularity for businesses who generate biogenic wastes. However, users of AD can face significant certificate costs if transporting waste between sites, making AD feasible onsite but more difficult if aggregating waste streams to create efficiencies of scale. Also, it was noted that with this and all other heat switching, moving from one technology to another requires a lot of new equipment – we need to ensure the redundant products do not go to landfill. More widely, the idea of a circular economy seems to be gaining ground, but it still quite niche – businesses with a view to increasing circularity need for end-users to be fully engaged in the transition for it to work.

“How” and “who”

There was considerable discussion about reframing a lot of these environmentally-friendly changes into a wider business future-proofing programme, which will help engage those businesses who aren't currently engaged (or are even actively disengaged) by the idea of making their business greener. In addition, conversations with businesses should utilise a 'co-benefits' narrative rather than sustainability. It was also highlighted that we should be able to align skills training and funding with low carbon to make a more convincing case to businesses – such as providing access to an energy efficiency capital fund twinned with an energy management training course, to allow people within the business to take more control of their energy. In a similar vein, a suggestion was made to embed 'Business Low Carbon Champions' within business parks, to act as a central point to activate low carbon work across multiple businesses.

Table 4: Summary of the Business Roundtable, 29th June 2021

Targets & Measures	Stakeholder Support	Roundtable Outcome	Strategic Opportunities	Strategic Risks	Recommendation
Retrofit existing business premises: 62% existing buildings retrofitted by 2038		Reflection that retrofit does not have to equal heat source and insulation as in domestic – cooling and building controls more critical in many businesses. Current lack of awareness of what fuels businesses are using for their processes.	<ul style="list-style-type: none"> Multiple wins across economic gains, jobs growth and carbon reduction Potential for world-leading biobased retrofit market 	<ul style="list-style-type: none"> Current rollout reliant on sporadic government grants which have distorted the market – could affect deliverability of such an ambitious target (way ahead of Gov level projections) 	Include proposed max ambition target, clarify what retrofit means in the text (not just insulation).
Deploy rooftop solar PV: up to 48 GWh/yr on non-domestic properties by 2038		General support, grid constraints mentioned as limiting rollout but strong sense of deliverability	<ul style="list-style-type: none"> Benefits of co-locating generation with demand in business parks 	<ul style="list-style-type: none"> Grid capacity could restrict progress 	<i>Recommend keep original target from max ambition - up to 48 GWh/yr on non-domestic properties by 2038</i>
Increased efficiency: reduce energy use by 26% by 2038		Very strong support, could even go higher – lots of potential here. Can use ESCo-in-a-box model (or other aggregator ESCOs) for SMEs who are usually overlooked due to their size.	<ul style="list-style-type: none"> Large potential savings for NYorks businesses, no regrets 	<ul style="list-style-type: none"> Need a financing model that works for all business types (not just large industry or B2B), otherwise most businesses will be left behind 	<i>Investigate potential to increase this target to be more ambitious (e.g. 25% by 2030) using analysis of REF and ReBiz audits.</i>
Increased electrification: up to 58% fuel use by 2038 (47% by 2030)		Need the infrastructure to cope with the demand. Business park energy generation and storage on-site may reduce pressure on grid as a whole. More confidence in electrification than H2	<ul style="list-style-type: none"> If paired with onsite generation, this can lead to significant savings for businesses (compared to buying in REGOs) 	<ul style="list-style-type: none"> Risk that without greening the grid locally, carbon impact from grid electricity will still lead to high business footprints REGOs (buying in 'green energy' from the grid) can be expensive 	Include proposed target.

Fuel switch to bioenergy: up to 11% of fuel use by 2038 (10% by 2030)		If including AD, looks like a sensible target. Better to use own wastes wherever possible to avoid regulations for moving wastes.	<ul style="list-style-type: none"> • Builds on regional resources and distinctiveness, could be world-leading 	<ul style="list-style-type: none"> • Potential reliance on (bio)waste/biomass as a fuel could reduce focus on circularity/have ecological implications 	Keep target
Increase material efficiency/circularity: address scope 3 and residual emissions associated with linear economy by increasing material and resource efficiency, reuse, recycling and recovery.		Very important to keep in, but don't necessarily need a target number at this point. No consideration in study elsewhere of embedded emissions in new products/disposal of old heating systems etc.	<ul style="list-style-type: none"> • Can be easy to involve all businesses, no industries need be excluded from this transformation 	<ul style="list-style-type: none"> • Wider societal and business behaviour change, impacting on and impacted by relationships with customers, not solely within business's control 	Keep target, consider wording to make it measurable.
Shift to cycle freight: shift short journeys of light freight to cycle, displacing 2% van traffic Shift from road to rail: double proportion of freight carried by rail by 2030 from 10% to 20%		No discussion as covered off in previous Transport session, asked to raise if any issues, none raised	<ul style="list-style-type: none"> • See transport workshop outputs 	<ul style="list-style-type: none"> • See transport workshop outputs 	Include as reflected in the transport workshop
High standards for new business premises: Adopt regional high efficiency standards from 2021		Support for target, with suggestion that a target for a zero carbon business park could also be included. 2021 date considered not feasible.	<ul style="list-style-type: none"> • Show leadership, especially amongst rural areas • New business premises may benefit from lower energy bills 	<ul style="list-style-type: none"> • Higher construction costs may lead to reduced affordability for NYorks businesses 	Include target to have higher standards (date to be agreed), commit to engaging at a business park level for demonstrators.
Large-scale deployment of heat pumps (and hybrid heat pumps): up to 48% non-domestic heat by 2038		Currently too expensive for businesses to do this – hydrogen may be preferable due to lower cost.	<ul style="list-style-type: none"> • New industry to provide jobs as well as potentially reducing energy bills (not fully understood) 	<ul style="list-style-type: none"> • Possible backfire should HP costs remain high – switching needs to be an easy choice for businesses. 	To include balanced scenario target (39%): with 40% target by 2038 to allow some flex with hydrogen.
Deploy district heating: District Heat to cover		Not understood who will bear the costs associated with setting	<ul style="list-style-type: none"> • Potential for owner-operators to make modest return (i.e. stable, 	<ul style="list-style-type: none"> • Difficult to manage and market heat networks outside of urban areas and 	To include target between the max ambition (12%) and High H2/Balanced

12-22% of non-domestic heat by 2038		up and running district heat systems. Upper end timelines looking unrealistic to some (note: there was a typo on the doc and it showed 22-28% previously).	government-backed investment for councils)	large estates – without significant policy support (i.e. planning must consider in options analysis), won't be deliverable	(22%) Target of 20% by 2038.
Deploy H₂ boilers: hydrogen supplying 11-27% non-domestic heat by 2038		Expected that this number is too high, unrealistic infrastructure timelines. Suggestion that we wait for H2 and Heat and buildings strategies before setting targets on these.	<ul style="list-style-type: none"> • Possible lower costs for businesses (dependant on generation model decided by government) • Potential for less disruption to premises than heat pumps 	<ul style="list-style-type: none"> • Future business models for production still unclear so business case for users still unclear. • Very dependent on central government policy. • Risk around challenges generating sufficient green hydrogen 	To include target of 11% by 2038 (<i>reflects Balanced scenario</i>)
Fuel switch to hydrogen: up to 48% of fuel use by 2038 (9% by 2030), first use of H ₂ in industry by 2026 (dedicated pipework)		<i>Not enough expertise in the room to discuss in full</i>	<ul style="list-style-type: none"> • Possible lower costs for businesses (dependant on generation model decided by government) • Potential for less disruption to premises than heat pumps 	<ul style="list-style-type: none"> • Future business models for production still unclear so business case for users still unclear. • Very dependent on central government policy. • Risk around challenges generating sufficient green hydrogen 	Further discussion with stakeholders and experts to agree target.
Install CO₂ capture: up to 43 ktCO ₂ /yr captured from industrial processes (not power generation) by 2038		<i>Not enough expertise in the room to discuss in full</i>	<ul style="list-style-type: none"> • Relatively easy to 'tag on' to large CCS infrastructure if nearby enough (as in study assumptions) 	<ul style="list-style-type: none"> • Dependant on Gov backing of CCS infrastructure at Drax 	Further discussion with stakeholders and experts to agree target.