

Delivering Port of Liverpool-Associated Road freight Zero Emissions (DePoLARiZE) *Technical Summary*



Key Lessons

- *Net-zero transition of freight movements to and from the Port of Liverpool is a complex place-based challenge. A collaborative stakeholder approach can mobilize the collective imagination and momentum needed, over the medium-term, to engage with such problems.*
- *By building trust and acknowledgement of the common and mutually dependent fortunes of both Port and city of Liverpool, such a process could not only initiate significant bottom-up dynamism, able to sustain change over a longer period. It could also build up processes that bridge current stalemates faced by freight businesses and national government regarding expedited transition of the sector.*
- *Two key hurdles, in particular, are potentially opened up, over the medium-term, by such processes and their potential to build unified localized voices lobbying for specific investments and infrastructure, namely: 1) where does the money come from for significant infrastructural redesign?; and 2) how do we break the chicken-and-egg stalemate of selecting between emerging technological options for decarbonized freight?*
- *An ‘oblique’ approach may also be effective here. This would involve tackling a seemingly distinct issue but in a way that significantly reframes, on altogether more promising grounds, the currently paralyzed and contested issues of infrastructure redesign adequate for the 21st century. Specifically, focusing on the freight sector’s separate but urgent priority of building adequate facilities for drivers – in this case, probably inland, near the motorway network – is potentially one way of introducing new ways of looking at the central issue of ‘final mile’ freight movements to the Port while also itself delivering clear win-win outcomes in the meantime.*

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This Executive Summary presents the work of the 'Delivering Port of Liverpool-Associated Road-freight Zero Emissions' (DePoLARiZE) project, a collaboration between Lancaster Environment Centre of Lancaster University (Professor David Tyfield, Professor Duncan McLaren and Dr Alex Gough), and Sefton Council (Dr Stephen Birch). The project workshops were also professionally facilitated by Alison Crowther, of 'Made to Last' practitioners, Bristol. The project was funded by the Net Zero Innovation Programme (NZIP), a central government-funded collaboration between the Local Government Association and University College London to support university-council joint projects on significant place-based net-zero challenges. The project will run from January to October 2022.

Objectives

The project aimed to convene relevant stakeholders in the current challenges of decarbonizing, and more broadly transforming, freight mobilities to and from the Port of Liverpool, so as to kickstart an ongoing process for collaborative and effective action on this challenging issue. Recognizing that the relevant stakeholders are from diverse sectors that rarely interact – the freight sector, the Port and its tenant businesses, local government (both LA and CA), residents, unions (e.g. drivers, dockers), transport NGOs and thinktanks etc... – the objective was to establish connections and demonstrate the viability and productiveness of such an approach over the medium-term.

The project aims to provide two main lessons: (1) details of potential practical measures and interventions that can (help) decarbonise freight traffic associated with the Port of Liverpool and (2) an approach to the process of stakeholder involvement that could reframe the issue and open up the discussion. This involved a combination of desk-based research and stakeholder engagement.

Process and participants

Participants were recruited through snowballing of interviews by the project team, with specific effort put into involvement from freight operators, the Port and its tenant businesses, local residents and local government. A total of 23 participants from such roles (though not all attended all sessions) took part in a tailored and professionally facilitated set of 3 online workshops. These were based on the established Organizational Development method of 'Appreciative Inquiry'. The workshops provided an opportunity to look collectively at the challenges anew and so open up imaginative ways of tackling them going forward. These online events were held in late May and early June. A final workshop, wrapping up the process and formulating 'next steps' will be held early in the autumn.

Background Analysis

The current situation

The Port of Liverpool

The 34 million tonnes of cargoes shipped through Merseyside (around 23Mt imports, 11Mt exports) make the Port of Liverpool the 3rd largest (in terms of volumes) in England, with 20Mt passing through the Seaforth/Liverpool side and 14Mt through the Wirral. As a result of the Liverpool 2 dock expansion, opened in 2016, it is the only northern Port equipped to take the largest modern container vessels. This means the port operators are planning for a tripling in container volumes in the medium-term – from 5Mt to 15Mt – while bulk commodity volumes are sustained or grow more slowly. This tripling in container traffic would increase total volumes by about 50%. As an island nation in a world of various kinds of turbulence and one in which shipping is getting bigger, to service mega-markets in/from China etc..., it is also arguable that capacity for such big ships is a crucial strategic necessity – with Liverpool now strongly positioned within the UK to deliver that.

The port is estimated to contribute £650M a year in 'gross value added' to the economy, generating 7900 jobs directly and 52,000 jobs indirectly in the region. But these benefits are distributed around the north-west, often at sites linked to the port only by road; while locally there are many fewer jobs at the port than historically, and concentrated impacts from traffic, noise, pollution etc.

The port itself involves complex operations by 150 tenants as well as being the port authority. A huge diversity of goods are transferred, shipped or stored requiring specific types of carrier: including containers, refrigeration, bulk, aggregates, liquids/tankers, Roll-on Roll-off trailers. The city-region's recent 'Freeport' designation is intended to draw more freight-dependent businesses to the area, but the traffic implications are as yet unclear (estimated at about 2% increase max. according to a report for the Freeport by Arup).

Historically the city grew up around the port, their economy and wellbeing interlinked. Global and national changes since the 1970s, however, have increasingly meant that the fortunes of port and city are separate, and sometimes even pulling in opposite directions. Industry has moved out of the UK, enabled in part by the development of standardised 'container' based trade and shipping. Land freight has moved from rail to road, with out-of-town distribution and retail centres on the road network. And in recent years our expectations and demands for rapid and personalised delivery have reinforced a distribution economy based on motorway-located warehouses.

Decarbonizing the Port and its freight

In terms of climate impacts, the port has set a net-zero target for its own operations (by 2040), but of course this does not include the emissions from ships, or from land-side freight – just the operations of cranes, transfer vehicles, port buildings etc. Meanwhile about 3Mt of freight landing at Seaforth leaves by rail, overwhelmingly being a dedicated train trip for biomass to the Drax power station; and about 8Mt of freight passing through the port travels via the Manchester Ship Canal (MSC).

Given the new container terminal and the Freeport, together with post-Brexit opportunities for more US trans-Atlantic trade, it is hoped that this will mean Liverpool can start to compete more with Felixstowe and Southampton for the bigger, 'deep sea' vessels, especially for trade ultimately headed for the North and Midlands. Exports headed for the EU and continental Europe are also now seemingly coming more through Liverpool headed for Ireland rather than, as pre-Brexit, going from Hull/Immingham to Rotterdam.

The key issue for this project, though, is that this freight mobility generates (in 2017) over 5000 HGV journeys every weekday along the A5036, the main local road link to the motorways, and this is set to increase – possibly significantly. For instance, a 'record' single container delivery of almost 6000 TEU (maybe 4000 containers) was recorded recently. But this road cuts through a densely populated and socio-economically deprived area, and is already congested and polluted, with a ten-year reduction in life expectancy compared to elsewhere in the borough. The option proposed by National Highways to relieve this problem, though it does not have support of the local council or MPs, is a new road through scarce green space, taking traffic north to a relatively new bypass that connects the motorways to the main road going north to Southport. Alternatives including tunnels, overhead cables and mini-rail systems have been discussed, if not exactly proposed, in a major report by Arup commissioned by Sefton Council. Rail and (ship) canal alternatives are limited by costs and delays of additional transshipment, or limited suitability of the goods involved. So without major investment, road freight will dominate for the foreseeable future. And this also raises other issues, since the port provides no facilities for truckers (inc. refuelling, toilets, refreshments) and the main dock road, where many lorries park up, has historically been poorly maintained (though recently resurfaced).

Decarbonizing the freight sector

Matters are thus complex and challenging from the perspective of the port and its neighbouring locality. But turning to the freight industry, we likewise find a sphere of economic activity that is crucial; but highly complex in its operations, which are now overwhelmingly by road; *and* already facing a series of major pressures over several years, including:

- Brexit
- Covid and post-Covid (supply chains, driver shortages...)
- Fuel prices, now redoubled as an issue by the Russian war in Ukraine.

Decarbonization of freight, though, is also now coming as an increasingly insistent imperative for the industry – whether from legislation, from costs, or from popular pressure. This growing societal pressure is filtering through into demands from businesses onto the third-party logistics firms they use in their supply chains, e.g. in terms of requirements for reporting their 'scope 3' emissions. But with the vast majority of freight companies being very small businesses on tight profit margins, and already fighting so many fires for their business survival, at best this means much of the freight sector simply does not have the capacity to grapple, meaningfully and urgently, with decarbonization. At worst, decarbonization risks being not just the proverbial straw, but a whole new bale, that breaks the camel's back of many freight businesses, which could in turn spell serious disruption for the entire economy, both businesses and households. Conversely, though, if grasped as a strategic opportunity for the medium-term, it is possible decarbonization could be a real catalyst of broader positive change for the industry and the economy more broadly. The looming energy 'cost of living' (and cost of business) crisis adds extra urgency to these issues.

Options for decarbonization

The university project team collated the latest literature on options for decarbonizing of freight, and applied this to the case of the Port of Liverpool. This material was presented to the participants in the first of the three online workshops. The main options currently available are:

- Reducing the demand for freight
- Optimising vehicle use and loading
- Increasing the efficiency of conventional freight vehicles
- Reducing the carbon content of fuel/power
- Shifting freight to low carbon-intensity modes

For more details, please see the attached Appendix. In brief, though, the *prima facie* conclusion of this literature search is that there are currently no clear options that will entirely address the challenge of decarbonizing freight in and out of the Port. As a result, a longer-term process of experimentation and diverse forms of intervention by multiple parties will be needed.

Outcomes & Findings

General – Redefining the problem

The project brought together diverse stakeholders, many of whom had not previously had the opportunity to discuss these issues collaboratively. The response from all participants was overwhelmingly positive regarding the process as a template for future discussion on this issue.

Such ongoing collaboration is particularly important, though, because resolving the complex challenges involved is not possible through a business-as-usual approach where each of the stakeholders simply take care of their own operations or concerns. For freight transition generally (as for many challenges of decarbonization) there appears to be a ‘**you move first**’ stalemate, even between the freight businesses and government. It is clear that both parties are showing increasingly clear signs of commitment to tackling freight decarbonization, and to do so together, even if from a low starting point.¹ Yet government still expects that the sector takes the lead in choosing which technological options to back, while the sector meanwhile says it cannot invest in any new technologies without a clear steer from government – and not least regarding infrastructures.

Moreover, decarbonization is only one – albeit an increasingly urgent – element of the ‘perfect storm’ of pressures besetting the freight sector, including ports. Digitalization, skills shortages and uncertainly changing patterns of global trade and industry, with consequent shifts from ‘just-in-time’ to ‘just-in-case’ supply chains, are also shaking the industry to its foundations: the sector now has ‘a burning platform’ as Maersk now refers to it. There are demands from within the industry itself for greater collaboration, both to share learning about how to decarbonize and to tackle some of the current hurdles to it (e.g. in terms of inefficiency of journeys). However, this is challenging for such fast-moving businesses, especially when so many are comparatively small, on very tight (and tightening) profit margins and protective of their company data and operations. Trust between operators is often an issue.

The discussion that took place in this project confirmed that *a new and different approach is needed* if meaningful progress is to be made on this agenda. A **place-based and participatory approach**, involving all the diverse stakeholders affected, has been test-run in this project and proven capable of stimulating significant collective interest and of being potentially scalable. Such an approach is also particularly promising because meaningful decarbonization of freight, associated with central trade hubs like ports, is also inseparable from complex, potentially costly and intrinsically place-based decisions on the upgrade and transformation of associated infrastructures. The transformation of specific commercial operations and of infrastructures affecting multiple localized stakeholders are thus inseparable and must happen in parallel. Indeed, many types of infrastructures are implicated in freight transition: of transport itself (e.g. roads, rail, tunnels etc...), but also of associated services (e.g. of maintenance, warehousing, digitalized data monitoring, or driver/worker roadside facilities); of (renewable) energy (production, storage and recharging); and of other valued services (e.g. of green space, pollution monitoring and minimization, or institutions of skills & training).

Such an approach can also ease the stalemate noted above by building localized momentum backing specifically identified practical measures to deliver locally-appropriate transformation of the freight/hub system, thereby bridging the perspectives of the freight sector and (national) government.

¹ E.g. Only 28% of freight operators have made any changes at all to their operations regarding decarbonization, and 38% have taken no action (including researching options), according to Logistic UK’s *Logistics Report Summary 2022*

Such learning could also then even be scaled up across the country, enabling a clear and bottom-up (hence robust) national momentum towards specific technological options for decarbonizing freight, and to a broader national rationalization of freight mobilities. For instance, this could include: more significant modal shifts to rail and inland/maritime intra-national shipping, with ports 'the most under-used infrastructure in the country' (Peel Ports, at *Multimodal 2022*) on this island nation; the shift away from medium-sized vehicles, such as trucks, to larger and smaller vehicles, for longer- and shorter-distance movements respectively; or incentivizing international trade movements to service the north of England and Scotland from more northern ports.

In short, an **ongoing forum will enable collective learning and intervention over the medium-term in key locations**, such as around the Port of Liverpool. This may enable redesign of the local freight system so as to evolve optimally in parallel with all the other pressures transforming that sector. In establishing such a forum and process, this project has not just demonstrated the value of such a process, and established goodwill relations with many relevant stakeholders who could contribute to further discussions; but also offered initial insights illustrating the basis for convening them.

The main outcomes of the discussions within the workshops are summarised below:

- the *values and/or principles* that mattered most to the group were identified;
- *what* actions should be prioritised as happening next;
- *who* should be involved and brought into the process; and
- *how*, or in what ways, could such a process take place.

Values/principles

Participants identified the values and principles that mattered most to them. This process divided the values into three clear groups.

First, as clear favourites across the group were the three values of:

1. Environmental protection and ecological harmony (23%),
2. Well-being and public health (including clean air and access to green space) (20%)
3. Shared economic prosperity (for the locality and for the port) (14%).

Secondly, slightly less prioritised but still widely supported were:

4. Innovation (developing new and better ways of doing things) (9%)
5. Community participation (working together, making change) (8%)
6. Teamwork and collaboration with all stakeholders (7%)

Finally, least prioritised but, again, still widely supported were:

7. Leadership and inspiring others (6%)
8. Efficiency (in use of resources, time, energy etc...) (5%)
9. Local pride and heritage (in local history, green spaces and community of Liverpool and its port) (5%)
10. Youth (inspiring the next generation) (5%)

Although emphasis was placed on each of these values as separately important, given overlaps these values could be combined for ease of reference, as follows:

- **Environmental protection and public well-being** (Values 1 & 2)
- **Innovation, leadership inspiring others (inc. youth) & efficiency** (Values 4, 7, 8 & 10)
- **Community participation, teamwork and local pride & heritage** (Values 5, 6 & 9)
- **Shared economic prosperity** (Value 3)

We note that such values largely restate now familiar conclusions from such high-profile initiatives as the Sustainable Development Goals or Agenda 21. One **recommendation** (see below) for future work would thus be a more in-depth exploration of past failures to convene or sustain such multi-stakeholder processes around sustainability issues regarding the Port of Liverpool and/or the freight sector.

In light of the values, the workshops collectively also then suggested the following practical next steps:

What needs to happen next?

Responses to this question can be grouped under 5 major themes:

1. Innovation and research into relevant precedents

This included requests actively to explore **innovative and non-road solutions to improve connections and reduce carbon, for both containerized and non-containerized freight, between inland and the Port**, including the options already profiled by Arup for Sefton Council; as well as investigating other relevant examples from around the world, such as the Port of Los Angeles (re electric vehicles), Rotterdam (re automated freight movements), Antwerp & Bruges (re hydrogen), or Heysham as an example of an appropriate bypass.

2. Data gathering

The need for a whole range of **more accurate, granular and real-time data** was noted by participants, including regarding the operations of the Port and freight industry (e.g. on truck utilization rates; flows of goods, routes & destinations; potential for sharing journeys), levels of localized pollution (of air quality, but also light and noise, and of ships as well as landside freight), the emerging implications of the Freeport as it establishes itself and comparative costs of different infrastructural options (including their carbon cost of construction and maintenance).

3. New priorities and interventions

Reflecting the values above and the shifts needed within the freight/port sector, specific interventions were recommended, including:

- the development of (possibly ‘traffic light’-coded) **‘scorecards’ ranking various freight (and/or technological) options** across economic, social and environmental factors;
- **lobbying (national) government** for effective upgrade and increase in (electrified) rail and water freight capacity; and
- more generally a movement to **redefine the port as a hub for diverse activities**, all of which could contribute to broader regional decarbonization (e.g. renewable energy generation, (advanced/additive) manufacturing) and hence connected to a wider set of locations, not limited to (and perhaps even shrinking, through increased efficiencies) the footprint of the existing riverside Port estate. Though not explicitly discussed in this project, there are clear opportunities here connected to the Liverpool Freeport.

4. New relationships and their concerted management

As well as the requests for **similar forums to those provided by the project to continue**, and even become more formalized, suggestions were made of various initiatives that could increase interaction between port, freight sector and citizens, such as a **visitor centre/museum on site in the port or regular open days/tours**.

5. Jobs and working conditions

Finally, and by no means least, echoing similar statements of clear priorities for the freight sector at recent major trade shows (e.g. *Multimodal* at the NEC, Birmingham in June 2022), the **provision of proper facilities for drivers, high-quality training for young people** entering the industry and a general **higher prioritisation of working conditions for those in the freight/hub sector** was strongly advocated. Although seemingly distinct from the present concerns of decarbonizing freight, delivering on these key priorities for the sector (and, increasingly, for national government) actually could effect a significant opening and redefinition of the specific challenge of cleaning up freight movements in south Sefton/Liverpool City Region.

With no significant space available for such facilities at the riverside Port estate, the obvious option is to **build these inland at a location easily reached by the motorway network**. The expectation from the freight industry is provision of such facilities should be done at public expense since this would be for the public good. Were such facilities to be built, though, this could significantly influence and reopen the design of the infrastructure relaying freight the last few miles from that inland site to the Port. The result would thus be a significant improvement in worker welfare and job satisfaction, increasing workforce retention and hiring, while also creating a significant shift in the current deadlock over the future infrastructure for freight movements from the port. As a Port CEO at *Multimodal* also noted, investment in workers will also secure a key resource for the ongoing challenges of coming up with solutions in the face of potentially sudden shocks – ‘quay workers are key workers’, as he put it –; and so too for the medium-term challenge of collective learning about how best to decarbonize freight.

Who needs to be involved?

A diverse range of stakeholders were identified by participants as potentially significant partners in (various elements) of this agenda. Perhaps of most importance, though, on top of the various groups already represented in this project (see above) was the **potential for the Freeport to play a significant role**. It will also be essential to continue to involve major freight operators and/or users of the Port (who perhaps can offer the human resources for involvement) and freight trade bodies, representing smaller freight business. In all cases, though, it was noted that building collective and bottom-up momentum to tackle these place-specific issues would need to be supplemented by, and could significantly strengthen, **lobbying of central government**. Ultimately, the influence of decisions taken by government at a national level on which actions are taken cannot be bypassed.

How should the process be arranged going forward?

The responses to this question from the workshops can be grouped under 3 major themes:

1. Specific interventions to pursue

Discussions on this element overlapped considerably with those under the 'what?' heading. Key issues raised here included:

- **Establishment of a regular forum for diverse stakeholders** and/or mass engagement in the medium-term reshaping of freight movements to and from the Port, including Port open days etc...
- **Building of good and adequately sized facilities for drivers, possibly inland**, where they can also wait, if necessary, instead of idling or parking up, adding to congestion, near the Port.
- Commitment to a supporting **development of a nationwide strategy for re-rationalization of freight mobilities**, that has climate, air quality, wellbeing and justice woven through it – and hence with the necessary legislation to back this up.

2. Operating principles for such processes

Similarly, echoing items mentioned above, the key operating principles of such interventions would be **commitment to a medium-term process of collective learning**, hence:

- involving diverse and relevant stakeholders as a matter of course:
- working from the presumption that the issues are complex and in need of commensurately tailored responses, not just familiar off-the-shelf solutions or technological fixes; and
- that there is significant sharing of information and communication involved in all decision-making processes.

3. Specific openings for innovation in freight mobilities

Given the uncertain and potentially profound opportunities for rethinking freight mobilities from digitalization, not just decarbonization, participants particularly emphasized the need to **maximize exploration of the potential for greater information flow and sharing to increase the efficiency of journey sharing**, including through various forms of 'piggybacking' on existing traffic and/or the use of micro-mobilities. Is there the potential for more radical re-imagining of freight, in the medium-term, towards a more seamless reintegration of such 'industrial' mobilities into 'domestic' spaces and traffic flows, as both are transformed by the combined effect of digitalization and greening?



Conclusions and Recommendations

Liverpool: the leading port-city in the world, in quality not quantity?

Transforming the movements of freight in and out of the Port of Liverpool such that they are decarbonized and address associated issues of environmental justice (e.g. air quality) is a complex challenge that must involve multiple stakeholders over at least the medium-term. In particular, it is intrinsically both a commercial challenge for the freight sector and a place-based challenge, given the immovable location of the Port and its environs, and the infrastructure servicing it. Progress on this crucial issue thus demands breaking with business-as-usual approaches that parcel out responsibility, primarily to individual businesses, and instead moving towards a collaborative partnership approach of collective learning. The alternative is the current status quo of a ‘you move first’ stalemate, with worsening outcomes for all parties.

This project has successfully test-run a process to establish such collective stakeholder dialogue on this issue. A similar process could continue to support partnership in practically tackling the challenges in Liverpool, while also potentially scaling elsewhere. Key to the potential promise of such a process is how it could enable the iterative and collective formulation of a new vision and meaning for Liverpool, as both city *and* port inseparably: as the leading port-city in the world, if not in quantity (given the scale of mega-cities around the world with which it would be competing) then in the qualitative priorities of the 21st century, regarding decarbonization, innovation, environmental quality and inclusive governance.

Moreover, in taking such a lead, Liverpool would simply be adding to a rich history of firsts. As Ian Wray (2016) reminds us, Liverpool built the world’s “first commercial enclosed wet dock, the first inter-city passenger railway, the first tram system, [the first] iron framed glass walled buildings..., Britain’s first ring road, the world’s first town planning school... and the longest underwater tunnel.” Merseyside was also the site of the first public municipal park and instrumental in initiating the UK’s motorway network. And, crucially, it was Liverpool that achieved all these things, with the national government at best catching up. Such a history of infrastructural success was impossible without technical expertise and ambition, but also capacity for significant institutional and governance innovation. This spirit is precisely what is needed again today, albeit in the profoundly changed and fast-changing context of the present.

This project thus makes the following **recommendations**:

- Establish a **forum for ongoing participatory and place-based decision-making** regarding action to deliver expedited freight transition servicing the Port, and platforms to build and maintain stronger relations between port, freight sector and city (e.g. a museum, visitor centre or open days on site). Both of these initiatives should manifest a commitment to a medium-term process of collective learning-by-doing. Commissioning **research for an in-depth exploration of past failures to convene or sustain such multi-stakeholder fora** could be an important contribution to this learning process.
- Continue to **explore innovative and non-road solutions to improve connections and reduce carbon, for both containerized and non-containerized freight, between inland and the Port.**
- Develop **scorecards’ ranking various freight (and/or technological) options**, with these made widely available, to logistics companies, their customer businesses, local government etc...
- Explore who could deliver on demands for **more accurate, granular and real-time data** regarding freight movements, specifically into/out of/around the Port.
- As a key way to redefine the infrastructural challenges founded on clear win-win gains for all parties, actively explore the **construction and provision of proper facilities for drivers**, perhaps in conjunction with high-quality training for young people, at an appropriate location near the Port; possibly inland at a location easily reached by the motorway network.
- Continue to **lobby national government** for its support of Liverpool’s infrastructural needs, as identified over time by the above processes, and, more broadly, for development of a nationwide strategy and policy for re-rationalization of freight mobilities.

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