2050 INNOVATION HUB

Maritime Innovation Week 2022

Decarbonising the Supply Chain Hackathon

Introduction

The Port of Tyne is the principal northern gateway to the UK. It is the fastest growing port in the North East region and North Sea and it plays a key role in our customers' supply chain.

The Port has set a Tyne 2050 objective to achieve Net Zero by 2030. Many of our customers also have a net zero objective and the Port is an active partner in working with them to achieve carbon neutrality within their supply chain.

Currently we report our carbon footprint annually and have a few high level operational metrics. We would like to automate our process to be able to report monthly and to develop a CO_2 KPI by activity level that will be the baseline for measuring the impact of our actions to reduce CO_2 on our journey to Net Zero.

Port of Tyne Operations

The Port's main operational location is on the south side of the river at Tyne Dock, South Shields. It also has a second operational location in North Shields, which includes the International Passenger Terminal (IPT) for handling cruise and ferry passengers.

The main operational activities of the Port consist of:

- **Import and export of containers;**
- **Onwards transportation of containerised and palletised goods locally and nationally by our fleet of wagons;**
- Import and export of bulk and conventional cargoes;
- Warehousing, storage and management of goods;
- Passenger handling; and
- Provision of land, office, industrial and warehouse space to a number of tenants across both sites.

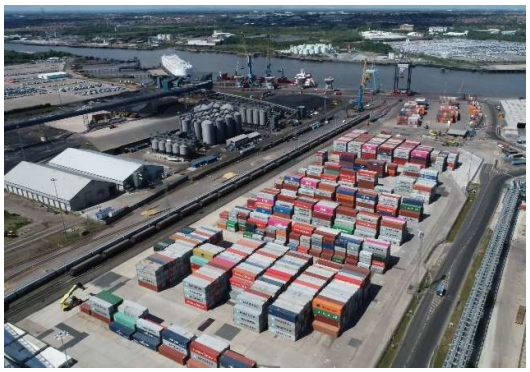
The Port is also a Harbour Authority and has statutory responsibility for navigation on the river. We have a fleet of marine vessels that undertake pilotage, hydrograhic surveys, dredging and other activities to maintain a safe waterway.

To deliver these services the Port utilises a number of key items of plant. We have a container crane and two portal cranes that run on electricity and a number of electric items of plant that operate mainly within our warehouses. The electricity we use is carbon neutral so is outside the scope of this hack.

Our other key items of plant run on gas oil or diesel. These include:

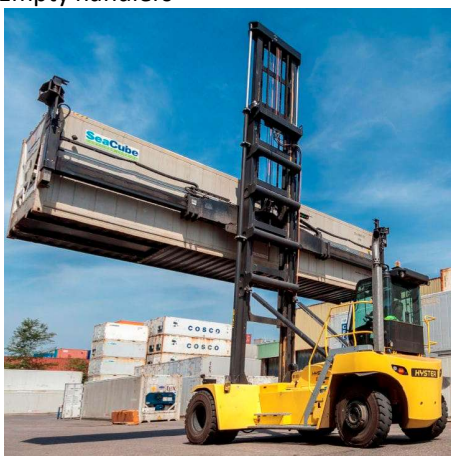
Plant used within our Containers operation:

- Container terminal



- Reach stackers

- Empty handlers



- Tugs

Plant used within our Transport operation:

- Fleet of LGVs and a tug

Plant used within other business areas:

- Cranes and hoppers for handling bulk cargoes

- Forklift trucks

- Shovel loaders

Hackathon Challenge and output

The Port measures and reports its carbon footprint annually at a high level but wants to analyse the data to understand its carbon footprint at a more granular level, specifically within its Container Terminal and Transport operations.

We will provide data sets for the Container Terminal operation and our Transport operation. You can choose to analyse the data for one of these areas or for both of them.

Analysis of the data should provide insights into how activities and items of plant are contributing to the Ports CO_2 footprint and should help identify opportunities to improve operational efficiencies and reduce carbon emissions. Additionally, this will serve as the baseline to measure the impact of our CO_2 reduction activities in these areas.

It would be great if this could be visual and interactive to support the various ways the data can be grouped together.

The types of carbon metrics we would like to measure include:

- CO_2 footprint for Container Terminal operation and our Transport operation.
- A CO_2 metric for each area i.e.
    - CO_2 per TEU for containers moved in to / out of / within the terminal
    - CO_2 per mile travelled
- CO_2 by plant group – i.e. by reach stacker, tug, empty handler etc.

The output of this should give managers and staff greater visibility of energy consumption and CO2 emissions in their area and how their CO_2 reduction activities directly contribute to the achievement of our Net Zero objective.

Data Sources

The following data will be available:

No.	Data	Description	Format
1.	Mandata_Vehicle Summary	Mileage and fuel usage by vehicle by day. Driving, standing and idling time.	Csv download
2.	Transport jobs_2021	Transport jobs by vehicle by day	Csv download
3.	Transport jobs_data explainer	Explanation of the data in "Transport jobs_2021"	Word document
4.	Container Handling Moves_2021	Total number of containers handled during 2021 split by: - Containers moved in to and out of the terminal by road and vessel - Reorg moves within the terminal	Excel spreadsheet
5.	Container Handling Moves_data explainer	Explanation of the data in "Container Handling Moves_2021"	Word document
6.	Container equipment	Which items of plant are used in each container movement	Excel spreadsheet
7.	Container equipment_explainer	Explanation of how / what equipment is used in each container movement	Excel spreadsheet
8.	Plant hours_containers	For items of plant allocated to Containers: - Hours an item of plant has been used each month	Excel spreadsheet
9.	Fuel usage_containers	For items of plant allocated to Containers: - Fuel drawings (in litres) by month for each item of plant	Excel spreadsheet

Scoring and Judging Criteria

The winning team will be determined by a panel of judges consisting of staff from the Port of Tyne and The National Innovation Centre for Data, and some guest judges invited by the Port. Entries will be judged on both **non-technical** and **technical** criteria by the judges using a scoring scale of 1-5. These criteria are as follows:

Non-Technical Criteria (Every criteria point scored 1-5)**:**

- Does the proposed solution answer the brief and bring value to the business?
- Does the idea fit in with Tyne 2050 aims and green agenda, eventually become part of a larger port process?
- Have they identified limitations to the solution and how additional time / dataset would enable future development?
- Is the presentation engaging, showcasing the problem and the resultant solution with use of visual/audio aids?

Technical Criteria (Every criteria point scored 1-5)**:**

- Have the provided datasets been explored in detail (breadth and volume of data used)?
- Did they extract relevant, hidden or previously overlooked insights from the data?
- Has any advanced statistical technique or innovative data analytics been implemented on the data set?
- Is the data analysis presented in a creative, user friendly format and does it offer clear visualization of insights and potential opportunities?

Assessed scores from each individual judge across all criteria will be used to calculate an overall average score for each team. The team with the highest score will be deemed the winner. In the event of a tie between teams, judge's discretion will prevail.