### NAME OF CASE

Drax high capacity biomass wagon

### KeyWords:

Innovative vehicles, vessels and equipment; Business to business (B2B) solutions, cooperation; collaboration; Communication between businesses and authorities: coordination, consultation; Innovative operational solutions; Transport management, fleet management; Interoperability and standardisation; Safety and security.

### Description:

Drax power station generates 7-8% of the United Kingdom’s electricity. It was a pure coal-fired power station, but has been converting a number of its generating units to burn biomass instead. In time, the majority of its electricity will be generated from biomass. Biomass is around one-third less dense than coal, so more volume is required to generate the same amount of electricity. The practice involved the design, construction and introduction to service of bespoke wagons specifically for biomass flows.

### Benefits:

- Economic and environmental benefits are resulting from the increased payloads per train.
- The rail solution helps Drax to generate more of its electricity from biomass which it is claimed reduces carbon emissions per unit of electricity generated. This claim has recently been challenged in terms of actual levels of carbon reduction including the ocean transport, domestic handling and combustion of the fuel for power generation.
- The amount of biomass carried per train is greater with the new wagons, as the same amount of biomass can be carried in fewer trains or a greater amount of biomass can be carried with the same number of trains. The calorific value of the biomass is about 65% of the coal and is less dense.
- The use of the biomass at full scale operations in terms of power generation implies more rail transport to support the level of power production previously based on coal.
- Increased efficiency/productivity of logistics processes
- Increased company profitability
- Increased competitiveness
- Increased quality
- Increased safety and security
- Limited climate change
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### Starting Point/Objectives/Motivation:

**Main problem, idea or motivation**

Conversion from coal to biomass for power generation induced a problem for mass transport of energy source by rail. No biomass wagon was available.

**Practice before the implementation**

Coal wagon transport with rail freight operator. Biomass flows are relatively new as it is only recently that power stations have started to generate electricity from biomass.

Prior to implementation of the bespoke wagons for biomass, coal wagons (in original or converted form) were used. The original 50-tonne merry-go-round wagons were replaced by high capacity 102/105 tonne coal wagons. These will continue to be used to service the remaining coal fired power generation units

**Purpose and the sustainability objective**

Switching away from fossil fuel and using regenerative biomass in large volume. Transport over long distance at competitive costs.

**Solution**

New wagons were designed by the designer business Lloyds and built by the manufacturer WH Davis, specialist in wagon

At present, the wagons are used for imported biomass flows from the ports of Tyne, Hull and Immingham to Drax. The fleet consists of 200 wagons.
Each wagon has a cubic capacity of 116 m$^3$, 29% more than the coal wagons that were used previously to carry biomass and the largest cubic capacity of any wagon type in the United Kingdom. The wagons have a 72 tonne payload.
The new wagons have semi-automatic top doors (for loading) and improved bottom door delivery (for unloading). The top doors protect the biomass and keep it dry while in transit.

Innovative use of space was required for the necessary equipment (e.g. brake and control equipment) on the wagon.
The wagons achieved very fast design approval and certification because of the combined approach of the sponsor (Drax), the designers (Lloyds), the wagon builders (W.H. Davis) the rail operators VTG UK and GBRf, and Network Rail as the infrastructure operator.

Transport mode or supply chain elements:
- Rail freight

Main actors involved
- Vehicle Manufacturer
- Vehicle Designer
- Rail freight operator
- Rail infrastructure manager
- Large industry client (energy provider)