Giurgiulesti International Free Port:
Report on Carbon Footprint 2018

Chisinau – Giurgiulesti
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DANUBE LOGISTICS

Contents

I. INTRODUCTION

Starting with 2016 ICS Danube Logistics SRL (Danube Logistics) has developed a Carbon Footprint Report for its operational activities at the premises of Giurgiulesti International Free Port (GIFP) on annual basis. Danube Logistics administrates and operates GIFP, whereas certain activities in the port are conducted by third party residents and tenants. In order to calculate the carbon footprint Danube Logistics follows both control based and activity based approaches. The present inventory refers to the period from 1 January - 31 December 2018.

The Carbon Footprint Report is prepared in accordance with the Greenhouse Gas (GHG) Protocol, which is most widely used as an international carbon calculation methodology and is compatible with other GHG standards, such as ISO 14064, which can be integrated in national and international greenhouse gas (GHG) registries.

The data analyzed relate mostly to the energy production and consumption both in stationary and non-stationary emission sources. The emission sources included in the carbon footprint refer to generated CO2 emissions, respectively to the emissions equivalent to CO2. Carbon dioxide (CO2), Methane (CH4) and Nitrous Oxide (N2O) are emitted during combustion of fossil fuels by port equipment and transport means used by Danube Logistics, as well as electricity consumption within port activities. Emissions from technical gases as by-product of combustion and so called F-gases emitted by cooling installations were neglected.

II. BOUNDARIES OF THE CO2 FOOTPRINTING

Greenhouse gas accounting involves the selection of two types of boundaries:

1. Organizational boundaries

Danube Logistics used the control approach for the purpose of consolidating and reporting GHG emissions, i.e. all emissions which the company can control and influence are considered. These are the activities conducted by the legal entity of Danube Logistics on the territory of Giurgiulesti International Free Port.

Thus the calculation of the CO2 footprint does not include the resident and tenant companies that carry on their operations at the premises of GIFP, as their activity cannot be influenced by Danube Logistics and access to the necessary information is not ensured.

2. Operational boundaries

The total territory of GIFP currently under development comprises 55 ha. The operational activities conducted within following areas are included in the scope of this report (fig. 1):

- Dry bulk and container storage area, general cargo and container terminal;
- Oil terminal area including tank farm, auto loading facility and railway facility; office park;
- Danube Logistics workshop;
- Infrastructure at GIFP premises including roads, parking areas;

Following areas are excluded:

- Grain terminal with access to Danube and Prut rivers;
- Grain storage facilities;
- Vegetable oil storage;
- Business park areas leased by third parties;

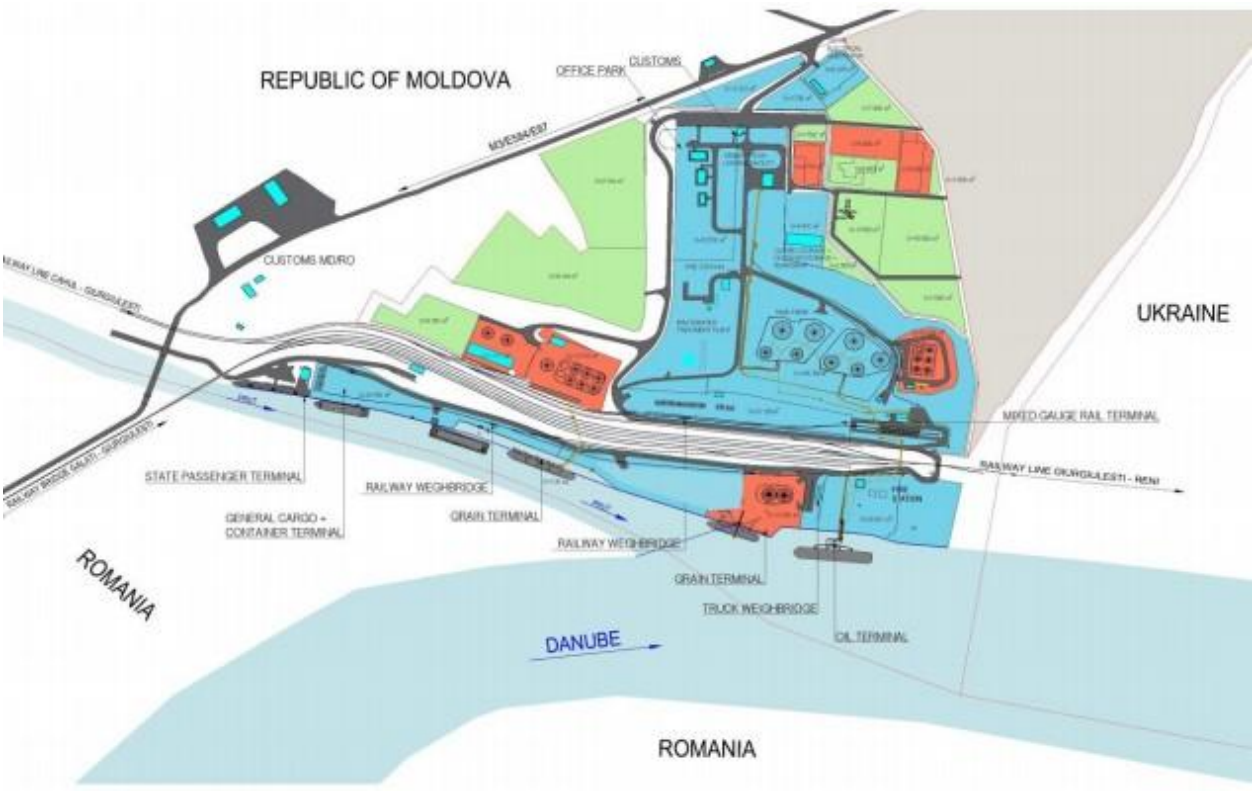

Figure 1. Port area that was taken into account for the calculation of CO2 emissions (shown in blue)

Following the recommendation of the Guidance Document "Carbon Footprinting for ports" issued by the World Ports Climate Initiative (WPCI) in 2010, the focus of this report is on emissions with scope 1 and scope 2:

a) Direct emissions (scope 1)

- Diesel and gasoline engines (kg CO2/liter);
  Fuel used by cargo handling equipment;
  Fuel used by on road and non-road vehicles;
  Fuel used by harbor crafts (tug boat) and feeder vessel at the berth;
  Fuel used by stationary sources;
  Fuel used by employee vehicles on the territory of GIFP;

- Burning of natural gas (kg CO2/m3)
  Natural gas used for heating for buildings of the GIFP office park;

b) Energy indirect emissions (scope 2)

- Consumption of electricity imported to GIFP (kg CO2/kWh);
  Electricity used by office park and business park areas including deposits and lighting;
  Electricity used by the pumping station of the oil terminal autoloading facility;
  Electricity used by terminal areas including lighting;
  Electricity used by other areas controlled by Danube Logistics;

III. CALCULATION OF GHG EMISSIONS

1. Activity-based approach

Danube Logistics applied an activity-based approach for the calculation of GHG emissions. The total GHG emissions are calculated through each type of fuel/energy used:

- The amount of natural gas and electricity consumption is measured using calibrated and certified meters.
- The amount of diesel is calculated by summing up the recorded amounts of fuel used by each piece of equipment used on the territory of GIFP. The supply of fuel for each piece of equipment is measured using a meter installed on the pump of the bunkering truck.

More than 95% of the data used for the calculation of emissions is based on real measurements of fuel and energy consumption reaching a high level of accuracy of the calculated emissions.

2. Selection of GHG emission factors

The energy consumption quantities were converted into GHG emissions by multiplying these figures with emission factors. The used emission factors comply with national and international standards of emissions for the selected types of resources. The emission factors are specific for each energy source and serve for the conversion of the quantities consumed by each energy source into GHG emissions. Table 1 shows the emission factors used for the calculation of the carbon footprint.

Table 1. Emission factors

ITEM	Emission factors (EF)	Units
EF diesel	2.68	kg CO2/liter
EF natural gas	1.88	kg CO2/m³
EF electricity	0.521	kg CO2/kWh

IV. RESULTS

In 2018 the total estimated GHG emissions at the premises of Giurgiulesti International Free Port of activities generated by Danube Logistics amount to 1,007.0 t CO2e increasing by 11.9% compared to 2017 (table 2). This increase reflects the increased transshipment volume. Subsequently the share of scope 1 of total emissions further increased from last year's 56.8% to 65.3% (table 3) while even the absolute amount of scope 2 emissions decreased by 10.2%. Emissions from CH4 and N2O are negligible.

Table 2. Total estimated GHG emissions

CO2e in tons	Factor	2016	2017	2018
CO2	1	858.1	896.7	1,003.4
CH4	25	1.7	1.7	2.1
N2O	298	1.2	1.1	1.5
Total CO2e		**861.0**	**899.5**	**1,007.0**

Table 3. Share of CO2 Emissions by Scope

Scope	CO2 emissions in tons	2018
Scope 1	655.2	65.3%
Scope 2	348.2	34.7%
Total CO2	**1,003.4**	**100%**

a) Diesel consumption (scope 1):

The total consumption of fuel amounts to 225,463 liters corresponding to CO2 emissions of 604.2 tons, which is 24.8% more than in the previous year. This increase refers mainly to higher consumption of cargo handling equipment reflecting the significant increase of transshipment activities at the general cargo terminal. Just as in previous years the major consumers of diesel are the mobile harbor crane and the reach stacker, and in 2018 accounting for even 84.5% of total consumption of cargo handling equipment (fig. 2).

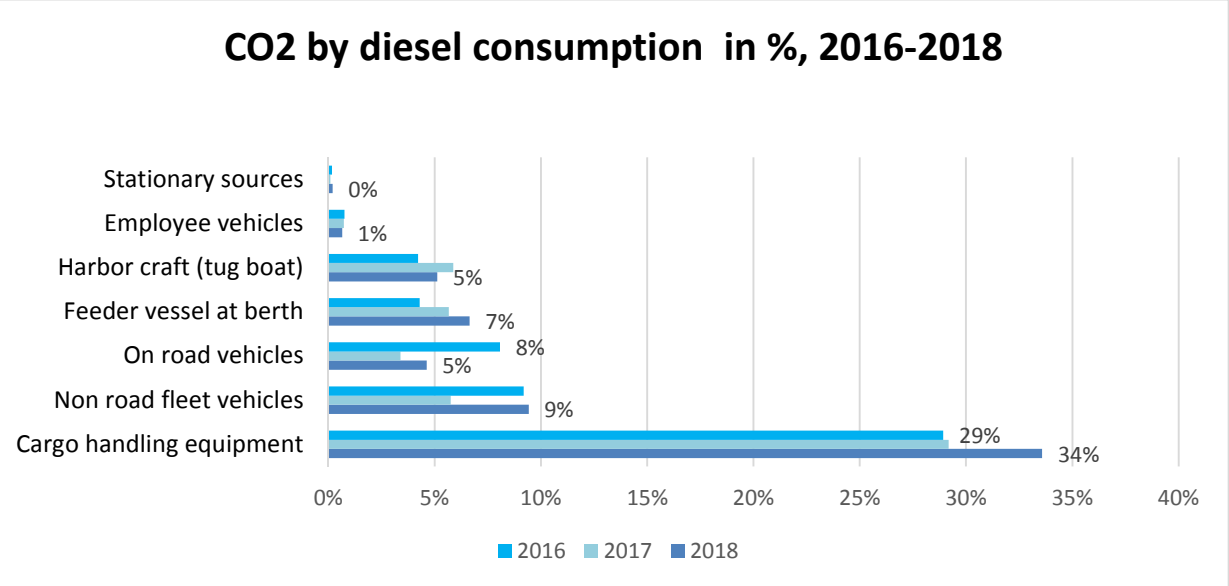

Figure 2. Share of CO2 emissions by diesel consumption of Danube Logistics in 2016- 2018

The fuel consumption of vessels considered in this report (scope 1) includes the tug boat chartered by Danube Logistics and used for navigation. Further Danube Logistics operates a regular container transportation service between GIFP and the port of Constanta. For this feeder vessel the fuel consumption during stationary time at the container terminal berth is considered.

92.2% of the CO2 emissions within scope 1 refer to the consumption of fuel, the remaining 7.8% refers to the consumption of gas.

b) Natural gas consumption (scope 1)

The consumption of natural gas used for heating of the buildings within GIFP Business Park amounted to 27,082 m³ in 2018 representing a decrease of 7.4% comparing to the previous year. This decrease results from less heating in office park buildings due to a shorter period with cold temperatures. The share of natural gas from all CO2 emissions amounted to 5.1%.

c) Electricity (scope 2)

Only the electricity used by the units owned and controlled by Danube Logistics was taken into consideration. In 2018 the electricity consumption reached 668,406 kWh corresponding to 348.2 tons of CO2 emissions. The decrease by 10.2% compared to previous year results from a reduction of truck loading activities at the oil terminal autoloading facility, and from the reduction of losses of the transformer of the substation in the course of supply of electricity to Giurgiulesti village over several months. A further important measure to reduce energy consumption and CO2 emissions is the gradual switch from conventional to LED lamps for outside lighting on the GIFP territory.

d) CO2 emission indicator

In order to better understand the impact of operational activities on CO2 emissions and to establish a baseline for further GHG emissions the following CO2 emission indicator was calculated (table 4).

Table 4. CO2 Emissions indicator

CO2e indicator	2016	2017	2018	Change to prev. year
t CO2e	861.0	899.5	1,007.0	11.9%
t DL transshipments	437,142	473,404	567,106	19.8%
kg CO2e/ t transshipped	**2.0**	**1.9**	**1.8**	**-6.5%**

The transshipments of Danube Logistics do not include the transshipments of grain conducted at the terminals of residents and the transshipment of vegetable oil but include the weight of cargo transported in containers. The decrease of the CO2e indicator to 1.8 kg CO2e per transshipped ton of cargo demonstrates the increased efficiency due to more efficient utilization of port equipment and facilities in the course of increasing transshipment volumes.

V. CONCLUSIONS

The total estimated GHG emissions equivalent to CO2 emissions generated by Danube Logistics activities at the premises of Giurgiulesti International Free Port increased by 11.9% from 899.5 t to 1,007.0 t CO2e in 2018. As the corresponding transshipment volumes increased by 19.8% the CO2e emissions per ton cargo transshipped decreased to 1.8 kg CO2e/t. The analysis shows that increased cargo transshipments improve the efficient utilization of port equipment and facilities and reduce the relative share of emissions.

As fossil fuel used for internal combustion engines is the major source of CO2 emissions the control and optimization of diesel use for port equipment is essential for both environmental and economic reasons. This needs to be further improved. Within the procurement of new equipment in the future it should be investigated to which extent electrical power driven equipment is more efficient in regard to emissions.

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