Digitalisation tools and technologies to support port environmental sustainability and performance of port operations in the TEN-T Core Network.

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The GREEN C Ports Action will pilot the use of sensors, big data platforms, business intelligence tools and artificial intelligence modelling at the ports of Valencia, Venice, Piraeus, Wilhelmshaven and Bremerhaven, contributing this way to the future roll out of these technologies in the market.

The first phase of the project will comprise the design, acquisition, engineering adaptation and installation of the different sensor networks at the participant ports. These sensor networks will gather environmental data of different types (e.g. air quality parameters, meteorological information, noise, congestion at gates, among other), transmitting it to a Port Environmental Performance (PEP) IT platform that will be programmed to receive real time data from the sensor networks and from existing operating systems in the port (i.e. PCS, PMIS and TOS).

The second phase of the project will start once the installation of the necessary equipment to build the required environmental sensor network is completed. At this stage, partners of the GREEN C Ports project will develop methods and analytics following big data techniques and advanced modelling, which will allow predictive analyses of ports’ environmental performance. By analysing the data gathered from the sensor networks together with existing information supplied by different port authorities and community systems, it will be possible to build models and advanced algorithms to predict in real time the impact of the environmental conditions over port operations (ship loading/unloading, port congestion, traffic management, etc.) and also over nearby city areas in terms of air quality, noise and other relevant parameters.

Specific Objectives of the Action:

- Upgrade existing sensor networks with new sensors at the pilot ports
- Implement a Port Environmental Performance (PEP) IT platform that will receive real time data from the sensor networks and from existing port systems (i.e. PCS, PMIS and TOS)
- Reduce the impact of port operations on their cities
- Monitor emissions from ports and vessels
- Increase the efficiency of port operations and optimize handling of cargo in core ports
- Facilitate access and egress of cargo in and out of core ports
- Communicate effectively the case studies results and the main benefits of the technologies piloted in this Action

www.greencportsproject.eu
Pilots

Six case studies will be specifically analysed and piloted at the 5 TEN-T core ports participating in the project.

The first business case seeks to predict the date and time of entry and departure of trucks to and from the port of Valencia. Accurately forecasting these values, it will be possible to reduce traffic congestion and CO₂ emissions generated by trucks at gates by at least 10%.

The second business case aims to predict the closure of the port of Venice due to tide, wind, fog, and consequently to optimize date and time of entry and departure of ships.

Business cases 3 and 4 aim to improve air quality and noise in both the Greek port of Piraeus and the port of Valencia. In this regard, the different equipment and sensors deployed will be integrated in the PEP platform in order to know how much each vessel in the port is emitting and whether the future emissions and noise generated by the vessels calling at these ports will be compatible with the established quality levels. These predictions will be of great interest to the port authority, city council and other institutions so that they can make decisions to reduce impact on neighbourhoods surrounding the ports when tolerance emission levels are forecasted.

The fifth business case will evaluate, in the German ports of Bremerhaven and Wilhelmshaven, how ship to shore (STS) crane productivity is affected by wave agitation, currents and wind. Once this information is reported, shipping companies will be able to adjust the “berth window” in which they call at the ports, reducing the length of the ship’s stay in port and the number of polluting emissions that these ships generate.

Finally, the sixth business case will track emissions generated by shipments of goods from the time they are loaded in the warehouse of origin to the time they are unloaded in the warehouse of destination. Thanks to this pilot, companies in the retailing sector will be able to inform their customers about the door-to-door carbon footprint corresponding to the transport of the products to be purchased in the company’s supermarkets.

Partners: