

### PRODUCTIVE SECTOR: Energy and Environment

#### PROBLEM DESCRIPTION

Reduce emissions related with port activities developing a system to supply electrical and thermal energy to a ship at port.

#### CHALLENGES AND GOALS

The aim of this project is to improve energy efficiency and reduce emissions related with port activities, developing a polygeneration clusterizable containerized system that supplies electrical and thermal energy to the ships, generated from liquefied natural gas engine, to prevent operating with their auxiliary groups during their stay in port.

#### MATHEMATICAL AND COMPUTATIONAL METHODS

- ✓ Exploratory Statistical Analysis.
- ✓ Statistical modelling: flexible regression models (Generalized Additive Models, GAM).
- ✓ R programming.



Polygeneration clusterizable containerized system that supplies electrical and thermal energy to the ships.

### GREEN PORT ENERGY CENTER

#### RESULTS AND BENEFITS

A profile of energy demand has been obtained without the need to carry out complex and expensive preliminary studies.

Relative to diesel, it has brought a CO2 emissions reduction of 20%.

Energy has been obtained through clean generation system installed in the port.

A computer tool that allows the calculation of cost-benefit of the use of the GPEC system during the stays in port of the ships, in terms of both energy efficiency and emission reduction, has been developed.



Aerial view of Vigo's port (World Port Source)

**Design and development of a polygeneration clusterizable containerized system that supplies electrical and thermal energy to the ships**



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