PIXEL Innovation Management
Equilibrium environmental vs. cost-benefit

Reduction of **environmental impact** of port activities (e.g. greenhouse gases for 15-20%)

Increase of **renewables energy uptake** in use-cases at small, medium and large ports

Adoption of a **Port Environmental Index** as a **global quantitative measure** to monitor and act on own environmental footprint

Reduction of **operational and infrastructural costs** with better Port-City integration

Improvement of logistics through data analytics over **waiting time for vessels**, **on-time performance**

Heterogeneous information hub tailored for the interoperability in building over the limited data **interchange of Port Community Systems** (PCS)

PIXEL – Port IoT for Environmental Leverage

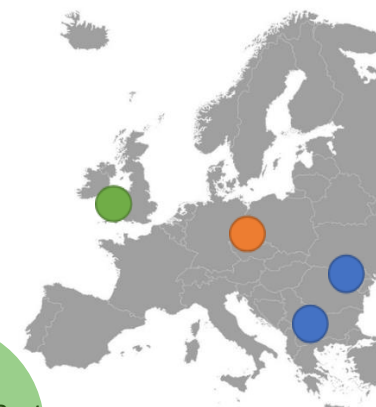- **Secure IoT solutions** for port ecosystem operations

- **Business intelligence** w/ predictive analytics

- **Environmental awareness** with actionable tool: PEI

- Addressing **medium and small ports with scalability** to big ports

- Focusing on **port-city ecosystem challenges**

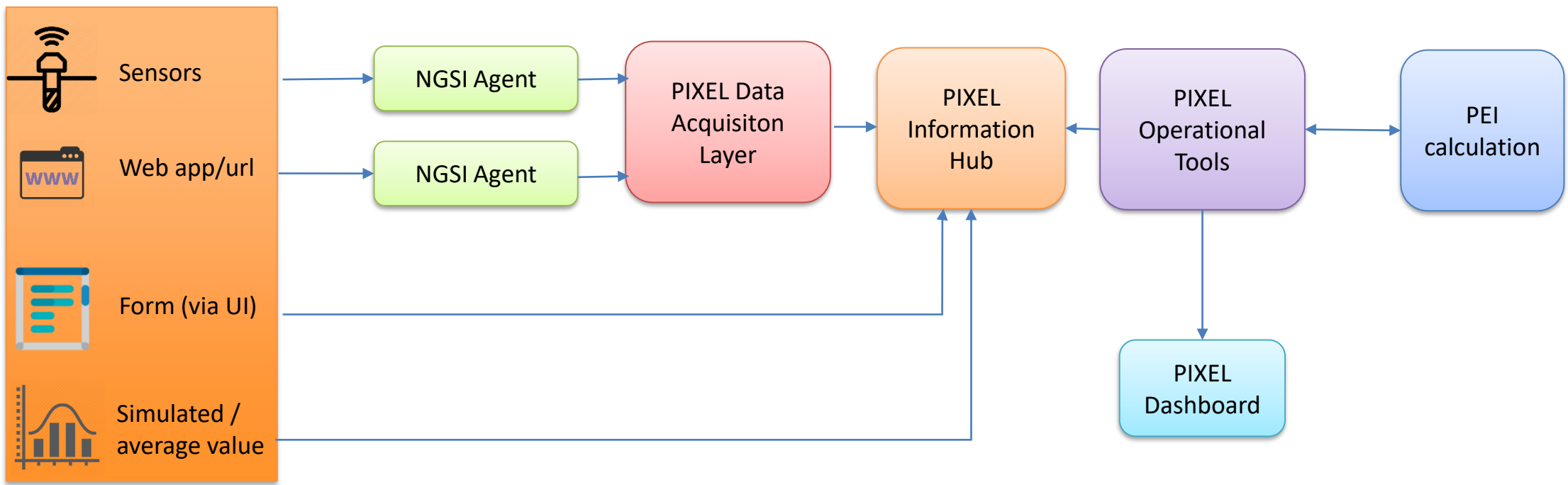⚓ MONFALCONE · BORDEAUX · PIRAEUS · THESSALONIKI ⚓

Big Data analytics

Interoperab. secure IoT ecosystem

Energy simulation & prediction

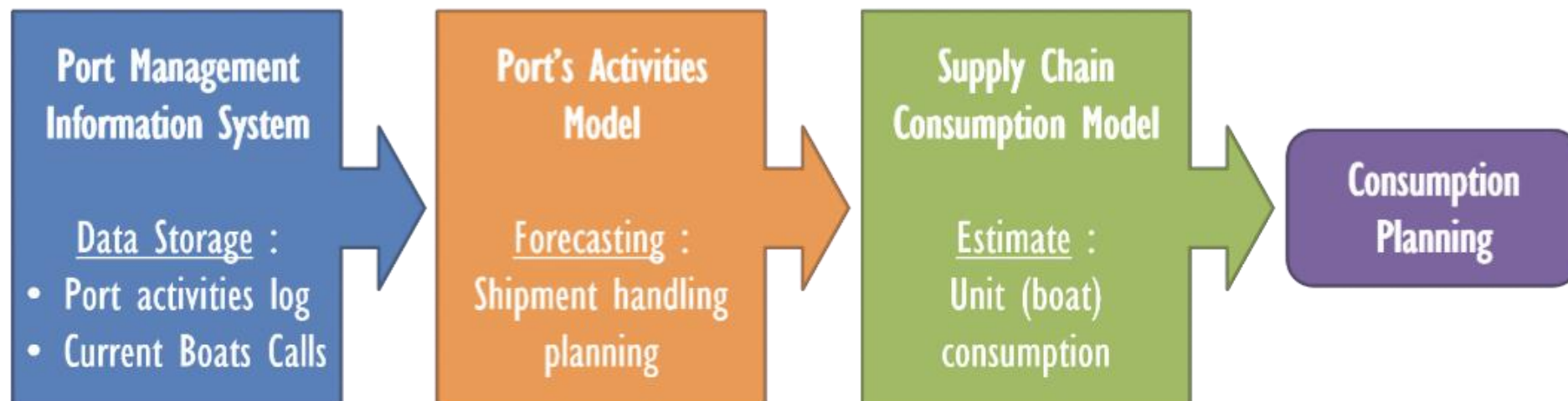*Quantitative Port Env. Index*

PIXEL – Product description

PIXEL – Energy demand model

From **boats traffic...**   ...to **energy consumption**

Port Management Information System

Data Storage :
- Port activities log
- Current Boats Calls

→

Port's Activities Model

Forecasting :
Shipment handling planning

→

Supply Chain Consumption Model

Estimate :
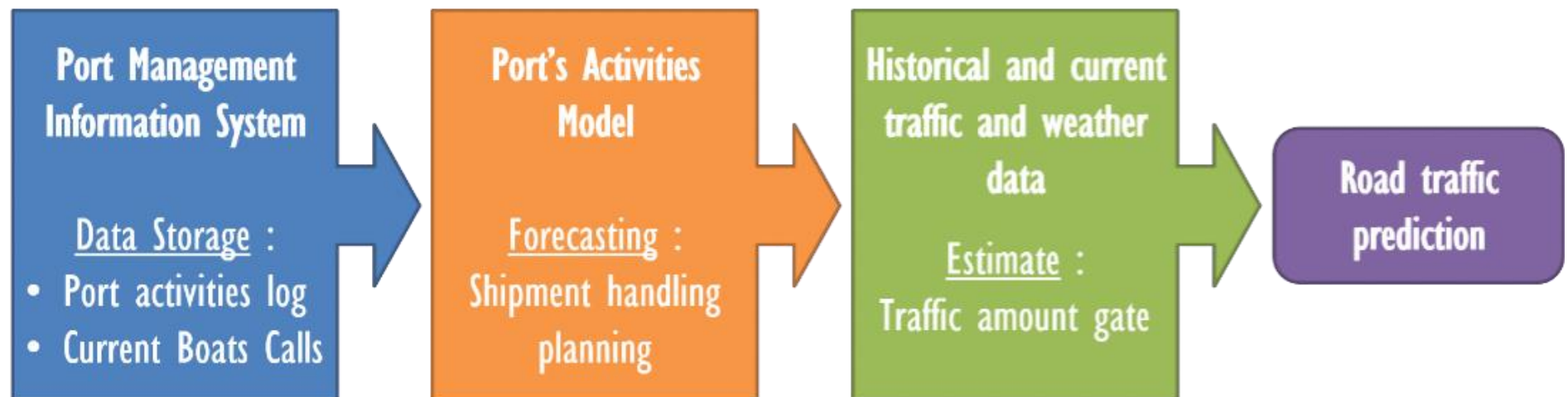Unit (boat) consumption

→

Consumption Planning

PIXEL – Port – City multimodal traffic model

From **boats traffic**…   …to **short-time prediction for traffic amount the gate**

Port Management Information System

Data Storage :
- Port activities log
- Current Boats Calls

Port's Activities Model

Forecasting :
Shipment handling planning

Historical and current traffic and weather data

Estimate :
Traffic amount gate

Road traffic prediction
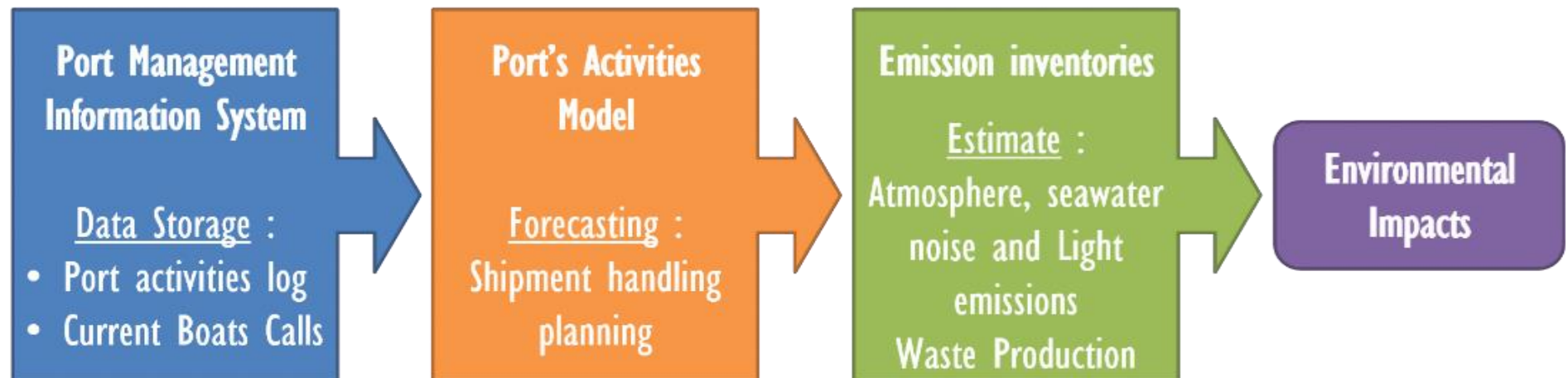
PIXEL – Environmental Pollution model

From **boats traffic…**   …to **emission quantification**

Why do you need a **Port Environmental Index**?

Today's environmental challenges are rising to fit the real global needs, enhanced by legislation and standards. Ports need clear understanding of their **overall environmental performance**

Ports can **optimize their use of resources** to include the appropriate monitor of environmental-related activity and act on it

PEI is a global indicator of the impact in ports that permits the ports to have a **real-time measure of their environmental footprint and to plan actions** to reduce it to desired levels

1 Air quality
2 Energy consumption
3 Noise
4 Relationship with local community
5 Ship waste
6 Port development (land related)
7 Climate change
8 Water quality
9 Dredging operations
10 Garbage / Port waste

Top 10 environmental priorities of European ports for 2018

A useful **Port Environmental Index**

▍PEI relies on a **baseline of IoT data sources** that enable the interoperable data collection with needed frequency (some of it real-time)

▍It is a **composite environmental index**, i.e., a mathematical aggregation of a set of indicators.

▍Combines different environmental indices - **environmental Key Performance Indicators** (eKPIs) - into a single metric using a specific mathematical algorithm.

A useful **Port Environmental Index**

PEI will be using the **PIXEL baseline infrastructure** to enable small and medium ports for environmental awareness and action

The modularity of PIXEL will suit port-cities of different sizes, natures and needs **towards the Port of the Future**

The costs of environmental assessment and action are covered by the investment on the **improvement and optimization of port operations**

Diffusion
Bring the relevant information to the subscriber through the relevant channel
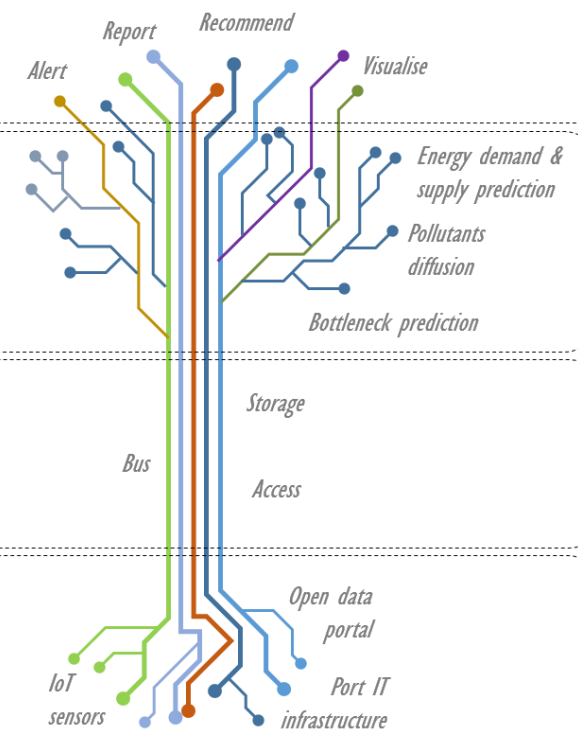
Monitoring & Modelling
Convert raw data to useful information about today and model port activities to predict future impact

Management
Support data processing through an open, robust and modular platform

Acquisition
Collect heterogeneous data from multiple sources through live data stream connectors

Report   Recommend
Alert   Visualise
Energy demand & supply prediction
Pollutants diffusion
Bottleneck prediction
Storage
Bus
Access
Open data portal
IoT sensors
Port IT infrastructure

PIXEL – Where IoT meets the Port of the Future

First **IoT integrated platform** focused on optimization of operations w/ reduction of **environmental impact**

Port Environmental Index (PEI) as a quantitative composite indicator of the overall environmental performance of a port

Secured dashboard with **operational tools** for decision support (real time monitoring and predictive analysis)

Information hub and optimization operations through **smart models** (energy, transportation, pollution and port-city integration)

PIXEL – Where IoT meets the Port of the Future

PIXEL – Where IoT meets the Port of the Future

THANK YOU

Get to know us at **pixel-ports.eu**