Ports Energy and Carbon Savings

Deliverable 1.2.3

Baseline measurement reports all partners

Project No. 2S03-009

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Author

NAME	ORGANISATION
Laurence A. Wright	Solent University
Anthony Gallagher	Solent University
Isara Muangthai	Solent University

Revision history

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1. Introduction

This report develops energy and carbon footprint baselines for the PECS pilot partners, through application of the method developed in D1.1.4. The method follows the terms of 'scopes', defined by the World Resource Institute and World Business Council for Sustainable Development, which relate to the spatial boundary and level of control over the emission source. 'Scope 1' is defined as a direct emission within the boundary of the port; this includes all emissions arising as a direct result of the organisation or system (e.g. emissions from in-boundary fuel combustion). 'Scope 2' considers emissions from grid connected electricity, steam, and heat. Typically, electricity generation is essential for supplying most activities in the port. 'Scope 3' expands the definition to include other indirect up- and down-stream emissions associated with the port. For example, emissions from marine transportation within the boundary of the port (Figure 1).

The results provided in this report are partial for some partners due to data gaps, and are strictly provisional and subject to revision as the PECS project continues.

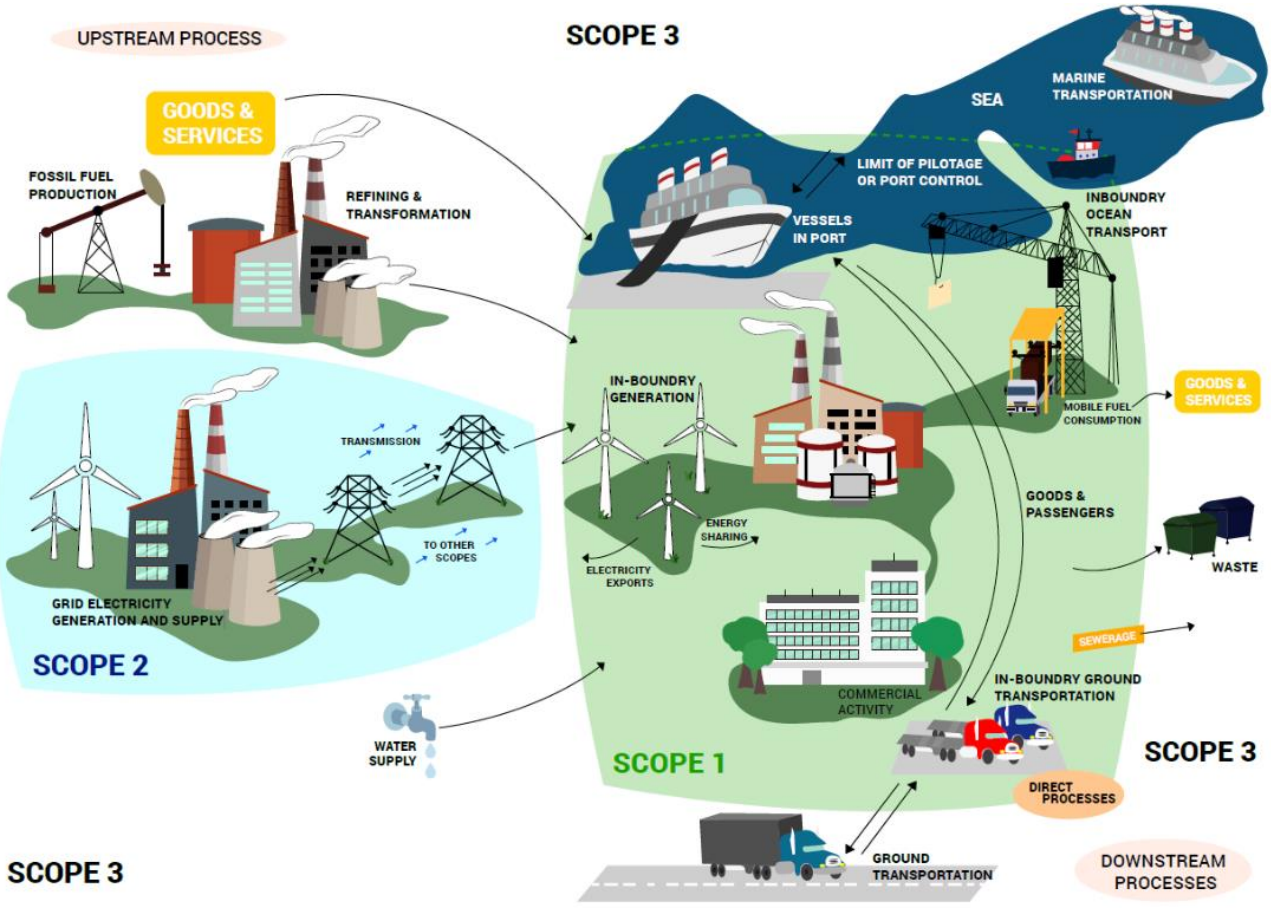

FIGURE 1 PORT DIAGRAM INDICATING ENERGY AND CO_2 EMISSIONS FLOWS.

2. Ostende Haven

The Port of Ostend (Ostende Haven) is in Ostend, West Flanders, Belgium (Figure 2) it is a centre for freight transport. Shipping takes place between Ostend and England. Full management of operations within the port is undertaken by AGHO which is a public organisation.

The port area of Ostend is defined by the limits of the regulatory control of the harbour authority. Within the context of the PECS project an innovative 100kW turbine is to be installed, also an energy independent pontoon (2x12m), including LED-lights, powered by solar panels and a small wind turbine is to be installed.

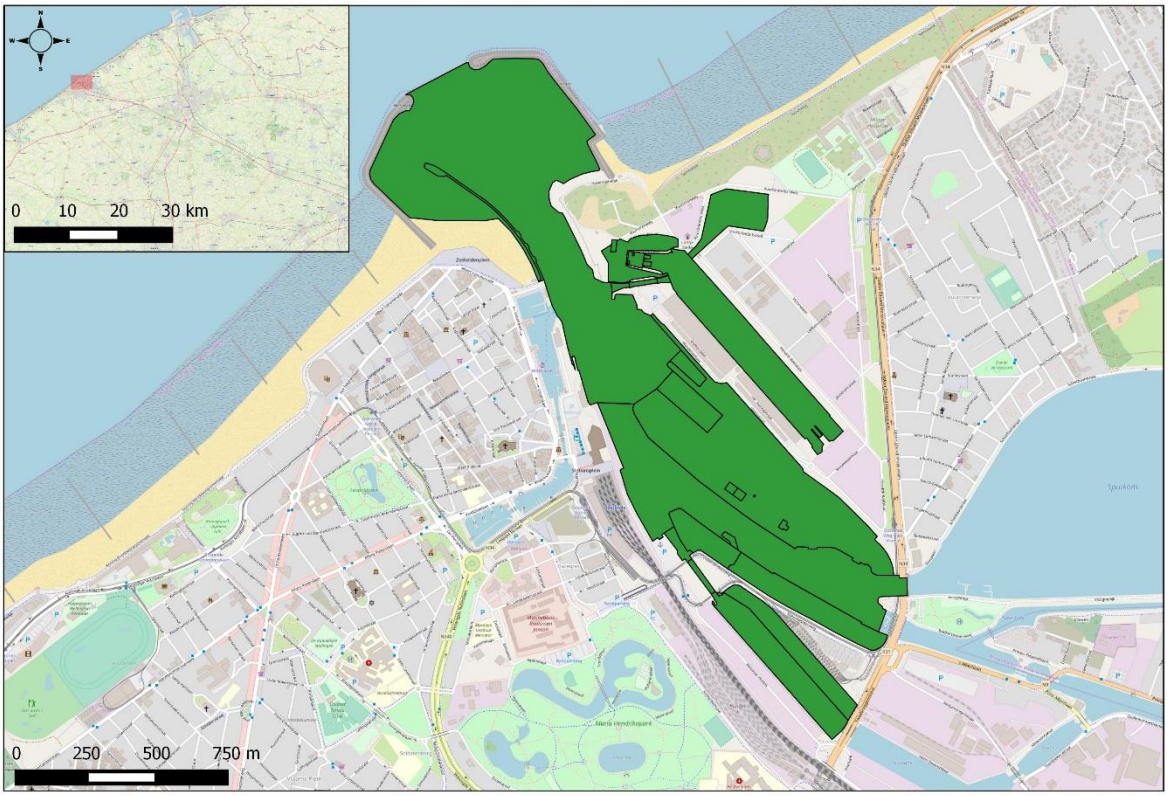

FIGURE 2 PORT OF OSTEND AND LOCATION OF OSTEND (INSERT).

Results of the baseline assessment for the Port of Ostend are currently limited to a partial coverage footprint from the Ostend offshore village and is for emissions relating to electricity consumption only. Investigations are being undertaken to explore methods to improve the data coverage.

TABLE 1 PROVISIONAL BASELINE RESULTS FOR THE PORT OF OSTEND

Scope	Category	Energy (Gwh)	Carbon footprint ($kgCO_2e$)
1	Stationary Fuel Combustion	No data	No data
	Industrial processes	No data	No data
	In-boundary ground transport (port owned)	No data	No data
	In-boundary ground transport (non-port owned)	No data	No data
	In boundary marine transport (port owned)	No data	No data
	In boundary marine transport (non-port owned)	No data	No data
	Mobile machinery	No data	No data
2	Electricity (partial)	1416100	779000
	Steam	No data	No data
	Heat	No data	No data
3	Water Supply	No data	No data
	Sewerage	No data	No data
	Out of boundary road transport	No data	No data
	Out of boundary marine transport	No data	No data
	Waste	No data	No data
	Goods and services	No data	No data

3. Gemeente Hellevoetsluis

Hellevoetsluis is a city municipality on Voorne-Putten Island in the western Netherlands, in the South Provence of Holland. Historically an important naval port, Hellevotsluis harbour now operates as a municipal marina.

The port area of Hellevoetsluis consists of four ports, namely: Veerhaven, Kanaalhaven / Koopvaardijhaven, Vestinghaven, and the Heliushaven. Within this port, two commercial ports and four water sports clubs are active. In addition, part of the port area is owned by the municipality of Hellevoetsluis. The Vestinghaven is protected town area.

The PECS intervention consists of six small wind turbines. The best locations for small windmills are the Koopvaardijhaven and the Veerhaven. The energy can be used directly for the own energy consumption of the harbour.

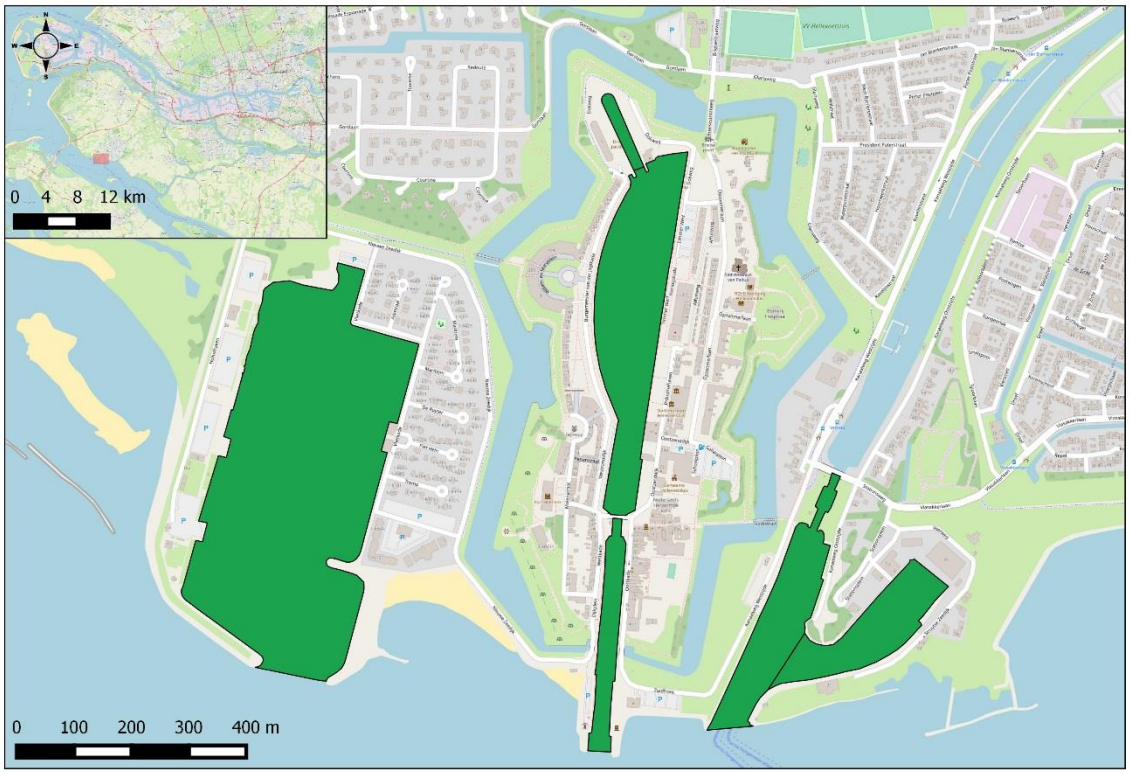

FIGURE 3 HARBOUR OF HELLEVOETSLUIS AND LOCATION OF HELLEVOESLUIS (INSERT).

TABLE 2 PROVISIONAL BASELINE RESULTS FOR HELLEVOETSLUIS

Scope	Category		Energy (Gwh)	Carbon footprint ($kgCO_2e$)
1	Stationary Fuel Combustion	WSV Helius	7190	1471.27
		WSV Hellevoetsluis	4983	1019.65
		WSV Haringvliet	5604	1146.73
		Marina Cape Helius -	2435	498.27
		Municipality harbour - Koopvaardijhaven / Vestinghaven	0	0.00
		Ceilidth - Veerhaven	0	0.00
	Industrial processes		No data	No data
	In-boundary ground transport (port owned)		No data	No data
	In-boundary ground transport (non-port owned)		No data	No data
	In boundary marine transport (port owned)		No data	No data
	In boundary marine transport (non-port owned)		No data	No data
	Mobile machinery		No data	No data
2	Electricity	WSV Helius	96839	44118.12
		WSV Hellevoetsluis	51779	23589.59
		WSV Haringvliet	63890	29107.14
		Marina Cape Helius -	124000	56492.18
		Municipality harbour - Koopvaardijhaven / Vestinghaven	70213	31987.79
		Ceilidth - Veerhaven	80000	36446.57
	Steam		N/A	N/A
	Heat		N/A	N/A
3	Water Supply		No data	No data
	Sewerage		No data	No data
	Out of boundary road transport		No data	No data
	Out of boundary marine transport		No data	No data
	Waste		No data	No data
	Goods and services		No data	No data

4. Portsmouth International Port

Portsmouth International Port, is owned and operated by Portsmouth City Council. It represents one of the six PECS project pilot partners. Portsmouth International Port is in the City of Portsmouth, Hampshire, on the south coast of the UK (Figure 4).

Portsmouth International Port has five linkspans for the purpose of loading/unloading Ro-Ro (roll-on-roll-off) type ferry vessels. Linkspan number 2 recently reached the end of its operational lifetime and has been replaced with an energy efficient linkspan as part of the PECS project. The new linkspan is designed to incorporate carbon saving features which allows the port to continue providing a service to customers and controlling its CO_2 emissions at the same time.

The Port boundary is primarily determined by the geopolitical boundary of the port administrative area (Figure 4). For the purposes of the carbon footprint, all activities within this boundary are considered scope 1 emissions sources; transboundary sources including electricity, steam, and heat are considered scope 2; and further transboundary sources including waste, out-of-boundary transport, and goods and services are considered scope 3 (**Error! Reference source not found.**).

Within the context of the PECS project, linkspan 2 is considered the intervention and is thus reported separately (to monitor effectiveness of the intervention against the baseline scenario) and within the context of the wider port environment.

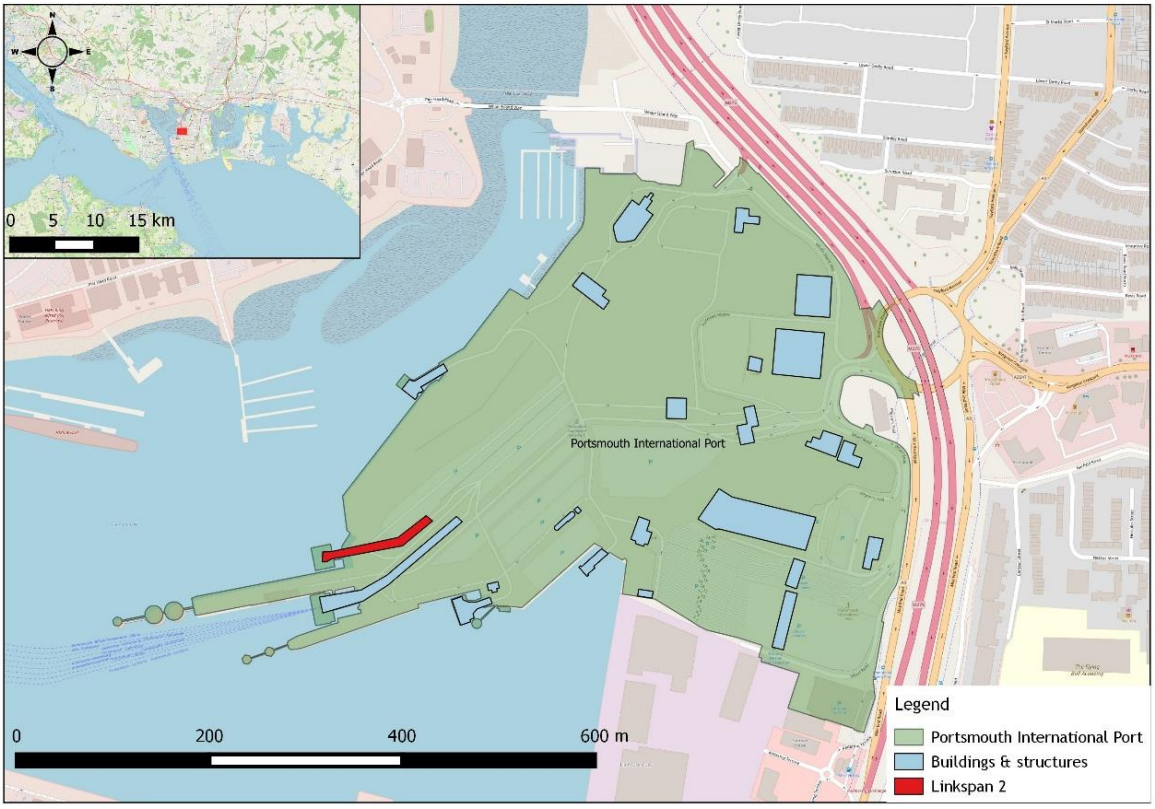

FIGURE 4 PORTSMOUTH INTERNATIONAL PORT AND LOCATION OF PORTSMOUTH, UK (INSERT). THE PECS PROJECT INTERVENTION, LINKSPAN 2 IS HIGHLIGHTED.

Results are provided for the data category items identified for the 2017 calendar period. Note these results are provisional only and subject to change with development in the PECS project. Results for energy statistics are reported in giga watt hours (Gwh), and carbon footprint in kg carbon dioxide equivalents ($kgCO_2e$).

TABLE 3 PROVISIONAL BASELINE RESULTS FOR PORTSMOUTH INTERNATIONAL PORT

Scope	Category	Energy (kWh)	Carbon footprint (kgCO2e)
1	Stationary fuel combustion	No data	No data
	No data	No data	No data
	Industrial processes	No data	No data
	In-boundary ground transport (port owned)	No data	No data
	In-boundary ground transport (non-port owned)		281488
	In boundary marine transport (port owned)	No data	No data
2	In boundary marine transport (non-port owned)		3937436
	Mobile machinery	No data	No data
	Electricity (limited coverage – linkspan 2 only)	161983	98669
3	Steam	N/A	N/A
	Heat	N/A	N/A
	Water supply	No data	No data
	No data	No data	No data
	Sewerage	No data	No data
	Out of boundary road transport		4720343

5. ODIJmond

Omgevingsdienst IJmond is a legal representative of local environmental government bodies in the IJmond region. Ijmond is located in the west of Netherlands, in the municipality of Velsen. The port area is key for the fishing industry in a key location for trade with Western Europe. Other large employers in the area include Tata Steel.

The scope and boundary of ODJomnd are primarily defined through the limits of regulatory responsibility of Omgevingsdienst IJmond. For information the Tata Steel site is excluded from this definition.

Within the PECS project ODIJmond are developing and deploying an Energy Potential Scan (EPS) tool and Local Energy Management (LEM) platform to encourage and enable energy sharing and reduction among businesses in the area.

As results from the EPS and LEM tools are still under consideration; energy use and carbon footprint for the ODIJmond area are currently provided through a headline figures for electricity, natural gas consumption only.

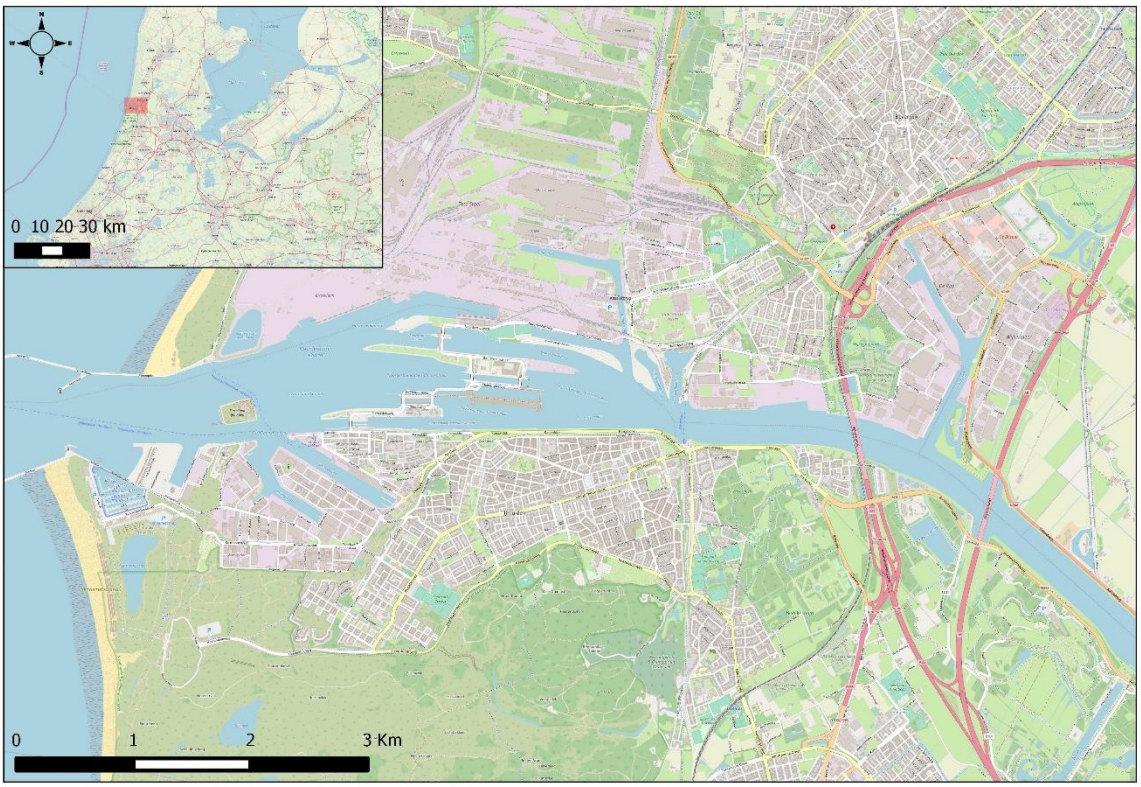

FIGURE 5 AREA OF ODIJMOND, AND WIDER LOCATION (INSERT)

TABLE 4 PROVISIONAL BASELINE RESULTS FOR THE AREA OF ODJMOND

Scope	Category	Energy (Gwh)	Carbon footprint ($kgCO_2e$)
1	Stationary Fuel Combustion	57.0	13889
	Industrial processes	No data	No data
	In-boundary ground transport (port owned)	No data	No data
	In-boundary ground transport (non-port owned)	No data	No data
	In boundary marine transport (port owned)	No data	No data
	In boundary marine transport (non-port owned)	No data	No data
	Mobile machinery	No data	No data
2	Electricity	70.5	9603190
	Steam	N/A	N/A
	Heat	N/A	N/A
3	Water Supply	No data	No data
	Sewerage	No data	No data
	Out of boundary road transport	No data	No data
	Out of boundary marine transport	No data	No data
	Waste	No data	No data
	Goods and services	No data	No data

6. Indachlor

Indachlor is an organisation set up by parent company Indaver NV. Indachlor is based in the port of Dunkirk, France. Indachlor will be a waste treatment facility, recovering chlorine from Belgium, Netherlands, western Germany and northern France. The PECS pilot comprises part of a 40k tonnes/year highly chlorinated waste treatment facility. It will recover all chlorine in form of hydrochloric acid for re-use and recovers all energy through steam (19MW thermal power). The pilot concerns the engineering, supply and construction of a turbo-generator and its ancillary equipment (electricity and instrumentation and automation).

As the Indachlor facility is currently under construction the baseline measurement has been completed using a life cycle assessment, provided by a third-party representative, prior to the commencement of PECS. Details of the headline figures from this study are provided below. Further details are soon to be made available following translation of the LCA report (currently in French).

The current predicted baseline energy consumption is 6560000 kWh pa, emitting 3608tCO_2e.

7. Blue Power Synergy

Blue Power Synergy is a small private company based in Oostende, Belgium. The company focuses on renewable energy synergy systems, utilising wind and solar energy. Within the context of the PECS project BPS will develop and test an energy generation and storage pontoon. Where this is a development activity, a single headline baseline figure is provided for the energy offset potential of the renewable generation capacity of the pontoon against an assumed Belgium grid average.

The pontoon has a potential energy generation capacity of 243000kWh pa, saving a potential 176tCO_2e pa, based on an assumption of 0.75kg/kWh CO_2e grid emission (Belguim).