

Towards a Low Carbon Emission Industry in the Port of Antwerp: the role of Carbon Capture, Utilization and Storage

Karen Callebaut, Technical Manager
Environment

25/02/2015



Agenda



- 1. Port of Antwerp**
- 2. Drivers**
- 3. Vision**
- 4. Strategy**
- 5. Initiatives**
- 6. Way forward**



LOCATED AT THE HEART OF EUROPE





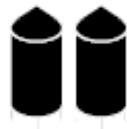
A MULTIFUNCTIONAL WORLD-CLASS PORT

Cargo handling, industry and logistics

Antwerp stands out as a **multifunctional world-class port** thanks to the presence not only of handling and logistics companies but also industry within the port. In no other port are the various services so closely coordinated. This makes the port of Antwerp the European distribution hub *par excellence*.



6.1 million m²
COVERED STORAGE SPACE



680,000 m³
POLYMERS STORAGE CAPACITY



7 STEEL SERVICE CENTRES



6.9 million m³
LIQUID BULK STORAGE CAPACITY



1 ALL-WEATHER TERMINAL



**13,057 ha
PORT AREA**



7 of the 10
LARGEST CHEMICAL COMPANIES



17 terminals
SPECIALISING
IN BREAKBULK



15 million TEU
CONTAINER CAPACITY



3 VEHICLE
PROCESSING CENTRES



2 million m³
REFRIGERATED STORAGE CAPACITY

Drivers

- Companies' competitiveness

Activity	Added value Flanders	Added value PoA	Period	Reference
Chemicals	5.38 bn EURO	2.87 bn EURO	2010-2012	NBB-INR
Refineries	1.24 bn EURO	0.96 bn EURO	2010-2012	NBB-INR

- Social economy
 - ✓ Chemicals: 10.907 direct (17% of Flanders) (NBB, 2012; essenscia, 2012)
- Hotspot industrial CO₂-eq
 - ✓ 15 Mton CO₂-eq (PoA) vs 31 Mton CO₂-eq (Flanders) (VORA, 2010)
- Europe's largest integrated petrochemical cluster
 - ✓ Cost efficiency by synergy

Vision



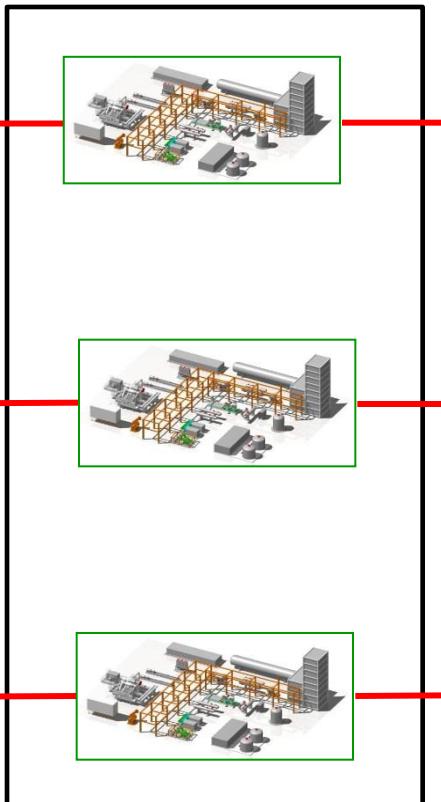
CO₂ source 1



CO₂ source 2



CO₂ source n



Purification of CO₂
(if needed)



Use



Compression/Liquefaction
at PoA

OR

Depleted NG
Aquifer
EOR

Geological storage at
North Sea

**CCU(S) Network at
Port of Antwerp**

Strategy

- ✓ Facilitate CCU(S) projects
 - Detecting opportunities
 - Stimulating partnerships
 - Pro-actively exploring infrastructure

- ✓ Formalise engagement
 - Industry
 - Policy makers

- ✓ Knowledge sharing
 - Annual CCUS Advisory Group
 - North Sea Basin Task Force

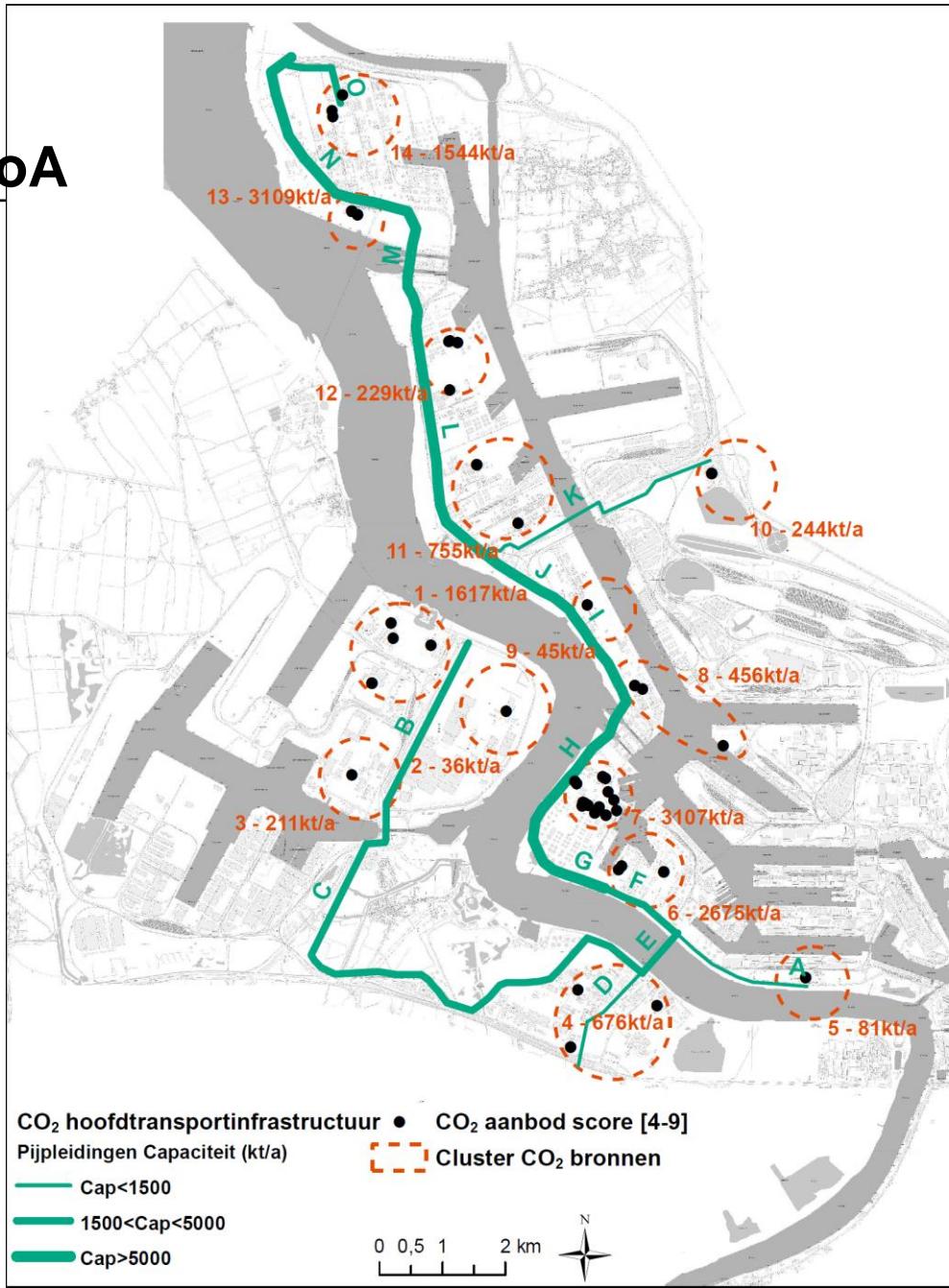


Initiatives

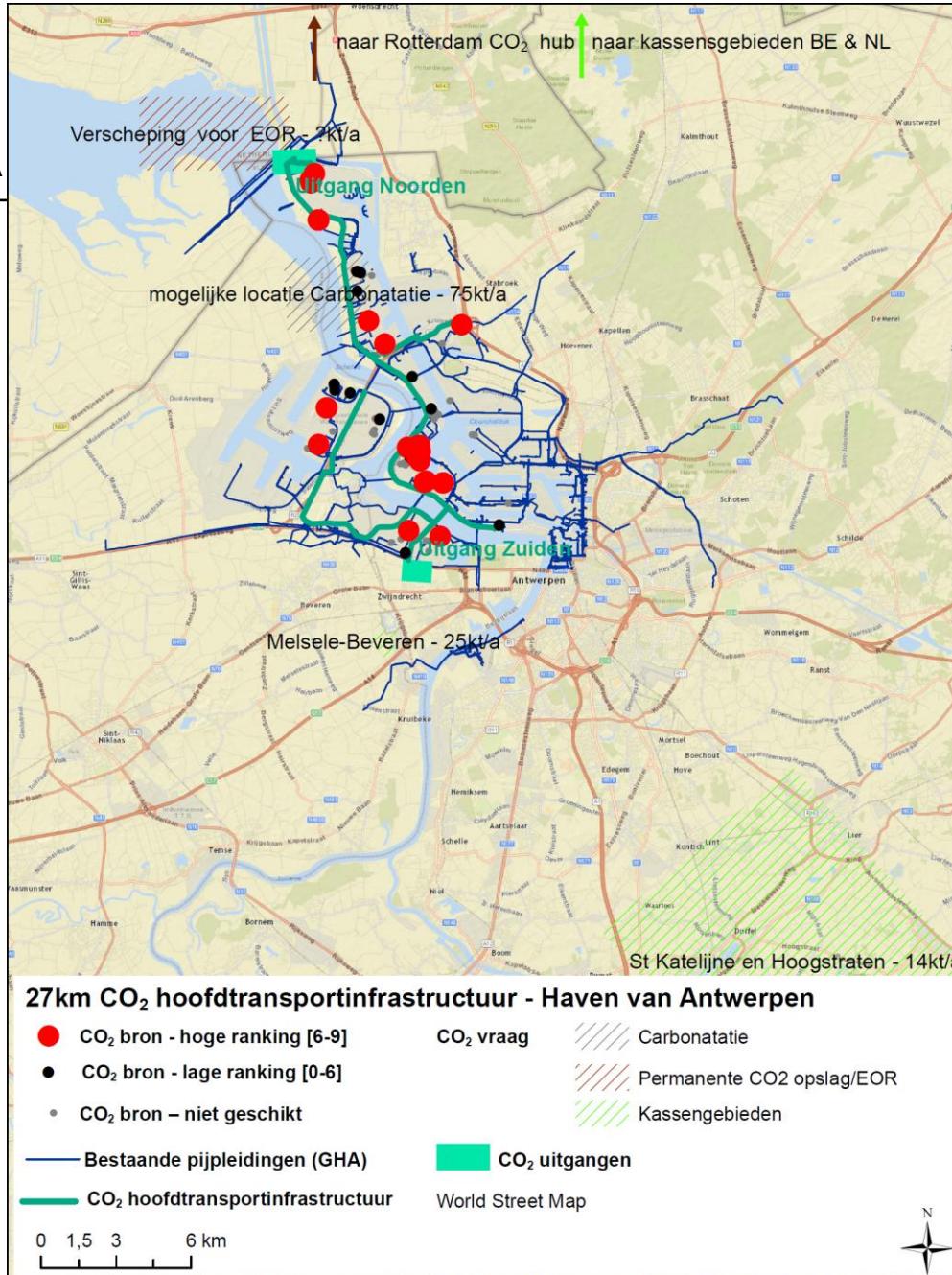


Partner(s)	Scope
Flemish and Dutch regional bodies and knowledge institutes www.co2cleaning.eu	Interreg IV <ul style="list-style-type: none">- Inventory CO₂, CH₄, RES, infrastructure- CO₂ cleaning plant- Feasibility analysis CCUS infrastructure PoA- Cases greenhouses- Power to Gas- Vision document
Knowledge institutes, industry	Horizon2020 <ul style="list-style-type: none">- CO₂ conversion through electrochemistry and plasma technology- Pilot scale testing
Messer Group, Recmix	High level calculation of business cases <ul style="list-style-type: none">- Greenhouses- Carbonation
FISCH asbl	Opportunities CO ₂ renewable chemicals <ul style="list-style-type: none">- Identify Flemish expertise- Quick wins matchmaking PoA

Feasibility analysis CCUS infrastructure PoA



Feasibility analysis CCUS infrastructure PoA



Feasibility analysis CCUS infrastructure PoA



	All sources (15 Mton / year)		No EOR (0.5 Mton / year)		Most relevant sources (5 Mton / year)	
	Gaseous	Supercritical	Gaseous	Supercritical	Gaseous	Supercritical
Tariff (€/ton CO ₂) Reference scenario	0.6	0.5	5.9	6.8	1.1	1.1
Tariff (€/ton CO ₂) Price steel +25%	0.6	0.6	6.0	7.0	1.2	1.1
Tariff (€/ton CO ₂) ROI 9%	0.7	0.6	6.9	7.1	1.3	1.2
Tariff (€/ton CO ₂) ROI 15% (highlighted)	0.9	0.9	9.0	10.9	1.8	1.7
Rate (€/ton CO ₂) Own capital 70%	0.5	0.5	5.2	6.0	1.0	0.9

Short term

- ✓ High level calculation business cases
- ✓ Facilitate CO₂ thematic group under EU Regulation N° 347/2013
- ✓ Prepare PCI Antwerp → The Netherlands or U.K.

Mid term

- ✓ Engage partners for CCU(S) implementation

CCUS Advisory Group 06/03 @ Antwerp

Thank you for your attention !



karen.callebaut@portofantwerp.com

0032-3-229 64 34

0032-474-610 912