

# Policies and measures to address air pollution in port cities

Bart Martens

Advisor vice-mayor Tatjana Scheck - City of Antwerp

Concawe seminar – March 18<sup>th</sup> 2024

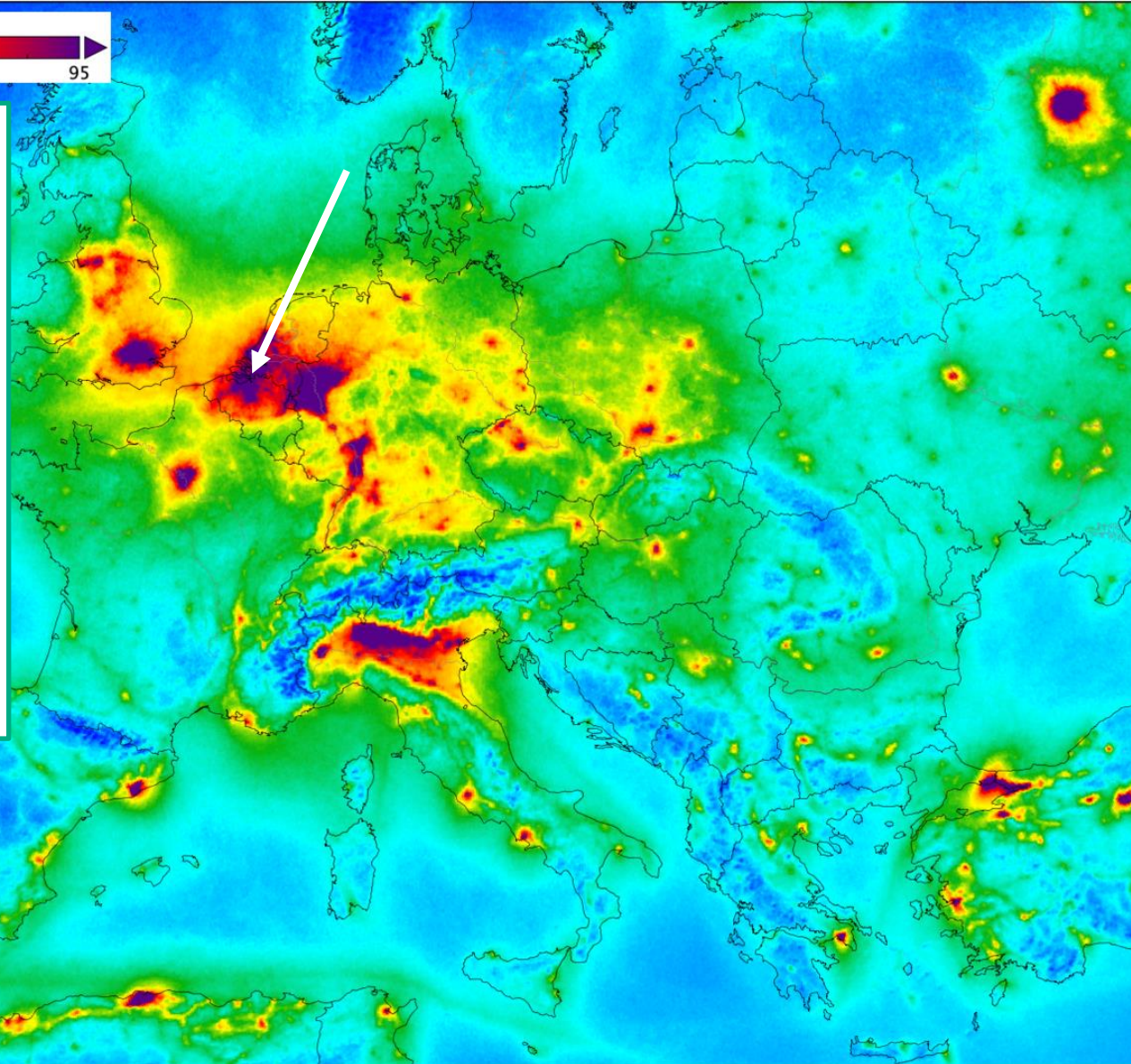


NO2 tropospheric column ( $\mu\text{mol}/\text{m}^2$ )

5 20 35 50 65 80 95

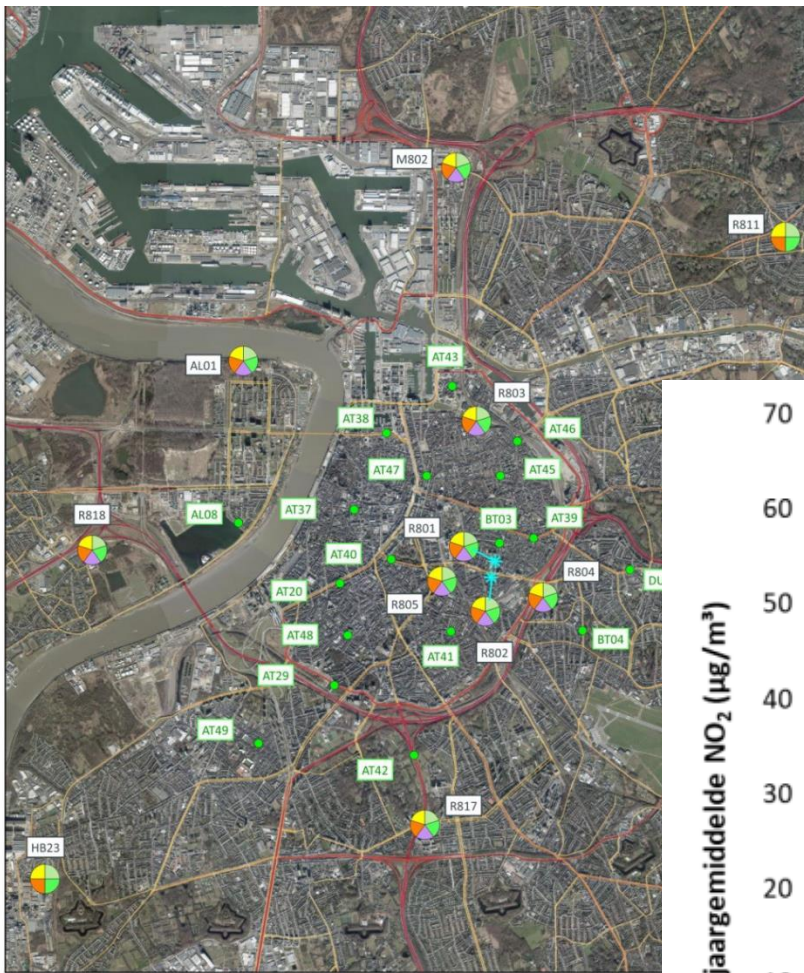
## Antwerp:

- 2nd largest city of Belgium
- 2nd largest Port of Europe
- 2nd largest Chemical cluster in the World
- Part of the Blue Banana
- Part of ARRRRA-cluster



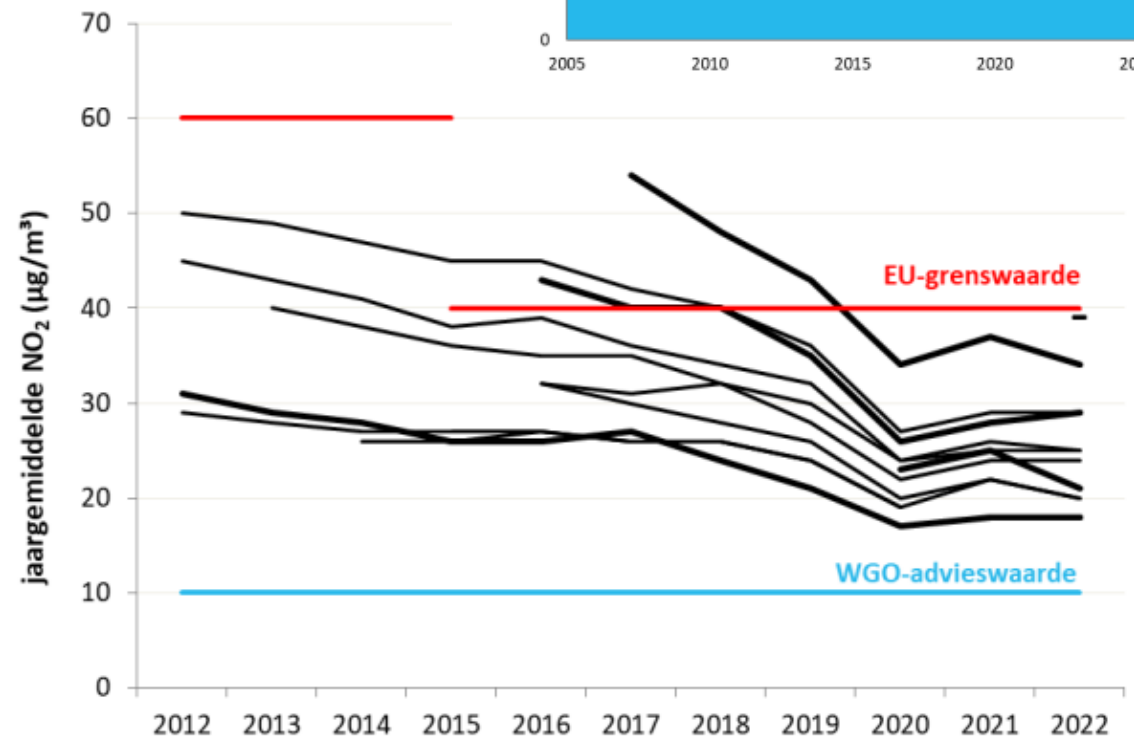
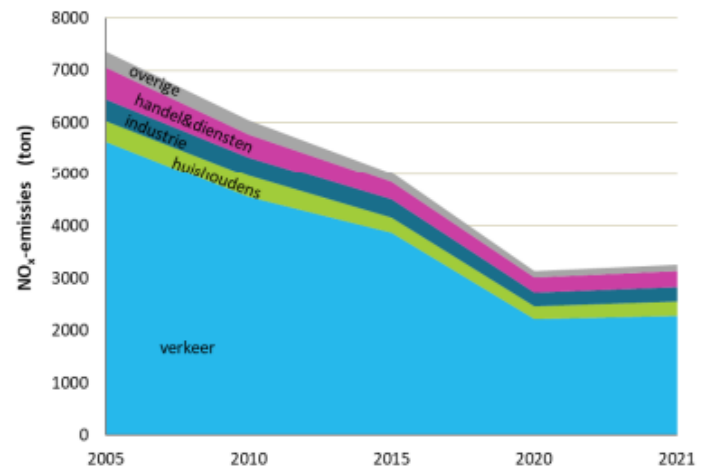
Source: ESA

[Antwerpforclimate.be](http://Antwerpforclimate.be)



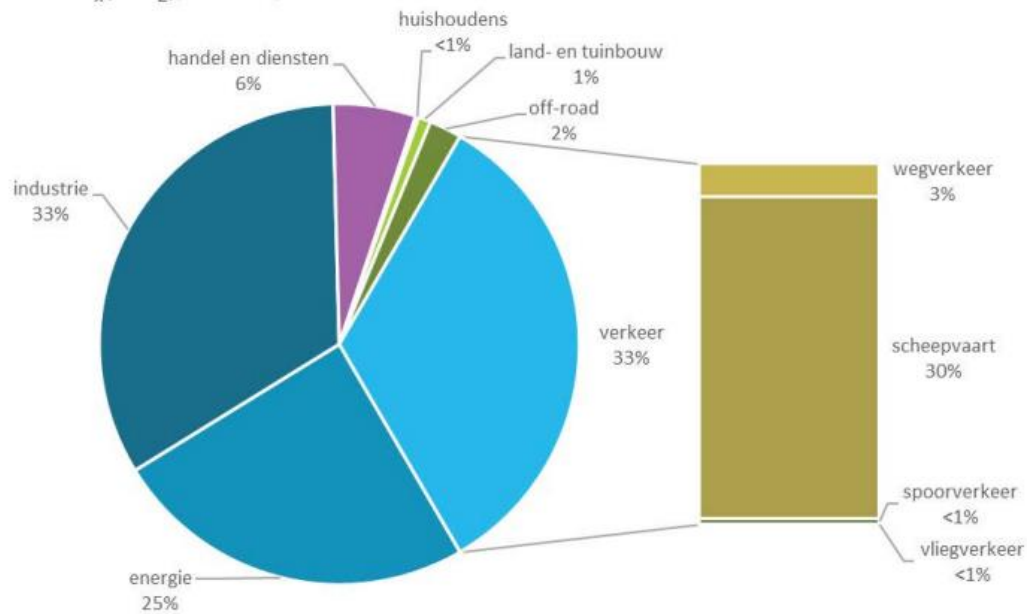
Metingen in de Antwerpse agglomeratie eind 2019

- PM<sub>10</sub>
- PM<sub>2,5</sub>
- Zwarte koolstof
- NO<sub>2</sub>
- NO
- NO<sub>2</sub> passieve sampler

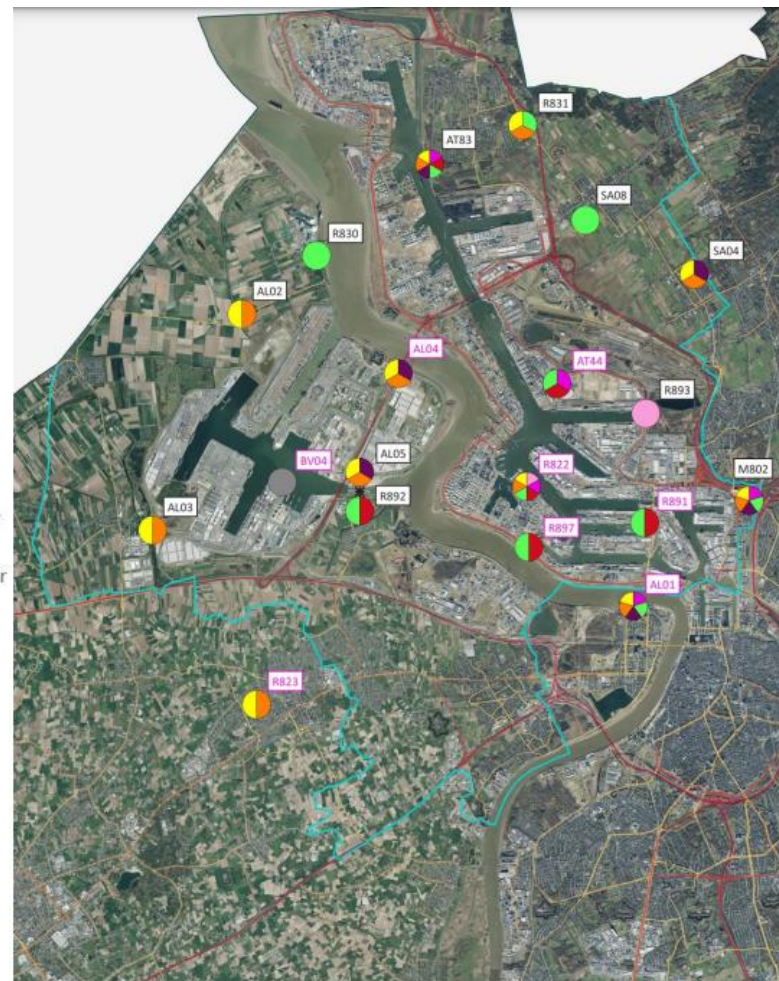
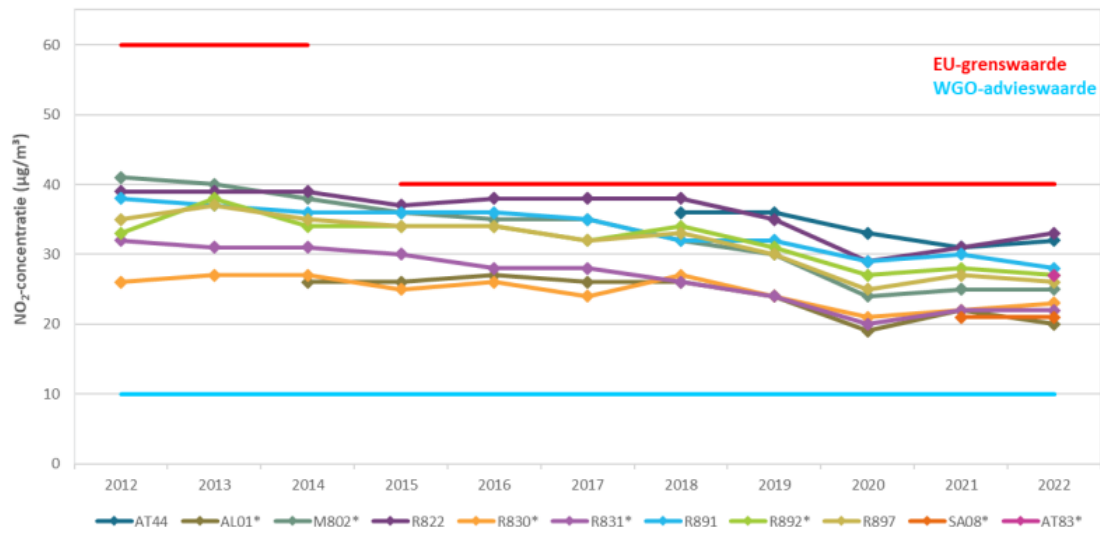


# Emissions and air quality in city

# emissies NO<sub>x</sub>(NO<sub>2</sub>), haven, 2021



Fig



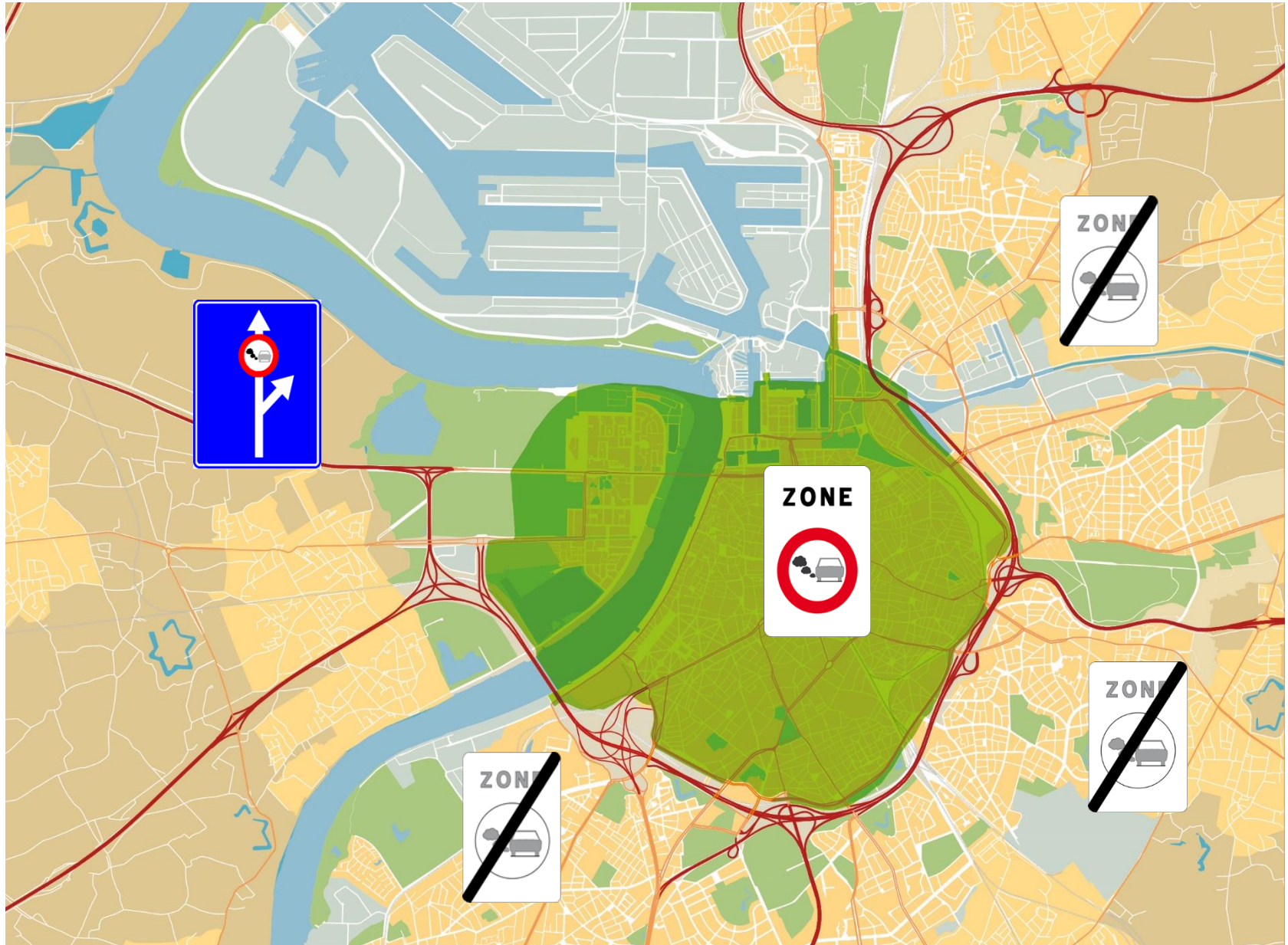
Luchtkwaliteit in de Antwerpse haven 2022



## Policy and measures

- City & Port level:
  - Low Emission Zone
  - Modal Shift
  - Steam grids & district heating
  - Remote Sensing
  - Environmental permitting
  - Shore power for rivercruises and inland&international shipping
  - H2 tug boat(s)
- Flemish & federal level
  - Environmental permitting
  - Public Transport
- European and international regulation:
  - Buildings: RED, EPBD, EED
  - Transport: CO2 standards cars&vans, trucks, busses..
  - Industry: IED-BAT-conclusions, ETS
  - Shipping: IMO standards, FuelEU Maritime, ETS, AFIR

# LEZ in Antwerp



# LEZ access criteria



Euro norm	As of 1/1/2026	As of 1/1/2028	As of 1/1/2031	As of 1/1/2035
<b>Euro 6d</b>	Admitted	Admitted	Admitted	Admitted with a day pass*
<b>Euro 6</b>	Admitted	Admitted after payment	Admitted with a day pass*	Admitted with a day pass*
<b>Euro 5/V</b>	Admitted after payment	Admitted with a day pass*	Admitted with a day pass*	Admitted with a day pass*
<b>Euro 4/IV</b>	Admitted with a day pass*	Admitted with a day pass*	Admitted with a day pass*	Admitted with a day pass*
<b>Euro 3/III</b>	Admitted with a day pass*	Admitted with a day pass*	Admitted with a day pass*	Admitted with a day pass*
<b>Euro 2/II</b>	Admitted with a day pass*	Admitted with a day pass*	Admitted with a day pass*	Admitted with a day pass*
<b>Euro 1/I</b>	Admitted with a day pass*	Admitted with a day pass*	Admitted with a day pass*	Admitted with a day pass*

# Remote sensing



The screenshot shows the Amazon.com.be website interface. At the top, there's a navigation bar with the Amazon logo, delivery location (Antwerp 2018), a search bar with 'Automotive' selected, and a search icon. Below the navigation bar, there are category links: 'Auto & Motorbike', 'Auto Accessories', 'Motorbike Accessories & Parts', 'Parts & Accessories', 'Tools & Equipment', 'Protective Clothes', and 'GPS & Navigation'. The main product image is a yellow plastic device with a black top. The device has a blue label that reads 'Drive Your Truck Without Diesel Exhaust Fluid', 'adBlue/DEF & NOx Emulator via OBD2', and 'PLUG & DRIVE READY DEVICE'. To the left of the main image is a vertical strip of seven smaller images showing different views of the device. To the right of the main image is a product title: 'Compatible with ADBLue OBD2 Emulator, Plug and Play Efficient Diagnostic Tool, Stable Performance, Compatible with Trucks'. Below the title is the brand 'MJKO' and a link to 'Search this page'. The price is listed as '€40<sup>53</sup>'. Below the price is a list of features: 'ADBLUE', 'Compatible Protocols: Supports SW CAN and MS CAN protocols, can access these exclusive replacements for Ford networks in addition to 5 standard OBDII protocols.', 'Fast Response: UART data buffer up to 2KB, baud rate increased to 460.8Kbps. Faster, more reliable and feature-rich than its predecessors. OBDII requests bytes up to 1024 bytes and can meet the needs of some special long-frame communications.z', and 'BATTERY SAVING TECHNOLOGY - The innovative standby function of the OBDII emulator allows you to leave the diagnostic scan tool plugged in without the risk of draining your car battery. Superior compatibility, supports battery voltage drop, active OBDII bus, key etc. Up to 4 Ways to Wake Up from Sleep Mode. Over voltage, over-current, overheating and battery depletion protection, firmware updates, in'. At the bottom right of the product image area is a link to 'Report an issue with this product'.

amazon.com.be Delivering to Antwerp 2018 Update location Automotive Search Amazon.com.be

All Prime Buy More & Save Today's Deals Gift Ideas Customer Service Brands of Belgium

Auto & Motorbike Auto Accessories Motorbike Accessories & Parts Parts & Accessories Tools & Equipment Protective Clothes GPS & Navigation

Compatible with ADBLue OBD2 Emulator, Plug and Play Efficient Diagnostic Tool, Stable Performance, Compatible with Trucks

Brand: MJKO Search this page

€40<sup>53</sup>

- ADBLUE
- Compatible Protocols: Supports SW CAN and MS CAN protocols, can access these exclusive replacements for Ford networks in addition to 5 standard OBDII protocols.
- Fast Response: UART data buffer up to 2KB, baud rate increased to 460.8Kbps. Faster, more reliable and feature-rich than its predecessors. OBDII requests bytes up to 1024 bytes and can meet the needs of some special long-frame communications.z
- BATTERY SAVING TECHNOLOGY - The innovative standby function of the OBDII emulator allows you to leave the diagnostic scan tool plugged in without the risk of draining your car battery. Superior compatibility, supports battery voltage drop, active OBDII bus, key etc. Up to 4 Ways to Wake Up from Sleep Mode. Over voltage, over-current, overheating and battery depletion protection, firmware updates, in

Report an issue with this product

Roll over image to zoom in

Plugged in Adblue emulators switching of Adblue injection over catalyst to save Adblue costs and maintenance costs - easy to buy on the internet



# Remote sensing



## Analysis of the 2019 Flemish remote sensing campaign

Final report

DEPARTEMENT  
OMGEVING

omgevingvlaanderen.be

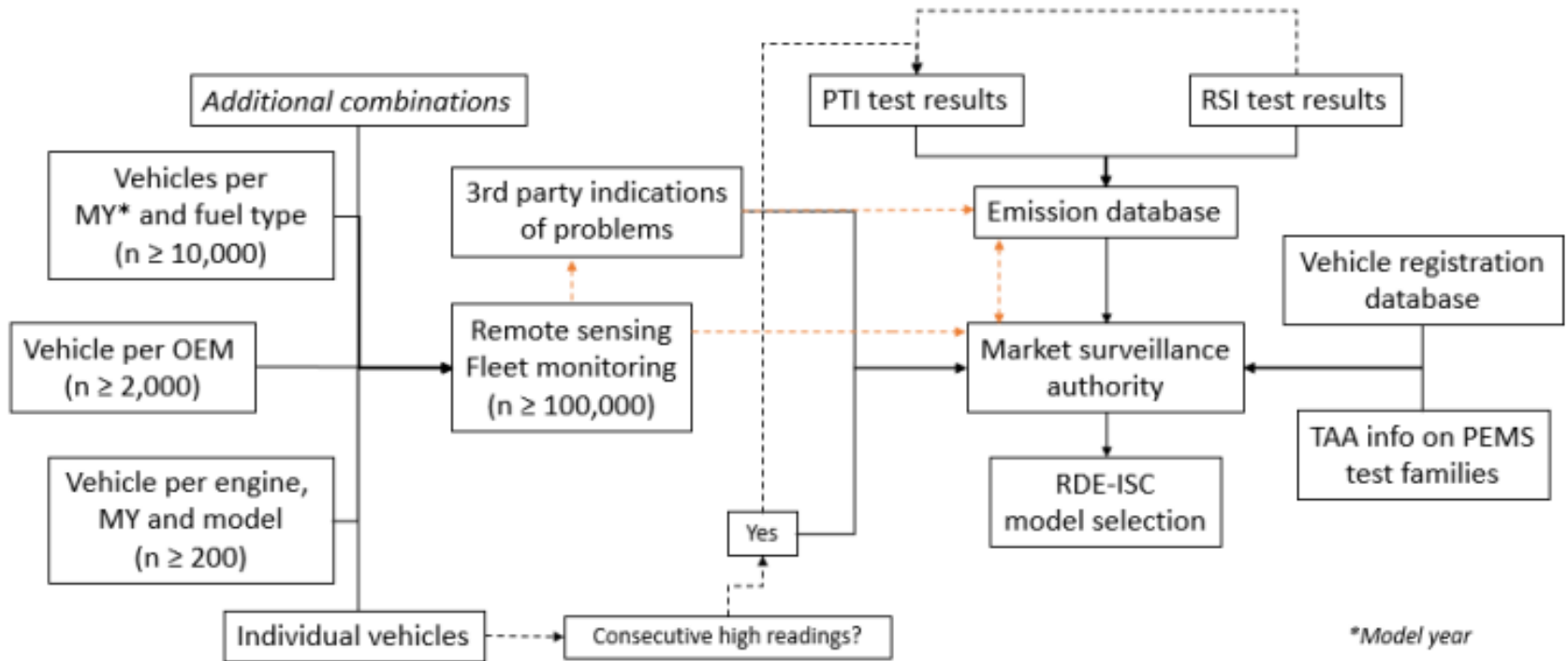


Flemish campaign with remote sensing cameras revealed that:

- 5-10% of trucks is tampering
- Fraudulent EURO VI truck emits as much NO<sub>x</sub> as 15 regular EURO VI trucks
- Without surveillance and enforcement policies, the environmental benefits of EURO VI are completely nullified.

Antwerpforclimate.be

# Remote sensing

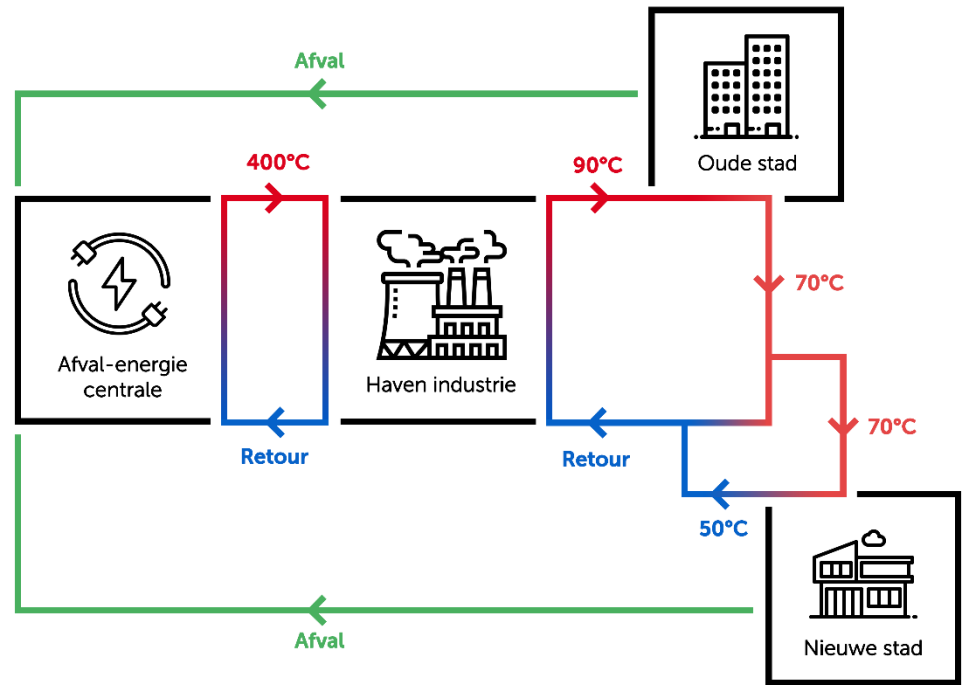


Holistic market surveillance system needed @ European level

# Steam Grids and district heating: Energy cascades

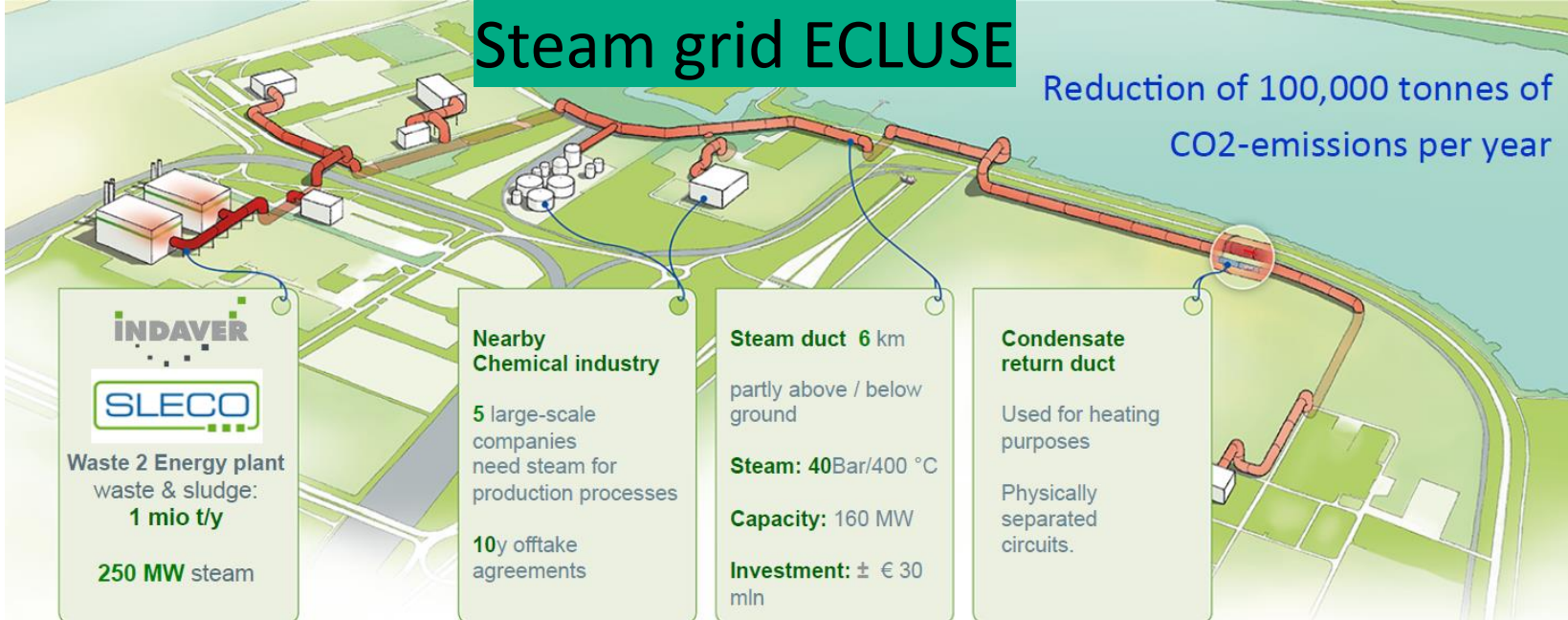
- Steam grid ECLUSE I&II for process industry
- High Temperature district heating for old city buildings
- Medium-Low Temperature grids for new urban districts

→ Combating climate change  
air pollution



# Steam grid ECLUSE

Reduction of 100,000 tonnes of CO<sub>2</sub>-emissions per year



## ■ Applications for steam:

- Distillation
- Evaporation / Drying
- Cleaning
- Chemical reactions

## ■ Steam production:

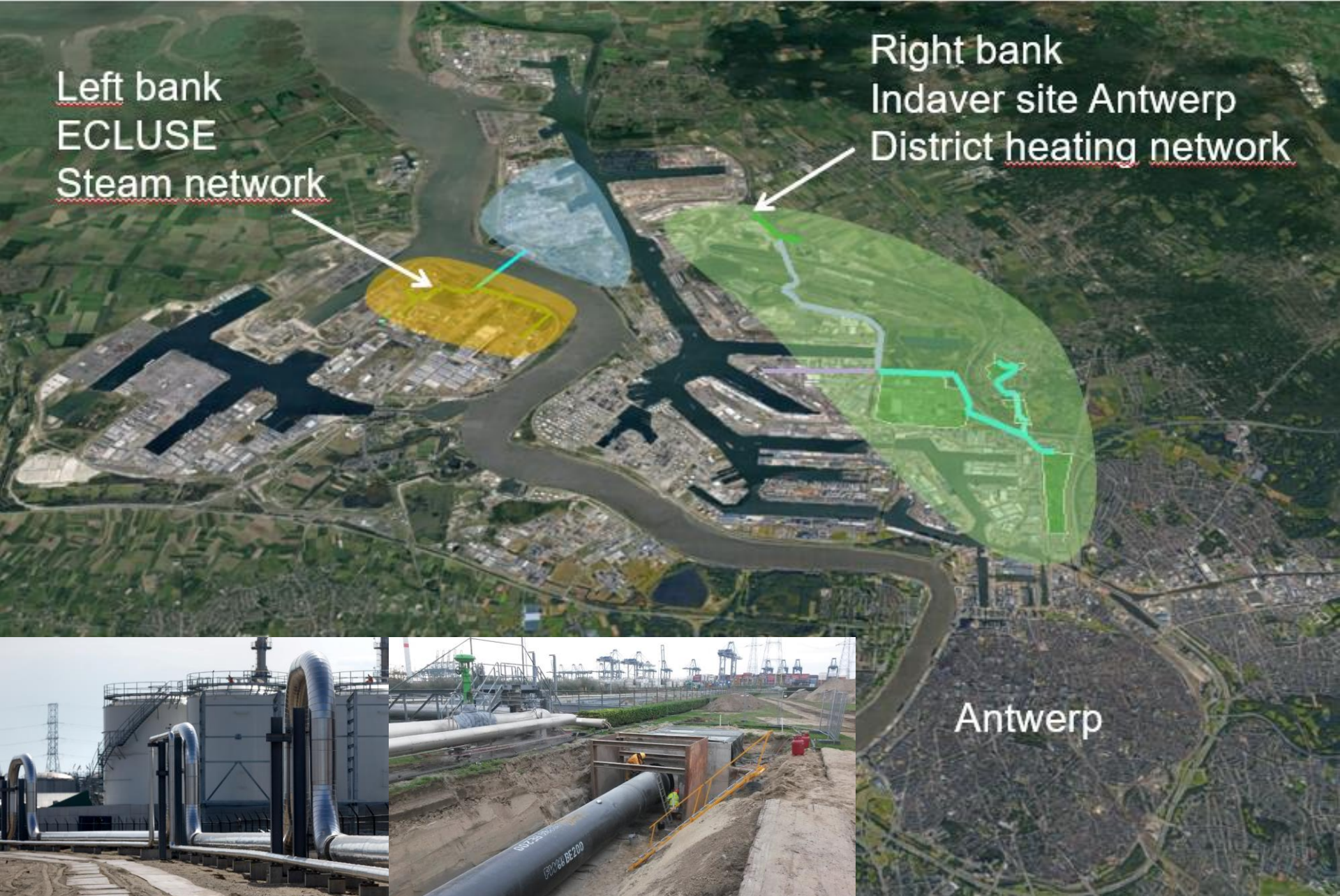
- Energy source: Natural gas
- Installations: Steam boilers and CHP



ECLUSE will provide steam for 6 chemical companies and replace approx. 10 steamboilers

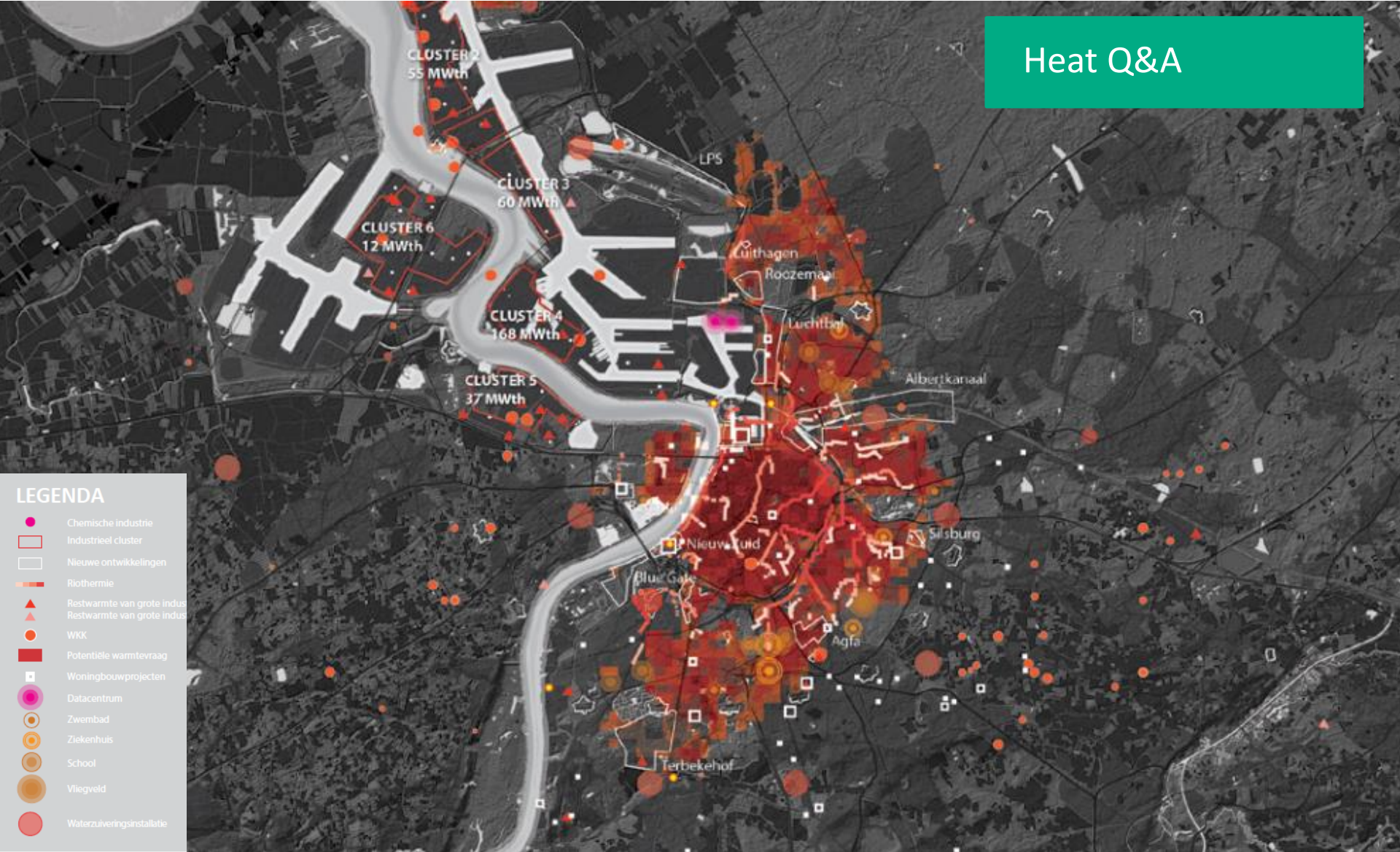
Left bank  
ECLUSE  
Steam network

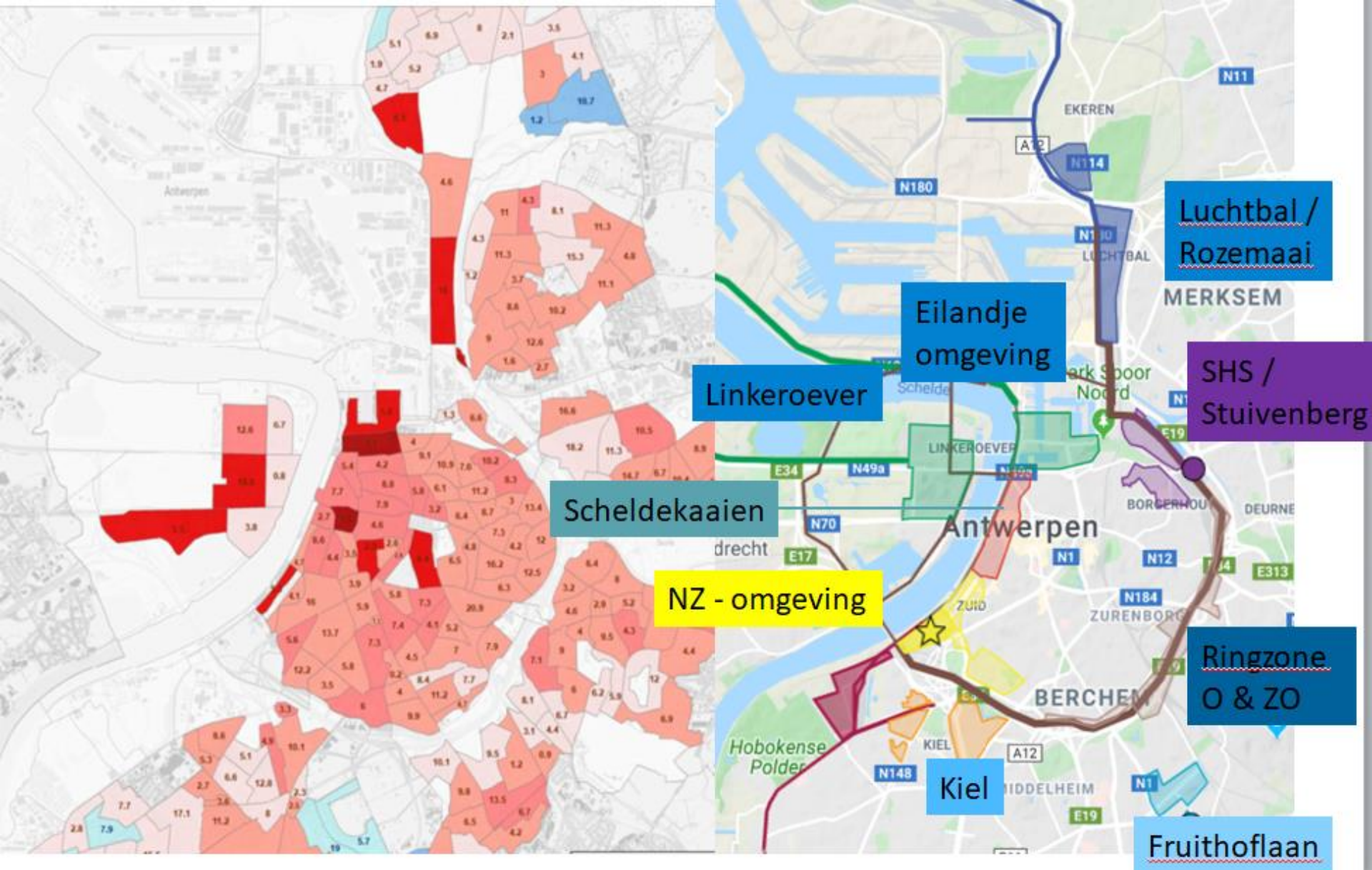
Right bank  
Indaver site Antwerp  
District heating network



Antwerp







# Roadmap District Heating 2030

OVER  
MORGEN

ARCADIS

## Roadmap 2030 | Stadsbreed warmtenet Antwerpen

08 juni 2022

- 10 % of heat demand buildings by 2030
- Up to 50% by 2050
- 71 kton CO2 reduction by 2030
- 25 ton NOx reduction by 2030

(~34 ton NOx after 1 yr LEZ)







Brussels, 8 March 2024

**Mr Pascal CANFIN**

Chair, European Parliament Committee for Environment, Public Health and Food Safety  
European Parliament  
60, rue Wiertz / Wiertzstraat 60  
B-1047 Bruxelles/Brussel

**Subject:** *Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on ambient air quality and cleaner air for Europe (recast) (2022/0347 (COD))*

Dear Mr CANFIN,

Following the informal meeting between the representatives of the three institutions on 20 February 2024, the provisional overall compromise text for a Directive of the European Parliament and of the Council on ambient air quality and cleaner air for Europe (recast) was agreed today by the Permanent Representatives' Committee.

I am therefore now in a position to confirm that, should the European Parliament adopt its position at first reading, in accordance with Article 294 paragraph 3 of the Treaty, in the form set out in the compromise text contained in the Annex to this letter (subject to revision by the legal linguists of both institutions), the Council would, in accordance with Article 294, paragraph 4 of the Treaty, approve the European Parliament's position and the act shall be adopted in the wording which corresponds to the European Parliament's position.

On behalf of the Council, I also wish to thank you for your close cooperation which should enable us to reach agreement on this dossier at first reading.

Yours sincerely,

*Pierre CARTUYVELS*

Chair of the Permanent Representatives  
Committee (Part 1)

Trilogue agreement

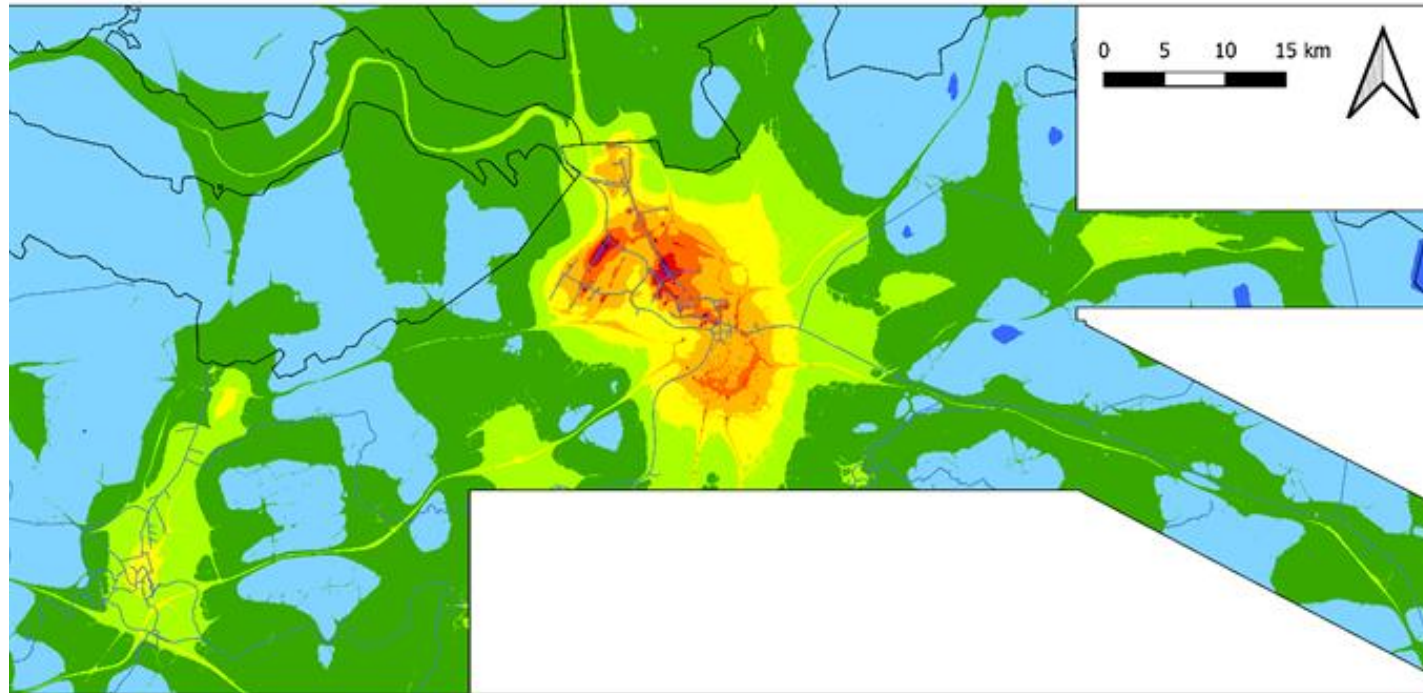
Ambient Air Quality  
Directive

## Ambient Air Quality Directive – new limit values

- Annual limit values for:
  - PM2.5: from 25  $\mu\text{g}/\text{m}^3$  to **10  $\mu\text{g}/\text{m}^3$  by 2030**
  - NO2: from 40  $\mu\text{g}/\text{m}^3$  to **20  $\mu\text{g}/\text{m}^3$  by 2030**
- MS can request, by 31 January 2029 and for specific reasons and under strict conditions, a postponement of the deadline for attaining the air quality limit values:
  - **until no later than 1 January 2040** for areas where compliance with the directive by the deadline would prove unachievable due to specific climatic and orographic conditions or where the necessary reductions can only be achieved with significant impact on existing domestic heating systems
  - **until no later than 1 January 2035** (with possibility to extend it by two more years) if projections show that the limit values cannot be achieved by the attainment deadline

# AAQD – new limit values extremely hard to meet in port areas

NO<sub>2</sub>-concentratie 2030*nonECA* [ $\mu\text{g}/\text{m}^3$ ]

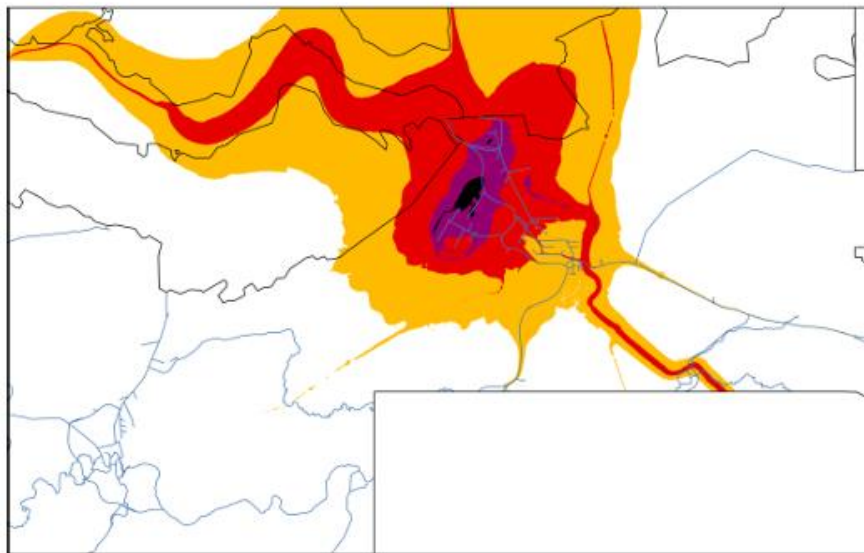


## Legende

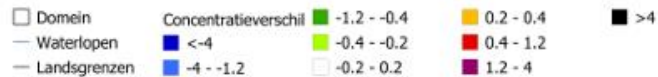
□ Domein	Concentratie	8 - 12	20 - 24	32 - 36
— Waterlopen	0 - 4	12 - 16	24 - 28	36 - 40
— Landsgrenzen	4 - 8	16 - 20	28 - 32	>40

# Impact Extra Container Capacity (+7 mio TEU) + mitigating measures (shore power all terminals + full elec rail)

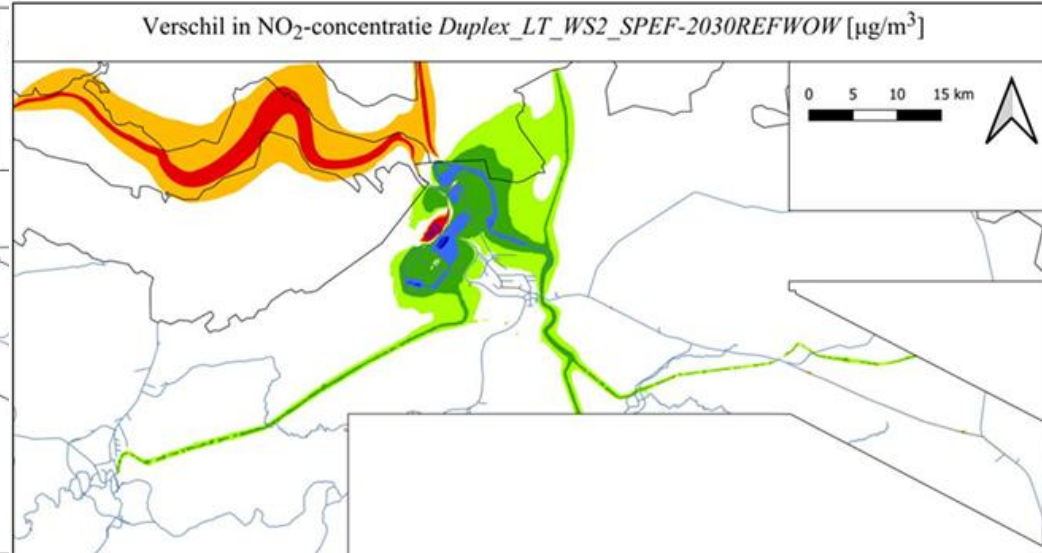
Vershil in NO<sub>2</sub>-concentratie Duplex\_HTF-2030REFWOW [ $\mu\text{g}/\text{m}^3$ ]



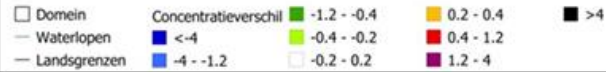
## Legende



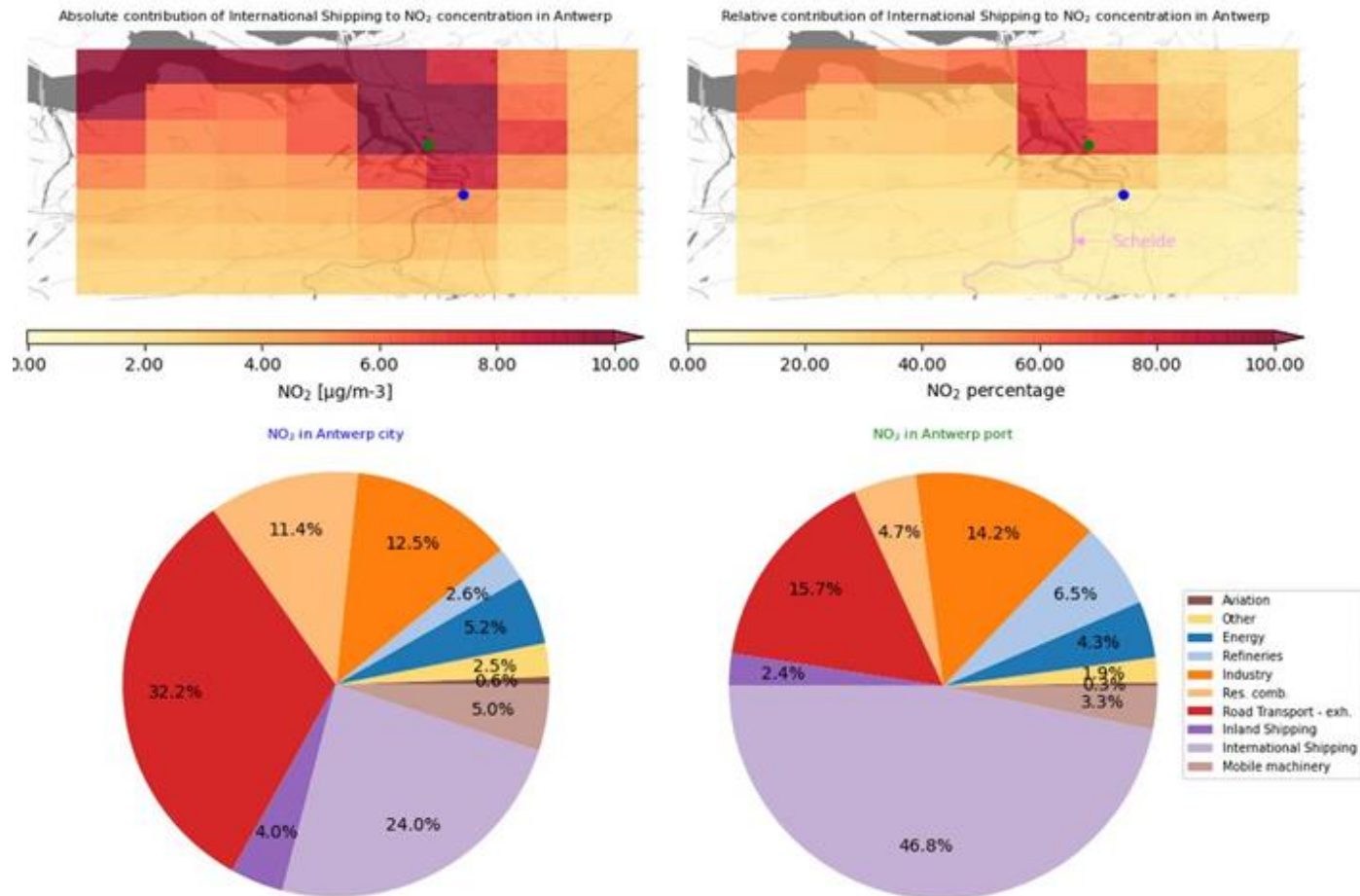
Vershil in NO<sub>2</sub>-concentratie Duplex\_LT\_WS2\_SPEF-2030REFWOW [ $\mu\text{g}/\text{m}^3$ ]



## Legende



# Huge impact shipping emissions (TNO study for Concawe): 16 $\mu\text{g}/\text{m}^3$ (47%) in port area and 6-7 $\mu\text{g}/\text{m}^3$ (24%) in city



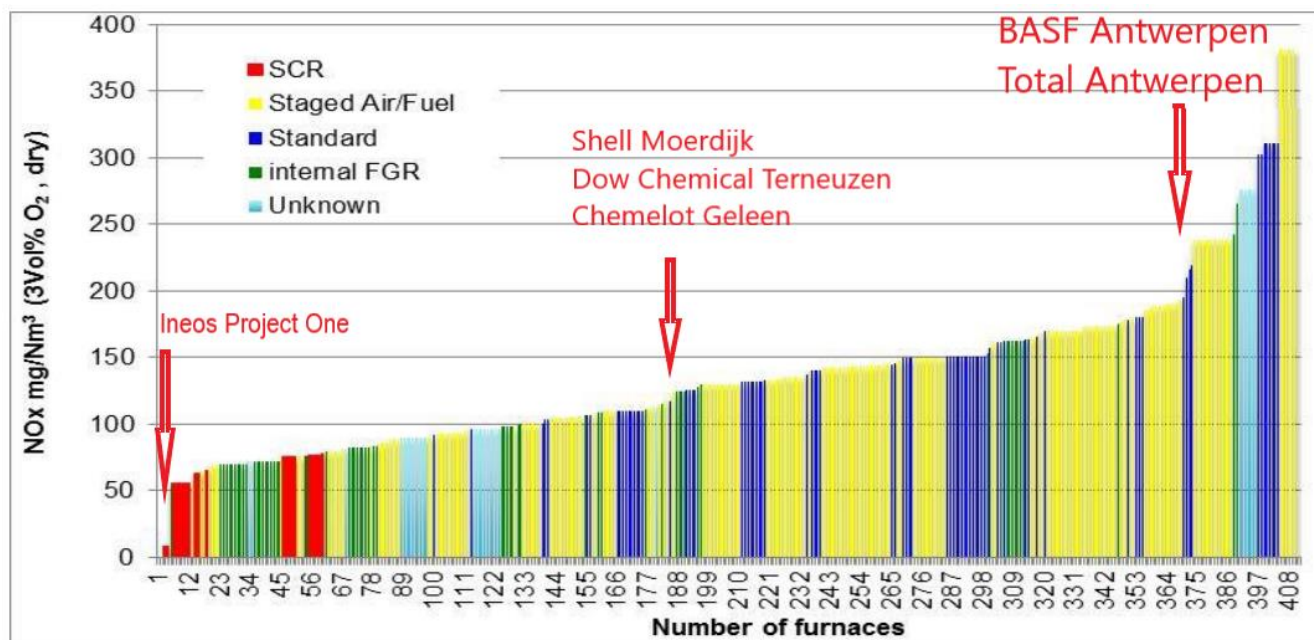
An aerial photograph of a large industrial refinery complex, likely the Batael refinery in Antwerp, Belgium. The facility is situated along a wide river, with numerous white storage tanks, distillation columns, and complex piping visible. The surrounding area includes urban development and green spaces. A teal text box is overlaid on the lower-left portion of the image.

# Environmental permits BATAELs

[Antwerpforclimate.be](https://www.antwerpforclimate.be)

## Chemical industry – refineries – energy: 25% of port emissions

- IED: importance of regular update environmental permits
  - E.g. Totalenergies: new permit for this petrochemical complex will lead to a reduction of NO<sub>x</sub> emissions from 3565 ton today to < 2100 ton in 2032 (reduction of 1465 ton NO<sub>x</sub> (-41%) in 10 yrs.
- End of the “no goldplating” policies applying the upper range of BATAELs:





## Conclusions

[Antwerpforclimate.be](https://www.antwerpforclimate.be)



## Conclusions

- Antwerp currently (and till 2030) compliant with EU Air Quality Legislation
- Enforcement existing legislation (EURO VI) via Remote Sensing, roadside inspections and in-service conformity checks = needed to ensure that projected benefits materialise
- Upcoming Air Quality Standards (new AAQD) will be very hard to meet in time due to large air pollution contribution > ships : further IMO action needed
- Huge reduction potential in regular update environmental permits: lower range of BAT-AEL
- Focus on climate policy measures with clear co-benefits for air quality:
  - Shore power (not only for international and inland shipping but also for cruises)
  - Steam grids and district heating
  - Electrification of industrial processes and container handling...

Thanks for your attention  
Any questions?

Bart Martens  
[bart.martens@antwerpen.be](mailto:bart.martens@antwerpen.be)  
+32 479273617

Antwerpforclimate.be