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# OVER 120 INDUSTRIAL COMPANIES. ONE POWERFUL CLUSTER. MAKE IT HAPPEN.

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# PORT OF ROTTERDAM'S INDUSTRIAL LOCATIONS

## OIL & OIL PRODUCTS

### Refineries

- 1 BP Raffinaderij Rotterdam
- 2 Gunvor Petroleum Rotterdam
- 3 Koch HC Partnerships
- 4 ExxonMobil Lubricants
- 5 Shell Nederland Raffinaderij
- 6 Esso Nederland (ExxonMobil)

### Refinery terminals

- 7 Gunvor Petroleum Rotterdam
- 8 Maasvlakte Olie Terminal (MOT)
- 9 Maatschappij Europoort Terminal (MET)
- 10 BP Raffinaderij Nederland
- 11 Shell Europoort Terminal
- 12 TEAM Terminal

### Tank terminals for oil products

- 13 Vopak Terminal Laurenshaven
- 14 Service Terminal Rotterdam
- 15 Sargeant Terminal

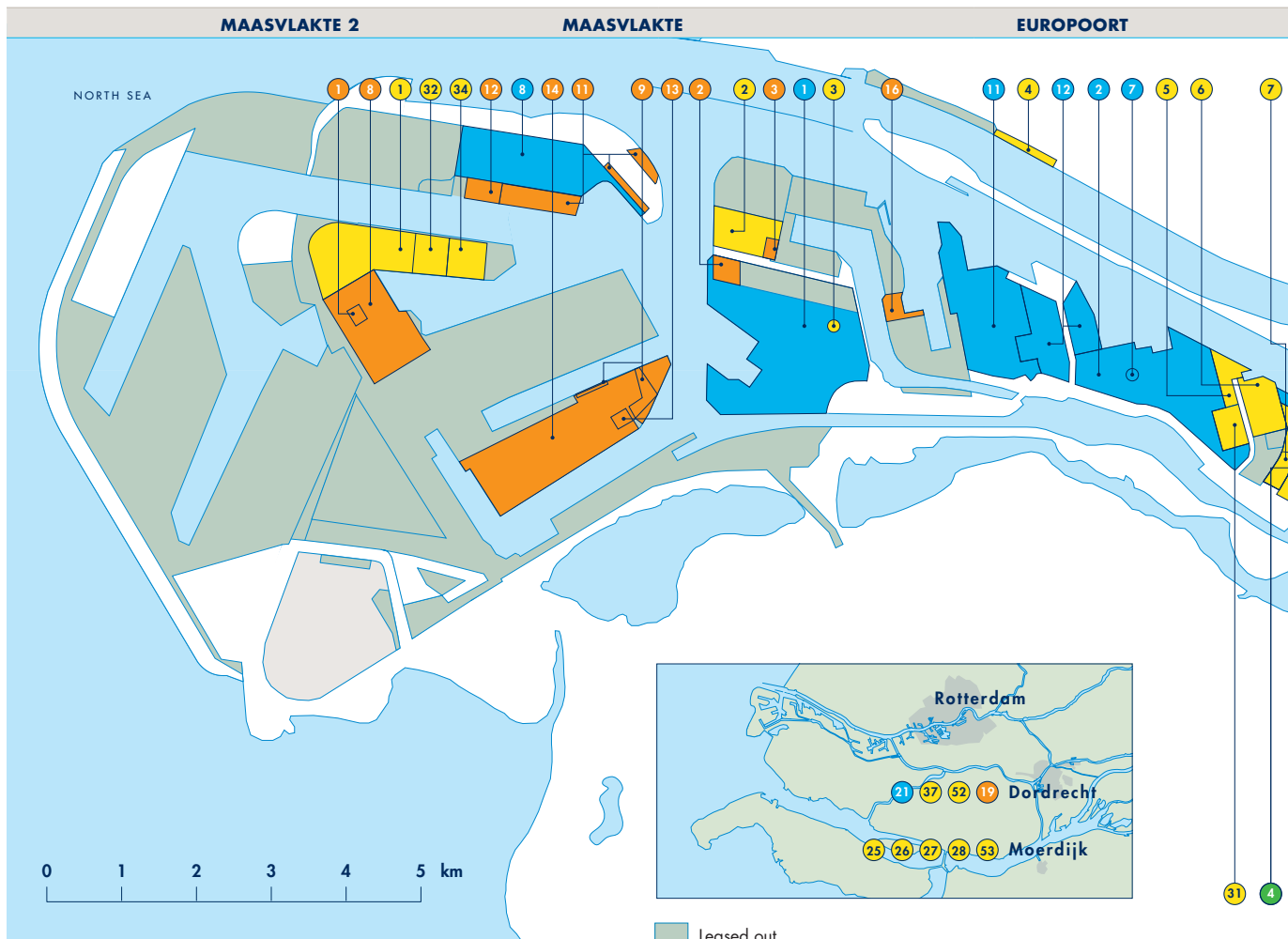
- 16 Koole Tankstorage Minerals BV
- 17 Rubis Terminal
- 18 Odfjell Terminals Rotterdam
- 19 Euro Tank Terminal (ETT)
- 20 Vopak Terminal Europoort
- 21 Haan Oil Storage

## CHEMICALS, BIOFUELS AND EDIBLE OILS

### Chemical Manufacturers

- 1 Lyondell Covestro
- 2 Indorama
- 3 BP
- 4 Synres
- 5 Caldic Chemical
- 6 ExxonMobil Chemical Aromatics Plant
- 7 Akzo Nobel Industial Chemicals
- 8 Kemira Rotterdam BV
- 9 Euroliquids
- 10 Huntsman Holland
- 11 Invista
- 12 Lucite International
- 13 Ducor Petrochemicals
- 14 Emerald Kalama Chemical
- 15 Cabot
- 16 Tronox Pigments
- 17 Kemira Rotterdam BV
- 18 Yara International
- 19 Aliphos

- 15 Cerexagri
- 16 Arkema Rotterdam
- 17 Almatix
- 18 Climax Molybdenum
- 19 Lyondell Chemical
- 20 Hexion UK Ltd
- 21 Akzo Nobel Industial Chemicals Shin-Etsu
- 22 Akzo Nobel Functional Chemicals
- 23 Organik Kimya
- 24 ExxonMobil Chemical
- 25 Aluchemie
- 26 Shell Nederland Chemie
- 27 Shin-Etsu
- 28 Hexion UK Ltd
- 29 Shell Moerdijk
- 30 LyondellBasell
- 31 Hexion UK Ltd
- 32 Ellba
- 33 Dr. W. Kolb
- 34 Coatex B.V.



28 Solvay Solutions Nederland

**Biofuels manufacturers**

29 Biopetrol Pernis

30 Biopetrol Rotterdam

31 Abengoa

32 Neste

**Edible oils refineries**

33 MaasRefinery

34 IOI-Loders Croklaan

35 Cargill Refined Oils Europe

36 Wilmar Edible Oils

37 Sime Darby Unimills

**Tank terminals for chemicals, biofuels and edible oils**

38 Maastank

39 Vopak Terminal Vlaardingen

40 Botlek Tank Terminal (BTT)

41 Koole Tank Storage Pernis

42 LBC Rotterdam

43 Odfjell Terminals Rotterdam

44 Rubis Terminal

45 Brenntag

46 Vopak Terminal Chemiehaven

47 Vopak Terminal TTR

48 Vopak Terminal Botlek

49 Aglobis

50 Lyondell Europoort Terminal

51 OCI Terminal Europoort

52 Standic

53 Stolthaven Moerdijk

**● GAS AND POWER, COAL AND BIOMASS**

**Gas fired**

1 Uniper Utility Center  
Maasvlakte Leftbank (UCML)

2 Enecogen (Eneco, Dong)

3 Indorama Ventures Europe  
Utility Island

4 Rijnmond Energie  
Maasstroomb Energie

5 Air Liquide

6 Air Products-Electrabel

7 PerGen

**Coal and Biomass fired**

8 Uniper MPP 1 & 2  
Uniper MPP 3

9 ENGIE RC

**Renewables**

10 AVR

**Natural gas terminals**

11 Gate terminal

12 Gate break bulk facilities

13 LNG-Peakshaver Gasunie

**Coal and biomass terminals**

14 EMO

15 European Bulk Services (Botlek)

16 European Bulk Services (Europoort)

17 RBT (Rotterdam Bulk Terminal)

18 BSR VanUden Stevedoring

19 ZHD Stevedoring

**● INDUSTRIAL GASES AND WATER**

1 Air Products

2 Air Liquide

3 Evides Industriewater

4 Linde Gas Benelux

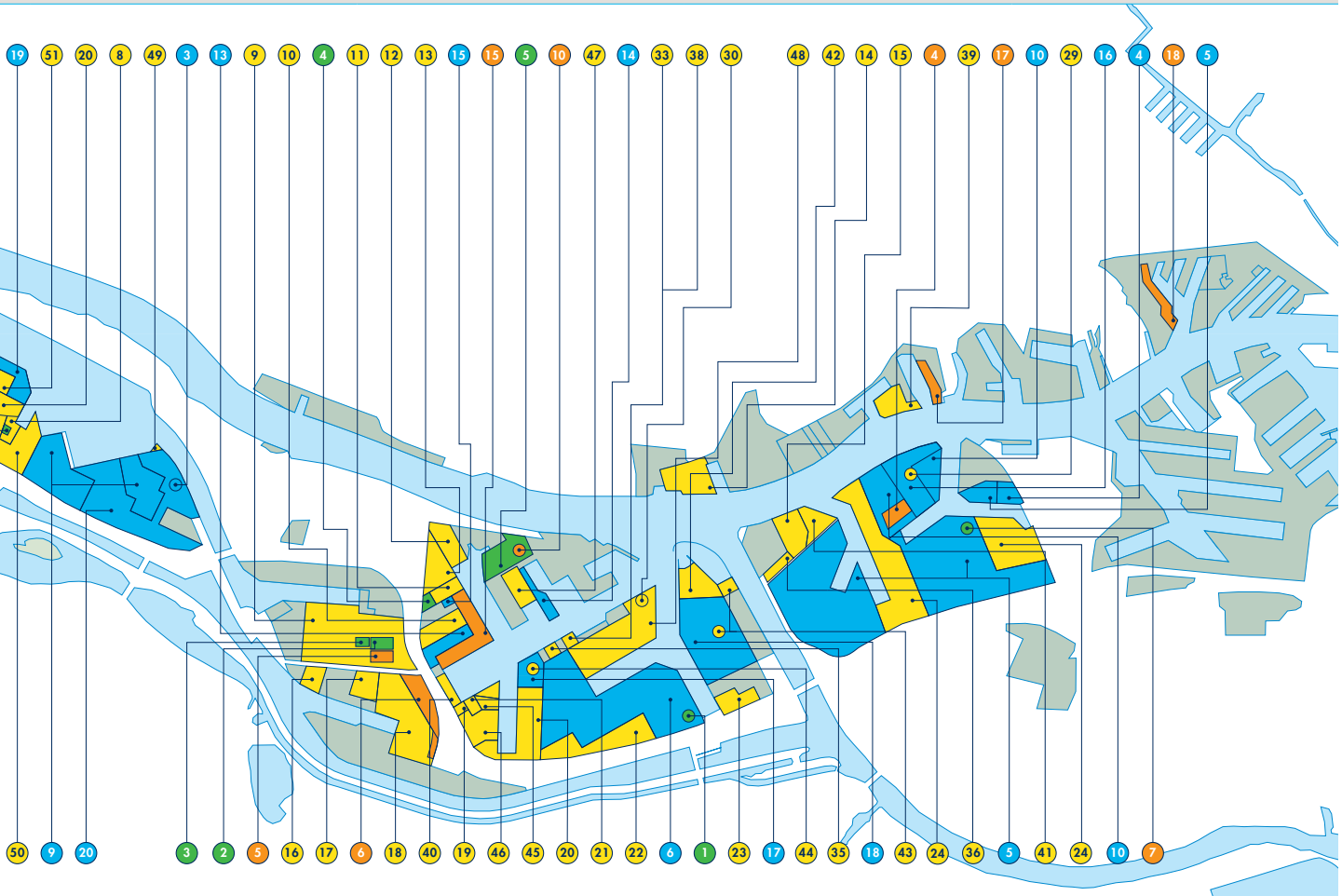
5 AVR

**EUROPOORT**

**BOTLEK**

**PERNIS**

**ROTTERDAM CITY**



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# OVER 120 INDUSTRIAL COMPANIES. ONE POWERFUL CLUSTER.

MAKE IT HAPPEN.

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**FACTS & FIGURES** ON THE ROTTERDAM ENERGY PORT AND PETROCHEMICAL CLUSTER



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# FOREWORD

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The Port of Rotterdam Authority is delighted to present the eighth edition of the Facts & Figures about the Rotterdam Energy Port and Petrochemical Cluster. Through this guide, we hope to offer the reader insight into the production and terminal facilities found in the port of Rotterdam. Since its last edition in 2009, the port has seen a number of major changes.

One of the key developments for us - as the port's 'landlord' - would have to be the opening of Maasvlakte 2. With the construction of this new land reclamation, the port of Rotterdam has enlarged its total land portfolio by some 20%. This land is made available to next-generation developments in the chemical, renewable, container and distribution sectors. Maasvlakte 2 is perfectly situated for exploiting the cluster advantages that have enabled the Port of Rotterdam to become a truly world-class port and industrial complex.

## Major investments

The port community hasn't rested on its laurels either. In 2011, for example, the Gate terminal for the import of LNG became operational at Maasvlakte. This terminal is already expanding with a breakbulk terminal for the distribution of liquid gas to bunker ships and smaller tankers. Two of the cleanest coal-fired power stations in the world have also started operations in Rotterdam. Many of the chemical companies and oil refineries have invested in the expansion or optimisation of their facilities. And in recent years, we have also seen a strong increase in the number of tank storage facilities.

With respect to renewable energy, we are proud to announce that over the past five years, the port has increased its wind energy capacity by another 56 MW. This means that the port is making good progress when it comes to realising the ambition of 200 MW of wind capacity in the port by 2020. View chapter 6 for an overview of major investments.

## Hub for the energy and petrochemical sectors

The port of Rotterdam has proven to be an outstanding hub for the energy and petrochemical sectors. Its pivotal location in Europe, excellent maritime access, substantial economies of scale, wide range of service providers and excellent connections by inland waterways, pipeline, rail and road make Rotterdam the port of choice for the world's leading (petro)chemical and energy companies.

Moreover, Rotterdam offers attractive cluster advantages, including shared utilities and a range of industrial clients at close hand. Many companies supply their neighbours with raw materials and semi-manufactured products. The residual products of one company can serve as raw materials for the other. Synergies like this create an extremely efficient and profitable business climate for all chemical companies in Rotterdam.

And as said, Rotterdam offers room for further growth. The Port of Rotterdam Authority continues to enhance opportunities for our existing and future process industries. For more information, feel free to contact one of our business managers.

## Port of Rotterdam Authority

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# PORT OF ROTTERDAM

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A photograph of an industrial facility at night, featuring large cylindrical storage tanks, metal walkways, and pipes illuminated by artificial lights. The scene is set against a dark sky.

# OVERVIEW OF PORT OF ROTTERDAM'S INDUSTRIAL CLUSTER

- 1.1 Overview of port of Rotterdam's industrial clusters
- 1.2 The industrial cluster in Rotterdam
- 1.3 Ship-to-Ship transfer facilities
- 1.4 Liquid bulk and dry bulk throughput 2005-2015
- 1.5 Throughput by products 2015

# 1.1

## OVERVIEW OF PORT OF ROTTERDAM'S INDUSTRIAL CLUSTER

### KEY FIGURES

#### The industrial cluster accounts for:

- Over 55% of the revenues of the port of Rotterdam
- Around 40% of the added value in the port of Rotterdam
- Around 20 % of the added value of the Dutch industrial sector
- Around 60% of the port land use
- Over 13,000 direct jobs
- Over 60,000 indirect jobs

### STRUCTURE

#### The industrial cluster in Rotterdam comprises:

- Oil refineries
- Crude oil terminals
- Chemical and petrochemical companies
- Third-party tank storage and distribution terminals for chemicals, biofuels and edible oils
- Ship-to-ship transfer facilities
- Refineries for edible oils
- Biofuel manufacturers
- Power plants
- Natural gas terminals
- Industrial gases and water companies
- Steam and power companies
- Over 1,500 km intercompany pipeline network for oil and chemical products
- Specialised warehousing companies for hazardous goods
- Tank cleaning companies
- Utility companies
- Waste incineration and disposal companies
- Comprehensive range of ancillary service companies

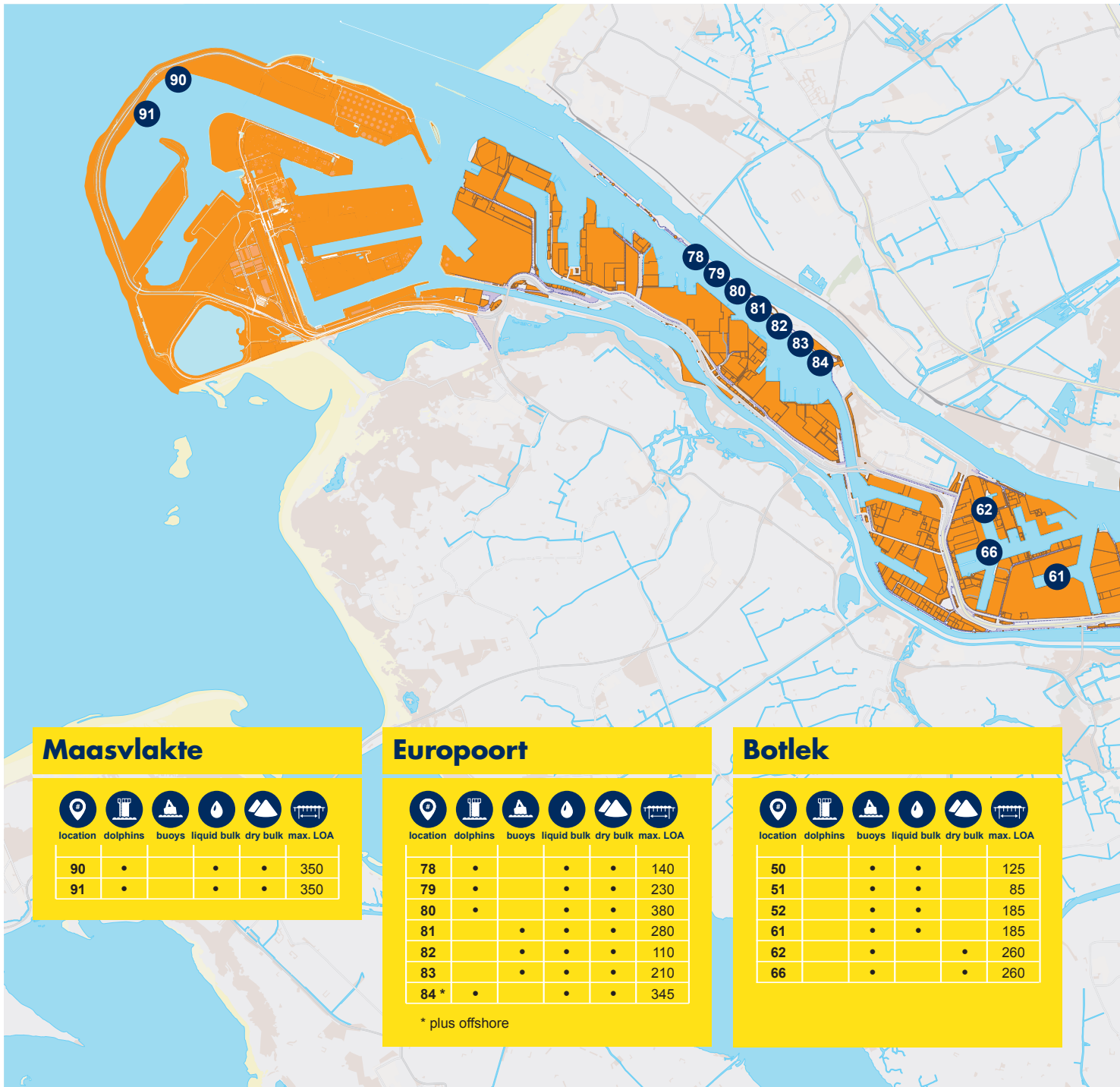
# 1.2

## THE INDUSTRIAL CLUSTER IN ROTTERDAM

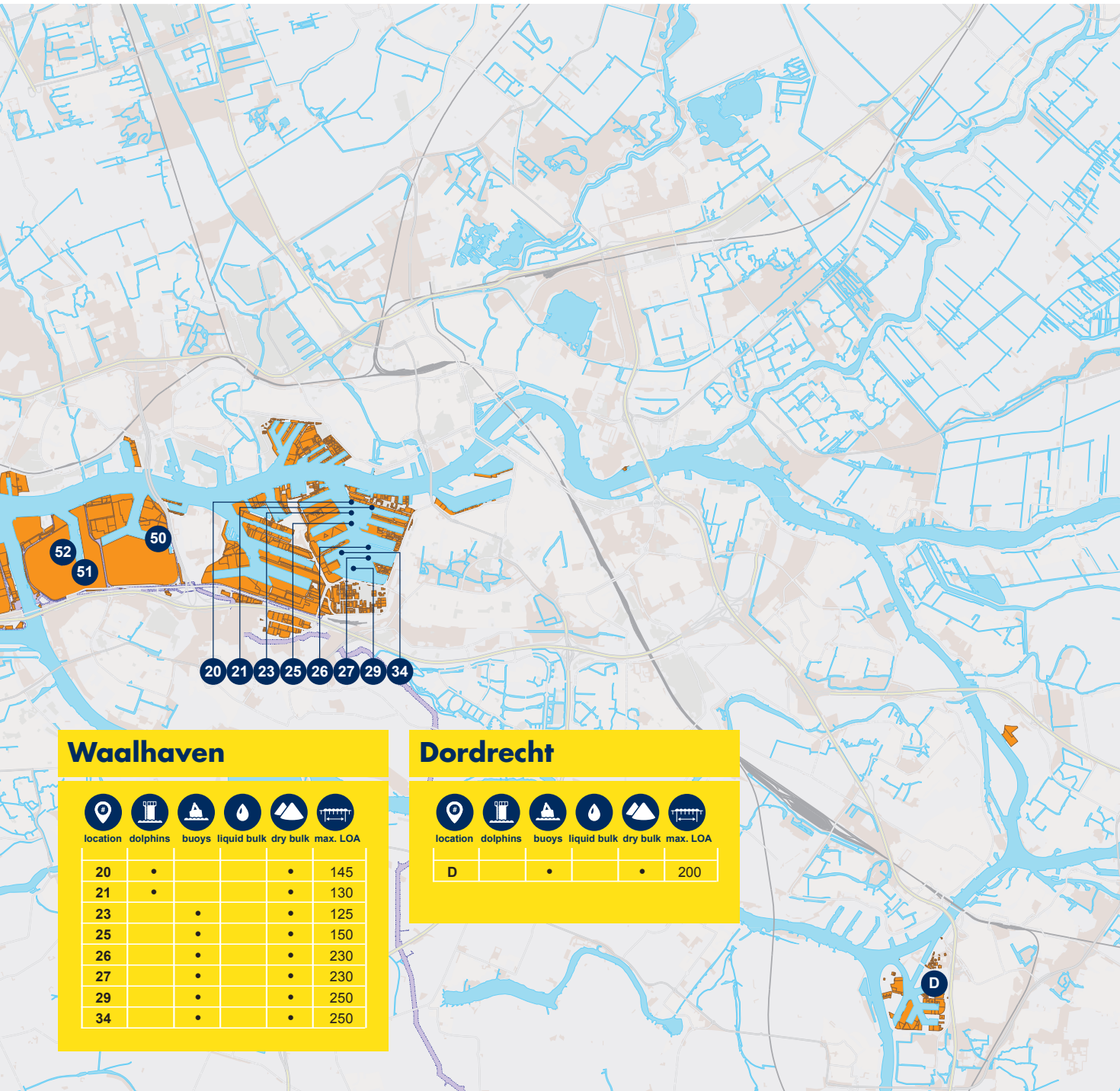
| PRODUCTS AND SERVICES                                  | NUMBER OF SITES | SITE (X 1,000 M <sup>2</sup> ) | NUMBER OF EMPLOYEES |
|--|-----------------|--------------------------------|---------------------|
| <b>Oil and oil products</b>                            |                 |                                |                     |
| Oil refining   | 6               | 8,970                          | 3,271               |
| Refinery terminals                                     | 6               | 3,680                          | 142                 |
| Tank terminals for oil products                        | 9               | 3,842                          | 535                 |
| <b>Chemicals, biofuels and edible oils</b>             |                 |                                |                     |
| Chemical manufacturing and products                    | 42              | 9,289                          | 6,167               |
| Biofuels manufacturing and products                    | 4               | 553                            | 260                 |
| Edible oil refineries                                  | 5               | 411                            | 477                 |
| Tank terminals for chemicals, biofuels and edible oils | 16              | 2,908                          | 843                 |
| <b>Gas and power, coal and biomass</b>                 |                 |                                |                     |
| Gas fired power plants                                 | 9               | 250                            | 107                 |
| Coal and biomass fired power plants                    | 5               | 1,325                          | 594                 |
| Wind turbines  | ...             | ...                            | ...                 |
| Natural gas terminals                                  | 2               | 530                            | ...                 |
| Coal and biomass terminals                             | 8               | 2,307                          | ...                 |
| <b>Pipelines and utilities</b>                         |                 |                                |                     |
| Industrial gases and water plants                      | 7               | 483                            | 634                 |
| Pipelines  | 3               | 50                             | 40                  |
| <b>Total industrial cluster</b>                        | <b>122</b>      | <b>34,598</b>                  | <b>13,070</b>       |

# 1.3

## SHIP-TO-SHIP TRANSFER FACILITIES



For more detailed information visit our website [www.portofrotterdam.com/sts](http://www.portofrotterdam.com/sts)



### Waalhaven

| location | dolphins | buoys | liquid bulk | dry bulk | max. LOA |
|----------|----------|-------|-------------|----------|----------|
| 20       | •        |       |             | •        | 145      |
| 21       | •        |       |             | •        | 130      |
| 23       |          | •     |             | •        | 125      |
| 25       |          | •     |             | •        | 150      |
| 26       |          | •     |             | •        | 230      |
| 27       |          | •     |             | •        | 230      |
| 29       |          | •     |             | •        | 250      |
| 34       |          | •     |             | •        | 250      |

### Dordrecht

| location | dolphins | buoys | liquid bulk | dry bulk | max. LOA |
|----------|----------|-------|-------------|----------|----------|
| D        |          | •     |             | •        | 200      |

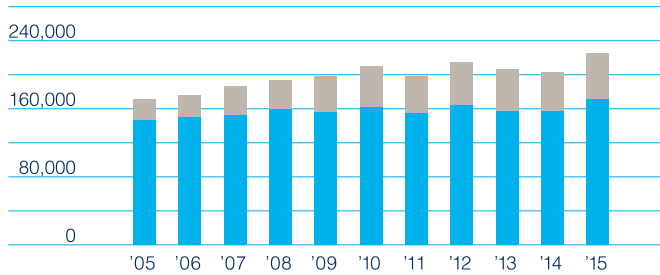
# 1.4

## LIQUID BULK AND DRY BULK THROUGHPUT 2005–2015

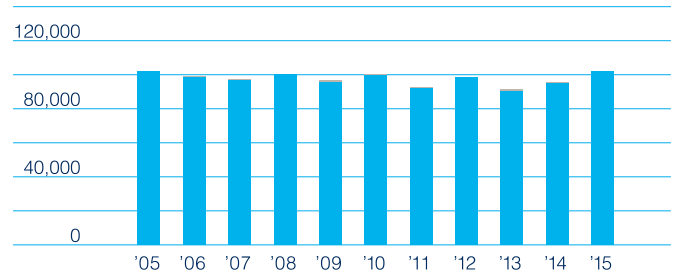
INCOMING/OUTGOING FLOWS BY SEAGOING VESSEL (x 1,000 metric ton)

■ Incoming ■ Outgoing

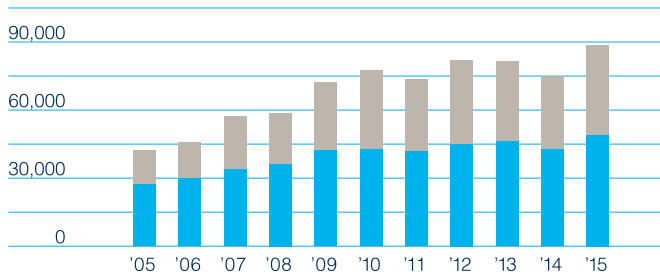
### Total liquid bulk



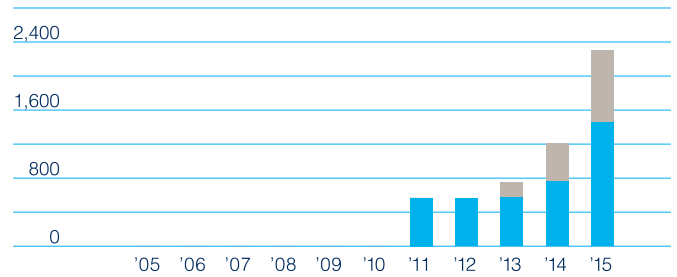
### Crude oil



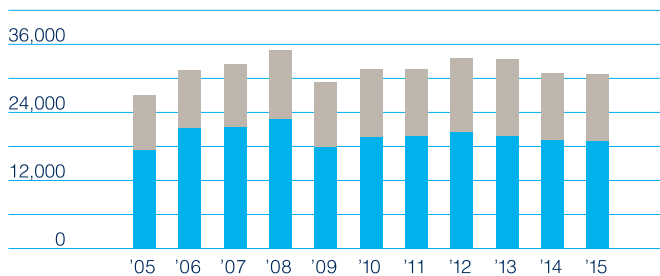
### Oil products



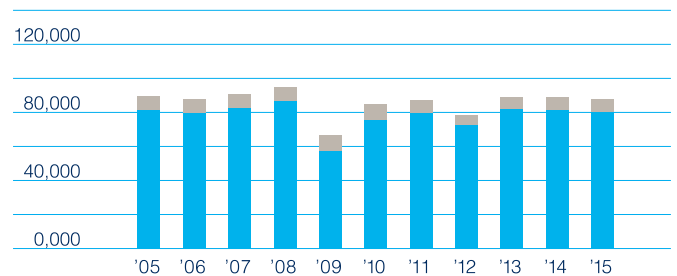
### LNG



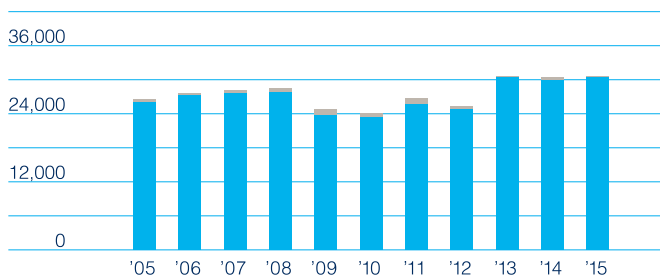
### Chemicals, biofuels and edible oils



### Total dry bulk



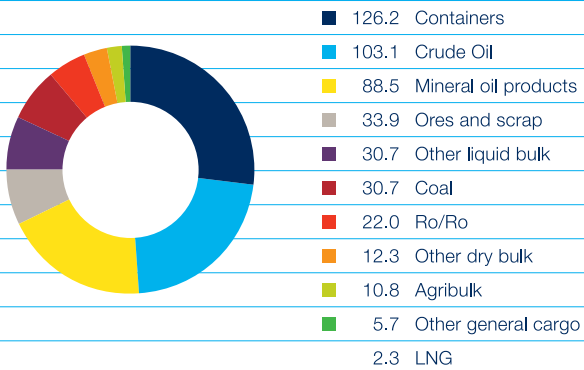
### Coal



# 1.5

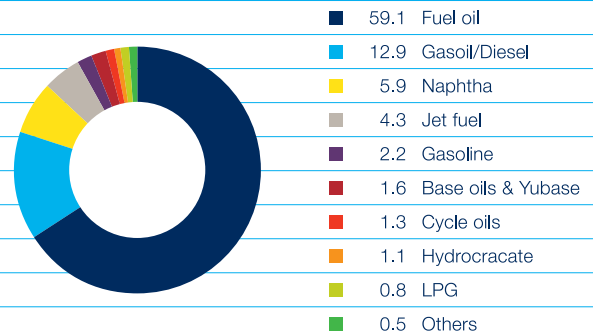
## THROUGHPUT BY PRODUCTS IN 2015

### Total throughput in 2015: 466.4 (X 1 million MT)



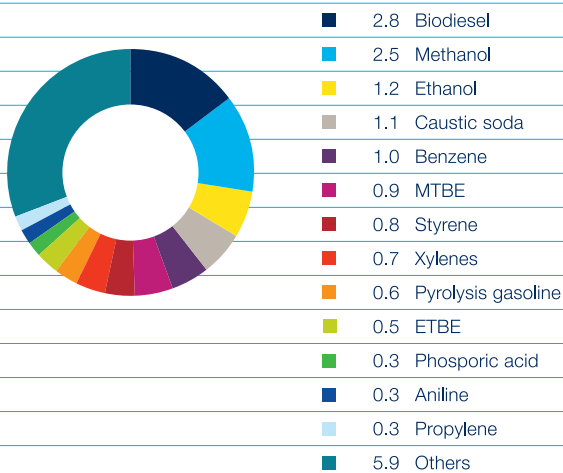
(Source: Notification of Harbour Dues)

### Mineral oil products (X 1 million MT)



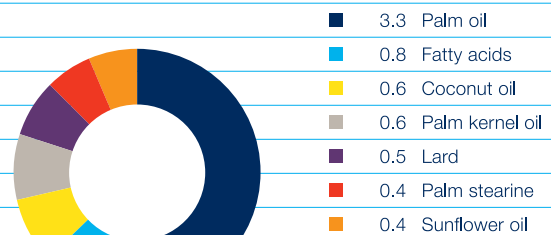
(Source: Notification of Hazardous Cargoes)

### Chemical products (X 1 million MT)



(Source: Notification of Hazardous Cargoes)

### Vegetable and animals oils and fats (X 1 million MT)



(Source: Notification of Hazardous Cargoes)







# OIL AND OIL PRODUCTS

**2.1** Refineries

**2.2** Refinery terminals

**2.3** Tank terminals for oil products

# 2.1 REFINERIES

| COMPANY                      | SITE<br>(X 1,000 M²) | NUMBER OF<br>EMPLOYEES | DISTILLATION (X 1,000 MT/YR) |                        | CONVERSION/REFORMING (X 1,000 MT/YR) |            |                   |
|------------------------------|----------------------|------------------------|------------------------------|------------------------|--------------------------------------|------------|-------------------|
|                              |                      |                        | ATMOSPHERIC<br>DISTILLATION  | VACUUM<br>DISTILLATION | CATALYTIC<br>REFORMING               | ALKYLATION | HF-<br>ALKYLATION |
| <b>Pernis Area</b>           |                      |                        |                              |                        |                                      |            |                   |
| ExxonMobil Lubricants        | 80                   | 110                    | -                            | -                      | -                                    | -          | -                 |
| Shell Nederland Raffinaderij | 3,050                | 1,458                  | 21,000                       | 8,000                  | 1,800                                | -          | 300               |
| <b>Botlek Area</b>           |                      |                        |                              |                        |                                      |            |                   |
| Esso Nederland (ExxonMobil)  | 1,630                | 570                    | 9,100                        | 4,500                  | 1,200                                | -          | -                 |
| <b>Europoort Area</b>        |                      |                        |                              |                        |                                      |            |                   |
| BP Raffinaderij Rotterdam    | 2,690                | 740                    | 20,000                       | 4,900                  | 1,200                                | -          | 330               |
| Koch HC Partnership          | 30                   | 30                     | 3,500                        | -                      | -                                    | -          | -                 |
| Gunvor Petroleum Rotterdam   | 1,490                | 363                    | 4,500                        | 2,400                  | 1,000                                | -          | -                 |
| <b>Total Refineries</b>      | <b>8,970</b>         | <b>3,271</b>           | <b>58,100</b>                | <b>19,800</b>          | <b>5,200</b>                         | <b>-</b>   | <b>630</b>        |

CONVERSION/CRACKING (X 1,000 MT/YR)

|                       | FLUID-BED<br>CAT CRACKER | HYDROCRACKER | THERMAL-<br>CRACKERS | VISBREAKER   | FLEXICOKER   | HYCON        |
|-----------------------|--------------------------|--------------|----------------------|--------------|--------------|--------------|
| <b>Pernis Area</b>    |                          |              |                      |              |              |              |
|                       | -                        | -            | -                    | -            | -            | -            |
|                       | 2,600                    | 2,600        | 2,700                | -            | -            | 1,300        |
| <b>Botlek Area</b>    |                          |              |                      |              |              |              |
|                       | -                        | 2,100        | -                    | -            | 2,200        | -            |
| <b>Europoort Area</b> |                          |              |                      |              |              |              |
|                       | 3,500                    | -            | -                    | 2,100        | -            | -            |
|                       | -                        | -            | -                    | -            | -            | -            |
|                       | -                        | -            | 530                  | 480          | -            | -            |
|                       | <b>6,100</b>             | <b>4,700</b> | <b>3,230</b>         | <b>2,580</b> | <b>2,200</b> | <b>1,300</b> |

# 2.2 REFINERY TERMINALS

| COMPANY                            | SITE<br>(X 1,000 M <sup>3</sup> ) | NUMBER OF<br>EMPLOYEES | DRAFT<br>(M) | CRUDE CAP<br>(X 1,000 M <sup>3</sup> ) | NUMBER OF<br>TANKS | CAPACITY<br>PER TANK<br>(X 1,000 M <sup>3</sup> ) | NUMBER OF<br>BERTHS |
|------------------------------------|-----------------------------------|------------------------|--------------|--|--------------------|---|---------------------|
| Team Terminal                      | 710                               | 40                     | 21 - 23      | 2,800                                  | 33                 | 40 - 120  | 3                   |
| BP Raffinaderij Rotterdam          | <sup>1)</sup>                     | <sup>1)</sup>          | 15 - 21      | 1,300                                  | 15                 | 50 - 100  | 2                   |
| Gunvor Petroleum Rotterdam         | <sup>2)</sup>                     | <sup>2)</sup>          | 21           | 285                                    | 5                  | 40 - 90   | 1                   |
| Maasvlakte Oil Terminal (MOT)      | 1,220                             | 44                     | 23           | 4,500                                  | 39                 | 110 - 120   | 2                   |
| Maatschap Europoort Terminal (MET) | 670                               | 25                     | 21           | 1,750                                  | 21                 | 60 - 100  | 2                   |
| Shell Europoort Terminal           | 1,080                             | 33                     | 13 - 20      | 2,150                                  | 32                 | 20 - 100  | 4                   |
| <b>Total Refinery Terminals</b>    | <b>3,680</b>                      | <b>142</b>             |              | <b>12,785</b>                          | <b>145</b>         |   | <b>14</b>           |

1) Included under BP Raffinaderij Rotterdam

2) Included under Kuwait Petroleum Europoort refinery

# 2.3 TANK TERMINALS FOR OIL PRODUCTS

| COMPANY                          | SITE<br>(X 1,000 M <sup>3</sup> ) | NUMBER OF<br>EMPLOYEES | DRAFT<br>(M) | NUMBER<br>OF TANKS |
|----------------------------------|-----------------------------------|------------------------|--------------|--------------------|
| <b>Pernis Area</b>               |                                   |                        |              |                    |
| Koole Tankstorage Minerals BV    | 650                               | 80                     | 14.5 (2017)  | 101                |
| <b>Botlek Area</b>               |                                   |                        |              |                    |
| Odfjell Terminals Rotterdam      | 680                               | 181                    | 13           | 281                |
| Rubis Terminal                   | 155                               |                        | 12.65        | 28                 |
| Sargeant Terminals               | 26                                | 7                      | 13           | 6                  |
| Service Terminal Rotterdam (STR) | 70                                | 25                     | 14           | 11                 |
| Vopak Terminal Laurenshaven      | 138                               |                        | 21           | 15                 |
| <b>Europoort Area</b>            |                                   |                        |              |                    |
| Euro Tank Terminal B.V. (ETT)    | 1,100                             | 68                     | 22.65        | 32                 |
| Vopak Terminal Europoort         | 1,001                             | 170                    | 21           | 99                 |
| <b>Dordrecht Area</b>            |                                   |                        |              |                    |
| Haan Oil Storage                 | 22                                | 4                      | 8.5          | 20                 |

3) Will be expanded to 215,000 m<sup>3</sup> in 2016 and 310,000 m<sup>3</sup> in 2020

4) Connected to Vopak Europoort Terminal by pipeline

|                       | CAPACITY<br>PER TANK (M <sup>3</sup> ) | CRUDE OIL<br>CAPACITY (M <sup>3</sup> ) | TOTAL<br>CAPACITY (M <sup>3</sup> ) | NR. OF BERTHS<br>INLAND SHIPPING | NR. OF BERTHS<br>SEAGOING VESSELS |
|-----------------------|--|---|-------------------------------------|----------------------------------|-----------------------------------|
| <b>Pernis Area</b>    |  |   |                                     |                                  |                                   |
|                       | 1,000 - 30,000                         | 0                                       | 1,100,000                           | 16                               | 5 (2017)                          |
| <b>Botlek Area</b>    |  |   |                                     |                                  |                                   |
|                       | 735 - 40,000                           |   | 1,636,100 <sup>3)</sup>             | 16                               | 7                                 |
|                       | 2,500 - 12,700                         |   | 161,600                             | 1                                | 3                                 |
|                       | 500 - 13,000                           |   | 31,500                              | 1                                | 1                                 |
|                       | 2,500 - 53,500                         |   | 240,000                             | 2                                | 1                                 |
|                       | 60,000 - 70,000                        |   | 924,864                             | 3                                | <sup>4)</sup>                     |
| <b>Europoort Area</b> |  |   |                                     |                                  |                                   |
|                       | 1,000 - 60,000                         | 465,000                                 | 1,118,000                           | 11                               | 5                                 |
|                       | 60,000 - 70,000                        | 1,000,000                               | 3,920,155                           | 15                               | 7                                 |
| <b>Dordrecht Area</b> |  |   |                                     |                                  |                                   |
|                       | 500 - 4,000                            |   | 35,000                              | 1                                | 1                                 |

---

# 3



A photograph of an industrial facility, likely a refinery or chemical plant. The image shows large pipes, a metal mesh structure, and a bicycle parked in the foreground. A yellow rectangular overlay is positioned in the upper left quadrant, containing the main title and a list of sub-sections. The background is a mix of industrial structures and a clear sky.

# CHEMICALS, BIOFUELS AND EDIBLE OILS

**3.1** Chemicals manufacturers and products

**3.2** Biofuel manufacturers and products

**3.3** Edible oil refineries

**3.4** Tank terminals for chemicals, biofuels and edible oils



# 3.1

## CHEMICALS MANUFACTURERS AND PRODUCTS

| COMPANY                         | SITE<br>(X 1,000 M <sup>2</sup> ) | NUMBER OF<br>EMPLOYEES | MAIN PRODUCTS                  | CAPACITY<br>(X MT/YR) |
|---------------------------------|-----------------------------------|------------------------|--------------------------------|-----------------------|
| <b>Pernis Area</b>              |                                   |                        |                                |                       |
| Arkema Rotterdam B.V            | 1 <sup>1)</sup>                   | 35                     | Gasdorisants                   | 5,000                 |
|                                 |                                   |                        | Mercaptans                     | 5,000                 |
|                                 |                                   |                        | Hydrogen sulfide               | 1,200                 |
|                                 |                                   |                        | Specialty sulfides             | 1,000                 |
| Cerexagri                       | 130                               | 130                    | Fungicides                     | 20,000                |
|                                 |                                   |                        | Insecticides                   | ...                   |
| Hexion UK Ltd                   | 16                                | 330                    | Bisphenol A                    | 190,000               |
|                                 |                                   |                        | Epichloro hydrin               | 100,000               |
|                                 |                                   |                        | Epoxy resins                   | 170,000               |
|                                 |                                   |                        | Versatic acids                 | 90,000                |
|                                 |                                   |                        | Cardura                        | 20,000                |
| Shell Nederland Chemie          | 1,020 <sup>2)</sup>               | 700                    | Propylene                      | 330,000               |
|                                 |                                   |                        | 1-Butene                       | 60,000                |
|                                 |                                   |                        | Isopropanol                    | 265,000               |
|                                 |                                   |                        | Dimethyl ketone (Acetone)      | 50,000                |
|                                 |                                   |                        | Polyether polyols              | 200,000               |
|                                 |                                   |                        | MTBE                           | 170,000               |
|                                 |                                   |                        | Methyl ethyl ketone            | 90,000                |
|                                 |                                   |                        | Methyl isobutyl ketone         | 35,000                |
|                                 |                                   |                        | Glycol ethers                  | 247,000               |
|                                 |                                   |                        | SAN polymer polyols            | 50,000                |
|                                 |                                   |                        | SAN polymer polyols            | 50,000                |
|                                 |                                   |                        | Hydrocarbon solvents           | 820,000               |
|                                 |                                   |                        | Brake fluids                   |                       |
|                                 |                                   |                        | Ploybutadiene rubber           | 15,000                |
| Shin-Etsu                       | 52                                | 75                     | Polyvinyl chloride             | 450,000               |
| <b>Botlek Area</b>              |                                   |                        |                                |                       |
| Akzo Nobel Industrial Chemicals | 330                               | 230                    | Chlorine                       | 600,000               |
|                                 |                                   |                        | Hydrochloric acid              | ...                   |
|                                 |                                   |                        | Sodium hydroxide (100%)        | 650,000               |
|                                 |                                   |                        | Chlorinated waste incineration | 42,000                |
| Akzo Nobel Functional Chemicals | 3 <sup>3)</sup>                   | 30                     | Metal alkyls                   | ...                   |
| Almatis                         | 77                                | 141                    | Tabular aluminina              | 100,000               |
|                                 |                                   |                        | CA Cement                      | 50,000                |

1) Included under Cerexagri

2) Based on data from 2009

3) Included under Akzo Nobel Industrial Chemicals

| COMPANY   | SITE<br>(X 1,000 M <sup>2</sup> ) | NUMBER OF<br>EMPLOYEES | MAIN PRODUCTS                            | CAPACITY<br>(X MT/YR) |
|---|-----------------------------------|------------------------|--|-----------------------|
| <b>Botlek Area – continued</b>                              |                                   |                        |  |                       |
| Aluchemie   | 260                               | 400                    | Carbon anodes                            | 510,000               |
| Cabot   | 140                               | 105                    | Carbon black                             | 80,000                |
| Climax Molybdenum   | 110                               | 90                     | Ammonium dimolybdate                     | ...                   |
|   |                                   |                        | Molybdenum oxide                         | ...                   |
|   |                                   |                        | Sulfuric acid                            | ...                   |
| Ducor Petrochemicals  | 130                               | 80                     | Polypropylene                            | 180,000               |
| Emerald Kalama Chemical                                     | 148                               | 160                    | Benzylalcohol                            | ...                   |
|   |                                   |                        | Benzoic acid                             | ...                   |
|   |                                   |                        | Benzaldehyde                             | ...                   |
|   |                                   |                        | Sodium benzoate                          | ...                   |
|   |                                   |                        | Non-phthalate plasticizers & coalescents | ...                   |
| ExxonMobil Chemical Aromatics Plant                         | 4)                                | 150                    | Benzene                                  | 750,000               |
|   |                                   |                        | Ortho xylene                             | 130,000               |
|   |                                   |                        | Para xylene                              | 690,000               |
|   |                                   |                        | Cyclohexane                              | 270,000               |
| ExxonMobil Chemical Plasticizers & Phthalic Anhydride Plant | 250                               | 50                     | Phthalic anhydride                       | 70,000                |
|   |                                   |                        | Plasticizers                             | 400,000               |
| Hexion UK Ltd   | 8                                 | 10                     | Formaline                                | 140,000               |
| Huntsman Holland  | 700                               | 550                    | MDI                                      | 420,000               |
|   |                                   |                        | Polyols                                  | 70,000                |
|   |                                   |                        | Variants                                 | 155,000               |
|   |                                   |                        | Formulations                             | 30,000                |
| Invista   | 75                                | 80                     | Polyamides (nylon 6.6)                   | 90,000                |
| Kemira Rotterdam  | 140                               | 150                    | Polyacrylamides                          | 150,000               |
| Lucite International  | 18                                | 65                     | Polymethyl methacrylate                  | 25,000                |

4) Included under Esso Refinery

# 3.1

## CONTINUED CHEMICALS MANUFACTURERS AND PRODUCTS

| COMPANY                               | SITE<br>(X 1,000 M <sup>2</sup> ) | NUMBER OF<br>EMPLOYEES | MAIN PRODUCTS           | CAPACITY<br>(X MT/YR) |
|---------------------------------------|-----------------------------------|------------------------|-------------------------|-----------------------|
| <b>Botlek Area – continued</b>        |                                   |                        |                         |                       |
| Lyondell Chemical                     | 480                               | 250                    | Propylene oxide         | 250,000               |
|                                       |                                   |                        | Propylene glycol        | 80,000                |
|                                       |                                   |                        | Propylene glycol ether  | 90,000                |
|                                       |                                   |                        | Tertbutyl hydroperoxide | 12,000                |
|                                       |                                   |                        | MTBE/ETBE               | 400,000               |
|                                       |                                   |                        | Gasoline grade TBA      | 589,000               |
|                                       |                                   |                        | Isobutylene             | 100,000               |
|                                       |                                   |                        | BDO                     | 126,000               |
|                                       |                                   |                        | Allyl alcohol           | 16,000                |
|                                       |                                   |                        | Methyl propanediol      | 20,000                |
| Organik Kimya                         | 30                                | 49                     | Acryloc polymers        | 45,000                |
| Shin-Etsu                             | 57                                | 110                    | Ethylene dichloride     | 80,000                |
|                                       |                                   |                        | Vinyl chloride monomer  | 620,000               |
| Tronox Pigments                       | 160                               | 260                    | Titanium dioxide        | 90,000                |
| <b>Europoort Area</b>                 |                                   |                        |                         |                       |
| Akzo Nobel Industrial Chemicals       | 4)                                | 4)                     | Dimethyl ether          | 20,000                |
| BP                                    | 5)                                | 5)                     | Propylene               | 125,000               |
|                                       |                                   |                        | MTBE                    | 94,000                |
| Caldic Chemical                       | 135                               | 52                     | Formaline               | 210,000               |
|                                       |                                   |                        | Paraformaldehyde        | ...                   |
|                                       |                                   |                        | Hexamethylene tetramine | ...                   |
| Euroliquids                           | 21                                | 25                     | Liquids fertilizers     | 70,000                |
|                                       |                                   |                        | Ad blue                 | 10,000                |
| ExxonMobil Chemical Oxo-Alcohol Plant | 320                               | 158                    | Oxo-alcohols            | 300,000               |
| Indorama                              | 482                               | 230                    | PTA                     | 350,000               |
|                                       |                                   |                        | PET                     | 400,000               |
| Kemira Rotterdam                      | 60                                | 25                     | Hydrogen peroxide       | 38,000                |

4) Included under ExxonMobil Chemical

5) Included under BP Raffinaderij Rotterdam

| COMPANY                      | SITE<br>(X 1,000 M <sup>2</sup> ) | NUMBER OF<br>EMPLOYEES | MAIN PRODUCTS             | CAPACITY<br>(X MT/YR) |
|------------------------------|-----------------------------------|------------------------|---------------------------|-----------------------|
| <b>Maasvlakte Area</b>       |                                   |                        |                           |                       |
| Lyondell Covestro            | 600                               | 180                    | Propylene oxide           | 285,000               |
|                              |                                   |                        | Styrene monomer           | 640,000               |
| <b>Hoek van Holland Area</b> |                                   |                        |                           |                       |
| Synres b.v.                  | 63                                | 90                     | Alkyd resins              | ...                   |
|                              |                                   |                        | Acrylic resins            | ...                   |
|                              |                                   |                        | Urethane resins           | ...                   |
| <b>Vlaardingen Area</b>      |                                   |                        |                           |                       |
| Yara Vlaardingen             | 52                                | 105                    | Liquid fertilizers        | 125,000               |
|                              |                                   |                        | Horticultural fertilizers | 65,000                |
| Aliphos Rotterdam B.V.       | 40                                | 64                     | Feed phosphates           | 220,000               |
| <b>Moerdijk Area</b>         |                                   |                        |                           |                       |
| Coatex B.V.                  | 34                                | 22                     | Disperging agent          | 50                    |
| Dr. W. Kolb                  | 77                                | 80                     | Surfactants               | 80,000                |
|                              |                                   |                        | Emulsifiers               | 5,000                 |
| Ellba                        | <sup>6)</sup>                     | <sup>6)</sup>          | Propylene oxide           | 250,000               |
|                              |                                   |                        | Styrene monomer           | 550,000               |
| Hexion Inc.                  | <sup>6)</sup>                     | <sup>6)</sup>          | Veova                     | 65,000                |
|                              |                                   |                        | Veoflex                   | 25,000                |
| LyondellBasell               | <sup>6)</sup>                     | 108                    | Catalloy                  | 200,000               |
|                              |                                   |                        | Polybutene                | 40,000                |
| Shell Nederland Chemie       | 3,200                             | 798                    | Ethylene                  | 900,000               |
|                              |                                   |                        | Propylene                 | 500,000               |
|                              |                                   |                        | Butadiene                 | 115,000               |
|                              |                                   |                        | Benzene                   | 500,000               |
|                              |                                   |                        | Ethylene oxide            | 305,000               |
|                              |                                   |                        | Ethylbenzene              | 640,000               |
|                              |                                   |                        | Ethylene glycols          | 155,000               |
|                              |                                   |                        | Propylene oxide           | 210,000               |
|                              |                                   |                        | Styrene monomer           | 450,000               |
| Solvay Solutions Nederland   | 20                                |                        | Surfactants               | ...                   |
|                              |                                   |                        | Emulsifiers               | ...                   |

6) Included under Shell Nederland Chemie

# 3.2

## BIOFUEL MANUFACTURERS AND PRODUCTS

| COMPANY                | SITE<br>(X 1,000 M <sup>2</sup> ) | NUMBER OF<br>EMPLOYEES | MAIN PRODUCTS                | CAPACITY<br>(X MT/YR) |
|------------------------|-----------------------------------|------------------------|------------------------------|-----------------------|
| <b>Neste</b>           |                                   |                        |                              |                       |
|                        | 245                               | 110                    | NEXBTL                       | 1,000,000             |
|                        |                                   |                        | Bio LPG <sup>1)</sup>        | 40,000                |
| Biopetrol Rotterdam BV | 33                                | 69                     | Biodiesel, refined glycerine | 400,000               |
| Biopetrol Pernis BV    | 25                                | 1                      | Biodiesel, refined glycerine | 250,000               |
| <b>Abengoa</b>         |                                   |                        |                              |                       |
|                        | 250                               | 80                     | Bioethanol                   | 480,000               |
|                        |                                   |                        | DDGS                         | 400,000               |
|                        |                                   |                        | CO <sub>2</sub>              | 350,000               |

1) Available in 2016

# 3.3

## EDIBLE OIL REFINERIES

| COMPANY                    | SITE<br>(X 1,000 M <sup>2</sup> ) | DRAFT<br>(M)  | NUMBER OF<br>EMPLOYEES | NUMBER<br>OF TANKS |
|----------------------------|-----------------------------------|---------------|------------------------|--------------------|
| <b>Pernis Area</b>         |                                   |               |                        |                    |
| MaasRefinery               | 1                                 | <sup>1)</sup> | 19                     | <sup>1)</sup>      |
| Wilmar Edible Oils         | 20                                | <sup>2)</sup> | 28                     | 10                 |
| <b>Botlek Area</b>         |                                   |               |                        |                    |
| Cargill Refined Oil Europe | 90                                | 15            | 120                    | 100                |
| <b>Maasvlakte Area</b>     |                                   |               |                        |                    |
| IOI Loders Croklaan        | 180                               | 14            | 80                     | 65                 |
| <b>Dordrecht Area</b>      |                                   |               |                        |                    |
| Sime Darby Unimills        | 120                               | 4.5           | 230                    | 190                |

1) Included under Maastank

2) Included under Koole

|                        | CAPACITY<br>PER TANK (M <sup>3</sup> ) | TOTAL STORAGE<br>CAPACITY (M <sup>3</sup> ) | REFINERY<br>CAPACITY (MT/YR) | NR. OF BERTHS<br>INLAND SHIPPING | NR. OF BERTHS<br>SEAGOING VESSELS |
|------------------------|--|---|------------------------------|----------------------------------|-----------------------------------|
| <b>Pernis Area</b>     | <sup>1)</sup>                          | <sup>1)</sup>                               | 40,000                       | <sup>1)</sup>                    | <sup>1)</sup>                     |
|                        | 250 - 1,250                            | 8,500                                       | 750,000                      | <sup>2)</sup>                    | <sup>2)</sup>                     |
| <b>Botlek Area</b>     |  |   |                              |                                  |                                   |
|                        | 50 - 10,000                            | 100,000                                     | 900,000                      | 1                                | 1                                 |
| <b>Maasvlakte Area</b> |  |   |                              |                                  |                                   |
|                        | 120 - 12,500                           | 200,000                                     | 950,000                      | 2                                | 1                                 |
| <b>Dordrecht Area</b>  |  |   |                              |                                  |                                   |
|                        | 10 - 5,000                             | 75,000                                      | 450,000                      | 4                                | 0                                 |

# 3.4

## TANK TERMINALS FOR CHEMICALS, BIOFUELS AND EDIBLE OILS

| COMPANY                     | SITE<br>(X 1,000 M³) | DRAFT<br>(M) | NUMBER OF<br>EMPLOYEES | NUMBER OF<br>TANKS | CAPACITY PER<br>TANK (M³) |
|-----------------------------|----------------------|--------------|------------------------|--------------------|---------------------------|
| <b>Pernis Area</b>          |                      |              |                        |                    |                           |
| Koole Tankstorage Pernis BV | 114                  | 13.65        | 70                     | 260                | 150 - 22,000              |
| <b>Botlek Area</b>          |                      |              |                        |                    |                           |
| Maastank                    | 24                   | 11           | 39                     | 64                 | 70 - 1,800                |
| Botlek Tank Terminal (BTT)  | 100                  | 14           | 37                     | 33                 | 1,800 - 17,150            |
| LBC Rotterdam               | 200                  | 10.6         | 65                     | 110                | 70 - 5,000                |
| Odfjell Terminals Rotterdam | 680                  | 13           | 181                    | 281                | 735 - 40,000              |
| Rubis Terminal              | 155                  | 12.65        | ...                    | 28                 | 2,500 - 12,700            |
| Brenntag                    | 29                   | 13           | 40                     | 50                 | 50 - 1,200                |
| Vopak Terminal Chemiehaven  | 189                  | 11.85        | ...                    | 97                 | 362 - 10,150              |
| Vopak Terminal TTR          | 159                  | 12.8         | 93                     | 89                 | 672 - 14,895              |
| Vopak Terminal Botlek       | 576                  | 11.85        | 105                    | 196                | 500 - 22,475              |
| <b>Europoort Area</b>       |                      |              |                        |                    |                           |
| Aglobis                     | 10                   | 11.6         | 9                      | 7                  | 7,200 - 20,000            |
| Lyondell Europoort Terminal | 260                  | 15           | 10                     | 4                  | ...                       |
| OCI Terminal Europoort      | 55                   | 13           | 28                     | 2                  | 23,000                    |
| <b>Dordrecht Area</b>       |                      |              |                        |                    |                           |
| Standic                     | 168                  | 9.35         | 36                     | 163                | 156 - 6,600               |
| <b>Moerdijk Area</b>        |                      |              |                        |                    |                           |
| Stolthaven Moerdijk         | 10                   | 8.4          | 30                     | 37                 | 340 - 2,090               |
| <b>Vlaardingen Area</b>     |                      |              |                        |                    |                           |
| Vopak Terminal Vlaardingen  | 179                  | 14           | 100                    | 351                | 250 - 2,640               |

|                         | CHEMICAL PRODUCTS<br>& BIOFUELS | EDIBLE OILS | TOTAL CAPACITY (M <sup>3</sup> ) | NR. OF BERTHS<br>INLAND SHIPPING | NR. OF BERTHS<br>SEAGOING VESSELS |
|-------------------------|---------------------------------|-------------|----------------------------------|----------------------------------|-----------------------------------|
| <b>Pernis Area</b>      |                                 |             |                                  |                                  |                                   |
|                         | x                               | x           | 625,000                          | 8                                | 3                                 |
| <b>Botlek Area</b>      |                                 |             |                                  |                                  |                                   |
|                         |                                 | x           | 48,300                           | 3                                | 1                                 |
|                         | x                               | x           | 200,000 <sup>1)</sup>            | 2                                | 2                                 |
|                         | x                               |             | 83,000                           | 1                                | 1                                 |
|                         | x                               |             | 1,636,100                        | 16                               | 7                                 |
|                         | x                               |             | 161,600 <sup>2)</sup>            | 1                                | 3                                 |
|                         | x                               |             | 15,000                           | <sup>3)</sup>                    | <sup>3)</sup>                     |
|                         | x                               |             | 219,446                          | 5                                | 2                                 |
|                         | x                               |             | 318,736                          | 4                                | 2                                 |
|                         | x                               | x           | 850,063                          | 14                               | 8                                 |
| <b>Europoort Area</b>   |                                 |             |                                  |                                  |                                   |
|                         | x                               |             | 92,000                           | 1                                | 2                                 |
|                         | x                               |             |                                  |                                  | 1                                 |
|                         | x                               |             | 46,000                           | 1                                | 1                                 |
| <b>Dordrecht Area</b>   |                                 |             |                                  |                                  |                                   |
|                         |                                 |             | 230,500                          | 4                                | 4                                 |
| <b>Moerdijk Area</b>    |                                 |             |                                  |                                  |                                   |
|                         | x                               |             | 32,350 <sup>4)</sup>             | 1                                | 1                                 |
| <b>Vlaardingen Area</b> |                                 |             |                                  |                                  |                                   |
|                         | x                               | x           | 572,386                          | 11                               | 3                                 |

1) Will be expanded to 750,000 m<sup>3</sup> by 2016

2) Will be expanded to 215,000 m<sup>3</sup> in 2016 and 310,000 m<sup>3</sup> in 2020

3) Via Vopak Terminal Chemiehaven

4) Will be expanded to 48,350 m<sup>3</sup> by Q3-2016



4



# ENERGY PRODUCTION

## 4.1 Power and steam generation

4.1.1 Gas fired plants

4.1.2 Coal fired plants with biomass co-combustion

4.1.3 Biomass plants

4.1.4 Waste plants

4.1.5 Wind turbines

## 4.2 Natural gas terminals

## 4.3 Coal and biomass terminals



# 4.1

## POWER AND STEAM GENERATION

### 4.1.1 Gas fired plants

| COMPANY   | SITE<br>(X 1,000 M <sup>2</sup> ) | DATE OF<br>OPERATION | NUMBER OF<br>EMPLOYEES | CAPACITY<br>ELECTRICITY<br>(MW) | CAPACITY HEAT<br>(STEAM IN<br>TON/HR) |
|---|-----------------------------------|----------------------|------------------------|---------------------------------|---------------------------------------|
| <b>Pernis Area</b>                              |                                   |                      |                        |                                 |                                       |
| Rijnmond Energie                                | 110                               | 2004                 | 42                     | 820                             | 135                                   |
| Maasstroom Energie                              | 30                                | 2010                 | <sup>1)</sup>          | 428                             |                                       |
| Air Liquide Pernis                              | <sup>2)</sup>                     | 2008                 | 35                     | 300                             | 800                                   |
| <b>Botlek Area</b>                              |                                   |                      |                        |                                 |                                       |
| Air Products/Electrabel                         | <sup>3)</sup>                     | 2002                 | <sup>3)</sup>          | 96                              | 225                                   |
| Air Liquide Rozenburg steam & power Cogen C     | <sup>4)</sup>                     | 1997                 | <sup>4)</sup>          | 48                              | 120                                   |
| Air Liquide Rozenburg steam & power Cogen A & B | <sup>4)</sup>                     | 1994                 | <sup>4)</sup>          | 88                              | 240                                   |
| <b>Europoort Area</b>                           |                                   |                      |                        |                                 |                                       |
| Indorama Ventures Europe utility island         | <sup>5)</sup>                     |                      | <sup>5)</sup>          | 28                              | 65                                    |
| Enecogen (Dong/Eneco)                           | 110                               | 2011                 | 30                     | 870                             |                                       |
| <b>Maasvlakte Area</b>                          |                                   |                      |                        |                                 |                                       |
| Uniper Utility Center Maasvlakte Leftbank       | <sup>6)</sup>                     | 2004                 | <sup>6)</sup>          | 80                              | 162                                   |

1) Included under Rijnmond Energie

2) Included under Shell Nederland Raffinaderij

3) Included under Air Products - Botlek

4) Included under Air Liquide - Rozenburg

5) Included under Indorama

6) Included under Uniper

### 4.1.2 Coal fired with biomass co-combustion

| COMPANY                | SITE<br>(X 1,000 M <sup>2</sup> ) | DATE OF<br>OPERATION | NUMBER OF<br>EMPLOYEES | CAPACITY<br>ELECTRICITY<br>(MW) |
|------------------------|-----------------------------------|----------------------|------------------------|---------------------------------|
| <b>Maasvlakte Area</b> |                                   |                      |                        |                                 |
| Uniper MPP1 + MPP2     | 880 <sup>7)</sup>                 | 1975                 | 204                    | 1040                            |
| Uniper MPP3            |                                   | 2015                 |                        | 1070                            |
| ENGIE RC               | 220                               | 2015                 | 90                     | 800                             |

7) 880 = MPP1 + MPP2 + MPP3

### 4.1.3 Biomass plants

| COMPANY | SITE (X 1,000 M <sup>2</sup> ) | NUMBER OF EMPLOYEES | CAPACITY ELECTRICITY (MW) | CAPACITY HEAT (STEAM IN TON/HR) |
|---------|--------------------------------|---------------------|---------------------------|---------------------------------|
| AVR BEC | 1)                             | 1)                  | 21                        | 80                              |

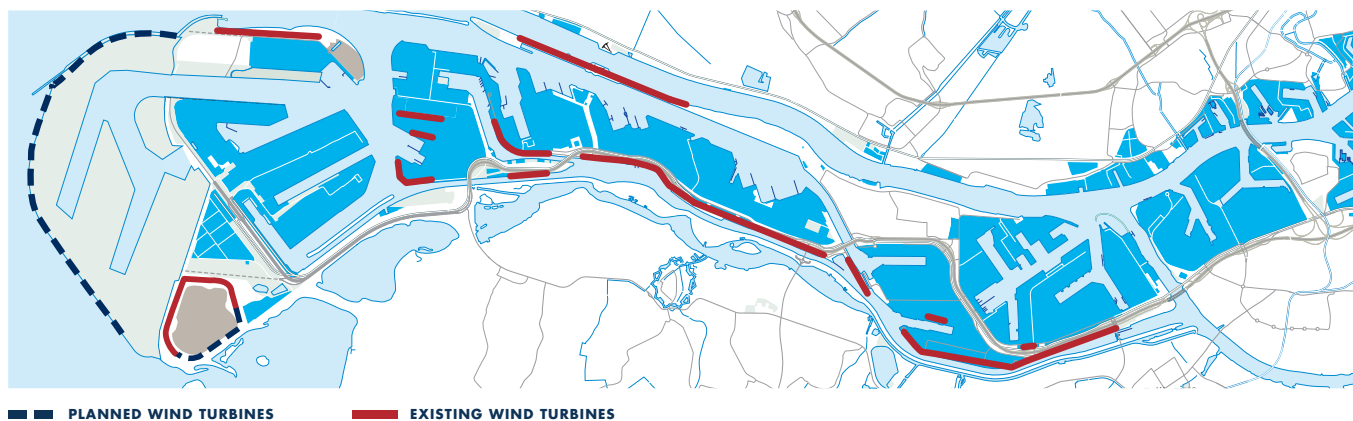
1) Included under AVR

### 4.1.4 Waste plants

| COMPANY | SITE (X 1,000 M <sup>2</sup> ) | NUMBER OF EMPLOYEES | CAPACITY ELECTRICITY (MW) | CAPACITY HEAT (STEAM IN TON/HR) |
|---------|--------------------------------|---------------------|---------------------------|---------------------------------|
| AVR     | 225                            | 300                 | 105                       | 450                             |

### 4.1.5 Wind turbines

| COMPANY       | CAPACITY ELECTRICITY (MW) |
|---------------|---------------------------|
| Wind turbines | 206                       |



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# 4.2 NATURAL GAS TERMINALS

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| COMPANY                    | SITE<br>(X 1,000 M <sup>2</sup> ) | THROUGHPUT<br>CAPACITY BCM | DATE OF<br>OPERATION |
|----------------------------|-----------------------------------|----------------------------|----------------------|
| Gate terminal              | 350                               | 12                         | 2011                 |
| Gate break bulk facilities | 60                                | <sup>1)</sup>              | Q2-2016              |
| Gasunie Peakshaver         | 120                               | ...                        | 1974                 |

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1) 280 slots per annum

# 4.3

## COAL AND BIOMASS TERMINALS

| COMPANY   | SITE<br>(X 1,000 M <sup>2</sup> ) | DRAFT<br>(M) | QUAY LENGTH<br>(M) | OPEN STORAGE<br>(X 1,000 M <sup>2</sup> ) | COVERED<br>STORAGE (M <sup>2</sup> ) |
|---|-----------------------------------|--------------|--------------------|---|--------------------------------------|
| <b>Maasvlakte Area</b>                            |                                   |              |                    |   |                                      |
| EMO   | 1,500                             | 23           | 2,330              | 1,100                                     |                                      |
| Marcor Stevedoring <sup>1)</sup>                  | 60                                | 16,65        | 500                |   | 260,000                              |
| <b>Europoort Area</b>                             |                                   |              |                    |   |                                      |
| European Bulk Services (EBS) Europoort            | 96                                | 18.5         | 600                | Dolphins                                  | 190,000                              |
| <b>Botlek Area</b>                                |                                   |              |                    |   |                                      |
| European Bulk Services (EBS)<br>St. Laurens haven | 320                               | 14.50        | 1,655              | 250                                       | 250,000                              |
| <b>Waalhaven Area</b>                             |                                   |              |                    |   |                                      |
| Marcor Stevedoring                                | floating cranes                   |              |                    |   | 44,000                               |
| <b>Merwehaven Area</b>                            |                                   |              |                    |   |                                      |
| BSR Van Uden Stevedoring                          | 60                                | 9,65         | 600                | 1,5                                       | 92,000                               |
| <b>Vlaardingen Area</b>                           |                                   |              |                    |   |                                      |
| RBT (Rotterdam Bulk Terminal)                     | 71                                | 12           | 525                | 40  | 152,200                              |
| <b>Dordrecht Area</b>                             |                                   |              |                    |   |                                      |
| ZHD Stevedores                                    | 200                               | 10           | 1,500              | 150                                       | 50,000                               |

1) Marcor plans to start operations at the terminal on the Maasvlakte in 2018.

# 5



# PIPELINES AND UTILITIES

**5.1** Pipelines

**5.2** The MultiCore pipeline system

5.2.1 Companies using MultiCore

**5.3** Industrial gases

**5.4** Industrial water



# 5.1 PIPELINES

| COMPANY                                 | SITE (X1,000 M <sup>2</sup> ) | NUMBER OF EMPLOYEES | MAIN PRODUCTS/SERVICES | CAPACITY (X 1,000,000 TON) |
|---|-------------------------------|---------------------|------------------------|----------------------------|
| Rotterdam-Rijn Pijpleiding Maatschappij | 35                            | 24                  | Crude                  | 22                         |
|   |                               |                     | Products               | 12                         |
| Rotterdam-Antwerpen Pijpleiding         | 15                            | 16                  | Crude                  | 30                         |

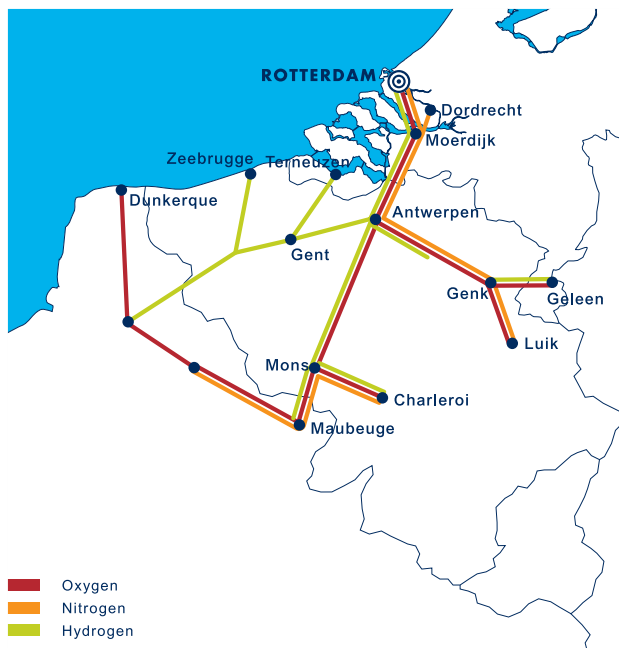
## Crude oil and oil products pipelines



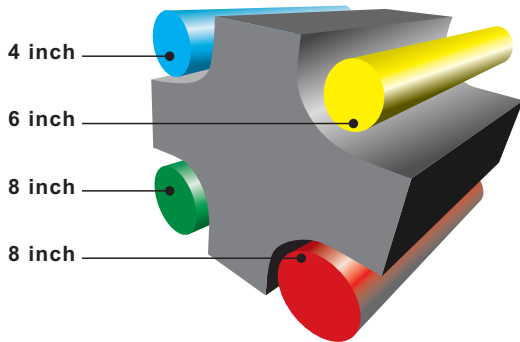
## Ethylene and propylene pipelines



## Industrial gas pipelines



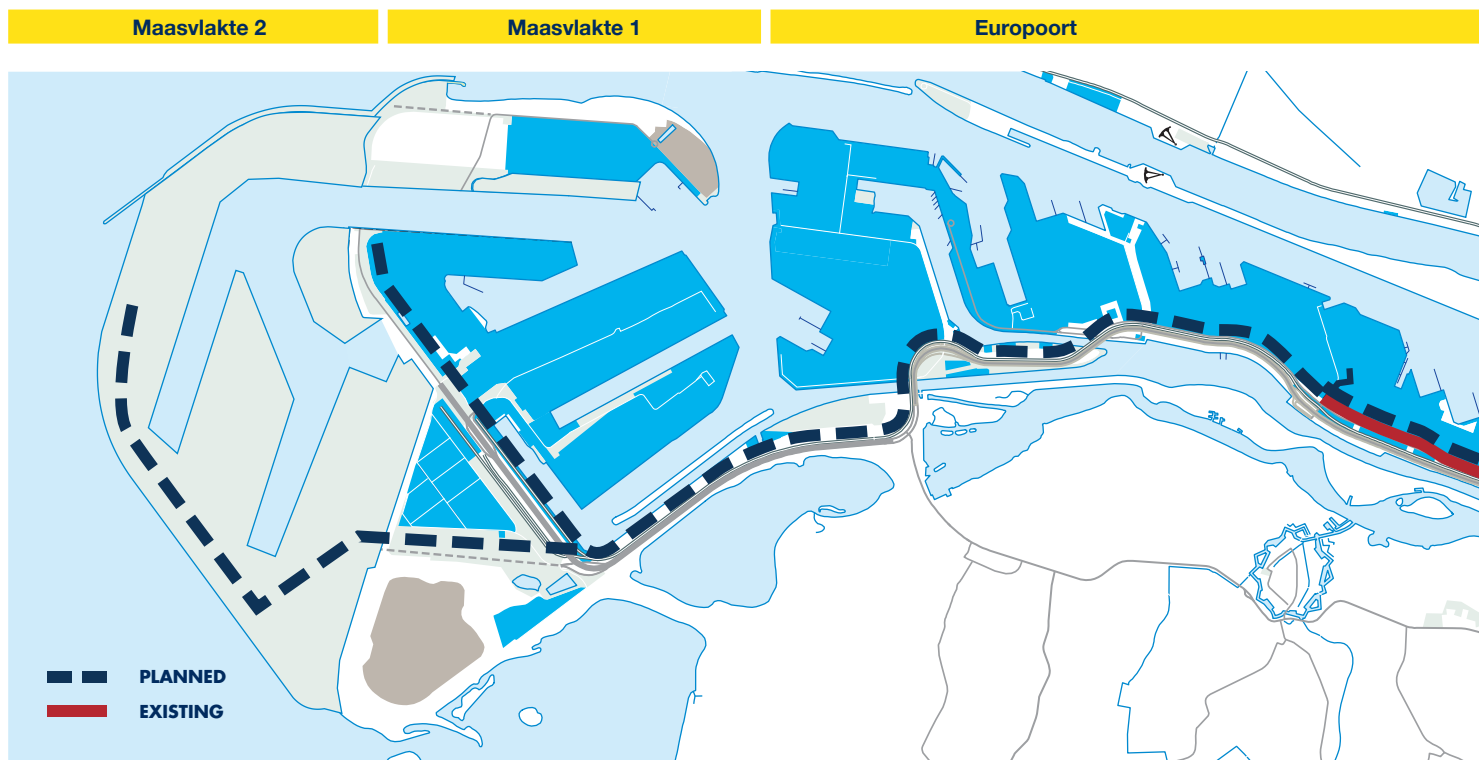
# 5.2 THE **MULTICORE** PIPELINE SYSTEM



## MultiCore®

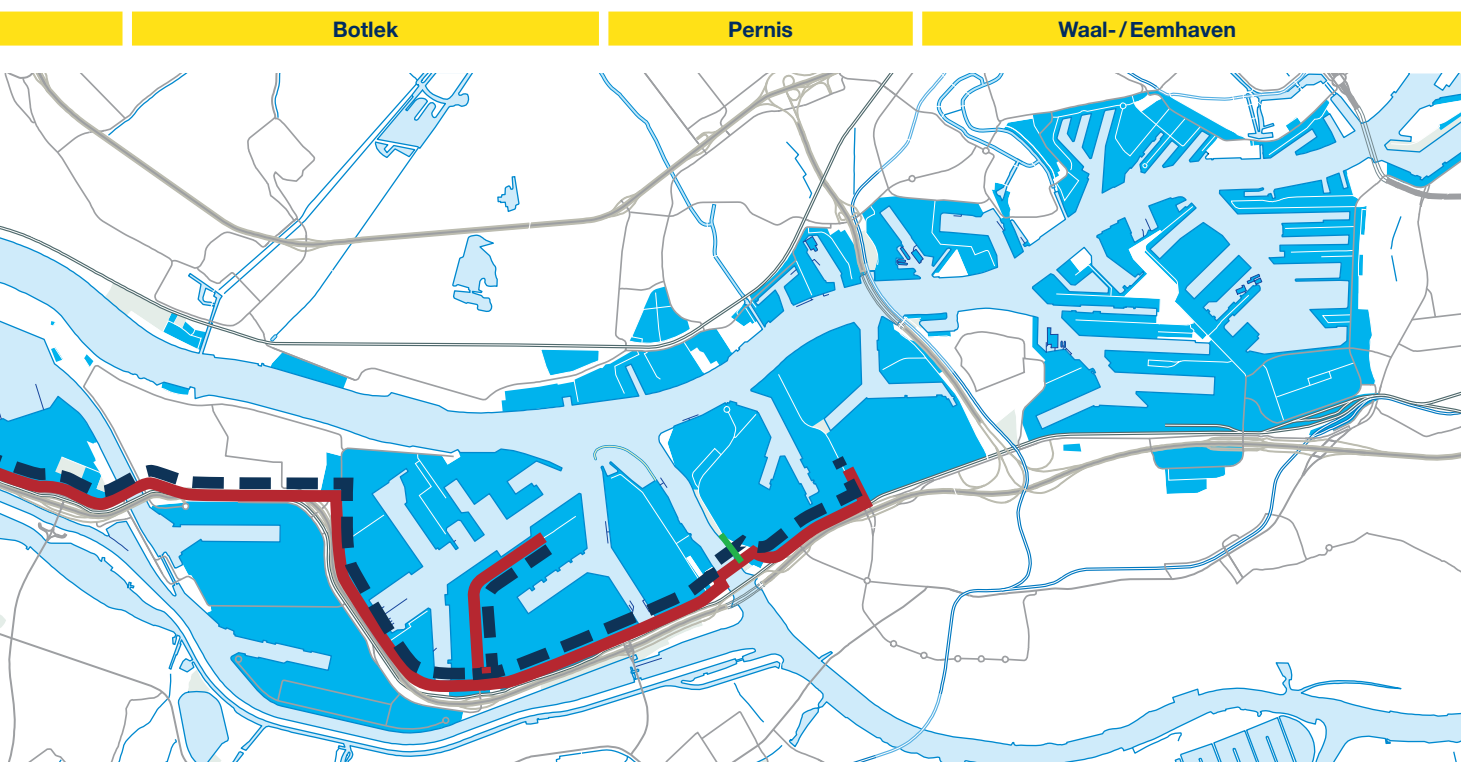
MultiCore C.V. is a joint venture company of Port of Rotterdam (75%) and Vopak Chemical EMEA (25%). MultiCore C.V. owns a bundle of 4 pipelines designed to transport chemicals and gases within the Rotterdam port area. Pipelines are available for lease by third parties.

## Multicore pipeline system



## 5.2.1 Companies using MultiCore

| COMPANY                | PRODUCT                  |
|------------------------|--------------------------|
| ExxonMobil Chemical    | Oxo-alcohols             |
| Air Products           | Oxygen                   |
| Air Products           | Nitrogen                 |
| Linde Gas              | Carbon dioxide           |
| Shin-Etsu              | Vinylchloride monomer    |
| Koch HC                | Butane                   |
| Shell Chemicals Europe | Isopreen extraction feed |
| Vopak                  | Various                  |



# 5.3

## INDUSTRIAL GASES

| COMPANY                          | SITE<br>(X 1,000 M <sup>2</sup> ) | NUMBER OF<br>EMPLOYEES | MAIN PRODUCTS / SERVICES  |
|----------------------------------|-----------------------------------|------------------------|---|
| <b>Botlek area</b>               |                                   |                        |   |
| Linde gas Benelux                | 22                                | 50                     | Oxygen, nitrogen, argon, compressed air, liquid oxygen, liquid nitrogen |
| Air Products                     | 145                               | 154                    | Hydrogen, nitrogen, oxygen, syngas, carbon monoxide, steam              |
| HyCO <sub>4</sub> (Air Products) | <sup>1)</sup>                     | ...                    | Hydrogen, steam   |
| Air Liquide Rozenburg            | 61                                | 60                     | Carbon monoxide, hydrogen, syngas, oxogas, nitrogen, oxygen             |
| <b>Europoort Area</b>            |                                   |                        |   |
| Linde Gas Benelux                | 16                                | <sup>2)</sup>          | Carbon dioxide (food-grade)   |

1) Included under Esso refinery

2) Included under Linde Gas Benelux - Botlek

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# 5.4 INDUSTRIAL WATER

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| COMPANY                                | SITE<br>(X 1,000 M <sup>2</sup> ) | NUMBER OF<br>EMPLOYEES | MAIN PRODUCTS / SERVICES         |
|--|-----------------------------------|------------------------|----------------------------------|
| <b>Botlek</b>                          |                                   |                        |                                  |
| AVR                                    | 225                               | 300                    | Waste treatment, water treatment |
| Evides Industriewater (DemiWaterPlant) | 14                                | 70                     | Demin water, process water       |

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# 6

A photograph of an industrial construction site. In the foreground, there is a complex network of blue and yellow scaffolding and pipes. In the background, there are industrial buildings and structures, including a tall tower and various pipes. The sky is clear and blue.

# **MAJOR INVESTMENTS IN PORT OF ROTTERDAM'S INDUSTRIAL CLUSTER**



# MAJOR INVESTMENTS

## IN PORT OF ROTTERDAM'S INDUSTRIAL CLUSTER

| COMPANY                      | PROJECT   | EURO'S<br>(IN MILLIONS) | YEAR      |
|------------------------------|---|-------------------------|-----------|
| Abengoa                      | Bio ethanol plant   | 500                     | 2010      |
| ADM                          | WKK   | 30                      | 2013-2014 |
| Air Liquide                  | Carbon monoxide plant   | 65                      | 2015      |
| Air Liquide                  | Hydrogen plant (130,000Nm <sup>3</sup> /h)  | 160                     | 2011      |
| Air Liquide                  | Liquid CO <sub>2</sub> plant  | 9                       | 2010      |
| Air Liquide                  | PerGen (Cogen Plant)  | 200                     | 2007      |
| Air Liquide                  | Blue hydrogen Refuelling Station  | ...                     | 2015      |
| Air Products                 | HyCO4 (H <sub>2</sub> ) plant   | 200                     | 2011      |
| Aliphos Rotterdam BV         | SMILE   | 6.5                     | 2016-2017 |
| Aliphos Rotterdam BV         | Product silos and loading unit  | 3                       | 2013-2014 |
| Aliphos Rotterdam BV         | Upgrade operating system  | 2.2                     | 2012-2019 |
| Aliphos Rotterdam BV         | Adjustments to quay   | 2.4                     | 2004-2005 |
| Aluchemie                    | Fume treatment plant  | 28                      | 2009      |
| Aluchemie                    | New mixer, adjustment mass plant  | 17                      | 2006      |
| Biopetrol Rotterdam          | Biodiesel and refined glycerin production units                                   | 80                      | 2008-2009 |
| Botlek Tank Terminal (BTT)   | Expansion Phase-1   | 75                      | 2010-2011 |
| Botlek Tank Terminal (BTT)   | Railloading rack  | 2.5                     | 2013      |
| BP Raffinaderij Rotterdam    | Effluent Treatment Plant  | 80                      | 2014      |
| BP Raffinaderij Rotterdam    | Rotterdam Liquid Isoformer Project (chemicals)                                    | ...                     | 2015      |
| BP Raffinaderij Rotterdam    | Expansion Aromatics Plant capacity (chemicals)                                    | ...                     | 2009      |
| BP Raffinaderij Rotterdam    | Desulphurization project (refinery)   | ...                     | 2006      |
| Cabot BV                     | Expansion including warehousing   | 15                      | 2014      |
| Cabot BV                     | 12 MW turbine generator   | 10.1                    | 2013      |
| Cabot BV                     | New jetty   | 0.8                     | 2007      |
| Aglobis                      | New truckloading station  | 0.2                     | 2016      |
| Aglobis                      | New filtration sulphuric acid   | 0.2                     | 2014      |
| Aglobis                      | Additional storage and jetty for Bayer  | 3.5                     | 2008      |
| Climax Molybdenum            | Chemical plant expansion  | ...                     | 2011-2012 |
| Climax Molybdenum            | Stockpile remediation   | ...                     | 2014      |
| Climax Molybdenum            | Renewal briquette installation & high voltage powerroom                           | ...                     | 2011      |
| Climax Molybdenum            | Various chemical plants, roaster, blacktopping & sewerage                         | 9                       | 2006      |
| Dr. W. Kolb Nederland B.V.   | Tank park and jetty   | ...                     | 2016      |
| EBS                          | Covered storage & regular   | 40                      | 2011-2015 |
| Emerald Kamala Chemical B.V. | Addition of a second benzoic acid purification process                            | ...                     | 2016      |
| Emerald Kamala Chemical B.V. | Revamp of the 2 <sup>nd</sup> Toluene Oxidation Unit to double oxidation capacity | ...                     | 2014      |
| Emerald Kamala Chemical B.V. | Construction of an extra Benzoic Acid Storage tank                                | ...                     | 2014      |
| Emerald Kamala Chemical B.V. | Non-phthalate plasticizer Plant   | ...                     | 2012      |
| EMO                          | New cranes and general improvements   | 158                     | 2011-2015 |
| EnecoGen                     | Gas fired power plant (850 MW)  | 600                     | 2011      |
| ENGIE RC                     | New power plant   | 1,500                   | 2011-2014 |
| Esso Nederland (ExxonMobil)  | Expansion of hydrocracker unit  | 1,000                   | 2016-2018 |
| Esso Nederland (ExxonMobil)  | New Air Products H <sub>2</sub> Plant   | ...                     | 2011      |
| Esso Nederland (ExxonMobil)  | Desulpharisation plant (refinery)   | ...                     | 2006      |
| Euro Tank Terminal (ETT)     | Caland jetty  | 3.5                     | 2016-2017 |
| Euro Tank Terminal (ETT)     | Extension of jetty and new quay wall  | ...                     | 2009      |

| COMPANY                                  | PROJECT  | EURO'S<br>(IN MILLIONS) | YEAR      |
|--|--|-------------------------|-----------|
| Euro Tank Terminal (ETT)                 | Phase 2 tank storage                                       | ...                     | 2008      |
| Euro Tank Terminal (ETT)                 | Phase 1 tank storage and jetty                             | 50                      | 2006      |
| Euroliquids                              | Tankpark II  | 2.1                     | 2014      |
| Euroliquids                              | Tankpark I   | 1.5                     | 2008      |
| Evides Industriewater                    | Denim water plant (1400 m <sup>3</sup> /h)                 | 50                      | 2010      |
| ExxonMobil Chemical                      | Rotterdam Liquid Isoformer Project                         | ...                     | 2015      |
| ExxonMobil Chemical                      | Expansion Aromatics Plant capacity                         | ...                     | 2009      |
| Gasunie                                  | Gas grid expansion   | 40                      | 2011      |
| Gate terminal                            | LNG break bulk facilities                                  | ...                     | 2015-2016 |
| Gate terminal                            | LNG terminal (12 bcm)                                      | 1,000                   | 2011      |
| Huntsman Holland                         | Expansion MDI plant  | ...                     | 2006-2007 |
| Huntsman Holland                         | New blending facility                                      | ...                     | 2015      |
| Huntsman Holland                         | Polyol plant expansion                                     | ...                     | 2014      |
| Huntsman Holland                         | MDI Splitter   | ...                     | 2013      |
| IE Projects                              | Windpark   | 36                      | 2014      |
| Indorama                                 | PTA Expansion with 20,000 MT/yr                            | 135                     | 2016      |
| IOI Loders Croklaan                      | Extension palm oil refinery and storage capacity           | ...                     | 2009-2010 |
| Kemira Rotterdam BV Europoort            | Capacity extension   | ...                     | 2017      |
| Kemira Rotterdam BV Botlek               | Emulsion Polyamines  | 5                       | 2007      |
| Koch HC Partnership                      | Rotterdam Refinery Expansion Project                       | 20                      | 2005      |
| Koch HC Partnership                      | Expansion Splitter   | 15                      | 2005      |
| Koole Tankstorage Pernis                 | New tanks 96,000 m <sup>3</sup>                            | ...                     | 2013-2014 |
| Koole Tankstorage Pernis                 | New Mildsteel and stainless steel tanks/reinforcing jetty  | ...                     | 2008-2010 |
| Kuwait Petroleum Europoort <sup>1)</sup> | Propane De-Asphalting heater                               | 7                       | 2014      |
| Kuwait Petroleum Europoort <sup>1)</sup> | 2 <sup>nd</sup> Sulphur plant & waste gas treatment        | 52                      | 2010      |
| Kuwait Petroleum Europoort <sup>1)</sup> | Steamboiler 4  | 21                      | 2010      |
| Kuwait Petroleum Europoort <sup>1)</sup> | Thermal Cracker / Visbreaker Heater & Soaker drum          | 21                      | 2006      |
| LBC TT Rotterdam                         | Rainbow – new jetty / tankpits and (un)loading facilities. | 50                      | 2015-2017 |
| LBC TT Rotterdam                         | New stainless steel tanks                                  | ...                     | 2005      |
| Linde Gas Benelux                        | CO <sub>2</sub> -facilities                                | 150                     | 2004-2015 |
| Lucite International                     | Environmental upgrading                                    | ...                     | 2006      |
| MaasRefinery                             | Specialties toll refinery                                  | 11                      | 2008-2009 |
| Maasstroom Energie (InterGen)            | Gas fired power plant                                      | 400                     | 2010      |
| Maastank International                   | Upgrading/expanding tankfarm                               | 30                      | 2013      |
| Maasvlakte Oil Terminal (MOT)            | Jetty 2  | 30                      | 2009      |
| Maatschap Europoort Terminal (MET)       | Terminal Extension Project                                 | 27.5                    | 2012-2013 |
| Neste                                    | Bio propane production facility                            | 60                      | 2015-2016 |
| OCI Terminal Europoort                   | Aqueous ammonia truck loading station                      | 2.3                     | 2015      |
| OCI Terminal Europoort                   | Redundant cooling compressor                               | 1                       | 2013      |
| Odfjell Terminals Rotterdam              | Expansion distillation capacity                            | 18.1                    | 2013-2015 |
| Odfjell Terminals Rotterdam              | Vapour emission reduction program                          | 18.4                    | 2010-2015 |
| Odfjell Terminals Rotterdam              | Modification barge/truck/rail loading facilities           | 7.2                     | 2010-2015 |
| Odfjell Terminals Rotterdam              | Pipeline connectivity                                      | 19.6                    | 2010-2012 |
| Odfjell Terminals Rotterdam              | Modification tankpits (new regulations)                    | 61.6                    | 2009-2015 |
| Odfjell Terminals Rotterdam              | Process automation   | 6.6                     | 2009-2015 |

1) Now Gunvor Petroleum Rotterdam

# MAJOR INVESTMENTS

## IN PORT OF ROTTERDAM'S INDUSTRIAL CLUSTER

| COMPANY                           | PROJECT   | EURO'S<br>(IN MILLIONS) | YEAR      |
|-----------------------------------|---|-------------------------|-----------|
| Odfjell Terminals Rotterdam       | Additional storage tanks  | 15.2                    | 2009-2014 |
| Odfjell Terminals Rotterdam       | Marine infrastructure   | 5.9                     | 2009-2010 |
| Odfjell Terminals Rotterdam       | New quay wall and reconfiguration of existing jetty   | ...                     | 2009      |
| Odfjell Terminals Rotterdam       | New distillation tower + additional storage tanks   | ...                     | 2008      |
| Odfjell Terminals Rotterdam       | Vapour recovery and treatment 6 <sup>th</sup> distillation unit   | ...                     | 2007      |
| Odfjell Terminals Rotterdam       | New distillation column   | ...                     | 2006      |
| Odfjell Terminals Rotterdam       | Additional storage tanks + expanding deepsea jetty capacity   | ...                     | 2005      |
| Organik Kimya                     | Debottlenecking WWTP  | 1                       | 2015      |
| Organik Kimya                     | Regenerative thermal oxidizer (RTO)   | 1                       | 2009      |
| Organik Kimya                     | Acrylic polymers plant  | 26                      | 2005      |
| Raedthuys                         | Windpark  | 20                      | 2013      |
| Rubis Terminal                    | Expanding capacity to 330,000 m <sup>3</sup> in 2020  | 120                     | 2014-2020 |
| Rubis Terminal                    | New tank terminal   | 50                      | 2006-2008 |
| Service Terminal Rotterdam        | Expansion and renewal   | 12                      | 2008      |
| Service Terminal Rotterdam        | Phase 1 tank storage  | ...                     | 2005      |
| Service Terminal Rotterdam        | New jetty   | ...                     | 2005      |
| Shell Nederland Chemie            | Expansion isopropanol plant   | ...                     | 2009      |
| Shell Nederland Chemie            | Expansion flexible polyols plant  | ...                     | 2008      |
| Shell Nederland Chemie            | Expansion isopropanol plant   | ...                     | 2006      |
| Shell Nederland Chemie            | Expansion rigid polyols plant   | ...                     | 2006      |
| Shell Nederland Raffinaderij      | New Solvent Deasphalter (SDA) unit  | ...                     | 2016-2018 |
| Shell Nederland Raffinaderij      | New hydrodesulphurization unit  | ...                     | 2009-2011 |
| Shell Nederland Raffinaderij      | Utility upgrade and renewal project   | ...                     | 2007-2012 |
| Shell Nederland Raffinaderij      | Revamp crude distiller furnaces   | ...                     | 2006-2008 |
| Shell Nederland Raffinaderij      | Selective hydrotreating unit  | ...                     | 2005-2006 |
| Shin-Etsu                         | Modernization instrumentation VCM Plant   | ...                     | 2005-2015 |
| Shin-Etsu                         | Replacement Oxychlorination reactors  | ...                     | 2016      |
| Stedin                            | Power grid expansion  | 50                      | 2009-2012 |
| Tankinstallatie Chemiehaven (TIC) | Move to new location  | ...                     | 2008      |
| Tronox Pigments                   | Environmental & expansion projects  | 110                     | 2000-2009 |
| Uniper (E.ON)                     | Maasvlakte Coal Fired Power Station (1,070 MW)  | ...                     | 2011-2014 |
| Van Uden Stevedoring              | Terminal 115,000 m <sup>2</sup>   | ...                     | 2012      |
| Vopak                             | Investments for environmental sustainability reasons  | ...                     | Ongoing   |
| Vopak Botlek                      | Additional tanks at the Botlek terminal   | ...                     | 2010      |
| Vopak Europoort                   | 400,000 m <sup>3</sup> new Jet fuel storage capacity (Midex)  | ...                     | 2014      |
| Vopak Europoort                   | Extension Tank phase 8 at Europoort in new Fuel Oil tanks 160,000 m <sup>3</sup>                        | ...                     | 2011      |
| Vopak Oil Rotterdam               | 4 <sup>th</sup> finger pier and tanks   | ...                     | 2006-2007 |
| Vopak Oil Rotterdam               | 3 <sup>rd</sup> finger pier   | ...                     | 2005      |
| Vopak Vlaardingen                 | Replacement of old tanks in Vlaardingen by larger tanks - additional capacity of 100,000 m <sup>3</sup> | ...                     | 2009-2015 |
| Vopak Vlaardingen                 | New loading/unloading railstation   | ...                     | 2015      |
| Wilmar Edible Oils                | Expansion palmoil refinery  | 30                      | 2008-2009 |
| Wilmar Europe Holdings            | Fatty Alcohol plant   | ...                     | 2014      |
| WNW                               | Windpark  | 40                      | 2012-2014 |
| XL Wind                           | Windpark  | 36                      | 2013      |

**CONSTRUCTION MAASVLAKTE 2** PORT OF ROTTERDAM AUTHORITY / 1,550 MILLION EURO / 2008-2013



# CONTACT DETAILS OF THE COMPANIES

active in the port of Rotterdam's industrial cluster

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# INFO

## Conversion factors of units used in this report

|                |                                 |                    |
|----------------|---------------------------------|--------------------|
| M              | 1 metre                         | 3.281 feet         |
| M <sup>2</sup> | 1 square metre                  | 10.765 square feet |
| M <sup>3</sup> | 1 cubic metre                   | 35.320 cubic feet  |
| MT             | 1 metric ton                    | 1.102 short ton    |
| KM             | 1 kilometre                     | 0.6214 mile        |
| HA             | 1 hectare                       | 2.4711 acres       |
| bcm            | 1 billion cubic metre (gaseous) |                    |

## Port of Rotterdam Authority

The objective of the Port of Rotterdam Authority is to enhance the port's competitive position as a logistics hub and world-class industrial complex. Not only in terms of size, but also with regard to quality. The core tasks of the Port Authority are to develop, manage and exploit the port in a sustainable way and to render speedy and safe services for shipping.

## Facts & figures about the port authority and the Port of Rotterdam

- Port Authority 1,100 employees, turnover approximately € 660 million.
- Port area approximately 12,603 ha of which 5,965 ha is commercial sites and 6,638 ha is water and railway lines, roads and pipeline zones.
- The length of the port area is approximately 42 kilometres.
- Direct employment over 90,000 jobs.
- Goods throughput 466 million tonnes of goods a year.
- Shipping approximately 30,000 sea-going vessels and 111,000 inland vessels per annum.

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# COLOPHON

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## COLOPHON

Published by the Port of Rotterdam Authority

**Production/coordination** Marketing Communication

**Date** February 2016

**Design** Smidswater

**Photography** Eric Bakker, Freek van Arkel, Aeroview, Siebe Swart

**Printing** Platform P

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