

# PORTVISION

ROTTERDAM





**PORTVISION**

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**ROTTERDAM**

# PORT VISION STRUCTURE

## Key items Chapter 01



**1.**  
The Rotterdam factor,  
of European importance

**2.**  
Global Hub, digital  
and efficient

**3.**  
Europe's Industrial  
Cluster, competitive  
and in transition

**4.**  
Connections between  
the port, city and region

**5.**  
Space for  
development

**6.**  
Human Capital

**7.**  
Innovation  
Ecosystem

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*The port of Rotterdam generates economic and social value and its size means that it has European importance.*

*The Global Hub and Europe's Industrial Cluster functions will deliver this value in combination with embedding in the region.*

*This requires space for development human capital and an innovation ecosystem.*

## Priorities Chapters 03 and 05

### Economic transition

- 1 Committing to a digital port and chain
- 2 Strengthening the high-grade network and accessibility
- 3 Making logistics chains more sustainable
- 4 Investing in infrastructure and commitment to a new energy system
- 5 Renewal of the raw materials and fuel system
- 6 Stable investment climate

### Social transition

- 7 Strengthening high-quality training
- 8 Connecting the labour market and education
- 9 Promoting labour mobility
- 10 Inclusive labour market

### Appealing region

- 11 Balance between urbanisation and the maintenance of adynamic complex
- 12 Improving health and safety in the living environment
- 13 Pooling strengths for the innovation ecosystem

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### Quantitative objectives and the Sustainable Development Goals

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The port and the region face three urgent challenges in the coming years: the economic transition, the social transition and increasing the appeal of the region. These challenges have a major effect on the achievement of the ambition and objectives. Priorities have therefore been identified for each challenge in which the focus will be placed in the years to come in order to generate economic and social value as a port, now and in the future. The overview shows the links between the priorities and the key items of the Port Vision.

The Port Vision acts as a compass for making the port of Rotterdam future-resilient. The realisation of the vision contributes to the achievement of the Sustainable Development Goals, the global agenda of the United Nations. Five of the seventeen SDGs are particularly relevant for the port. They have been broken down into eight sub-goals.

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# INTRODUCTION

Global developments such as the energy, raw materials and digital transitions require substantial changes to the Rotterdam port and industrial complex. These developments require a recalibration of the 2030 Port Vision. The Port Vision describes the ambitions and prospects for the Rotterdam port and industrial complex, including the seaports of Dordrecht and Moerdijk<sup>1</sup>. The central objective is to maintain and enhance the social and economic value of this complex and to reduce undesirable external effects such as carbon emissions.



The Port Vision acts as a compass: the ambitions are like dots on the horizon, even when circumstances change. The recalibrated Port Vision replaces the 2030 Port Vision from 2011. The central concepts, Rotterdam as a Global Hub and Europe's Industrial Cluster, remain unchanged. However, since the publication of the 2030 Port Vision in 2011, the City of Rotterdam, central government and the Port of Rotterdam Authority have formulated new objectives in, for example, the Dutch Climate Act, and so there has been a change in the substance of the two central concepts. In addition, the recalibration will position the port and industrial complex more firmly in the context of the city and region, puts employment as it will be in the future centre stage.

This Port Vision maintains the time horizon of 2030 because of the prevailing uncertainty about the pace of new developments and the impact that developments that we cannot foresee at present will have on the development of the port and industrial complex. In a number of areas, and particularly the energy transition, this document looks ahead to 2050.

The realisation of the vision requires, first and foremost, the commitment of the five stakeholders directly involved in the development of the port: the Port of Rotterdam Authority, the business community in the port as represented by Deltalinqs, the City of Rotterdam, the Provincial Authority of South Holland and the national government, known collectively as 'the covenant partners'<sup>2</sup>. In addition, the efforts of many other parties will be needed to transform the desired picture of the future into a reality. All parties contribute to the implementation of the vision on the basis of their own role, resources and capacities.

## THE CENTRAL GOALS ARE TO GENERATE SOCIAL VALUE AND REDUCE UNDESIRABLE EXTERNAL EFFECTS.

On behalf of the national government, the Ministries of Economic Affairs and Climate (EZK), Infrastructure and Water Management (I&W) and the Interior and Kingdom Relations (BZK) are involved. The last of these ministries is also actively involved in the development of the national environmental planning vision and it can therefore provide orchestration.

The covenant partners believe the vision will contribute to achievement of the Sustainable Development Goals (SDGs) drawn up by the United Nations. Many public and private stakeholders, including the Port of Rotterdam Authority, have placed the SDGs front and centre in reporting on their corporate social responsibility.

*The substance of the two central concepts, Rotterdam as a Global Hub and Europe's Industrial Cluster, has changed.*

- 1 In line with the regional industry platform's contribution to the national climate agreement for carbon reduction, this vision considers the complex as a whole, including activities in the seaports of Dordrecht and Moerdijk.
- 2 The Port Vision has been adopted by the City of Rotterdam. All the covenant partners are involved in implementation.

# GLOBAL HUB DIGITAL AND EFFICIENT



# KEY ITEMS

# Q1

The Port Vision acts as a compass showing the direction for making the Rotterdam port and industry cluster future-resilient. The aim is to maintain the creation of economic and social value. The key items below focus on strengthening the competitive position of the port of Rotterdam and achieving sustainable growth in a world-class port.

**DUE TO THE SCALE AND CONCENTRATION OF THESE FUNCTIONS, ROTTERDAM PLAYS A KEY ROLE IN THE RENEWAL OF THE ECONOMY. IT IS THE PLACE WHERE TRANSITIONS TAKE SHAPE.**

## 1. The Rotterdam factor, of European importance

The Rotterdam port and industrial complex is strategically and economically important for the regional, national and Northwest European economies. As a Global Hub and Europe's Industrial Cluster, the complex determines prosperity in the Netherlands, now and in the future. The complex is important for wholesale trade, re-export, port-related business services and maritime manufacturing. Global developments such as the energy, raw materials and digital transitions require major changes to Rotterdam's port and industrial complex. The implementation of the central concepts from the 2030 Port Vision as adopted in 2011 - Rotterdam as a Global Hub and Europe's Industrial Cluster - is changing fundamentally. Due to the scale and concentration of these functions, Rotterdam plays a key role in the renewal of the economy. The Rotterdam port and industry cluster is the place where transitions take shape. The success of the transition is by no means certain and it will require considerable efforts from all stakeholders.

*The complex determines prosperity in the Netherlands and Europe, now and in the future.*

## 2. Global Hub, digital and efficient

The Global Hub as a leading logistics hub offering fast, inexpensive, safe and reliable connections to the hinterland and overseas markets is being fundamentally transformed. The digital transition results in transparency so that logistics chains and processes in the port are efficiently and seamlessly coordinated from the sea through to the hinterland. Other causes of the transformation of the Global Hub are automation, the development of the circular economy and the increasing sustainability of transport chains. Rotterdam aspires to an international leading position in these areas in order to safeguard the continuity of Rotterdam's position as a Global Hub. Decisive factors in terms of the increased sustainability of logistics are the use of alternative fuels, electrification and the transport efficiency of all modalities. The availability of alternative fuels and rewards for their use are crucial. The hub function is therefore also essential to make the transition of the Industrial Cluster possible. Further infrastructure investments in the port and joint efforts to maintain robust multimodal accessibility and connectivity in the region and hinterland are needed to protect the Global Hub. They should also ensure that housing needs in the region and around corridors in the hinterland will not interfere with the accessibility and economic growth of the Global Hub.

*The Dutch Climate Agreement constitutes the framework determining the carbon reduction objectives for the Rotterdam port and industrial complex.*

## 3. Europe's Industrial Cluster, competitive and in transition

Europe's leading Industrial Cluster with a high level of activity is changing dramatically. Central here is the establishment of an efficient energy and raw materials system, not only to safeguard the future for existing activities but also to ensure that new business moves into the area at the same time. This twin strategy is necessary because, without the power and investment capacity of the existing port and industrial complex, it will be impossible to renew and attract substantial investment in new activities. This means the existing cluster will remain competitive, retain its social value and become future-resilient. The Dutch Climate Agreement will be the framework that determines the carbon reduction objectives of the Rotterdam port and industrial complex. The

agreement includes agreements about a 49% carbon reduction by 2030 (by comparison with 1990) for five sectors: Industry, Electricity, Mobility, Built Environment and Agriculture. The expansion of the energy infrastructure for heat, steam, CO<sub>2</sub> and electricity is a necessary first step and an important precondition for the transition to a carbon-neutral port and industrial complex. Infrastructure for landing and transporting hydrogen will be added in the next phase. This infrastructure is also of enormous strategic importance in the Northwest European context. It will allow Rotterdam to accommodate activities and functions for the Northwest European economy that would make a lasting contribution to carbon emissions elsewhere. The challenges described here involve uncertainties. That is why efforts are focused as much as possible on flexibility and expanding the portfolio of activities in the port and industrial complex in order to enhance robustness. A further extension of the port and industrial complex to include these activities is crucial in order to maintain the creation of social value in the long term for the port and industrial complex and for the city, the region and the Netherlands. The following new and growing markets are relevant in any case here: the biobased chemical industry, the valorisation of residual and waste flows (Rotterdam as a waste-to-value hub), the maritime manufacturing industry (including shipbuilding and offshore), port-related business services, agro-logistics and industry, and innovative companies that focus on the development and application of new technologies that contribute to the energy and digital transitions in the broader port economy.

**CENTRAL HERE IS THE ESTABLISHMENT OF AN EFFICIENT ENERGY AND RAW MATERIALS SYSTEM, SO THAT EXISTING ACTIVITIES HAVE A FUTURE AND SO THAT NEW BUSINESS MOVES INTO THE AREA.**

#### **4.**

## **Connections between the port, city and region**

The transitions result in greater inter-connectivity between the port and the urban economy. Intensive connections enhance the vitality of both the port and the region. A strong Global Hub and Industrial Cluster further Rotterdam's international position as the most diverse and competitive maritime capital in Europe (Rotterdam Maritime Capital) and vice-versa. In addition, the transitions provide opportunities to attract high-quality urban economic activities because innovative manufacturing industry, research institutes and business services (particularly digital) are increasingly inter-linked. A high-quality business and residential location is crucial to attract innovative employees and companies.

#### **5.**

## **Space for development**

Space for development is a critical, but at the same time scarce, success factor. Ensuring that there is sufficient space for the transition in the port and industrial complex will be a major challenge in the years to come. During the transition, space is needed in parallel for both the further growth and renewal of existing activities and the development of new activities. That will require an appealing, safe and healthy living environment in a growing urban area. On the one hand, this demands the clustering of new and existing companies in order to ensure that the physical space, facilities, residual flows and environmental space are used as intensively and efficiently as possible. On the other hand, the environmental profiles of these new activities and therefore the use of space required for the various environmental components – for example as a result of the application of technologies that are not known about currently – will only become clear over time. In view of the uncertainties and dynamics, caution and tailor-made approaches are needed to strike the right balance, with emotional perception also being a factor. The development and application of new instruments for the distribution of environmental space will help in this respect.

## 6. Human Capital

Human Capital is a crucial precondition for success. The challenges described above require an education and labour market characterised by sustainable and flexible employability, new skills, intersectoral cooperation, talent development and the introduction of talent, both national and international. A continuous dialogue is needed that leads to joint commitment from government, educational and research institutions, and the business community. There should also be an emphasis here on optimal sustainable accessibility and improving access to employment for vulnerable groups.

*Human Capital is a crucial precondition for success.*

**THE SOCIAL TRANSITION  
REQUIRES A CONTINUOUS  
DIALOGUE BETWEEN  
GOVERNMENT, EDUCATION  
AND RESEARCH  
INSTITUTES, AND THE  
BUSINESS COMMUNITY.**

## 7. Innovation Ecosystem

The quality of the innovation ecosystem is a decisive factor in the digital and energy transitions and in the efforts to widen the portfolio. The ambition to be an international leader requires an innovation ecosystem in which all the components are world-class. Those components include a training infrastructure, the encouragement of entrepreneurship, targeted recruitment of talent, research, test facilities, support for start-ups and scale-ups, the availability of venture capital, regulations that encourage innovation, suitable meeting and working places for innovative entrepreneurs, and high-quality demand for innovative products and services.



# **BACK-** **GROUND**

**NS**

### The Rotterdam port and industrial complex and its surroundings

As the largest port in Europe, with a throughput volume of 469 million tonnes (2018), Rotterdam is an important hub for worldwide flows of goods and an important gateway to the European market of 500 million consumers. The port and industrial complex is globally competitive and it offers full connectivity to the hinterland. With over 500 scheduled services, Rotterdam is connected to more than 1,000 ports worldwide and it is part of a European network. It is located on three of the nine core corridors in the Trans-European Transport Network (TEN-T; Rhine-Alpine, North Sea-Baltic and North Sea-Mediterranean). Containers, general cargo, dry bulk and wet bulk are stored and transshipped at the terminals.

In addition, the port and industrial complex, with more than 45 chemical companies, five oil refineries and six vegetable oil refineries, is one of the world's largest oil and chemical centres and Rotterdam has the largest biobased cluster in Europe. Numerous international companies have located their operations in that cluster, which generates high levels of employment, has considerable innovative strength and serves a large hinterland.

The port is rooted in the Rotterdam region and it is part of the Metropolitan Region Rotterdam The Hague (MRDH), which is home to approximately 2.3 million inhabitants. Rotterdam's central urban area is increasingly popular. It is a multicultural society with a progressive business community and globally competitive research institutes. Rotterdam is home to many maritime business services and maritime technology companies. The intensive connections between the port and the city strengthen them both: a dynamic port requires a dynamic region, and vice-versa.

*As Europe's largest port, Rotterdam is the gateway to 500 million European consumers.*

### Impact on society

The social significance of the port of Rotterdam is far-reaching. Traditionally, the Netherlands has been a centre for distribution, an open economy with close connections to other countries, particularly in Europe. Wholesale trading and activities relating to re-exportation generate substantial economic value. As the largest Dutch port, the Rotterdam mainport is a driving force and it is closely involved with imports and exports for business and supplies of consumer goods<sup>3</sup>. The port and industrial complex itself is home to many industries that are important for the Netherlands (chemicals, energy, metals and the maritime industry). A large number of everyday products such as petrol, packaging, pharmaceutical products and paint are based on products that come from the Rotterdam port and industrial complex.

**WITH OVER 500 SCHEDULED SERVICES, ROTTERDAM IS CONNECTED TO MORE THAN 1,000 PORTS WORLDWIDE AND IT IS PART OF A GLOBAL NETWORK.**

<sup>3</sup> Erasmus Universiteit, Bart Kuipers, The Rotterdam effect (2018)

The economic significance of the port of Rotterdam is seen not only in the port and industrial complex but also in the business services and suppliers in the municipalities located immediately alongside the complex and in the hinterland.

These important functions in the Dutch economy are reflected in the earning capacity and the related employment opportunities. The port of Rotterdam generates 6.2%, or € 45.6 billion, of value added for the Netherlands<sup>5</sup>. Companies in the Rotterdam port and industrial complex account for €15 billion of that sum. €8 billion is value added from suppliers. The 'Rotterdam effect', economic activities made possible further afield in the Netherlands thanks to the presence of the port of Rotterdam, such as re-export through logistics and distribution, and the establishment of port-related business services, are forward indirect effects. In combination with the direct and backward indirect effects, these effects result in the total value added related to the port of Rotterdam. In terms of employment, this translates as 385,000 jobs, some of which can be attributed to the Rotterdam effect. Approximately 184,000 people had port-related jobs in the Rotterdam-Rijnmond region in 2017<sup>4</sup>. That is 2.0% of all people employed in the Netherlands. Of these, 101,000 people are location-based and employed in the area (2017 figures) and 83,000 have indirectly related jobs in this region. In addition, good access through the transport infrastructure can affect spatial-economic development and therefore be a factor in determining where economic development takes place. Rotterdam's infrastructure is therefore important as a factor determining companies' decisions to locate here, not only for re-exportation activities but also for the Dutch economy as a whole.

The social impact of the Rotterdam port and industrial complex also includes undesirable external effects varying from local noise pollution to the impact on air quality and the climate. The high level of activity also makes the area energy-intensive, with the associated emissions of greenhouse gases. Rotterdam is a hub for the trade in energy carriers and an important centre for energy production and the chemical industry in the Netherlands. Eighteen percent of national carbon emissions are produced here. Since 2005, the port and industrial complex has been supplying captured CO<sub>2</sub> to greenhouse horticulture and, for five years now, steam and heat networks have been in place for the exchange of steam and the supply of residual heat to district heating networks.

**THE PORT OF ROTTERDAM IS  
THE DRIVING FORCE BEHIND  
6.2% (€44 BILLION)  
OF THE VALUE ADDED OF THE  
DUTCH ECONOMY.**

<sup>4</sup> Erasmus Universiteit, Bart Kuipers, The Rotterdam effect (2018).

<sup>5</sup> 2017 Port Monitor, Rotterdam-Rijnmond region.

Looking to the future, the Rotterdam port and industrial complex also plays an important role in the successful energy, digital and raw materials transitions and in ongoing automation. In the energy and raw materials transitions, Rotterdam mainport can group activities and act as a hub for alternative forms of energy such as offshore wind, biomass and hydrogen. As an accelerator, the mainport is indispensable for the achievement of the national objectives for raw materials and the climate. First of all because the port processes large quantities of biomass and because the port of Rotterdam provides some of the facilities needed for offshore-wind development in the North Sea. The digital transition can actually be accelerated by means of clustering. The port innovation ecosystem that has been developed is a fertile breeding ground for companies working in a range of activities such as e-platforms, artificial intelligence, 3D printing, industry 4.0 and blockchain technology. Digital innovations of this kind contribute to the renewal of the Dutch economy.

*The Rotterdam port and industrial complex has an important role to play in a successful energy, digital and raw materials transition and in ongoing automation.*

# AS AN ACCELERATOR, THE MAINPORT IS INDISPENSABLE FOR THE ACHIEVEMENT OF THE NATIONAL TARGETS FOR THE CLIMATE AND RAW MATERIALS.

### **Importance of collaboration and acceleration**

Collaboration and acceleration are key to the realisation of this vision. The success of the transitions is by no means certain and it will require considerable efforts from all stakeholders. Intensive strategic partnerships are essential here: with neighbouring industrial areas, municipalities and regions such as Schiedam, the Greenport in the Westland, the Drecht towns, Brabant, Noord-Limburg/Venlo and Zeeland, logistics hubs in the hinterland, other North Sea ports and ports elsewhere in the world. Collaboration and the acceleration of related processes not only strengthens the position of Rotterdam and the companies based here, it also creates strategic value for the Netherlands and Europe due to the economic importance of the port of Rotterdam.

# CHANGING WORLD

poses  
three  
challenges.

# 3

Global developments such as the energy, raw materials and digital transitions require major changes to Rotterdam's port and industrial complex that are needed to maintain and, where possible, improve living standards and prosperity in the region.

The various developments are far-reaching, wide-ranging and fast-moving. They can, certainly in combination, lead to trend breaks. So adaptability, adequate space, flexibility and a strong strategy focusing on innovative capacity, the broadening of the portfolio and improvements to the business location are important for the ongoing development and renewal of the Rotterdam port and industrial complex.

The three main challenges for Rotterdam can be summarised as follows:

- 1. Economic transition:** the digital, energy and raw materials transitions, and changing trade flows
- 2. Social transition:** changing jobs and skills
- 3. Appealing region:** compact, competitive, healthy and green

# 1. Economic transition: future-resilient

The 'economic transition' comprises recent developments such as the digital, energy and raw materials transitions, but also changing trade flows. With these developments, the port and industrial complex and the urban area have become increasingly interconnected. The port of Rotterdam now extends well beyond the city's boundaries. Innovative industry, research institutes and business services are interwoven to an ever greater degree. The growth of digital services has also intensified the connection between the urban economy and the port and industrial complex.

### Digital transition

ICT systems are generating more opportunities all the time. Digital innovation creates value and makes it possible to develop new business models that will contribute significantly to prosperity and progress. Digital products have many applications, for example in logistics chains. The digital transition provides the port with major opportunities in terms of efficient handling and transport.

The efficient exchange of information results in, among other things, shorter turn-around times for ships, fewer empty lorries on the roads and just-in-time production options, and contributes to the competitive position of the port of Rotterdam. On the other hand, we are increasingly dependent on ever-more complex ICT systems. That makes our economy more vulnerable, and it intensifies the risks and potential consequences of cybercrime.

### Energy transition

A far-reaching transition is underway in both the production and consumption of energy. The Netherlands has already taken concrete steps, for example by working on a Climate Agreement and with the decision to phase out gas production from the Groningen field completely in the years after 2022. Worldwide, electricity production from alternative sources is rising rapidly and it can almost compete with non-renewable energy in terms of cost price. The electrification of many processes and new applications, as in the field of mobility, will also lead to growth in those sales opportunities. Electric and autonomous vehicles are on the rise, and the increasing commitment to sustainable transport is pushing demand for alternative fuels and 'Green Lanes'. Partly against the backdrop of the expected electrification of chemical and other industrial processes and

power-to-X technologies, the availability of affordable renewable energy is increasingly a factor in decisions about where to locate businesses. The options to store renewable energy instead of using it directly, and to convert it into molecules instead of electrons, are important elements.

#### Raw materials transition

In line with the energy transition, we are also seeing a raw materials transition. The carbon ambitions and growing demand for raw materials favour the emergence of a circular economy focusing on different ways of using products and raw materials. This will involve replacing fossil raw materials by non-fossil alternatives, re-use and recycling. This makes the raw materials transition a fundamental component of the approach to the climate challenge and it will affect the port as an industrial cluster and logistics hub.

The emergence of the raw materials transition will open up many opportunities for the Rotterdam port and industrial complex to strengthen its competitive position and for the arrival of new businesses. The concentration of raw material and residual flows from industry and logistical activities in the regional port and industrial complex of Rotterdam, and from the urban region, constitutes an excellent basis for the broad-based introduction of circular production and consumption. Connecting existing and new activities to a shared and efficient system of energy and raw materials will make it possible to optimise the value of residual flows and re-use them. The transition from fossil to secondary raw materials will also lead to the creation of new activities that can opt for the port area as a location. The focus here is on the valorisation of waste flows through their transformation into alternative raw materials by means of sorting, and mechanical and chemical recycling. In that way, it is possible

## THE PORT AND INDUSTRIAL COMPLEX AND THE URBAN AREA ARE INTERCONNECTED.

to produce secondary chemicals and fuels with a smaller carbon footprint. The port of Rotterdam's location in a metropolitan area where large quantities of waste are generated underlines these opportunities.

#### Changing trade flows

Global developments affect global trade flows and the port of Rotterdam as a link in the international logistics chain. The volume of global trade flows is increasing but signs of change are also emerging. On the one hand, the world economy is doing well. However, the rise in economic activity is not spread evenly across all regions. As a result, the economic centre of gravity is moving to Asia and China. In addition, the rise in geopolitical tensions and trade barriers, examples being the Brexit and import duties on trade between China and the US, is acting as a brake on economic growth and therefore on throughput volumes. The short-sea market in particular (containers and RORO) may be negatively affected by the Brexit, particularly

in a no-deal scenario, while nearshoring trade volumes to Central and Eastern Europe and Central Asia are expected to increase. Increasing connectivity also plays a role, for example as a result of the Chinese Belt and Road Initiative (BRI). This means that transport between Asia and Europe is becoming increasingly easy because of complementary modalities, and port developments in Southern Europe and the Baltic may be sources of more competition.

The raw materials transition is also affecting trade flows. As a logistics hub, the port of Rotterdam is a link in the international value chain between areas where raw materials and materials are produced on the one hand and production locations on the other. The drive to establish closed recycling systems means that the geography of value chains will change and this may also affect what is transported. An example of this is the rising volume of biomass.

# EUROPE'S INDUSTRIAL CLUSTER COMPETITIVE AND IN TRANSITION







## CHANGING WORLD POSES THREE CHALLENGES

Figure 1

### Long-term scenarios for cargo throughput

In order to understand the implications of the various 'visions of the future' for the expected development of the port and industrial complex, and more specifically the existing cargo volumes, the Port of Rotterdam Authority has drawn up scenarios. These scenarios express economic growth and world trade, technological breakthroughs in areas such as the digital transition, automation and renewable energy, and global climate agreements in terms of future throughput volumes and industrial development. Effects of the raw materials transition have only been included in the scenarios to a limited extent. A bandwidth emerges from these scenarios in which existing throughput<sup>6</sup> in Rotterdam may, given current insights, be reasonably expected to develop. The results of the estimates<sup>7</sup> (see figure 2) show that there is a lot of uncertainty and that the transitions may have far-reaching and unclear consequences for the existing goods flows in the port of Rotterdam.

Three of the four scenarios indicate that existing goods flows may stabilise or even



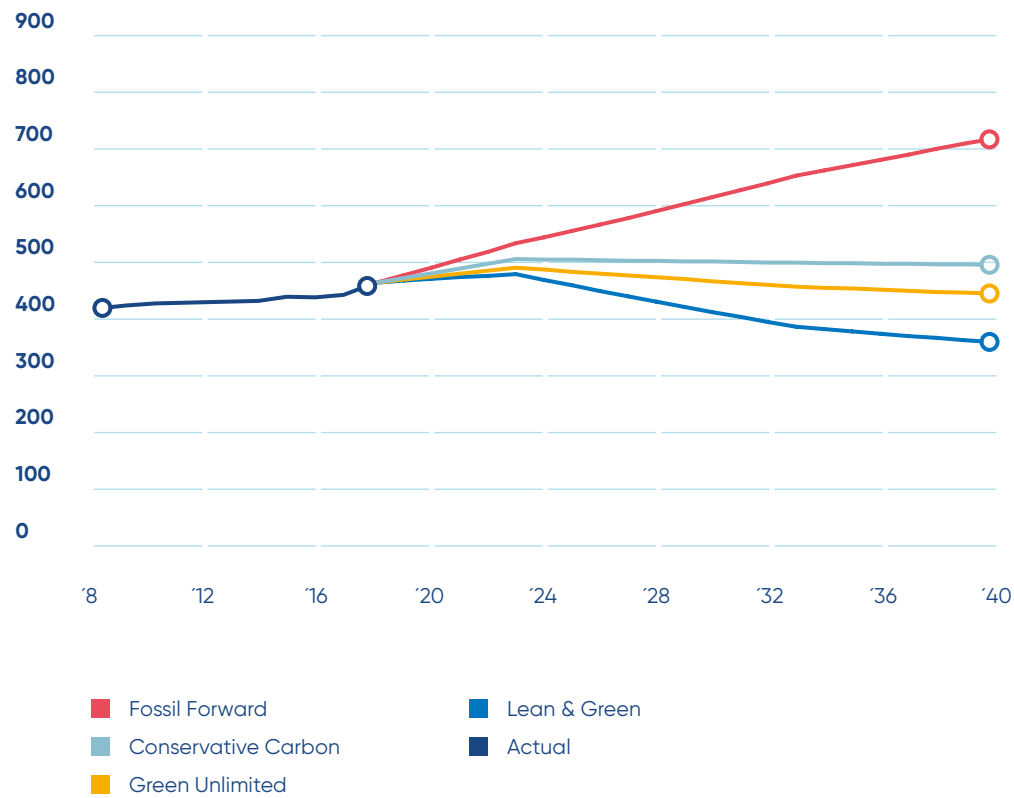
decline over time. This will be the case in particular if the global energy transition accelerates, cutting demand for fossil fuels. That will primarily affect the volumes of crude oil, oil products and coal, and the feedstock and semi-finished products for processing them. Container flows are expected to continue to grow but at a slower pace than in earlier estimates.

<sup>6</sup> Entirely new flows of goods, such as hydrogen, may also emerge in these scenarios. The Port of Rotterdam Authority has conducted exploratory studies in this area but the high levels of uncertainty mean that any new flows have not been included in the above estimates.

<sup>7</sup> The scenarios presented have been discussed with the Netherlands Bureau for Economic Policy Analysis (CPB), the Clingendael Institute, Ecofys research bureau and banks (Rabobank, ING, ABN AMRO).

# THE DRIVE TO ESTABLISH CLOSED RECYCLING SYSTEMS MEANS THAT THE GEOGRAPHY OF VALUE CHAINS WILL CHANGE AND THIS MAY ALSO AFFECT WHAT IS TRANSPORTED.

Figure 2  
Total development of current cargo flows (in millions of tonnes)



## 2. Social transition: changing jobs and skills

In time, the economic transition will be accompanied by changes in the labour market. Conversely, an economic transition can only be achieved through a commitment to human capital and the adequate harmonisation of the education system and the labour market. A social transition is just like innovation: the labour market and the education system must also adapt continuously to technological and digital developments.

Technological developments in the energy-, raw materials- and digital transitions lead to changes in jobs, increased productivity and a changed role for labour. The nature and scale of employment in the port is changing. The demand for non-standardised work will rise and a lot of standardised work will become increasingly automated. This trend is expected to lead to a rise in the level of training required from employees. In the short term, large numbers of technical staff, in particular engineers who can work in a wide range of areas, will be needed for the expansion and conversion of existing activities. This will result in even more pressure on the availability of adequately qualified staff. Talent development in the existing labour supply and the incoming labour force, both national and international, is becoming increasingly important.

## THE DIGITAL, ENERGY AND RAW MATERIALS TRANSITIONS ARE TRANSFORMING THE NATURE AND SCALE OF EMPLOYMENT IN THE PORT.

Many new skills will be required for the changing types of job. Technology is developing rapidly and it requires adaptability and broad employability from employees. The importance of skills such as the analysis of large amounts of data and transforming those data into services to serve customers is on the rise. Multidisciplinary work in multicultural teams with different levels of training and supra-company, intersectoral collaboration will be the rule rather than the exception. This will call on the 'soft skills' of the employees of the future, and require an understanding of the bigger picture, as well as flexibility and agility from employees.

New jobs in the orbit of the port of the future will mainly be created in business services, innovative manufacturing industry, research and development (R&D), and innovation. As a result, the port, city and region will be more closely connected, not only physically but also socially and culturally. A culturally strong city and an appealing region will draw in creative and highly educated talent. But

it is also important to preserve the jobs on the more practical side. Both types of job are essential for the economic transition. At the same time, Rotterdam has a large group that still has to catch up with developments in the city and the port. Labour mobility and a more inclusive city will play an important role here. The regions that are able to respond to this changing demand and provide these next-century skills will be successful. Targeted interventions, for example through education, knowledge development and the social climate, will be needed to ensure that the social transition is tailored to the economic transition. The social partners (government authorities, employer and employee organisations) will have a major responsibility in this area. This shared responsibility has already been set out in a Training and Work Agreement which also includes a Port component and which has a strong focus on inclusiveness, labour mobility and development. After all, a successful social transition will strengthen the economic transition, and vice-versa.

### 3. Appealing region: compact, competitive, healthy and green

The economic and social transitions require an appealing region where companies want to invest and people want to live. A region of this kind demands unremitting attention, particularly in view of increasing global competition and the corresponding rise in the importance of regional innovative capacity, urbanisation, and general demand for a healthier and greener society.

In the face of rising global competition, an appealing region draws in investments from companies with international operations. This applies not only to investments in organisation and a broader scope for companies located in the port but also to attracting investment in new, forward-thinking companies and talent. An appealing region for investment therefore establishes the foundation for renewal. An attractive business location is essential, with conditions such as legal certainty (including the field of permits and climate policy), competitive charges and tariffs, excellent physical connections within the region and with other regions, and a world-class innovation ecosystem. Another

*An appealing region for investment, both national and international, establishes the springplank that innovation requires. The same precondition applies to a healthy and safe living environment where talented people want to live.*

competitive factor is increasing concentration and consolidation in, among other areas, the chemical industry. This is changing the market dynamics in the global chemical industry<sup>8</sup>. As a result, the Rotterdam port and industrial complex is facing growing competition from other regions as a business location. The same precondition applies to a healthy and safe living environment where talented people want to live. The aim is an inclusive city where the residential conditions and cultural facilities match the wishes of the employees of the future. At the same time, a living environment of this kind also represents a challenge that requires space, particularly in view of the rising popularity of Rotterdam, the associated housing demand and the growth of the population. In Rotterdam, there is still a lot of room for using the city more compactly in relative terms but the pressure on space will increase. This requires a good balance between the ongoing need for the physical and environmental space of the port and industrial complex, and the space required for an appealing and healthy living environment and a growing city.

*The increasing appeal of the city and more intensive traffic is leading to higher pressure on the road infrastructure. Mobility forecasts relating to roads, waterways, railways, pipelines and public transport indicate that there will be bottlenecks on the main road network in all scenarios<sup>9</sup>. So action is required.*

<sup>8</sup> Chemicals Executive M&A Report by A.T. Kearney, 2017

<sup>9</sup> National Market and Capacity Analysis (NMCA)

**PERSPECTIVE**  
**ROTTERDAM**  
**PORT COMPLEX**

2030



On the basis of these cornerstones – and with the completion of the necessary transitions – the port of Rotterdam will continue to create major economic and social value in the coming years. We will also make a substantial contribution to the earning capacity of the Netherlands and to the agreed national and international climate goals. The strength of both cornerstones is enhanced by our strong links with not only the maritime cluster but also the regional economy and knowledge infrastructure.

Rotterdam is the leading European hub for the global and European cargo flows.

### Port vision for 2030

Rotterdam is Europe's most important port and industrial complex and it is linked to a strong regional maritime cluster with a leading international position. It is a powerful combination of a Global Hub and Europe's Industrial Cluster, a pioneer in efficiency and sustainability, and it draws on the strengths of maritime technology and maritime business services. It is therefore an important cornerstone for the prosperity of the region, the Netherlands and Europe. Rotterdam is closely connected with Northwest European industrial and logistics hubs. Leading companies invest here in the most modern facilities. Close collaboration between businesses, governments and research institutes results in a high-quality labour force and living environment, as well as excellent accessibility.

## 1. Global Hub

### Vision for Global hub

**Rotterdam is the leading seamless European hub for the global economy and intra European cargo flows. The Global Hub in Europe for containers, fuel and energy flows, energy carriers and fuels. Rotterdam and its hinterland make up an integrated network and lead the field in terms of sustainable and efficient chains. The smart use of information is the new standard.**

Rotterdam is an appealing hub for all goods flows. The complex offers fast, cheap and reliable connections to the hinterland and to overseas markets. The port can accommodate the world's largest ships, there is considerable capacity for a range of transshipment and storage activities, and many hinterland destinations are easily accessible by road, inland shipping, rail and pipeline. Moreover, Rotterdam is a highly reliable and safe port, and a hub for clean transport fuels.

### Digital port and chain

The transparency of logistical transport chains make transport via the port of Rotterdam in 2030 seamless, and even more efficient and appealing for customers. In terms of digital links with other ports, the links between the port community and the hinterland and links between individual players in the port itself. Physical and digital infrastructures reinforce each other.

The port of Rotterdam, as a part of global logistics chains, is involved in international data networks in 2030. Producers, shippers and carriers are seamlessly connected to other parties through digital planning tools, platforms and e-marketplaces. Information about shipping routes and changes in schedules is available in good time and it is shared with parties in the hinterland. All in all, this facilitates integrated digital door-to-door logistics on the global scale, connecting producers and consumers of goods around the world. The coordination and exchange of information in the port of Rotterdam is efficient and simple: there is a Port Community System (PCS) based on the most stringent technological and security standards. Sensors collect digital information and make it available to users such as autonomous vehicles and vessels. Companies no longer

## ROTTERDAM IS AND WILL CONTINUE TO BE THE LEADING EUROPEAN HUB FOR THE GLOBAL ECONOMY AND INTRA-EUROPEAN CARGO FLOWS. WITH THE DURABLE, EFFICIENT AND SAFE PROCESSING OF ALL MODALITIES AND EXCELLENT INFRASTRUCTURE IN THE PORT AND IN LINKS TO THE HINTERLAND.

have to organise things like pre-reporting vessels, shipment status, export documentation, or loading/unloading lists. The result is greater efficiency, lower planning costs, better and transparent scheduling, faster throughput and fewer errors. Shippers can respond in real time to changes in the schedule and fewer unexpected delays make it possible to produce 'just-in-time'. Ports can make optimal use of their capacity, achieve shorter, even more reliable, transit times, and optimally coordinate the maintenance of the physical infrastructure.

The digital infrastructure is designed to reduce the vulnerability of complex systems. That enhances the reliability of the systems, improving security in general and cybersecurity in particular. The digital transformation of many port functions, from ship guidance to risk management, has led to new working methods and new relationships with parties in and around the port in 2030. The automation of container handling has been developed further. Clear choices have been made in the difficult balance between transparency and chain optimisation on the

*Rotterdam is a transparent, digital port where coordination and exchanges of information are efficient and simple.*

one hand, and the interests of individual parties and privacy considerations on the other.

### High-grade network and accessibility

In Rotterdam, the handling of all modalities is sustainable, efficient and safe. The infrastructure in the port and the hinterland connections through inland shipping, pipelines, road and rail are excellent. National government, the provincial authority, the port industry and the Port of Rotterdam Authority have improved the quality of the port as a business location, and accessibility in and around the port for the various modalities. The 'Diamond' area that includes Rotterdam and the connections with the hinterland are robust. Rail freight transport is competitive and there is a level playing field in Europe. By introducing other transport concepts, port logistics can cope with the increasingly congested road infrastructure. In collaboration with central government and the region, steps have been taken to keep road haulage possible and to permanently safeguard access to the Rotterdam 'diamond' area. They include plans to manage traffic intersections temporarily affected by maintenance work.

Rotterdam has excellent connections with the European hinterland, and it is linked to inland hubs and neighbouring ports, including Dordrecht and Moerdijk. The high-quality, dense and multimodal network connecting Rotterdam to the hinterland responds to the fact that cargo flows are determined more often by parties in the hinterland, where there has been extensive concentration of activities. Important factors here are the ongoing strengthening of the infrastructure connecting ports (such as the pipeline infrastructure between Rotterdam and Antwerp) and the development of the freight corridors East (Rotterdam-Arnhem/Nijmegen-Germany), South-East (Rotterdam-North Brabant/



*Network structures are more complex but also more efficient in 2030.*

Limburg-Germany) and South (Rotterdam-Antwerp).

The excellent collaboration with regions in the hinterland has allowed Rotterdam to establish a strong position in container chains, and the port and industrial complex is a leading location for warehousing. Maritime container transport almost always has a distribution centre as an intermediate destination, and the connection of distribution centres to the Rotterdam port network has created close bonds with cargo clients. The connection of distribution centres is possible due to the location of those centres in logistical hotspots on the corridor between Rotterdam and the European hinterland.

The Global Hub is a central node in the 'TEN-T core network' of the European Union. Through the TENT-T corridors (Rhine-Alpine, North Sea-Baltic and North Sea-Mediterranean), Rotterdam has strong links with growth regions and economic centres in Europe. Direct rail shuttle connections and rail connections through hubs have made it possible to increase market share in Central and Eastern European growth regions.

For the optimal processing of goods flows, there has been a long-term commitment to changing the modal split (more transport by water, rail and pipeline; less by road). In order to achieve this, a major upgrade has been achieved in the quality of rail and inland shipping. That includes, among other things, more high-frequency, regular shuttles between sea and inland terminals. The critical mass required for this purpose has been achieved by the establishment of the Container Exchange Route on the Maasvlakte, and agreements between terminals and shippers about how containers are transported to the hinterland.

The growth of multimodal transport has made network structures more complex but also more efficient by 2030. Inland hubs, from where cargo goes to smaller intermodal terminals, developed further as the gateway to the port. The 'extended gate' concept, in which goods are cleared by the customs authorities and empty containers are temporarily stored, has developed further by 2030 and it is in use at several locations in the port. The schedules for these inland hubs and the sea terminals are closely coordinated. In the Netherlands, the relevant parties collaborate harmoniously on the establishment of transport corridors that are reliable, robust and safe, that contribute to sustainable economic growth, and that go hand in hand with the best possible quality of life near the corridors<sup>10</sup>. The management of freight flows along these corridors is based on digital services that use reliable

**ROTTERDAM HAS EXCELLENT CONNECTIONS TO THE EUROPEAN HINTERLAND, WITH INLAND HUBS AND NEIGHBOURING PORTS.**

# CONNECTIONS BETWEEN THE PORT, CITY AND REGION





data about matters including capacity and smooth traffic flows by road, water and rail, and throughput times at terminals.

The infrastructure in the port and to the hinterland is climate-resilient. That requires the monitoring of developments and timely decisions about the measures required. Climate change is explicitly included in plans for the construction, maintenance and renovation of water-based and land-based infrastructure. 'Resilient' means that the networks can cope better with low water levels and damage to pipelines resulting from drought, flooding caused by cloud bursts, and damage to asphalt and bridges caused by high temperatures. Climate resilience also takes into account sea level rise and more fluctuations in river water levels. The latter factor in particular has implications for the port. In addition to periods of high water, periods with lower water levels on the rivers will be more common in the future. Indeed, 'low water' will be the first noticeable effect of climate change. Salt seawater then penetrates further inland, causing the salinisation of the soil, subsurface and surface water. Low water levels also mean that inland shipping can carry less cargo and they affect the traffic capacity of rivers. This is a serious concern, particularly for inland shipping.

The port of Rotterdam and the Greenports have combined forces and make each other stronger. The benefits have been achieved through efficient logistics and good access that respond to the requirements of fresh products. The port will cater to the growing demand for fresh logistics. In that way, the port of Rotterdam is playing an increasingly prominent role as a 'fresh hub' in the region and a broader logistics hub. Fresh products can be re-exported after being imported into the port and processed in the Greenport cluster.

*The port of Rotterdam is playing an increasingly prominent role as a 'fresh produce hub' in the region.*

Due to the high demand for the development of logistical real estate, additional space has been created in the Waal-Eemhaven area, the Botlek, Europoort and the Maasvlakte for the establishment of distribution centres. This location is appealing because of its relatively high added value and employment prospects (approximately €1 million and approximately 25-30 FTEs per hectare). Fresh logistics and agrologistics make the most of these benefits. In addition, access to the Maasvlakte and Europoort, with adequate alternatives for car traffic, has improved for the employees. This makes the companies located here more appealing as places to work.

## CLIMATE CHANGE IS EXPLICITLY INCLUDED IN PLANS FOR THE CONSTRUCTION, MAINTENANCE AND RENOVATION OF WATER-BASED AND LAND-BASED INFRASTRUCTURE.

<sup>10</sup> This joint approach addresses the bottlenecks identified in the National Market and Capacity Analysis (NMCA) in the road, water and rail networks in a combined approach consisting of more capacity, better utilisation of the roads and mobility management.

### Sustainable logistics chains

By 2030, the Global Hub will be part of the most sustainable logistics chain in the world with the lowest carbon footprint per tonne-kilometre. Major sustainability gains<sup>11</sup> have been achieved in logistic chains passing through Rotterdam by comparison with 2018. The roll-out of alternative fuels and electrification, as well as improvements in the transport efficiency of all modalities, have been decisive in this respect.

Due to early collaboration with external partners (shippers, shipping companies, suppliers of biofuels), the first Green Trade Lanes in Europe have been established via Rotterdam. These are green corridors for sustainable inland shipping based on alternative fuels such as biofuels or sustainably produced hydrogen or methanol. The use of biomass in biofuels is in line with the requirements of the European Renewable Energy Directive, with a focus on the sustainable origin of the material and the most high-grade level of use. This gives Rotterdam a competitive edge. In 2030, the port and industrial complex is the hub for the most climate-friendly transport fuels in the world (production, storage, transshipment, bunkering). Finally, shore-based power facilities are now present at a number of locations in 2030. The use of shore-based power supplies has also reduced carbon emissions, as well as emissions of other air pollutants and noise from berthed vessels. This has been made possible by the commitment of a large range of partners.

In terms of the transport efficiency of shipping, several initiatives have contributed to the reduction of carbon emissions. Those initiatives focus primarily on maximising the coordination of ship handling by sharing information and allowing customers to plan the most efficient route themselves. In addition, the widely used route planner Navigate

# ROTTERDAM IS THE HUB FOR THE MOST CLIMATE-FRIENDLY TRANSPORT FUELS AND IT IS CONNECTED TO EUROPE'S FIRST GREEN CORRIDORS.

provides a picture of carbon emissions and the Port of Rotterdam Authority rewards sustainable shipping. That has improved Rotterdam's competitive position.

The roads are used intensively in 2030. Road haulage has become more sustainable with the introduction of, among other things, truck platooning and new drive systems. This has been made possible by innovation-oriented players and the high density of hinterland movements by truck from the port. Truck platoons leave Rotterdam on their way to the hinterland every day, and also at night.

The way to making transport sustainable is still uncertain and so several approaches are being taken at the same time. In maritime shipping, technical and operational measures can reduce carbon emissions in the short term. Efficiency measures can reduce fuel consumption by 20 to 50%. In the medium term, electric motors, hydrogen and synthetic fuels such as methanol will increasingly

come into the picture. LNG and biofuels are important as transition fuels between 2020 and 2050 (see Figure 3). The same efficiency measures and the switch to alternative fuels as those seen in maritime transport apply to hinterland transport. However, the switch from road haulage to transport by inland shipping, rail and pipelines can make an extra contribution here (see Figure 3).

<sup>11</sup> This includes air quality (NOx and particulate matter), noise and climate neutrality (CO<sub>2</sub>).

**IN THE MEDIUM TERM,  
ELECTRIC MOTORS, HYDROGEN  
AND SYNTHETIC FUELS SUCH  
AS METHANOL WILL BECOME  
INCREASINGLY DOMINANT.**

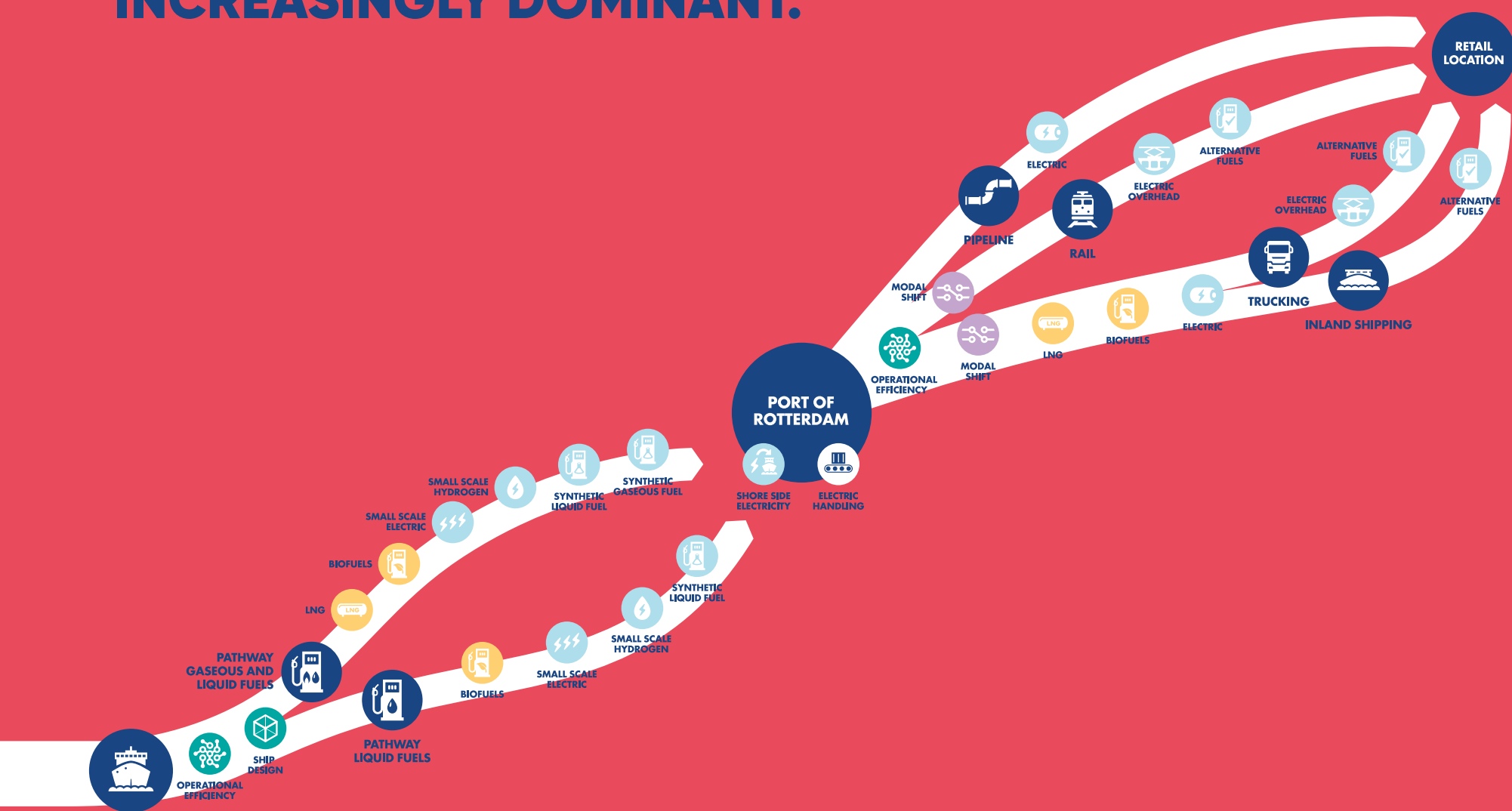


Figure 3  
Pathways to make transport to and from  
the port more sustainable

## 2. Industrial cluster

### Vision for Industrial Cluster

The Rotterdam port and industrial complex is leading in Europe. There is a high level of activity and the port is an important hub in the Northwest European market. Substantial investments have been made by existing and new companies, resulting in dramatic changes to the complex. New and transformed industries are flourishing in a growing, and increasingly efficient, energy and raw materials system that covers the entire cluster. Rotterdam has become a waste-to-value hub and it is a circular hotspot.

### Industry in the cluster as a partner

The experience and financial strength of the industry in the cluster are essential for the transition. There is a commitment to a twin strategy: not only the facilitation of existing fossil activities by improving sustainability performance in line with national and international objectives but also the encouragement of new sustainable activities. This is possible by investing in new technologies that reduce end-user carbon emissions in areas including energy efficiency, electrification, the transport and underground storage of industrial carbon emissions, and the use of hydrogen. The innovative strength of the industry in place is also a factor that determines the development of new activities.

### Space for development

The modernisation of existing activities is linked to the arrival of new industries that contribute to the energy transition. By clustering new and existing companies, the scarce physical space, facilities, residual

flows and environmental space are used as intensively and efficiently as possible. The environmental characteristics of the new activities have become clear only over time, and the same therefore also applies to how much space is needed for them. Examples are noise production and emissions of air pollutants. Nevertheless, the more intensive use of physical<sup>12</sup> space in the port complies with the statutory environmental standards<sup>13</sup>. In view of the uncertainties and dynamics, caution and tailor-made approaches are needed to strike the right balance. The environmental planning for the port works with different types of location functions but also with new instruments for sharing the environmental space. As a result, a balance has been achieved between the development needs of the port and the prevention of the unnecessary encroachment on environmental space. However, no decline is apparent in the demand for physical and environmental space in the port.

<sup>12</sup> The available physical space has proved necessary for, among other things, the generation, production and processing of sustainably produced electricity, hydrogen, biomass and waste, and transport. New pipelines and cables for the far-reaching electrification of the area and the re-use of heat, steam and CO<sub>2</sub>, as well as for the transport of hydrogen. In addition, the Brexit also took up more physical space, among other things for customs purposes. Due to the intensive cooperation between the national government, the City of Rotterdam, the Port of Rotterdam Authority and Deltalinqs, the Brexit will not have any major consequences for the Netherlands or, more specifically, the port and industrial area.

<sup>13</sup> Through investments in the Rotterdam port area, including cleaner engines and fuels, we will reduce substance emissions so that the port of Rotterdam continues to comply with the standards. This means there is only a low risk of standards being exceeded as a result of a possibly more stringent standard for particulate matter.

### New energy and raw materials system

The combination of sustainably produced electricity, hydrogen, biomass and residual flows is at the basis of the new energy and raw materials system in Rotterdam and far beyond. In a necessary intermediate phase, hydrogen is produced from natural gas and residual gases, with released CO<sub>2</sub> being stored in empty gas fields under the North Sea. This will be followed by the large-scale production of hydrogen on the basis of water electrolysis using sustainably produced electricity, mainly from wind farms in the North Sea. To achieve this, the options for offshore energy landfall facilities in the Rotterdam port area and the associated spatial implications have been taken into account. There is a distinct possibility that there will not be enough sustainably-produced energy available within the Netherlands to meet demand for electricity or green hydrogen production in the port and industrial complex. Certainly if hydrogen is to be used as a fuel or in other applications in addition to being used as a raw material for the chemical industry. The port has therefore been transformed into a hydrogen hub and it has the facilities required to import sustainably-produced hydrogen from countries where sustainable energy is abundantly available. By 2030, companies will be connected through an infrastructure that forms the basis for a circular system for electricity, hydrogen, residual gases, steam,

high and low temperature heat, CO<sub>2</sub> and other residual flows. The extensive infrastructure of the port and industrial complex means that energy and residual flows can be fully utilised. The construction of this infrastructure began in good time (see steps 1 and 2 in Figure 4). In the early stages of the transition, the infrastructure supports the exchange of fossil energy flows. As 2050 approaches, renewable flows are becoming increasingly dominant. The new energy system delivers enough energy to heat homes, greenhouses in horticulture, offices and other businesses. The Rotterdam port and industry cluster and the adjoining horticultural cluster of Greenport West-Holland strengthen each other in the transformation to a new energy and raw materials system. Coal-fired power plants have been overhauled or shut down. The sharing of land, utilities and assets is

widespread. For unexpected situations, we retain flexible facilities at crucial locations that can run on hydrogen and, in emergencies, on natural gas.

There are enough physical and environmental space to experiment in order to discover and scale up, in good time, innovative ways of using raw materials. The synergy between, for example, Brainport in Eindhoven and Mainport Rotterdam helped to bring innovations to the market more quickly.

**SUSTAINABLY PRODUCED  
ELECTRICITY, HYDROGEN,  
BIOMASS AND RESIDUAL FLOWS  
CONSTITUTE THE BASIS FOR  
THE NEW ENERGY AND RAW  
MATERIALS SYSTEM IN  
ROTTERDAM AND FAR BEYOND.**



**Carbon-neutral chemical industry and refining**

In 2050, the chemical sector is flourishing, with feedstock including hydrogen, waste and biomass. The sector has a leading position in the delivery of products to growing markets for renewable fuels and raw materials. The declining demand for fuels has led to the far-reaching integration of chemical industry and refining in Europe. The refining sector is now smaller but it has grown in its role as a producer of chemical raw materials and fuels for export. Furthermore, in 2050, the port and industrial complex will be a location for the large-scale conversion of synthetic raw materials and fuels based on renewable energy. This is an important development for aviation and shipping. Even if there is a reduction in carbon emissions of 95% (the national climate objective for 2050), there will still be activities that do not fit in with the circular system. The port and industrial complex therefore has limited space for greenhouse gases. In time, the balance will be carbon neutral.

**Circular valorisation**

The port and industrial complex of Rotterdam is circular as 2050 approaches and it has developed into a waste-to-value hub. Residual products are the new raw materials. Industrial activities are connected to a circular system without wasting energy and raw materials (see 'new energy and raw materials system' above). With the production of secondary raw materials and materials in the waste-to-value hub, Rotterdam is making an important contribution to the raw materials transition and a smaller carbon footprint.

The raw materials transition has transformed the logistical flows: trade in, and the storage and transshipment of, sustainable 'agribulk' products (such as cereals, wood chips and bio-ethanol) and residual products have

*In 2050, the chemical sector is flourishing, with flows like hydrogen, waste and biomass as raw materials.*

increased sharply. The circular economy has therefore also become a game changer for logistical real estate such as distribution centres and warehouses. In addition to new partnerships, the demand for space has also been taken into account in the organisation of return flows in a circular chain.

The optimal access to the port of Rotterdam by water, road, rail and various pipelines has allowed it to establish a strategic position in the circular economy. This makes it possible to collect, recycle and group materials from the hinterland, and redistribute them to the hinterland or the rest of the world. Advanced sorting, large-scale chemical and mechanical recycling, and remanufacturing take place

**THE PORT AND INDUSTRIAL COMPLEX OF ROTTERDAM IS CIRCULAR AS 2050 APPROACHES AND IT HAS DEVELOPED INTO A WASTE-TO-VALUE HUB. RESIDUAL PRODUCTS ARE THE NEW RAW MATERIALS.**

in the waste-to-value hub that has been established here. There are enough opportunities to experiment in order to discover and scale up, in good time, innovative ways of using raw materials. The synergy between, for example, Brainport in Eindhoven and Mainport Rotterdam helped to bring innovations to the market more quickly. The relevant services for these activities have also been located in Rotterdam.

Food production is increasingly linked to the port in 2030. The trend towards a green, circular economy has also led to investments in sectors such as intensive, non-land-based agriculture and artificial protein production in the port, and in industrial processes in the port. Residues from food production serve as feedstock for the biobased economy and fuel production.

Sound collaboration between national government, the Port of Rotterdam Authority, the business community, the City of Rotterdam and the Provincial Authority of South Holland, for example in the areas of permits, accessibility/transport network, spatial planning and environmental space, has allowed the circular economy to develop further.

There is consensus about the objective of the energy transition: the implementation of the Paris Agreement. As we work, we continually clarify how we go about this and, on the basis of that understanding, we take concrete steps. In the Netherlands, this has taken the shape of processes based on the national Climate Agreement, and the regional Industry Platform has developed a shared vision for the establishment of a sustainable industrial area, Rotterdam-Moerdijk. Looking ahead to 2050, the desired carbon emissions reduction will also be achieved through the application of new, circular technology (see Figure 4).

### New industry

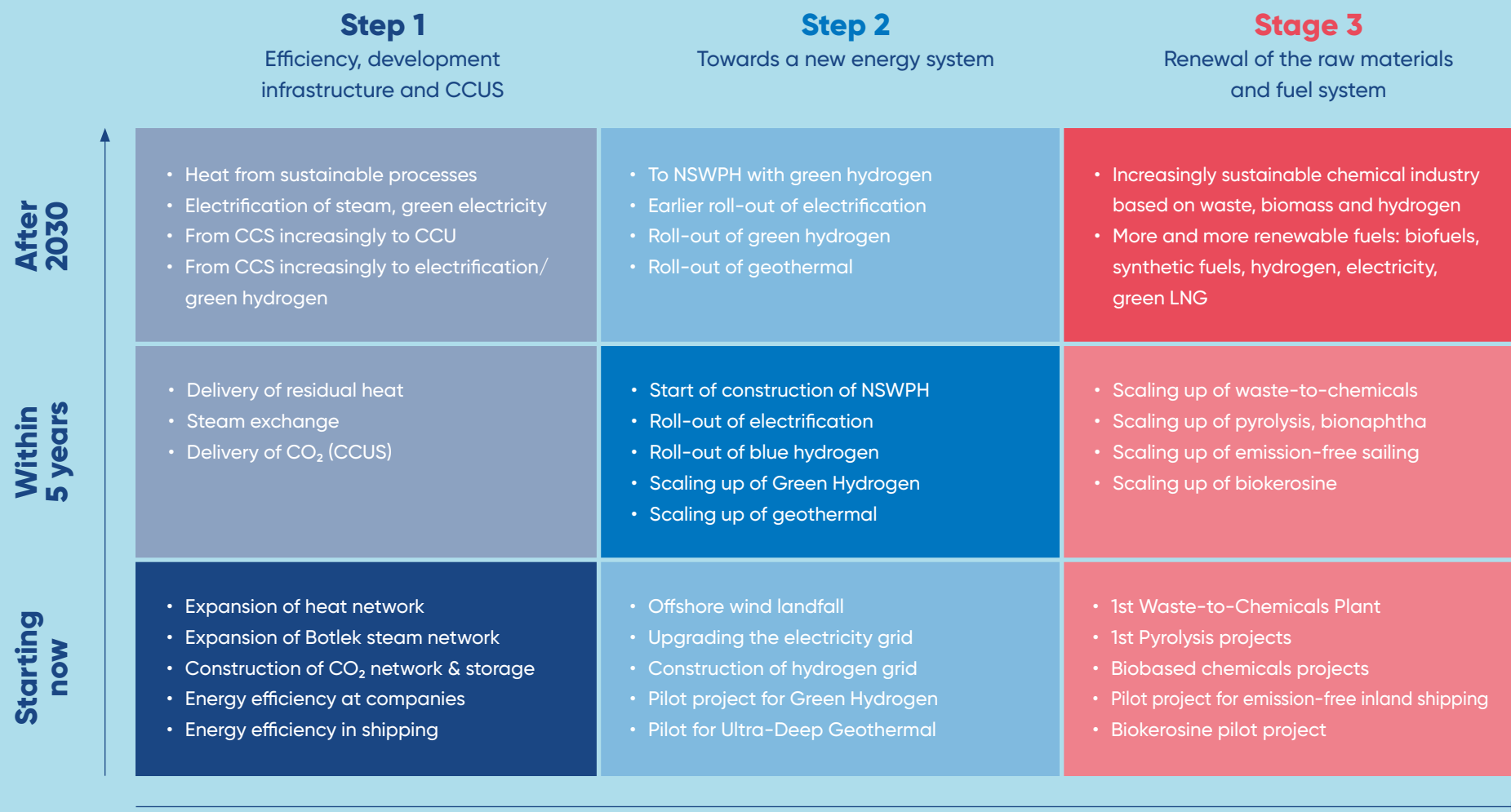
In 2030, Rotterdam hosts numerous new industries. These new markets impose increasing, and still partly unknown, demands on the port and industrial complex. In addition to the energy transition and the increasing circularity of the value chain (see Figure 4), technological developments relating to the sustainability of the chemical industry chemistry and digital technologies have led to investments in new industry and cargo flows in Rotterdam. By diversifying its activities, the port and industrial complex has become a versatile and productive area with a partially urban character, as in the Merwe-Vierhaven area.

In 2030, the port and industrial complex is home to activities such as the production and assembly of components for offshore wind, the sustainable dismantling of oil and gas platforms, biobased chemistry, the agro-industry, 3D printing and the manufacturing industry, but also new industries that cannot yet be foreseen. The presence of technical expertise and maintenance capacity for equipment for the offshore industry means that the ports in the region, such as Schiedam and the Drecht towns, also contribute to knowledge, innovation and materials for this sector. The new activities are of a sustainable nature and/or contribute to making existing activities more sustainable. They have resulted in part from public-private partnerships between investors and the Port of Rotterdam Authority and/or local and regional authorities.

*By diversifying its activities, the port and industrial complex has become a versatile and productive area with a partially urban character.*

*Advanced sorting, large-scale chemical and mechanical recycling and re-manufacturing take place in the resulting waste-to-value hub.*

Figure 4  
**Rotterdam industrial area –  
 Moerdijk on the road to carbon neutrality**



**START NOW ON THE THREE  
 STEPS LEADING TOWARDS  
 A CARBON-NEUTRAL INDUSTRIAL  
 AREA IN ROTTERDAM – MOERDIJK.**

# ALL ACTORS RELEVANT FOR STRONG INNOVATIVE CAPACITY ARE CONNECTED TO THE ROTTERDAM INNOVATION ECOSYSTEM.

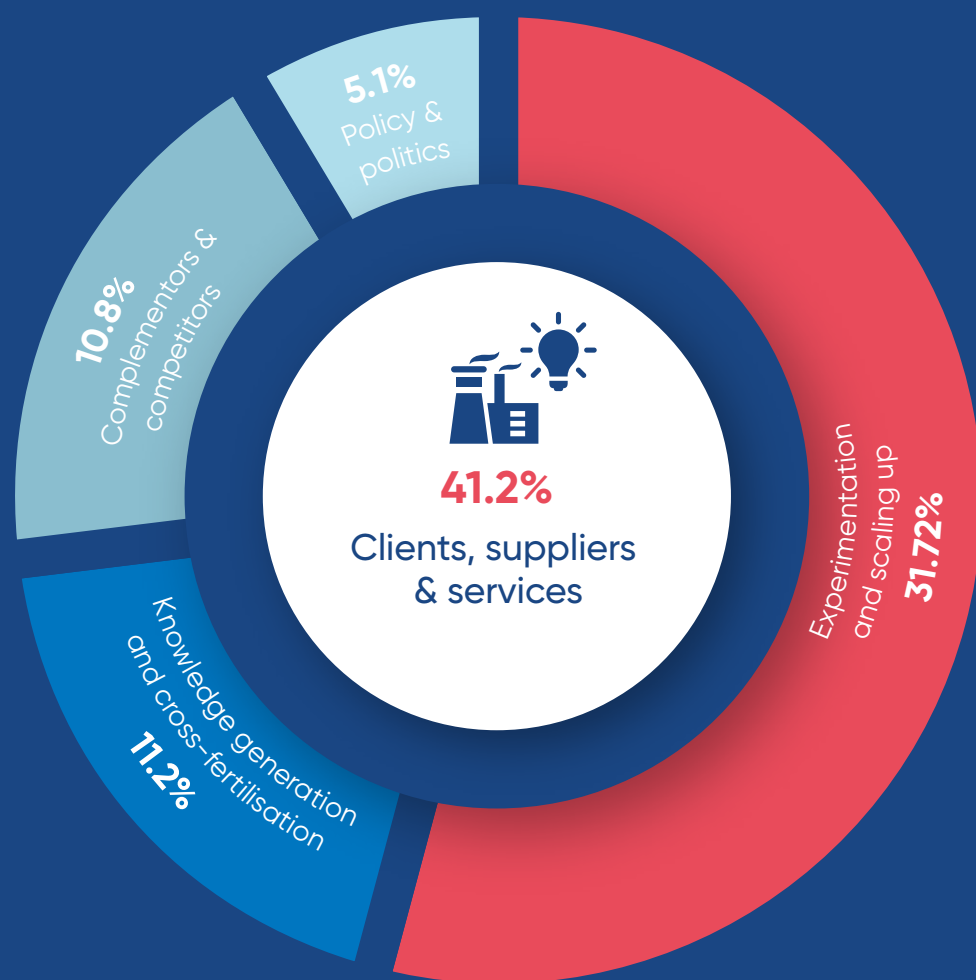


Figure 5  
Innovation ecosystem  
(2018 Port Innovation Barometer)

### Flexibility of labour and education

In 2030, there are more and more specialist jobs and, at the same time, people are changing jobs more quickly. In order to respond, the business community, government and educational institutions have focused on making the labour market and education more flexible (see also 'social transition'). Close regional cooperation between businesses and educational and research institutions allows them to respond quickly to changing demand. The combination of specific and generalist skills makes employees more agile. For many companies, this is an additional reason to stay here or to move to the region.

## 3. Connections between the port, city and region

### Vision of connections between the port, city and region

The port, city and region is globally competitive as a business location and it meets the expectations of the leaders of the international business community. Rotterdam and the region are the world's leading centre of knowledge and trade that is tailored to the Global Hub and Europe's Industrial Cluster. Typical for Rotterdam and the region are the high quality and wide variety of residential environments, which are appealing for international talent.

### World-class innovation ecosystem

Rotterdam has a world-class innovation ecosystem. The port of Rotterdam is a leading international player in the field of assimilating, sharing and securing knowledge. The innovative strength in Rotterdam includes both technological and non-technological factors that determine product and process innovation, radical innovation and innovative corporate entrepreneurship.

All players who are relevant for strong innovative capacity are connected to the Rotterdam innovation ecosystem. In the direct value chain of companies located in the port and industrial complex, that innovation ecosystem includes customers, suppliers and service providers, not only for companies located in the port

*Innovative initiatives can scale up faster by using the knowledge and infrastructure in place.*

but also for complementors. Startup hubs, business incubators and accelerators, innovation platforms and research institutes are linked for the purposes of experimentation and scaling up innovation. Politicians deliver the policies that make innovation possible. Partly because of the quality of the innovation ecosystem, Rotterdam is at the forefront of transitions such as the energy and digital transitions. The development and application of innovations contribute to sustainable and efficient production chains, and the safety and accessibility of the port and industrial complex.

The port business community, the Port of Rotterdam Authority, hotspots such as the Makers District, local, provincial and national government authorities and research institutes work closely together to achieve continuous improvements in innovation performance. This contributes to the creation of more and more high-grade employment. Those efforts have, in concrete terms, led to innovative companies moving to Rotterdam, investments in innovation being made in Rotterdam and R&D expenditure in Rotterdam increasing.

As for business incubators and accelerators, Rotterdam's innovation ecosystem can build on internationally leading initiatives such as PortXL and SmartPort. In physical terms, there are excellent test facilities and incubators that generate major innovation dynamics. These are innovative initiatives ranging from chemical pilot projects and recycling in the Botlek area to start-ups near the urban area that can scale up faster by using existing knowledge and infrastructure.

The once obsolete RDM and Merwe-Vierhavens (M4H) port areas have also been transformed into a flourishing Makers District: modern, innovative clusters where, in addition to housing, there is room for port-related activities, research institutes and start-ups.

# HUMAN CAPITAL





In this vibrant area with a wide range of facilities, culture and events, young companies are developing into major established companies and new technologies are being devised, tested and applied. The Waal- and Eemhaven is a port area for incoming and outgoing short-sea containers and other continental cargo activities such as fresh logistics and breakbulk. And it is an important home base for maritime service providers and port suppliers. These activities are also a good buffer zone in Waalhaven-East between the residential area and more intensive port activities.

### Port-related business services and maritime technology

The port and the city make each other stronger and they breed new manufacturing industry and services. The broadening and modernisation of Rotterdam's economy

*The port and the city make each other stronger and they breed new manufacturing industry and services.*

is also expected to be located in the urban area because of the commitment to maritime business services and new manufacturing industry. In that way, the presence of head offices, maritime services and shipping companies can help to boost the flow of goods, and offshore and new technology companies can contribute to Rotterdam's position. The continuing expansion of companies operating cruises and hotel ships in Europe and Rotterdam is another example of the connections between the port, city and region, in which the segment acts as a lynchpin. This broadening of the economic base also makes the Rotterdam economy more resilient. The synergy effects described here require a high-quality urban business location.

Rotterdam's maritime cluster is one of the most complete in the world. The region from the Maasvlakte to Gorinchem houses a unique variety of maritime companies. The region derives its character from the presence of leading maritime business service providers such as insurers, legal/financial firms, consultancy and IT, commodity traders and maritime technology companies with excellent shipbuilders and hydraulic engineers, offshore companies, shipping, inland shipping, maritime suppliers, and cruise and technology companies that focus on maritime sectors. The maritime cluster places a particular emphasis on 'new commodities' that can contribute to the energy transition (trade in biomass, LNG), vegetable oils and food. In the service sector, this will involve the growth of maritime insurers, and arbitration and research institutes. Maritime technology companies focus on, among other things, attracting start-ups working on maritime technologies (such as autonomous and emission-free sailing, smart shipbuilding, smart ship maintenance and offshore wind). Collaboration with a number of incubators

**THE MARITIME CLUSTER OF ROTTERDAM IS ONE OF THE MOST COMPLETE IN THE WORLD. THE REGION FROM THE MAASVLAKTE TO GORINCHEM HAS A UNIQUE RANGE OF MARITIME COMPANIES.**



and accelerators (including Port XL, ECE, RDM Campus, CIC and Yes! Delft) has been essential here.

### Labour market and competences

The port is a more appealing place to work in 2030. So companies can recruit well-qualified and affordable staff at all levels. To safeguard this position, the port business community is in constant dialogue with the education sector to ensure there is a good match between vocational education and the needs of the labour market.

Technical and economic developments have created new economic chains, new jobs and new types of port professions with different desired competencies. The analysis of big data and data flows is important for many sectors. This trend means that employees must be more highly educated. A lot of standardised work is increasingly digital and automated. At the same time, there is more demand for non-standardised work, for example in maintenance, and system development, management and control. This work primarily requires large numbers of technical people. Not specialised engineers but technicians who can work in a wide range of areas. With well-trained and agile personnel, the port business community is responding optimally to the opportunities afforded by the economic transition.

In 2030, employees have a highly developed adaptive capacity and they can keep up with the technological developments, which will continue in rapid succession. The concept of 'professionalism' has been transformed. It is no longer about employability alone but also about multidisciplinary work. In multicultural teams with different levels of training. This requires other attitudes and 'soft skills' such as working with customers and colleagues in organisations, planning and teamwork.

## WORK IN THE PORT IS APPEALING. WITH SUITABLY TRAINED AND AGILE PERSONNEL, THE PORT RESPONDS OPTIMALLY TO OPPORTUNITIES.

Innovative companies, government authorities and educational institutions are making major investments in a modern and balanced labour market.

At the same time, the port and city are continuing to look out for vulnerable groups in the labour market. And the labour market provides ample opportunities for young talent. All that requires arrangements for good, vocational education at different levels. A joint Human Capital Agenda shapes this social transition, which is supported by the government, research institutes and the business community. The agenda covers modern human resources management, sustainable employability, new skills, intersectoral collaboration, agility and talent development.

### Residential environment

Rotterdam will build at least 50,000 houses by 2040. In this way, the city is responding to its increasing appeal and the growth of its population. In addition, by making more housing available, the city is contributing to the professional mobility of talent and encouraging economic development. Approximately 250,000 more homes will be built in the southern part of the Randstad urban agglomeration during the same period. The region has

opted to concentrate urbanisation around the infrastructure in place (including public transport) along the Dordrecht-Rotterdam-Delft-Leiden axis but also, in part, around the Rotterdam-Hook of Holland metro line. Efforts are also being made to replace and boost the housing stock in the region, and to integrate housing demand with the strengthening of the economic top locations and investing in high-quality public transport and cycling facilities. Residential and working environments, including the port and industrial complex, are easily accessible.

Early consultation with relevant authorities, project developers and local residents has resulted in a healthy balance between space for a growing city on the one hand and the development of the port and industrial complex on the other. The physical and environmental space needed to shape the transition and deal flexibly with the environmental impact of new activities have been taken into account. This has involved drawing up additional requirements for the development of new housing, not least in view of developments in society as a whole with regard to the perception and acceptance of inconvenience. A new regional framework constitutes the basis adopted by all stakeholders for the coordination of the response to housing needs.

*The quality of the living environment in the Rotterdam region is high.*

**A SOUND EQUILIBRIUM  
HAS BEEN STRUCK  
WITH RESPECT TO  
HOUSING BETWEEN  
SPACE FOR A GROWING  
CITY AND THE  
DEVELOPMENT OF THE  
PORT AND INDUSTRIAL  
COMPLEX.**

#### Health and safety

Safety contours around the port and industrial complex and the risk contours around the necessary hinterland connections (road, water and rail) in the context of the Basisnet have provided clarity for the business community and the locality about the physical boundaries for risks involved in business operations and the transport of hazardous substances, and where vulnerable property may be built.

Given the special needs of the area, a joint commitment to specialised fire-fighting and emergency services is essential. This is the responsibility of the Joint Fire Brigade, a collaboration between the business community and government agencies, which does that work in this area and which has therefore

taken over the obligation to maintain a company fire brigade from the associated companies.

The quality of the living environment in the Rotterdam region is high. However, the densification of the urban area and the expansion of the labour market mean that continued investment in measures and facilities is needed to maintain accessibility in the region. Local air quality complies with the statutory environmental standards, for example as a result of investments in cleaner engines and fuels. The number of complaints associated with industrial activities has also fallen. That is because companies have assumed their responsibilities and because of supervision and strict enforcement by the Rijnmond Environmental Service (DCMR) at companies that are associated with a lot of inconvenience for the local area. The we-nose network established by the Port of Rotterdam Authority, Deltalinqs/business community, Provincial Authority of South Holland, the City of Rotterdam and DCMR supports this effort.

### Landscape

The present cultural and green facilities contribute to the international appeal of the area and therefore to the appeal of the business location. The green structure in the port and industrial complex, which consists of wide pipeline strips, verges, the Vogelvallei, the Geuzenbos and the ecological development of the Krabbenterrein and Papegaaienbekeiland, links up well with areas outside the port. Those areas constitute an important connection with the nature and leisure areas in the rest of the province. In concrete terms, they are, among others, the Brielse Meer lake zone, the dunes of Voorne and the Solleveld & Kapittel dunes. As part of the Rotterdam Mainport Development project, the Provincial Authority of South Holland has completed the remaining 600-hectare nature and leisure area in 2030 in

areas including the Buitenland van Rhoon near the Rotterdam urban area. Ongoing efforts to upgrade the ecological and leisure qualities of the region, as in the areas of Midden Delfland, IJsselmonde and Voorne-Putten, improve the appeal of the business location. And they provide a further boost for the region as a place to live.

The location of the port and industrial complex outside the dikes means it can suffer economic damage as a result of sea level rise. In combination with the Maeslant barrier, the area is well protected against high water. In order to manage the flood risk, adaptation strategies have been developed for each sub-area, including possible detailed measures. In addition, as part of the Delta Programme, there has been an investigation of the possible impact of increasingly frequent cloudbursts

**CULTURAL AND GREEN FACILITIES  
CONTRIBUTE TO THE INTERNATIONAL  
APPEAL OF THE AREA AND THEREFORE  
TO THE APPEAL OF THE BUSINESS  
LOCATION.**

causing damage as a result of rainfall, hail and gusts of wind ('supercells'), and the possible adaptation strategies in response.

Due to its location in the Rhine–Meuse estuary, the port, with its harbour basins, waterways and hard banks, has an impact on the natural ecosystem. In addition, the European Water Framework Directive requires water management authorities (Rijkswaterstaat and the Dutch water authorities) and users to maintain good water quality. That is why we have focused on good ecological water quality in a way that fits in with the economic function<sup>14</sup>. Various projects have been completed in the Rijnmond area to restore tides where possible in order to enhance ecological quality, leisure and the tidal experience. In 2030, the Brielse Meer lake still plays an important role in the freshwater supplies for industry in the port. The construction of the Spijkensluis intake sluice, in combination with an improved measuring and monitoring system, will safeguard the supplies of supply of fresh water from the Brielse Meer

*Climate change is emphatically included in plans for the construction, maintenance and renovation of water- and land-based infrastructure.*

**THE PRICE-QUALITY RATIO OF THE ROTTERDAM PORT PRODUCT IS COMPETITIVE AND OFFERS VALUE FOR MONEY. ROTTERDAM STANDS OUT IN TERMS OF EFFICIENCY AND SUSTAINABILITY.**

until 2050. This is of increasing importance in a context of climate change and possibly long periods of drought.

### **Delivering an appealing price-quality ratio**

The price-quality ratio of the Rotterdam port product is still competitive in 2030. Rotterdam stands out in terms of efficiency and sustainability. Clients are willing to pay for this but 'value for money' is crucial. This applies to both the total chain expenses and direct expenses for investors in, and users of, the port complex. We achieve 'value for money' by mitigating rises in the costs of the port and the service providers, such as tugboats, pilots and boatmen. Factors such as short turnaround times, good hinterland connections, the availability of sustainable facilities (such as electricity, steam and CO<sub>2</sub>) and well-trained employees contribute to internationally competitive operating costs. Security of supply, price and the environmental impact are also essential factors.

<sup>14</sup> One possible condition is that measures should not affect nautical safety negatively.

# **FURTHER** **CONCRETISATION**

of priorities for  
collaborative  
agenda



In the decades to come, the current economic, social and spatial structure of the port and industrial complex will change fundamentally. A successful transition for the Rotterdam port and industrial complex requires creativity and commitment from all relevant parties, and also flexibility and adaptability in view of the considerable uncertainties.

Collaboration and acceleration are essential for the realisation of this vision. The port will have to respond innovatively and proactively to the collective challenges. The vision described above can therefore be realised only through effective collaboration. With all the partners having their own individual responsibilities.

There is also an increasing discrepancy between how quickly the world is changing on the one hand and, on the other hand, the pace of adaptation in alliances and decision-making in response. Consequently, the port and industrial complex is losing valuable time and it cannot optimally fulfil its role as the motor of the Dutch economy. Although the transitions will only be seen in the medium term, it is important to begin in the short term. The pace of planning, decision-making and realisation will have to be faster. From all parties.

## Economic transition

The following thirteen priorities have been set for the realisation of the vision of Rotterdam as a Global Hub and Europe's Industrial Cluster.

### Global Hub

#### Commitment to the digital port and chain

The digital transition is complex and it will be associated with far-reaching changes that will include streamlining and redesigning working procedures and new alliances. The emphasis is increasingly on optimal collaboration and data exchange in the logistics chain. This requires a high degree of digital maturity from all those involved. For example, global standards will have to be developed in order to follow the logistical process, from production to the end product that reaches the consumer. The first step will include functional definitions of nautical information focusing on human communications in the maritime industry. Ultimately, agreements about data definitions are crucial to facilitate communication between systems.

The correctness and integrity of information, and reliance on the processes, act as a lubricant here, allowing the chains to operate smoothly. At the national level, this will require initiatives directed and enabled by the national government. The Road Traffic Control Tower is an example of how data access can help to improve chains. Sharing data (both inside and between companies) and the increasing use of data for analysis and decision-making are therefore gaining momentum. The Port of Rotterdam Authority is committed to the ongoing development of technology and more transparency to further data exchange.

Investments are needed in an extensive, fast and reliable digital infrastructure that will provide access to the large amounts of data in the port and facilitate the exchange of information for all parties involved. An infrastructure of this kind will have to expand in line with digital developments and it will require interconnected data systems, investments in fibre-optic networks and the 5G standard.

**Upgrading the high-quality network and accessibility**

Without further investments and joint efforts, congestion will persist; the national government, the Provincial Authority of South Holland, the City of Rotterdam and the Port of Rotterdam Authority will continue to focus on accessibility projects that accessibility physical bottlenecks, maintain and where possible improve accessibility in and around the port in the various modalities, make the network less vulnerable and create a level playing field within Europe. Those efforts will contribute both to the quality of the port as a business location and to Rotterdam's competitive position. The smooth functioning of the 'diamond' of Rotterdam and the regional traffic system is vitally important, not only because almost half of all containers are transported from seagoing vessels to locations in the region but also because the appeal of the area as a place to work needs to be maintained.

The increasing number of traffic movements is putting more pressure on the road infrastructure<sup>15</sup>. This is attributable to the growing appeal of the city and the rise in the average age of the populace in the municipalities bordering the port area, as a result of which people working in the port commute longer distances. In combination with changes in mobility in the future, this will result in congestion on roads, waterways, railways, cables and pipelines, and in public transport.

Integrated traffic and transport policies for the optimal use of existing capacity, the implementation of the Freight Corridors Programme and good coordination between the construction of new infrastructure and the maintenance of existing infrastructure should safeguard the multimodal accessibility of the port and ensure there is a balance between economic development and housing needs. For example, the ambitions

*The optimal use of existing capacity, the implementation of the Freight Corridors Programme and the sound coordination of the construction of new, and maintenance work on existing, infrastructure should safeguard good multimodal access to the port.*

for the transport of hazardous goods by rail to the hinterland mean that adequate space will be required (including environmental space) and this conflicts with the new housing developments near this rail route. Important projects include the construction of the Meuse Delta Tunnel<sup>16</sup>, the completion of the Theemsweg Route, the deepening of the Nieuwe Waterweg, the replacement of the Suurhoff Bridge, a new multimodal riverbank connection for the Rotterdam region and the upgrading of metropolitan public transport. In addition, in order to maintain the current quality of roads and waterways, large-scale maintenance will be conducted on riverbank connections in the Rotterdam region during the next ten to fifteen years. For example on the Van Brienenoord Bridge and the Heinenoord Tunnel.

Despite these efforts, the Rotterdamse 'diamond' continues to be vulnerable as a road traffic system. Changes will be needed in regional and hinterland transport to cope with the increasingly busy rush hour, which will continue almost through the entire working day. This requires logistical adjustments such as modal splitting, truck platooning, more road haulage at night and the more intensive use of inland terminals outside the Rotterdamse 'diamond'.

Another factor is that climate change means that transport by water and pipelines needs to be future-resilient. Increasing the capacity of land- and water-based infrastructure

*Climate change makes it necessary to ensure that all transport modalities are made future-resilient.*

<sup>15</sup> National Market and Capacity Analysis (NMCA)

<sup>16</sup> Also known as the 'Blankenburg Tunnel'

to cope with sea level rise, low river levels, damage to pipelines due to drought, flooding as a result of cloudbursts, and damage to asphalt and bridges due to heat is essential to maintain robust and reliable access.

The plans for producing electricity in the North Sea represent a challenge to access from the sea. This far-reaching development requires, particularly in terms of spatial planning, good coordination with all other functions, including the international shipping routes and connections to Rotterdam's port and industrial complex. The routing of shipping is vital for safe navigation at sea and for smooth and safe access to the port. Correspondingly, the 2030 North Sea Strategy takes the incorporation of the other functions of the North Sea into account. For example with the North Sea Wind Power Hub, a wind energy island at sea that will eventually connect wind farms with a capacity of 70-100 GW to each other and to the shore.

### **Making logistics chains more sustainable**

The use of alternative fuels, cleaner engines and electrification, as well as the improvement of the transport efficiency of all modalities, and the furthering of water and rail transport, are decisive factors in terms of making logistics more sustainable.

The use of alternative fuels involves both 'bridge fuels' and a 'fuel switch'. Bridge fuels, such as LNG and biofuels, are already available and they are contributing to decarbonisation. However, they do not have the potential needed to achieve the ultimate objectives for 2050. The 'fuel switch' involves the transition to all-electric options, synthetic fuels, and hydrogen. It will allow us to achieve almost complete decarbonisation. A prerequisite for large-scale use is the establishment of a comprehensive network of alternative fuels and bio-LNG bunkers in the

context of the Freight Corridors Programme and steps to encourage shipping to use LNG and cleaner engines. This may involve the introduction of new policies or the granting of discounts. In the Green Corridors Programme, the Provincial Authority of South Holland and the Port of Rotterdam Authority are working to assess the technical and financial feasibility of battery-electric sailing with mobile systems, or electric-hydrogen sailing and the charging/replacement stations needed. In order to encourage the switch to electric inland shipping, the Port of Rotterdam Authority is working with the national government to look at possible tax incentives such as an exemption from electricity tax when vessels use land-based electricity supplies.

The challenge for the time to come will be to link up the different initiatives in such a way that they can justify the innovation and development costs. An important challenge here will be to obtain European funding for things like the ongoing development of truck

platooning. Furthering water and rail transport will depend vitally on improving the efficiency of these modalities. In the area of passenger transport, public and collective transport, water transport and bicycle facilities represent possible solutions.

Internationally, initial agreements have been made about carbon reduction in shipping but they are not yet in line with the substantial carbon reduction ambitions for industrial activities in Rotterdam. Given the need for an international approach, Rotterdam aspires to play a leading role in the development of international coalitions to accelerate the sustainability of maritime transport.

## **SUSTAINABLE LOGISTICS WILL REQUIRE ALTERNATIVE FUELS, CLEANER ENGINES AND ELECTRIFICATION, BUT ALSO TRANSPORT EFFICIENCY AND THE PROMOTION OF WATER AND RAIL TRANSPORT.**



## Industrial cluster

### Investing in infrastructure and commitment to a new energy system

For the phase between 2018 and 2025, the primary focus will be on improving energy efficiency and the construction of energy infrastructure (inside Rotterdam and connections to other chemical complexes) and Carbon Capture Utilisation and Storage (CCUS) projects that industry can collaborate in with projects to reduce carbon emissions. The development of large-scale infrastructure such as heat networks requires substantial investments that will, in part, depend on public support and require steering by central government or the provincial authority. For example on the basis of the national and provincial environmental planning vision and coordination at the regional and local levels by provincial and municipal authorities (including the re-use of old infrastructure (particularly gas)). The business community must establish the connections to the networks and the heat network in particular. Both the electricity mains and, where appropriate, the connections and internal systems of companies must be upgraded for this purpose. That will require close cooperation between, and the coordination of, projects by industry and the grid operators.

For the 2020 to 2030 phase, the main focus will be on enhancing the sustainability of energy consumption by industry. The expansion of the energy infrastructure for electricity and hydrogen, and the establishment of a market for hydrogen, should make this possible. Adequate supplies of affordable

*The development of large-scale carbon and energy infrastructure requires substantial investments that must, in part, come from society as a whole.*

green electricity will be needed in good time. Offshore wind energy can play a major role here. The Dutch coalition agreement has formulated an ambition of approximately 11.5 GW of installed capacity by 2030<sup>17</sup>. To accommodate the upgrading of the energy infrastructure in the scarce space available, the optimal coordination of power cables, transformer stations and land use will be required. The regulatory framework for operators will need to support this optimisation process.

The success of the energy transition requires the correct pricing of carbon for Europe, and Northwest Europe in particular. The national government can make the difference here. Agreements between governments, research institutes, state holdings and the business community about research and investment programmes, financing and risk

**THE EXPANSION OF THE ENERGY INFRASTRUCTURE FOR ELECTRICITY AND HYDROGEN INFRASTRUCTURE MUST ALLOW FOR SUSTAINABLE ENERGY USE BY INDUSTRY.**

<sup>17</sup> 'Offshore wind' route map.

<sup>18</sup> In recent years, public-private ventures have been lost that we actually need again.

reduction techniques are also important. The speed and flexibility of permit procedures also determine the pace of the transition. Through sustainable alliances<sup>18</sup>, the Netherlands can also establish a distinctive profile in terms of the smooth completion of permit procedures for projects and measures.

### Renewal of the raw materials and fuel system

The renewal of the raw materials and fuel system will be central in the 2030 to 2050 phase on the road to achieving the climate objectives. This will require steps to provide large supplies of green electricity and hydrogen for the industry cluster and the development of Rotterdam as an international waste-to-value, biomass and hydrogen hub.

In order to ensure there is an international market for biofuels, it is important for us to harmonise policies for sustainable biomass so that the same rules apply in all EU countries. The Dutch national government has announced a 'sustainability framework for all forms of biomass and all applications'. The revision of the European Renewable Energy Directive was adopted recently. That includes criteria for sustainable biofuels. It is important for the national government to incorporate these criteria in national policies. This will give the biobased market the opportunity to scale up.

Circular initiatives also have to be accelerated now. Changes to waste legislation and regulations, and room for experimentation, but also adequate supplies of biobased and waste-based raw materials are needed here.

In order to optimise the valorisation of waste and to accelerate the transition from waste to raw materials, it is important not to classify residual products as waste. A cluster or demarcated-area approach, in which the assessment on the basis of European waste

**IN ORDER TO VALORISE WASTE OPTIMALLY AND TO SWITCH FASTER FROM WASTE TO RAW MATERIALS, IT IS IMPORTANT FOR RESIDUAL PRODUCTS NOT TO BE DESIGNATED AS WASTE.**

legislation is made in a clustered way for groups of similar waste and/or applications and in which it is not necessary to classify products as waste when several phases in the process of working up the waste are located within one and the same area, can be used to initiate acceleration.

In the run-up to adjustments of this kind, projects in the field of recycling and/or the circular economy require a proactive attitude on the part of governments to work flexibly with existing waste legislation on the basis of provisions for experimentation in the legislation and regulations. Further harmonisation is also required of procedures for both 'waste or raw material' and permits. We need to make optimal use of the legal latitude we have and, in the meantime, work on creating more legal latitude for circular initiatives. With an explicit status as an experimentation region with physical space for experimentation in

the field of waste-to-resource pilots and projects, Rotterdam could develop into a waste-based hub as well as a biobased hub. Finally, collaboration on structuring the permit system of the future will help to facilitate all the transitions referred to above.

Another precondition is the availability of an adequate supply of biobased and waste-based raw materials for industry. There is currently no clear European or national policy for biobased raw materials and chemicals. Regulations at the European level are important so that these products can also be traded internationally. We can learn, for example, from the considerations relating to biofuels in the context of the European Renewable Energy Directive. A supplementary import strategy for waste and secondary raw materials by the national government will also play a role here.

### Stable investment climate

The transition challenges require a stable investment climate over a period of years, and legislation and regulations for the continuation and strengthening of the various industrial clusters in the Netherlands. The energy transition can be accelerated by a long-term administrative, policy and financial commitment from central government, and the provincial and municipal authorities. Legislation and regulations require amendments, for example in the area of improving the application of regulations relating to energy efficiency and the network codes for direct-current networks. International standards will be needed in this area.

*New types of training that cater to the labour market of the future need to be developed.*

broad training is expected to increase. That applies to all levels of training, with a specific focus on technology and IT. New multi-disciplinary courses and minors, and modular learning pathways, can provide solutions. Opportunities for refresher training and further training for current employees are also important. A continuous dialogue between the city authorities, the Port of Rotterdam Authority, the port business community (Deltalinqs) and educational institutions (such as Delft University of Technology, the Erasmus University, the Rotterdam Hogeschool, the Shipping and Transport College and the RDM Centre of Expertise) should make the links between education and the business community closer.

The creation of new training courses should, in conjunction with the initiatives under the Rotterdam and National Technology Pact,

## Social transition

### Boosting high-quality training

In order to improve the match between education and the labour market of the present and future, the competences needed in the future need to be defined. New training should be developed to cater to this future labour market. That is true for not only pupils and students but also for teachers. This will also need a new approach to education. In that way, it will be possible to increase the influx of international talent to Rotterdam. The labour market is now often in competition for graduate students in particular and employees in general. This makes it necessary to emphasise even more strongly the appeal of the port of Rotterdam as a place to work.

Because it is not yet clear which technologies will be leading, it is important to give students broad training and to make them agile. Demand for engineers with

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# ROOM FOR DEVELOPMENT





also result in efforts to reduce the shortage of science and technology teachers in energy-related training courses. Stimulation measures here will include, for example, teacher internships in companies, hybrid instructor and teaching posts, the modularisation of teacher training courses and tackling cumbersome regulations so that we can provide faster training for technical college graduates and people from the business world to become teachers.

In addition, more physical learning and experimentation environments are needed to keep knowledge, equipment and instruments up to scratch. The existing public-private infrastructure of the Centres for Innovative Professionals, Centres of Expertise and Field Labs will be expanded for this purpose.

### Connecting the labour market & education

An appealing business location needs a good balance between supply and demand on the labour market. Both quantitatively and qualitatively. That is why the Port of Rotterdam Authority, Deltalinqs, municipal authorities and educational institutions are committed to a Human Capital Agenda along the lines of the technological energy transition. This agenda is linked to the South Holland Human Capital Agreement that was signed by 66 parties in 2019. It is used as a basis for central government, research institutes and the business community to invest in talent, training and work-to-work pathways for all professional levels. That includes modern human resources management, sustainable employability, soft skills, intersectoral collaboration, agility and talent development. This market-wide approach should ensure the implementation of shared action initiatives and the long-term involvement of relevant stakeholders. The Human Capital Agenda will include the joint commitment to technology and IT. The idea is to encourage more students to develop in these directions,

# A COMMITMENT TO AGILE AND FLEXIBLE WORKERS ENHANCES LABOUR MOBILITY AND HELPS TO ESTABLISH A BALANCE IN THE LABOUR MARKET.

to communicate these directions as valid options for the future and to encourage the port business community to describe clear expectations for the future.

A second priority is to ensure that students move directly from school to work. The City of Rotterdam, working with the Port of Rotterdam Authority and Deltalinqs, has drawn up a Training and Work Agreement for this purpose. The port and city will also have to be better connected for workers in physical terms, which is why the partners are working on public-transport options for access to the port. This will enhance the connections for students, pupils and other talented people without their own transport, educational institutions and the port business community.

### Inclusive labour market

Under the Training and Work Agreement, the Port Authority, Deltalinqs, the STC-Group and the City of Rotterdam are encouraging the port business community to participate in initiatives for making the labour market more inclusive. Projects such as Startbaan, Ambachtslab Charlois and Skills Navigator Bootcamp are concrete examples. In the time

to come, more initiatives of this kind will be developed for vulnerable groups such as older candidates, young people without starting qualifications and people who find it difficult to enter the labour market such as refugees. In order to achieve these goals, the joint policy based on the principle of 'Social Return on Investment' is also being re-assessed.

#### Promoting labour mobility

In order to promote labour mobility in the larger Rijnmond region, the partners are committed to working with agile and flexible employees. Labour mobility helps to maintain the balance of the labour market. This furthers the better use of knowledge and skills, and the personal growth of employees. In the light of the energy and digital transitions in many working processes, it is an increasingly important consideration. In joint programmes, the various stakeholders will conduct explorations at an early stage of the measures and arrangements that are needed. Those measures and arrangements could include, for example, sustainable employability and the availability of training resources for development, training and mobility opportunities.

## **A REGIONAL FRAMEWORK FOR PERMITS, ACCESSIBILITY, SPATIAL PLANNING AND ENVIRONMENTAL SPACE PROVIDES THE BASIS FOR A BALANCE BETWEEN URBANISATION AND THE MAINTENANCE OF A DYNAMIC COMPLEX.**

Research into the arrangements required is also a part of this process. The focus here is on things like refresher training and retraining, transition counselling for other work, temporary supplements for benefits or if people move to lower-paid jobs, but also ways to manage the implications for pension accrual and customised arrangements for the older people whose chances of finding work are minimal.

Encouraging labour mobility also requires the development of social initiatives. The Rotterdam Initiative for Social Innovation (RISI) is looking at which regional social innovations will be needed to maintain progress in economic and technical innovations. Rotterdam Werkt! has been established to further labour mobility between companies and therefore to exchange knowledge and increase employee flexibility. The joint Training and Work Agreement encourages companies to exchange employees on a temporary basis and employees to make a definitive switch.

## **Appealing region**

#### Balance between urbanisation and the maintenance of a dynamic complex

The City of Rotterdam and municipalities in the region will have to tackle a major urbanisation challenge in the years to come. This requires a balanced approach between space for a growing city and an appealing living environment on the one hand, and the physical and environmental space needed for the port and industrial complex on the other. A balance of this kind and the prevention of congestion (now and in the future) and mutual inconvenience are only possible

through collaboration. A regional framework for permits, accessibility, planning and environmental space (including development space for nitrogen deposition) can serve as a basis here. As part of that framework, the housing needs and economic development of the region can go hand in hand, while we protect nature, leisure facilities and cultural amenities. By concentrating housing, work and other facilities near new and existing hubs in the mobility network, distances become shorter and unnecessary traffic is eliminated. Wherever possible, construction will take place in the built environment. The high demand for housing will also result in opportunities for using residual heat from industry. Given developments in society as a whole with regard to thinking about nuisance and the acceptance of disruptive activities, municipal authorities and project developers will have to work with additional demands with respect to the insulation of buildings or the construction of appropriate barriers.

### Improving health & safety in the living environment

Industry and transport have become considerably cleaner during recent decades and so environmental pollution has been reduced. Nevertheless, the port still exerts a lot of pressure on the surrounding area, which is calling for a cleaner, quieter port. The port community has an important responsibility, particularly in terms of reducing emissions from all modes of transport with cleaner engines and fuels, and shore power facilities. The joint efforts of the covenant partners, including financial resources from the national government and the City of Rotterdam will allow progress to be made in this area.

In the context of urbanisation, there is also a focus on space for cultural and green facilities and access to the residential and working environment. Nature in the port is important for the

quality of the locality. A responsible approach to natural resources and the locality is therefore a precondition for a future-resilient port. That is why natural values are carefully taken into consideration during the development of the port. Investments in road infrastructure and improvements in public transport, on the water or elsewhere, improve the quality of life and travel to work. More detailed agreements based on the 2017 MIRT study of accessibility in Rotterdam-The Hague and the Area Programme on Accessibility in Rotterdam-The Hague will be implemented. For example, an MIRT Reconnaissance Study of the Rotterdam Riverbank Connection has been initiated that focuses on upgrading the multimodal accessibility of the region in relation to the growth of the city. In addition, as part of the Rotterdam Mobility Approach, the City of Rotterdam is implementing measures to achieve a better balance between cars, cyclists, pedestrians and public transport. The existing cultural and green facilities contribute to the area's international image and therefore to its appeal

**INVESTMENTS IN ROAD  
INFRASTRUCTURE AND  
IMPROVEMENTS IN PUBLIC  
TRANSPORT IMPROVE THE  
QUALITY OF LIFE AND  
ACCESS TO WORK.**

*Natural values will be taken into account in the development of the port.*



as a business location. Individual projects can contribute here through the design and management of temporary nature locations, such as sites about which decisions have yet to be made and that are lying fallow in the meantime.

Due to the long-term presence of industrial activities, soil and groundwater have been polluted at different locations in the port and industrial complex. In order to restore the quality of the soil and groundwater to a standard that is appropriate for the activities in a port and industrial area, the responsibility for tackling soil and groundwater remediation has been delegated to a single competent authority. This results in more options for re-using these brownfield sites and reduces the financial risks associated with soil pollution.

During new port developments, steps are taken to ensure that specific areas can cope with sea level rise. Low water levels also require attention. A 'Second Mannheim Act' with international agreements for the optimal navigability of the Rhine during periods of drought (resulting in low water levels) can limit the impact on

*A single competent authority for soil and groundwater remediation will enhance the re-usability of brownfield sites.*

inland shipping. Taking bridge heights into account can also keep rivers open for inland shipping when tides are extremely high or low. The City of Rotterdam, the Provincial Authority of South Holland and the national government are including an area-specific approach to 'flood risk management' in their own environmental planning visions.

#### **World-class innovation ecosystem**

The challenge for the time to come will be to strengthen Rotterdam's innovation ecosystem. Connecting companies located in the port with drivers of innovation such as clients and suppliers, innovative parties from the region and initiatives to accelerate innovation such as RDM, PortXL and Rotterdam Port Fund will play a role here. In addition, innovative companies must be able to move to Rotterdam (see 'business location') and continue to grow without difficulty. In addition, improvements can also be made to the international positioning of Rotterdam's innovation ecosystem. Strong communications about the opportunities in Rotterdam will allow the region to position itself even stronger and so to create even more opportunities. The City of Rotterdam and the Port of Rotterdam Authority are working on a strategy for this area in collaboration with organisations like Rotterdam Partners and Innovation Quarter. A meaningful benchmark for the innovative strength of the Rotterdam region could help to make us even stronger.

Another factor is the targeted deployment of knowledge companies/research institutes that can further strengthen the existing ecosystem and attract international talent to the region. This addresses a major bottleneck affecting this region: the limited availability of skilled employees (see 'social transition' actions).

**CONNECTING COMPANIES  
LOCATED IN THE PORT WITH  
DRIVERS OF INNOVATION  
WILL FURTHER STRENGTHEN  
ROTTERDAM'S INNOVATION  
ECOSYSTEM.**

## Embedding the Port Vision

The Port Vision is accompanied by a collaborative agenda to ensure that it is properly embedded in the social context. It brings together the stated priorities, the guiding statements and the frameworks of the Port Vision. Implementation is shaped in the planning processes of the various stakeholders. As far as the responsibility of the Port Authority is concerned, the embedding process is mainly located in the context of its own business operations.

Progress on the realisation of the objectives in this Port Vision is monitored annually. On the basis of this annual Progress Report, a decision will be made about the extent to which the collaborative agenda requires adjustment and which measures are required to achieve the formulated ambitions and objectives. Adaptability remains essential if this Port Vision is to be realised.

For the purposes of the embedding process, the vision is also linked to the National environmental planning vision (NOVI), which will describe the desired development of the physical living environment and provide guidance for regional elaboration by provincial and municipal authorities. The national and regional authorities draw up joint environmental planning agendas based on their own environmental planning visions. These new, country-based agendas provide suggestions for coordinating decisions about developments in the physical living environment. The spatial agendas will fit in with the scope of both the Dutch Environmental Planning Act and the NOVI, and they will replace the MIRT area agendas. They constitute the basis for operational agreements about the deployment of programmes and concrete project decisions by the various authorities.

**THE PORT VISION IS REFLECTED IN THE POLICIES OF VARIOUS STAKEHOLDERS. A COLLABORATIVE AGENDA WILL FURTHER EMBEDDING.**

The Dutch government wants to designate area-based programmes for specific areas with very complex challenges (*perspective areas*) where the government authorities and NGOs involved are working on urgent challenges on the basis of a shared view of the future. The approach in these areas is programmatic, shaping implementation over periods of several years and involving the possible use of new instruments. Various criteria play a role in the selection of the areas, including the overlapping of complex, urgent challenges (involving several national interests), regional scale, multi-year approach, the involvement of multiple authorities and a demonstrable need for the involvement of the national government. In view of the challenges and priorities described in this Port Vision, it is natural for the port and industrial complex to be designated as a perspective area of this kind. The current Dutch government will make a decision about the selected areas in the NOVI that will be adopted in late 2019.

# QUANTITATIVE OBJECTIVES



and Sustainable  
Development  
Goals

The realisation of the vision set out here will make Rotterdam, as Europe's most important port and industrial complex, future-resilient and allow it to continue generating significant economic and social value. Although it is still uncertain what the long-term implications of the transitions will be for the port and industrial complex, the covenant partners have, in this vision, decided on a course irrespective of external trends and developments. So that the size and nature of the economic and social value represented by the port and industrial complex is what it should be for society as a whole. The ambitions result in eight, partly new<sup>19</sup>, quantitative targets<sup>20</sup>.

## 1. Increasing value added

The activities in the port and industrial complex generate a total value added of approx. 45 billion per year (6.2% of GDP). This value consists of direct effects, related value from suppliers, re-exportation (the 'Rotterdam effect'<sup>21</sup>) and maritime services. This value added rose by more than 10% in the period 2007–2016<sup>22</sup>. The ambition for 2030 is to keep the growth of value added in line with the development of Dutch GDP<sup>23</sup>. Flexibility and adaptability will serve as the basis for the achievement of that ambition.

## 2. Development of port-related employment

The port accounted for 385,000 jobs directly and indirectly in 2018, 101,000 of which were location-based and in the area. This means that direct port-related employment rose by 15,000 jobs by comparison with 2007. This increase is mainly attributable to the road haulage and wholesale sectors. The ambition is for ongoing growth in total employment as a result of the transition processes. The ratio between direct and indirect port-related employment could shift here in favour of indirect employment as 2030 approaches. The shift will be located primarily in the urban area.

<sup>19</sup> New objectives with respect to the 2030 Port Vision from 2011 are (a) the commitment to the reduction of carbon emissions (in shipping), (b) connectivity in terms of the LSCI and (c) the international positioning of Rotterdam as a Maritime Capital.

<sup>20</sup> The eight objectives are in line with the indicators included annually in the annual progress report 'The State of the Port'. It is not possible/desirable to set objectives for 2030 for all the indicators contained in that report because of the considerable uncertainties with respect to economic, technological and social developments.

The correlation between the indicators listed above and all the indicators from *The State of the Port* is shown in brief in Annex 1.

<sup>21</sup> Erasmus Universiteit, Bart Kuipers, *The Rotterdam effect* (2018).

<sup>22</sup> 2016 is the last year available. The period 2007–2016 includes the economic crisis, which had a strong impact on global trade flows and the Dutch economy. During the same period, Dutch GDP rose by just over 5%, total throughput in the Hamburg Le Havre range by less than 5%, and Rotterdam throughput by more than 10%.

<sup>23</sup> Assuming the bandwidth in the WLO scenarios (with low annual growth of 1.2% and high annual growth of 2.2%) results in total value added in 2030 of between 23 and 26 billion.

## SUBSTANTIAL PUBLIC AND PRIVATE INVESTMENTS ARE NEEDED TO REALISE THE VISION OUTLINED HERE.

### 3. The decarbonisation of shipping and of the port and industrial complex

In 2018, the port and industrial complex accounted for 18% of national carbon emissions, with the largest proportion by far being related to industry. In line with the international agreements (Paris) and the planned national Climate Agreement, the target is to achieve a reduction in carbon emissions, by comparison with 1990, of 49% by 2030 and 95% by 2050. This should make the area virtually climate-neutral by 2050. The envisaged national Climate Agreement constitutes the framework that determines the contribution of the Rotterdam port and industrial complex to carbon reduction in the five sectors of Industry, Electricity, Mobility, Built Environment and Agriculture.

*Realisation of the vision set out here will make Rotterdam, as Europe's most important port and industrial complex, future-resilient and allow it to continue generating significant economic and social value.*

### 4. Public-private investments

Substantial public and private investments are needed to realise the vision outlined here. In the first instance, these will be investments in the energy and CO<sub>2</sub> infrastructure needed for the decarbonisation of the port and industrial complex and, given the expected stagnation/fall in value added in the areas of refining and petrochemicals, investments in new activities such as offshore wind, biobased chemicals, agro-industry and activities that contribute to the raw materials transition.

The ambition for the labour market (see 'employment') requires investments in relatively labour-intensive sectors such as the production, assembly and maintenance of renewable energy sources (mainly offshore wind), distribution, innovative manufacturing, the circular economy and port-related business services. Activities like this can mitigate the inevitable decline in some sections of the current labour market, primarily through the increasing use of digital technologies and ensuring that there is an ongoing increase in the overall number of related jobs.

In recent years, the investment volume in Rotterdam has averaged €1.5 billion a year and the trend is rising. The ambition for the next five years is to attract approximately €2 billion in investments annually. The Rotterdam port and industrial complex aims to attract €25 to €35 billion in investments from companies with leading positions in their markets between now and 2030.

# INNOVATION ECOSYSTEM





## 5. Connectivity

Rotterdam aims to be Europe's best connected port by 2030. Rotterdam is connected 24/7 with 500 million consumers in the European hinterland. Accessibility through world-class infrastructure is decisive for our competitive position. This strategic connectivity<sup>24</sup> is an important feature of Rotterdam as a Global Hub. The presence of a well-connected port provides companies in the Netherlands with relatively fast and cheap access to foreign markets, allowing them to purchase commodities such as raw materials and semi-finished products for less and to serve export markets better. For consumers, more connectivity improves the availability and reduces the prices of imported products. Between 2007 and 2017, there was almost no change in the connectivity of the Netherlands as calculated by UNCTAD<sup>25</sup> (growth was less than 2%). Further investments are required to safeguard excellent multimodal accessibility. This is in line with the agreed reduction of container transport to the hinterland by road.

*Rotterdam aims to be Europe's best connected port by 2030.*

**SAFETY IS AN ESSENTIAL  
PRECONDITION FOR THE  
FUNCTIONING OF THE  
PORT OF ROTTERDAM.**

## 6. Safety

Safety for shipping, employees in the port, local residents, businesses and leisure users of the port area is indispensable for the proper functioning of the port of Rotterdam and for the creation of value. That means safety on the roads, social safety, flood risk management, health and safety at work, and cybersecurity. The Port of Rotterdam Authority, the Rijnmond Environmental Protection Agency (DCMR), the business community and local, provincial and national government authorities are all working on this area, each on the basis of their own role. DCMR and the Rotterdam Rijnmond Safety Region (VRR) monitor safety on land on behalf of the city and provincial authorities. The objective for shipping traffic is an integrated safe port with no major nautical incidents<sup>26</sup>. Incidents on land must also be prevented where possible.



## 7. Air quality

The social value of the port and industrial complex is closely linked to the quality of the living environment. As a result of more and more new technologies and innovative applications, the air quality in the Rijnmond area has improved over the past two decades and it complies with the applicable legal standards. Despite the declining annual average concentration, a healthy and attractive living environment remains a constant focus. The aim for the coming years is to continue to apply the statutory standards in the context of a further intensification of the port and industrial area and an increase in transport in the region and to the hinterland with the aim of improving air quality further<sup>27</sup>. The objectives for the climate and air quality have mutually beneficial effects. The decision of the IMO (International Maritime Organization) to reduce the sulphur standard for marine fuel used worldwide from a maximum of 3.5% sulphur to 0.5% by 2020 will also be helpful.

<sup>24</sup> Connectivity is calculated specifically for container networks based on factors such as the number of direct connections and the average size of the ships using these connections.

<sup>25</sup> The Liner Shipping Connectivity Index, developed by the United Nations Conference on Trade and Development (UNCTAD).

<sup>26</sup> The Nautical Safety Index (NSI) reports nautical safety and includes the severity of accidents. In 2017, the NSI was 7.95, exceeding its target of 7.0.

<sup>27</sup> The WHO targets are more ambitious than the present legal standards.

<sup>28</sup> Research by, among others, Erasmus University and Nyenrode Business School.

**THE OBJECTIVE IS TO IMPROVE ROTTERDAM'S RANKING AS AN INTERNATIONAL MARITIME CAPITAL.**

## 8. Rotterdam's position in the international ranking of maritime capitals

Rotterdam's global position as an international maritime capital is seen in its unique combination of business services, maritime technology and commodity trading. After London, Rotterdam has the largest maritime business services cluster in Europe<sup>28</sup> and the Rotterdam region (Maasvlakte-Rotterdam-Drecht towns) is home to the largest clusters of maritime technology companies in the world. Leading rankings (such as MENON or Baltic-Xinhua Exchange) measure the development of maritime capitals. The aim is for Rotterdam to occupy a higher position in those rankings.

## QUANTITATIVE OBJECTIVES AND THE SUSTAINABLE DEVELOPMENT GOALS

### Sustainable Development Goals

By adopting these objectives, the port of Rotterdam is contributing to the Sustainable Development Goals (SDGs) drawn up by the United Nations. All seventeen Sustainable Development Goals apply to the port but five of them are particularly relevant<sup>29</sup>. Table 1 provides further details in this respect.

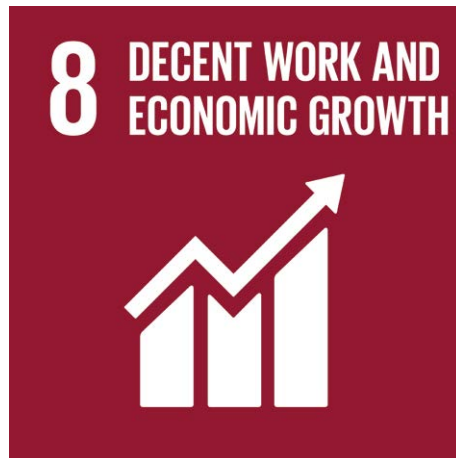
Table 1  
**Contribution of quantitative objectives to Sustainable Development Goals United Nations**

<sup>29</sup> The approach of the Port Vision also fits in with SGD17: partnership to achieve objectives.

### SDG(s)



Objective	8	8	7 13	7 8 9 13
<b>1. Increasing value added</b>	<b>2. Development of port-related employment</b>	<b>3. Decarbonisation</b>	<b>4. Public-private investments</b>	
<b>Main indicator</b>	The ambition is to keep the growth of direct value added in line with the development of Dutch GDP. Assuming €15 billion in 2017 and an annual GDP growth rate of 2%, this amounts to <b>€19 billion</b> in 2030.	Jobs for more than <b>180,000 people</b> in the port and industrial area, and the urban economy.	The Climate Agreement to be concluded at the national level is the framework that determines the contribution of the Rotterdam port and industrial complex to the carbon reduction target. In the sectors of Industry, Electricity, Mobility, Built Environment and Agriculture, the objective for 2030 in the Netherlands is to <b>reduce carbon emissions by 49%</b> by comparison with 1990. The target for 2050 is 95%.	The ambition for the next 5 years is to attract approximately €2 billion in investments annually. In the period leading up to 2030, investments should attain <b>€25-35 billion</b> from companies that are leaders in their markets.



**5. Connectivity**

Rotterdam aims to be Europe's best connected port by 2030. This should be reflected in a **leading position for the Netherlands in the Liner Shipping Connectivity Index** of the United Nations Conference on Trade and Development (UNCTAD), which ranks countries in terms of connectivity.



**6. Safety**

The objective for shipping traffic is an integrated safe port with **no major nautical incidents**. The companies on land implement their duty of care in order to minimise incidents.



**7. Air quality**

The aim is to maintain air quality in accordance with **statutory standards**.



**8. Position of Rotterdam as a maritime capital**

The objective is to achieve a higher position for Rotterdam in leading **rankings for maritime capitals** such as MENON or the Baltic-Xinhua Exchange.





