

# SCENARIOS FOR 2050

## PORT OF ROTTERDAM AUTHORITY

WHITE PAPER



**The world around us is changing rapidly. A broad range of global issues - geopolitical developments, energy availability and supply chain disruptions - involve extremely high levels of uncertainty. Scenarios help to prepare by exploring a range of possible futures.**

They provide us with a clearer understanding of the challenges and opportunities for the port, industry and our customers. Imagining possible futures is important so that the Port of Rotterdam Authority can respond accordingly. The Port Authority can draw on these scenarios to give direction to strategic decision-making. Which investments are needed to attract new freight flows, business and clean energy? Where should adjustments be made?

The Port of Rotterdam Authority has developed four detailed, global scenarios for the years leading up to 2050. Each scenario results in a distinct forecast for the port and industrial complex. Central to these analyses is the issue of how changes in geopolitics, economics, society and technology could impact the port-industrial complex, and the size and composition of port throughput. Will there be a global focus on ambitious climate action or will the energy transition stall? Will global powers erect trade barriers to protect their own industries or will free trade be allowed to flourish? Do consumers prioritise quality over price or the exact opposite?

Eight external key driving forces form the basis for the scenario framework. These are (1) geopolitical stability, (2) government policy and spending, (3) consumer behaviour, (4) global climate change measures, (5) the life cycle transition (linear to circular), (6) corporate social responsibility, the change in the relative

true cost of (7) production and (8) transportation. These key drivers involve most uncertainty and they have most impact on the development of the port industrial complex, our customers, partners and the Port of Rotterdam Authority itself. The direction and strength of the drivers differ in the various scenarios. That leads to four relevant global scenarios leading up to 2050 and a bandwidth for the future landscape of the port.

The scenarios evolve, with two primary pathways leading to four secondary pathways. The first primary pathway is a world led by global cooperation, the 1.5°C target and broad-based prosperity. Around 2030-2035, this primary pathway splits into two secondary pathways. The first is the strengthening of commitment to cooperation, transparency and broad-based prosperity (Connected Deep Green). The second is a tilt towards a regional focus on clean and healthy living environments (Regional Well-Being).

The second primary pathway leads to a world with geopolitical tensions and a focus on efficiency, financial prosperity, resilience and defence. This pathway diverges into two secondary pathways around 2030-2035. The first involves greater fragmentation, a lack of trust and protectionism in a world of Protective Markets. The second involves a tipping point driven by growing concerns about the economic consequences of external shocks affecting factors such as food and energy availability, extreme weather or cyber hacks (Wake-Up Call).

Ultimately, all four secondary pathways lead to distinct global scenarios for 2050.

The core narratives of the four global scenarios for the period leading up to 2050 are:

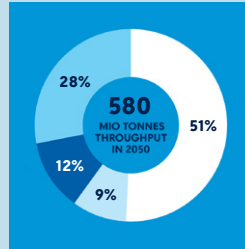


**Connected Deep Green:**

Effective global cooperation with the acceleration of digital transparency in logistics chains and global commitment to targets for combating climate change, resulting in global carbon neutrality by 2050, broad-based prosperity and high economic growth, and a maximum temperature rise of 1.5 degrees centigrade this century.

**Impact on port and industrial complex**

Institutional quality and geopolitical stability are high due to global cooperation. Major investments to achieve carbon neutrality by 2050, in combination with high population projections, result in strong GDP. Growth in world trade leads to significantly more container handling. Large amounts of renewable energy, fossil energy falls to zero by 2050.

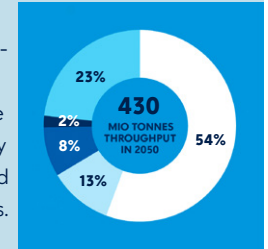


**Regional Well-Being:**

A switch from a shared commitment to transition in the absence of sufficient global trust towards a regional focus on clean and healthy environments, privacy and well-being emerges in clusters of countries by early 2030. This results in a deteriorating business environment for basic industry in Northwestern Europe and moderate economic growth.

**Impact on port and industrial complex**

Moderate growth of world economy due to trade barriers and diverse carbon-reduction measures between countries. The business climate for energy-intensive industry in Northwest Europe is affected by a greater focus on the quality of the living environment. Strong decrease in total throughput, especially crude oil, coal and iron ore. More breakbulk due to imports of semi-finished products. Strong intra-regional European market with growth in shortsea volumes.

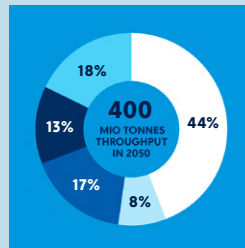


**Protective Markets:**

A world with a lack of trust between global powers, global geopolitical tensions and suboptimal integration in logistics chains. There are competing economic interests in a fragmented world with a focus on self-sufficiency, financial prosperity, resilience and defence. No global carbon neutrality before 2100 and low economic growth.

**Impact on port and industrial complex**

Neglect of climate obligations has a negative effect on investments. Extreme weather conditions and less R&D impair productivity. A declining EU population, low economic growth, significant reduction in throughput volume. Slow transition to renewable energy due to trade barriers. Considerably less refining of crude oil, less general cargo due to re- and nearshoring.

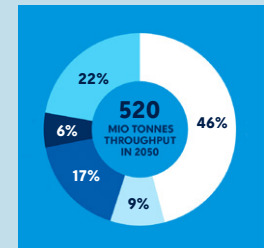


**Wake-Up Call:**

Increasing concerns about the economic impact of external shocks such as food and energy availability or extreme weather mark a tipping point. There is increasing awareness that strategic cooperation and rigorous measures are needed to reduce carbon emissions. This leads to strategically strong EU policies, moderate economic growth and a late but rapid transition to renewable energy.

**Impact on port and industrial complex**

Increase in investments and economic growth due to radical acceleration in sustainable energy from 2030 onwards. Slight fall in EU population, shift in consumer behaviour and belief. More imports of biomass as a raw material for energy and chemistry. Late but fast energy transition requires CO<sub>2</sub> storage. Increase in containers due to favourable economic climate. Significantly higher throughput of non-fossil fuels.





## Throughput for each scenario leading up to 2050

The global scenarios have been modelled using top-down logic to capture global dynamics and details specific to the Port of Rotterdam. The scenarios establish a bandwidth in development for the port and industrial complex leading up to 2050 which is summarised in the figure on the following page.

### Current situation

Balanced portfolio with 44% accounted for by liquid bulk and 33% by containers. Dry bulk makes up 17% of total throughput and breakbulk 7%. Minimal throughput of renewable raw materials and renewable energy.

### Key points for throughput forecast

The share of general cargo in throughput increases in all scenarios leading up to 2050. Liquid bulk volume decreases; the extent depends on transition to renewable flows and the pace of the energy transition. The dry bulk volume is highly dependent on the use of biomass and the strength of Northwest Europe as an industrial motor. In all scenarios, container volumes grow leading up to 2035.

## Why do we need scenarios?

**Carline Borest**, strategist, Port of Rotterdam Authority:

“Scenarios help us to understand possibilities with a long-term horizon and prepare for uncertainties ahead. All scenario pathways are plausible, distinct and relevant. The long-term scenarios challenge us to stretch our thinking and establish a bandwidth in which the future may unfold. The scenarios and associated forecasts provide us with guidance for crucial and resilient decisions to strengthen the position of the port industrial complex and the role of the Port Authority in that complex in the long term.”



## Beyond the scenarios

**Allard Castelein**, CEO, Port of Rotterdam Authority:

“Our new scenarios provide us with valuable insights that help us to make sound decisions. We do acknowledge the range of uncertainties shown by the scenarios, which may well imply a significant change in our portfolio over the next thirty years. We are up for the ambitious challenge this involves. With our customers and partners, we are firming up our goals and making them robust in the various scenarios so that we can accelerate our transition towards becoming the world’s smartest and most sustainable port.”

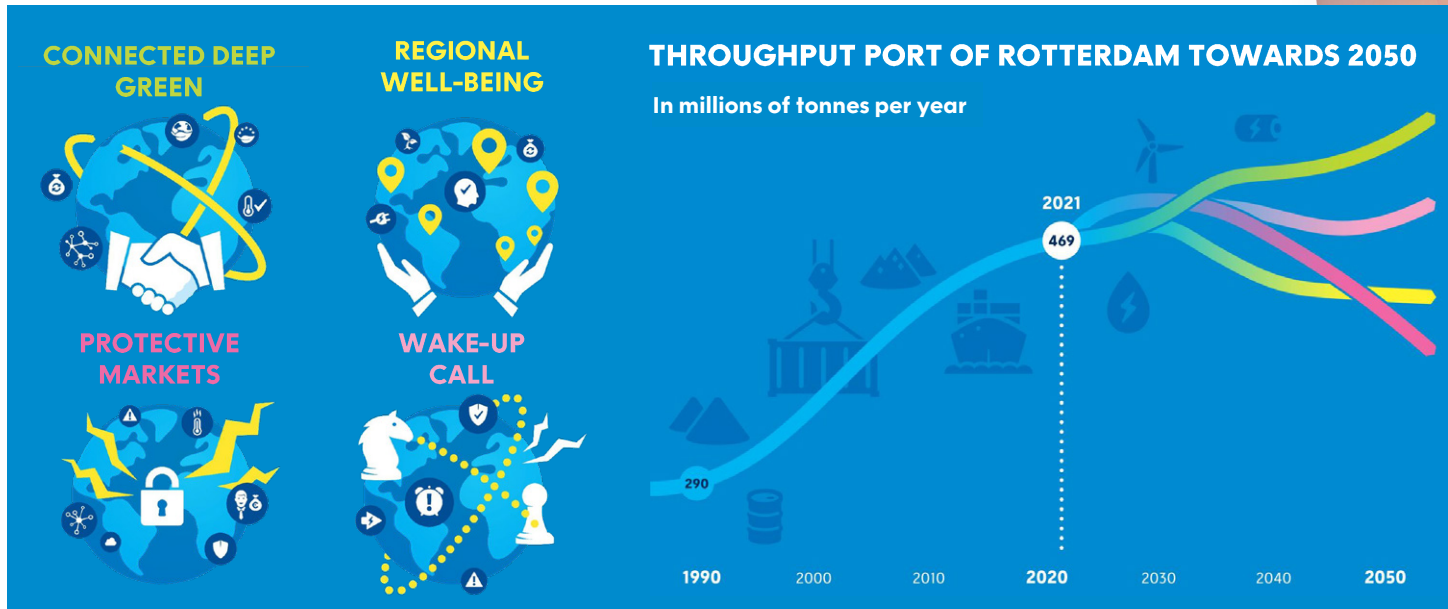


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*“You can achieve climate neutrality in two ways. The first is to go to a company and say: when are you going to turn out the lights and stop producing? The other is: how can I help you change while remaining efficient and relevant?’ Castelein is for the second option, and his scenarios are meant to help.”*

(source: NRC, 29 September 2022, CEO of Port of Rotterdam Authority: ‘The port of Rotterdam will be smart’)

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*“If we want to achieve a carbon reduction of 55 to 60 percent by 2030, we need to take decisions now. In the energy world, 2030 is tomorrow.”*

(source: NRC, 29 September 2022, CEO of Port of Rotterdam Authority: ‘The port of Rotterdam will be smart’)

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