



# SHELL'S POWERING PROGRESS STRATEGY

And Pernis refinery's moves towards net -zero emissions

Darren Cross, VP Marketing & Customer Operations, Shell Catalysts & Technologies

April 2022



# Cautionary note

The companies in which Shell plc directly and indirectly owns investments are separate legal entities. In this presentation “Shell”, “Shell Group” and “Group” are sometimes used for convenience where references are made to Shell plc and its subsidiaries in general. Likewise, the words “we”, “us” and “our” are also used to refer to Shell plc and its subsidiaries in general or to those who work for them. These terms are also used where no useful purpose is served by identifying the particular entity or entities. “Subsidiaries”, “Shell subsidiaries” and “Shell companies” as used in this presentation refer to entities over which Shell plc either directly or indirectly has control. Entities and unincorporated arrangements over which Shell has joint control are generally referred to as “joint ventures” and “joint operations”, respectively. Entities over which Shell has significant influence but neither control nor joint control are referred to as “associates”. The term “Shell interest” is used for convenience to indicate the direct and/ or indirect ownership interest held by Shell in an entity or unincorporated joint arrangement, after exclusion of all third-party interest.

This presentation contains forward-looking statements (within the meaning of the U.S. Private Securities Litigation Reform Act of 1995) concerning the financial condition, results of operations and businesses of Shell. All statements other than statements of historical fact are, or may be deemed to be, forward-looking statements. Forward-looking statements are statements of future expectations that are based on management’s current expectations and assumptions and involve known and unknown risks and uncertainties that could cause actual results, performance or events to differ materially from those expressed or implied in these statements. Forward-looking statements include, among other things, statements concerning the potential exposure of Shell to market risks and statements expressing management’s expectations, beliefs, estimates, forecasts, projections and assumptions. These forward-looking statements are identified by their use of terms and phrases such as “aim”, “ambition”, “anticipate”, “believe”, “could”, “estimate”, “expect”, “goals”, “intend”, “may”, “milestones”, “objectives”, “outlook”, “plan”, “probably”, “project”, “risks”, “schedule”, “seek”, “should”, “target”, “will” and similar terms and phrases. There are a number of factors that could affect the future operations of Shell and could cause those results to differ materially from those expressed in the forward-looking statements included in this presentation, including (without limitation): (a) price fluctuations in crude oil and natural gas; (b) changes in demand for Shell’s products; (c) currency fluctuations; (d) drilling and production results; (e) reserves estimates; (f) loss of market share and industry competition; (g) environmental and physical risks; (h) risks associated with the identification of suitable potential acquisition properties and targets, and successful negotiation and completion of such transactions; (i) the risk of doing business in developing countries and countries subject to international sanctions; (j) legislative, judicial, fiscal and regulatory developments including regulatory measures addressing climate change; (k) economic and financial market conditions in various countries and regions; (l) political risks, including the risks of expropriation and renegotiation of the terms of contracts with governmental entities, delays or advancements in the approval of projects and delays in the reimbursement for shared costs; (m) risks associated with the impact of pandemics, such as the COVID-19 (coronavirus) outbreak; and (n) changes in trading conditions. No assurance is provided that future dividend payments will match or exceed previous dividend payments. All forward-looking statements contained in this presentation are expressly qualified in their entirety by the cautionary statements contained or referred to in this section. Readers should not place undue reliance on forward-looking statements. Additional risk factors that may affect future results are contained in Shell plc’s Form 20-F for the year ended December 31, 2020 (available at [www.shell.com/investor](http://www.shell.com/investor) and [www.sec.gov](http://www.sec.gov)). These risk factors also expressly qualify all forward-looking statements contained in this presentation and should be considered by the reader. Each forward-looking statement speaks only as of the date of this presentation, 19–21 April 2022. Neither Shell plc nor any of its subsidiaries undertake any obligation to publicly update or revise any forward-looking statement as a result of new information, future events or other information. In light of these risks, results could differ materially from those stated, implied or inferred from the forward-looking statements contained in this presentation.

The content of websites referred to in this presentation does not form part of this presentation.

We may have used certain terms, such as resources, in this presentation that the United States Securities and Exchange Commission (SEC) strictly prohibits us from including in our filings with the SEC. Investors are urged to consider closely the disclosure in our Form 20-F, File No 1-32575, available on the SEC website [www.sec.gov](http://www.sec.gov).

This presentation contains data and analysis from Shell’s Sky 1.5 scenario. Shell Scenarios are not intended to be projections or forecasts of the future. Shell scenarios including the scenarios contained in the presentation are not Shell’s strategy or business plan. When developing Shell’s strategy, our scenarios are one of many variables that we consider. Ultimately, whether society meets its goals to decarbonize is not within Shell’s control. While we intend to travel this journey in step with society, only governments can create the framework for success. The Sky 1.5 scenario starts with data from Shell’s Sky scenario, but there are important updates. First, the outlook uses the most recent modelling for the impact and recovery from COVID-19 consistent with a Sky 1.5 scenario narrative. Second, it blends this projection into existing Sky (2018) energy system data by around 2030. Third, the extensive scale-up of nature-based solutions is brought into the core scenario, which benefits from extensive new modelling of that scale-up. (In 2018, nature-based solutions required to achieve 1.5°C above pre-industrial levels by the end of this century were analysed as a sensitivity to Sky. This analysis was also reviewed and included in the IPCC Special Report on Global Warming of 1.5°C (SR15).) Fourth, our new oil and natural gas supply modelling, with an outlook consistent with the Sky 1.5 narrative and demand, is presented for the first time. Fifth, the Sky 1.5 scenario draws on the latest historical data and estimates to 2020 from various sources, particularly the extensive International Energy Agency energy statistics. As with Sky, this scenario assumes that society achieves the 1.5°C stretch goal of the Paris Agreement. It is rooted in stretching but realistic development dynamics today but explores a goal-oriented way to achieve that ambition. We worked back in designing how this could occur, considering the realities of the situation today and taking into account realistic timescales for change. Of course, there is a range of possible paths in detail that society could take to achieve this goal. Although achieving the goal of the Paris Agreement and the future depicted in Sky 1.5 while maintaining a growing global economy will be extremely challenging, today it is still a technically possible path.

Also, in this presentation we may refer to Shell’s “Net Carbon Footprint”, which includes Shell’s carbon emissions from the production of our energy products, our suppliers’ carbon emissions in supplying energy for that production and our customers’ carbon emissions associated with their use of the energy products we sell. Shell only controls its own emissions. The use of the term Shell’s “Net Carbon Footprint” is for convenience only and not intended to suggest these emissions are those of Shell plc or its subsidiaries.

Shell’s operating plan, outlook and budgets are forecasted for a ten-year period and are updated every year. They reflect the current economic environment and what we can reasonably expect to see over the next ten years. Accordingly, Shell’s operating plans, outlooks, budgets and pricing assumptions do not reflect our net-zero emissions target. In the future, as society moves towards net-zero emissions, we expect Shell’s operating plans, outlooks, budgets and pricing assumptions to reflect this movement.

# Outline

- Shell's Powering Progress strategy
- Achieving net-zero emissions
- An example of what Shell is doing at Pernis:
  - **Biofuels** - Shell Renewable Refining Process
- Future proofing our technology





## OUR PURPOSE

To power progress together by providing more and cleaner energy solutions



UNDERPINNED BY  
OUR CORE VALUES  
AND OUR FOCUS  
ON SAFETY



## OUR PURPOSE

To power progress together by providing more and cleaner energy solutions

### RESPECTING NATURE

Protecting the environment, reducing waste and making a positive contribution to biodiversity

UNDERPINNED BY  
OUR CORE VALUES  
AND OUR FOCUS  
ON SAFETY



### GENERATING SHAREHOLDER VALUE

Growing value through a dynamic portfolio and disciplined capital allocation



## POWERING PROGRESS

Our strategy to accelerate the transition to netzero emissions, purposefully and profitably



### POWERING LIVES

Powering lives through our products and activities, and by supporting an inclusive society



### ACHIEVING NET -ZERO EMISSIONS

Working with our customers and across sectors to accelerate the transition to netzero emissions

Shell's target: to become a net emissions energy business by 2050, in step with society and our customers

-zero



# Examples of energy transition milestones by 2030



## Operational efficiency <sup>1</sup>

- Eliminating routine flaring
- Maintaining methane emissions intensity <0.2% (2025)

## Natural gas shift

- Oil production peaked in 2019, expected to decline 1–2% per annum
- No new frontier exploration entries anticipated post 2025
- Growing gas share of hydrocarbon production to □55%

## Low-carbon power business

- Doubling electricity sold
- Delivering equivalent of >50 million households with renewable electricity
- Operating □2.5 million EV charge points

## Low-carbon fuels (biofuels, hydrogen)

- Producing 8 times more low-carbon fuels than today
- Increasing low-carbon fuels sales to >10% of transport fuels (up from 3% in 2020)

## CCS

- Targeting over 25 mtpa CCS (by 2035)

## Natural sinks

- Aiming for □120 mtpa of nature-based solutions
- High-quality offsets only



# What are we **already doing** ?

We are an energy provider

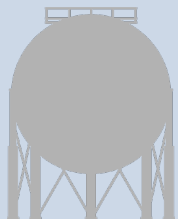
We are an energy user

We are a partner for change

## AT HOME



100% certified  
renewable electricity



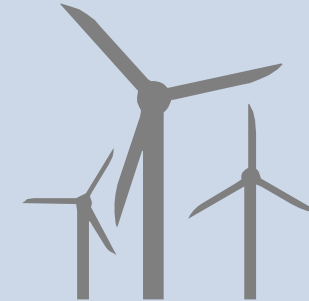
FOR BUSINESS  
Supplying carbon  
neutral LNG

## ON THE MOVE



185,000+ public EV charging  
facilities in 35+ countries

Through Raizen Shell is one of  
the world's largest sugar cane  
ethanol producers



GENERATING  
RENEWABLE POWER

NoordzeeWind , a Shell JV,  
supplies renewable energy  
through its 36 offshore  
wind turbines

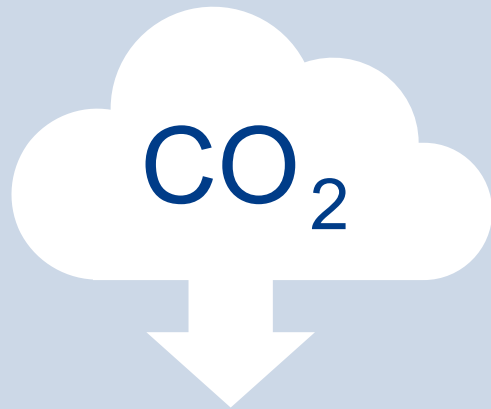
# What are we **already doing** ?

We are an energy provider

We are an energy user

We are a partner for change

## CAPTURING EMISSIONS



Quest CCS has captured and stored >5MT of CO<sub>2</sub>

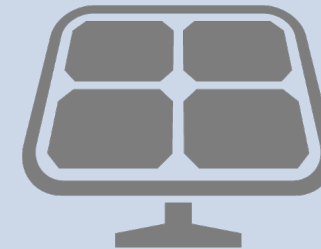
## IMPROVING ENERGY EFFICIENCY

A

B

C

Moerdijk's new furnaces at could reduce CO<sub>2</sub> emissions by 10%



USING CLEANER POWER

Installing solar power at a Singapore lubricants plant could avoid 33% of the greenhouse gas emissions from its electricity use

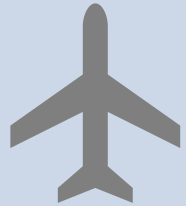
# What are we **already doing** ?

We are an energy provider

We are an energy user

We are a partner for change

## AVIATION



Supplying Amazon Air and DHL Express with sustainable aviation fuel (SAF)

Testing 100% SAF with Rolls Royce

## ROAD FREIGHT



Enabling hydrogen trucks

Offering nature-based carbon credits in Europe and Asia

## SHIPPING



Supplying marine customers with liquefied natural gas (LNG)

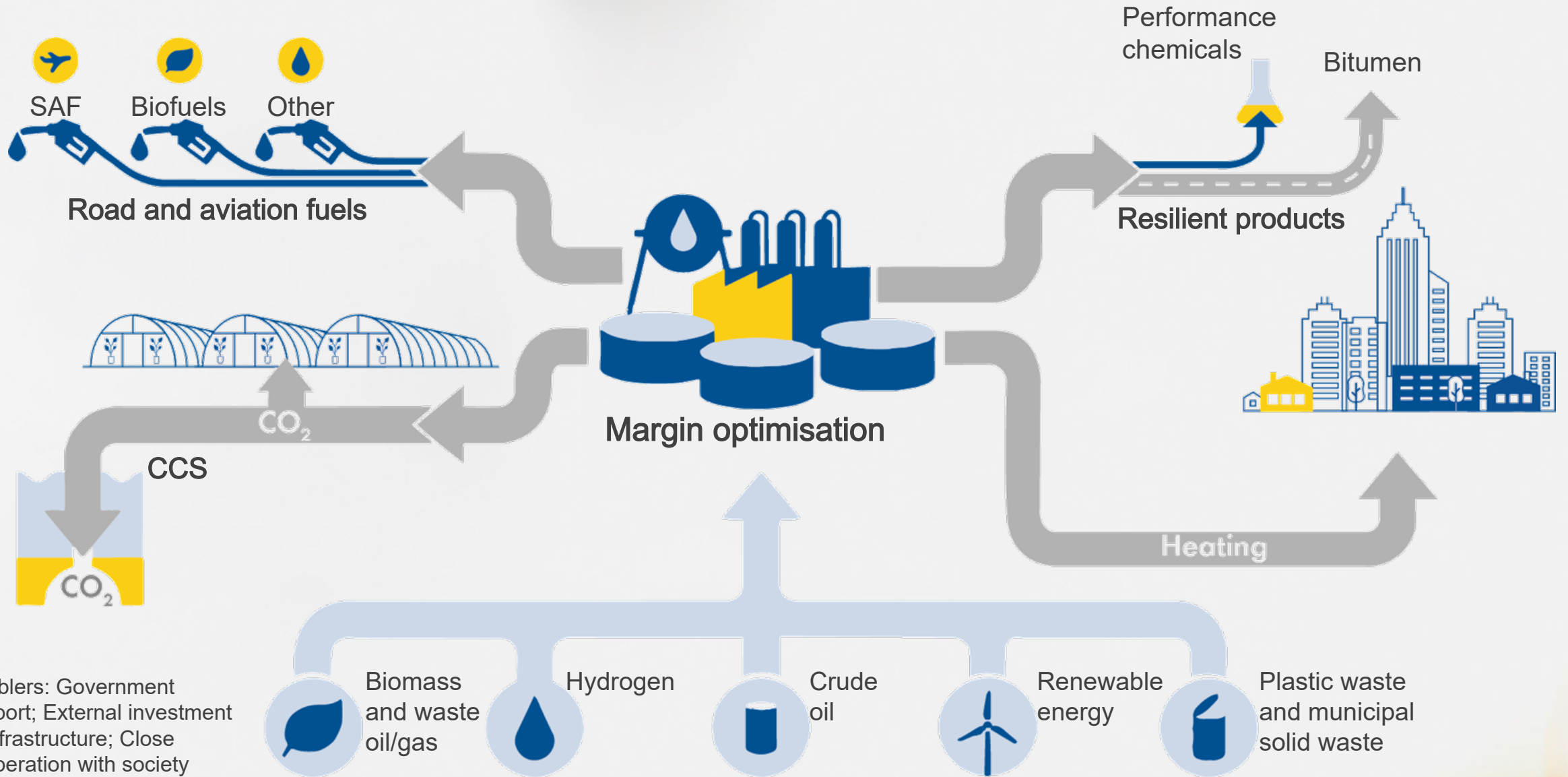
# Introducing Shell Pernis Europe's largest refinery

- 400,000 bpd capacity
- 550 hectare site = 1000 football fields
- High complexity means many crude types can be processed
- Product slate includes cleaner fuels and lubricants and chemicals

**Pernis' transformation to an integrated energy and chemical park that delivers low-carbon products is underway**



# Shell Energy and Chemicals Park Rotterdam



Enablers: Government support; External investment in infrastructure; Close cooperation with society

# Pernis decarbonisation pathways

- A
- B
- C

Pathway 1:  
**INCREASE ENERGY EFFICIENCY**



Pathway 2:  
**MAKE LOWER -CARBON ENERGY PRODUCTS**



Pathway 3:  
**STORE THE REMAINING EMISSIONS**



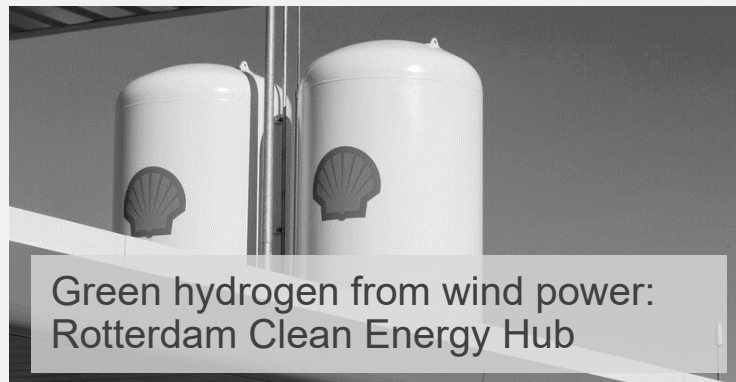
Residual heat to homes: Residual Heat Initiative



**Biofuels:** Shell Renewable Refining Process



Energy efficiency



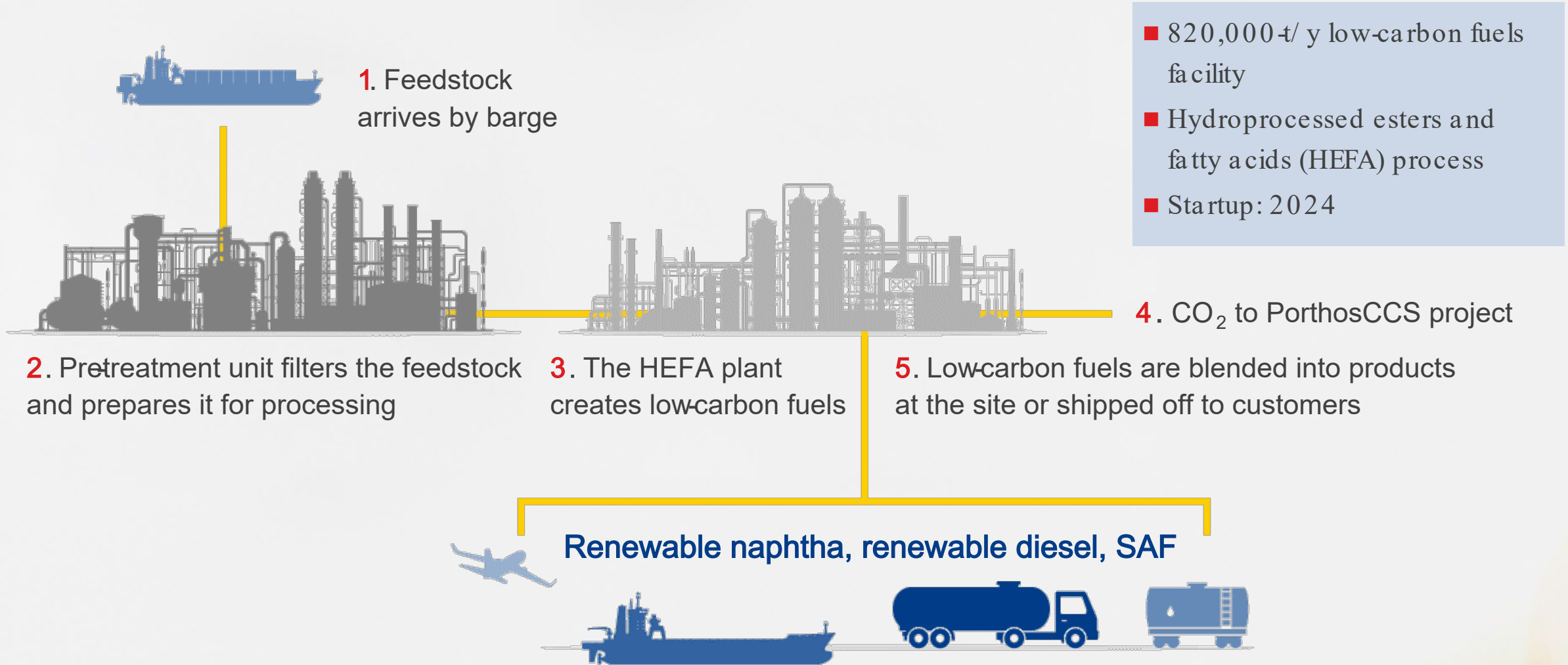
Green hydrogen from wind power: Rotterdam Clean Energy Hub



CCS: Porthosand Aramis projects

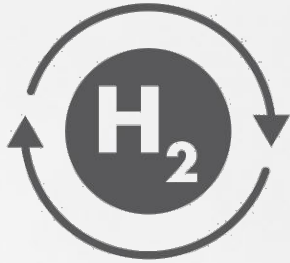
# Making low-carbon energy products with the Shell Renewable Refining Process

from 100% biofeeds



The **lowest carbon intensity biofuels**

of any HEFA unit worldwide?



### Partially renewable hydrogen

- The HEFA unit's hydrogen will be provided by a new hydrogen plant
- Most of the power supply comes from the process' residual gases, which originate from renewable sources

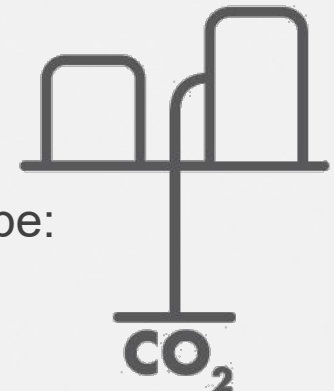
⇒ **much lower carbon intensity than regular hydrogen**

---

### CO<sub>2</sub> storage

CO<sub>2</sub> released by the process will be:

- captured (by ADIP ULTRA)
- stored under the North Sea via the Porthos pipeline



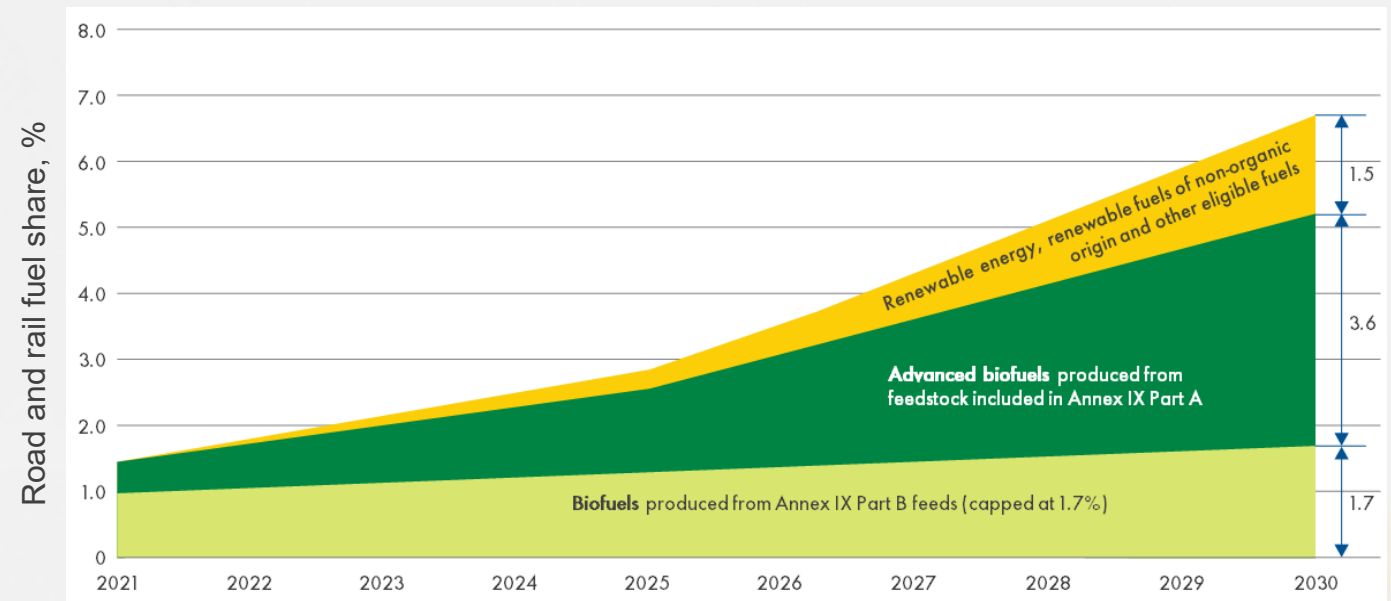


**Future proofing is key** : HVO technologies will need to evolve to process more challenging feeds

In the USA, feeds with a lower carbon intensity provide a profit improvement opportunity



In Europe, RED II is set to cap the easier feeds

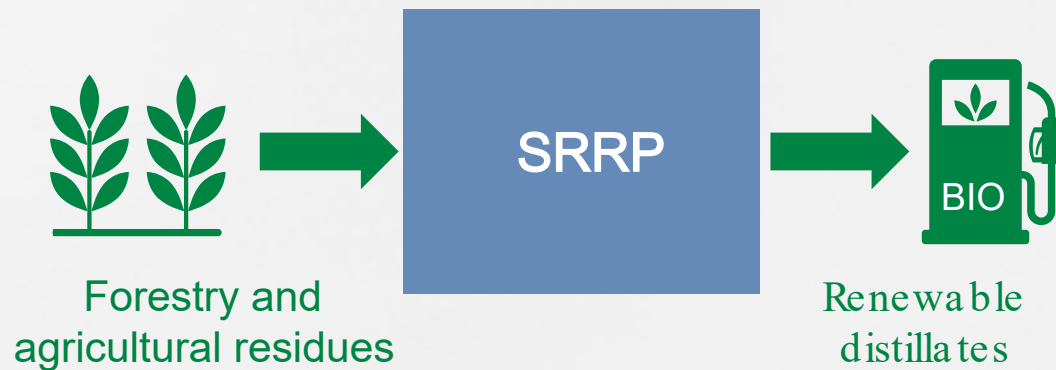


# Moving to **more challenging future feeds**

: Two options

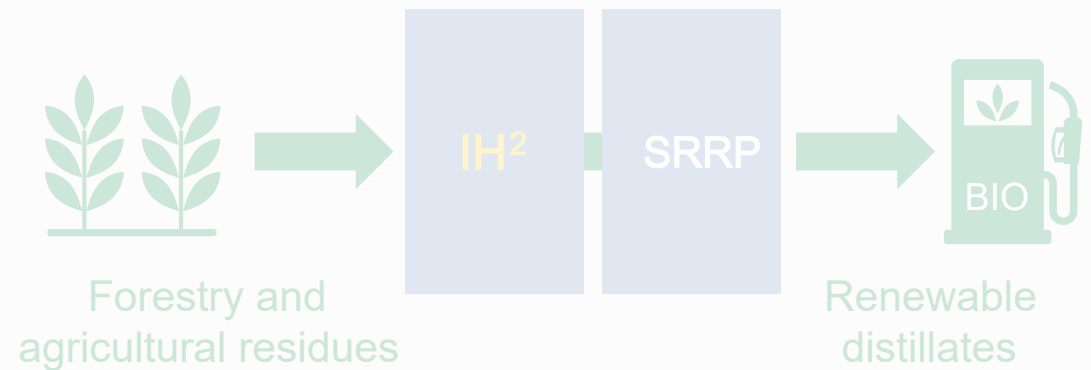
## 1. Ongoing SRRP R&D is targeting more challenging feeds

Realworld operating experience will provide valuable insights to help make this happen



## 2. A phased investment strategy

IH<sup>2</sup> can process non-food organic waste such as forestry and agricultural residues, aquatic plants and even plastic



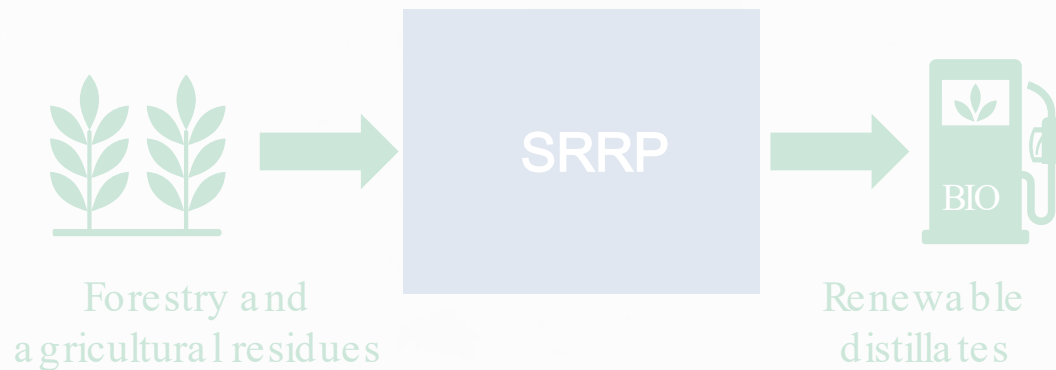
Significant equipment overlaps mean that this would not require a double investment

# Moving to **more challenging future feeds**

: Two options

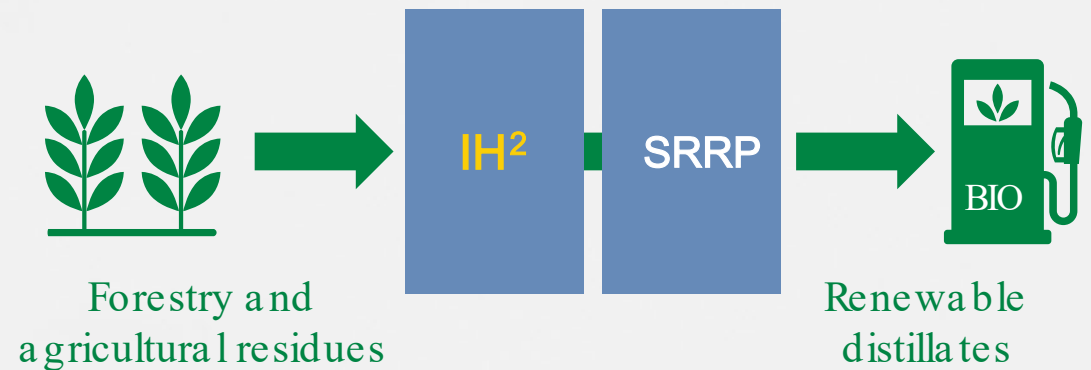
## 1. Ongoing SRRP R&D is targeting more challenging feeds

Real-world operating experience will provide valuable insights to help make this happen



## 2. A phased investment strategy

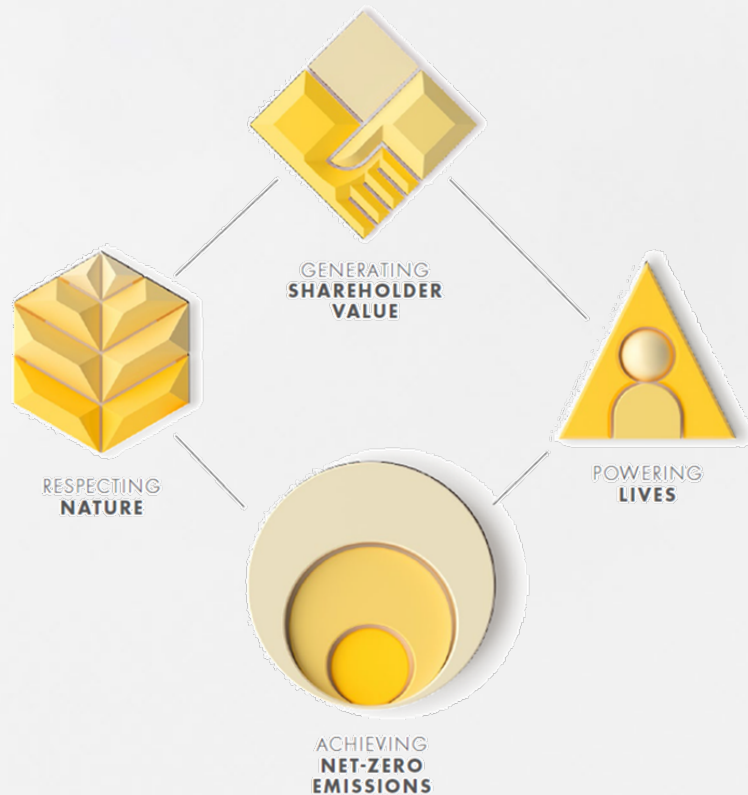
IH<sup>2</sup> can process non-food organic waste such as forestry and agricultural residues, aquatic plants and even plastic



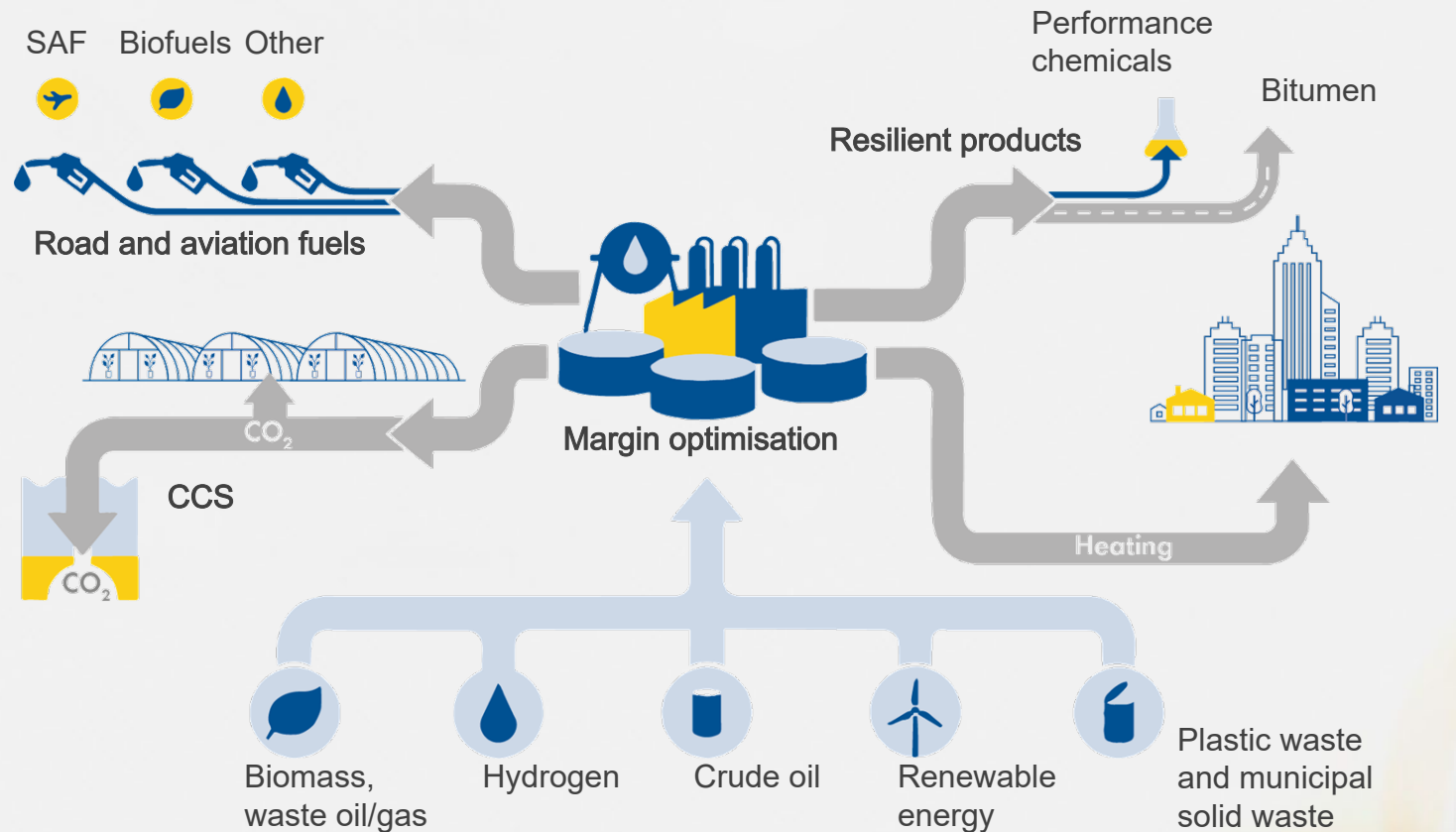
Significant equipment overlaps mean that this would not require a double investment

# Key takeaways

Powering Progress sets out our strategy to accelerate the transition of our business to net-zero emissions



At Pernis, a wide range of decarbonisation activities are underway, including making low-carbon energy products from 100% biofeeds with the Shell Renewable Refining Process



# Q&A



