

Navigating the e-fuel landscape: demand drivers, cost and willingness to pay **REDACTED SAMPLE**

A Market Report by Aurora Energy Research
February 2025



Our E-fuels Report offers an in-depth view of the European e-fuel market development, cost drivers and acceleration factors for uptake

- In Aurora's Report *Navigating the e-fuel landscape*, we answer the most important questions on cost, market and pricing dynamics of four key e-fuels: Ammonia, Methanol, e-Kerosene and e-Methane. These include:
 - Is European production of e-fuels competitive in the face of international imports?
 - What are the most promising e-fuels?
 - How do costs change under different business models for e-fuel producers?
 - How large is the gap between levelised cost of production and the willingness to pay?
 - What will determine the competitive advantage of e-fuel producers in Europe?
 - How can the 'missing money' gap be closed?
- With the Report you receive a supporting data book and one 2-hour sessions with the authors of the report and other hydrogen experts to discuss the findings.



Report

140 Powerpoint slide in pdf format



Expert session

A 2-hour session with the authors of the Report to discuss the results



Excel data book

Including all key inputs and outputs of the analysis in the Report

Credentials

Aurora has extensive experience across the entire hydrogen value chain and is well placed to provide in-depth analysis of e-fuels and their role in Europe's decarbonisation journey.

Throughout Europe we have advised utilities, financial institutions and asset owners on the supply and demand dynamics of the emerging hydrogen market.

Aurora's price outlooks are regularly tested by a large subscriber base when it comes to financing investment decisions.

We are delighted to offer this in-depth Report to you.

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The EU's Fit for 55 package is the main policy and regulatory driver for the development of the e-fuel sector

Example page
from Report
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A U R  R A

Following the climate targets set in the Paris Agreement, the European Council and the European Commission established the European Green Deal in 2019, setting out the EU's climate strategy. A policy framework has been constructed to implement the Green Deal, and many parts of which engage with the e-fuel industry.

Direct e-fuel policy frameworks

Renewable Energy Directive (RED) III RFNBO¹ targets

1 Deep-dive

The overall EU target for renewable energy sources consumption by 2030.

ReFuelEU aviation

2 Deep-dive

Mandates that aims to reduce aviation's carbon emissions by increasing the use of sustainable aviation fuels.

FuelEU maritime

3 Deep-dive

Mandates that aims to reduce greenhouse gas emissions from the shipping industry.

Alternative Fuels Infrastructure Regulation (AFIR)

Targets that aims to allow for an easier use, more reliable, and more accessible charge and refuel of vehicles and ships with alternative fuels.

Combustible car ban from 2035, e-fuel exemption

In 2023, the EU agreed to ban the sale of new combustion engine cars from 2035 onwards, except for cars that run exclusively on e-fuels.

Indirect e-fuel policy frameworks

EU Emissions Trading System (ETS) Reform²

The system puts a price on carbon. Every year, entities covered by the ETS have to buy "allowances" corresponding to their emissions.

EU Carbon Border Adjustment Mechanism (EU CBAM)

Tool to put a fair price on the carbon emitted during the production of carbon intensive goods that are entering the EU.

Innovation Fund

Fund aimed at delivering the commitments under the Paris Agreement and the climate and energy priorities set by policy packages.

E-fuel regulatory framework

RED III regulatory framework

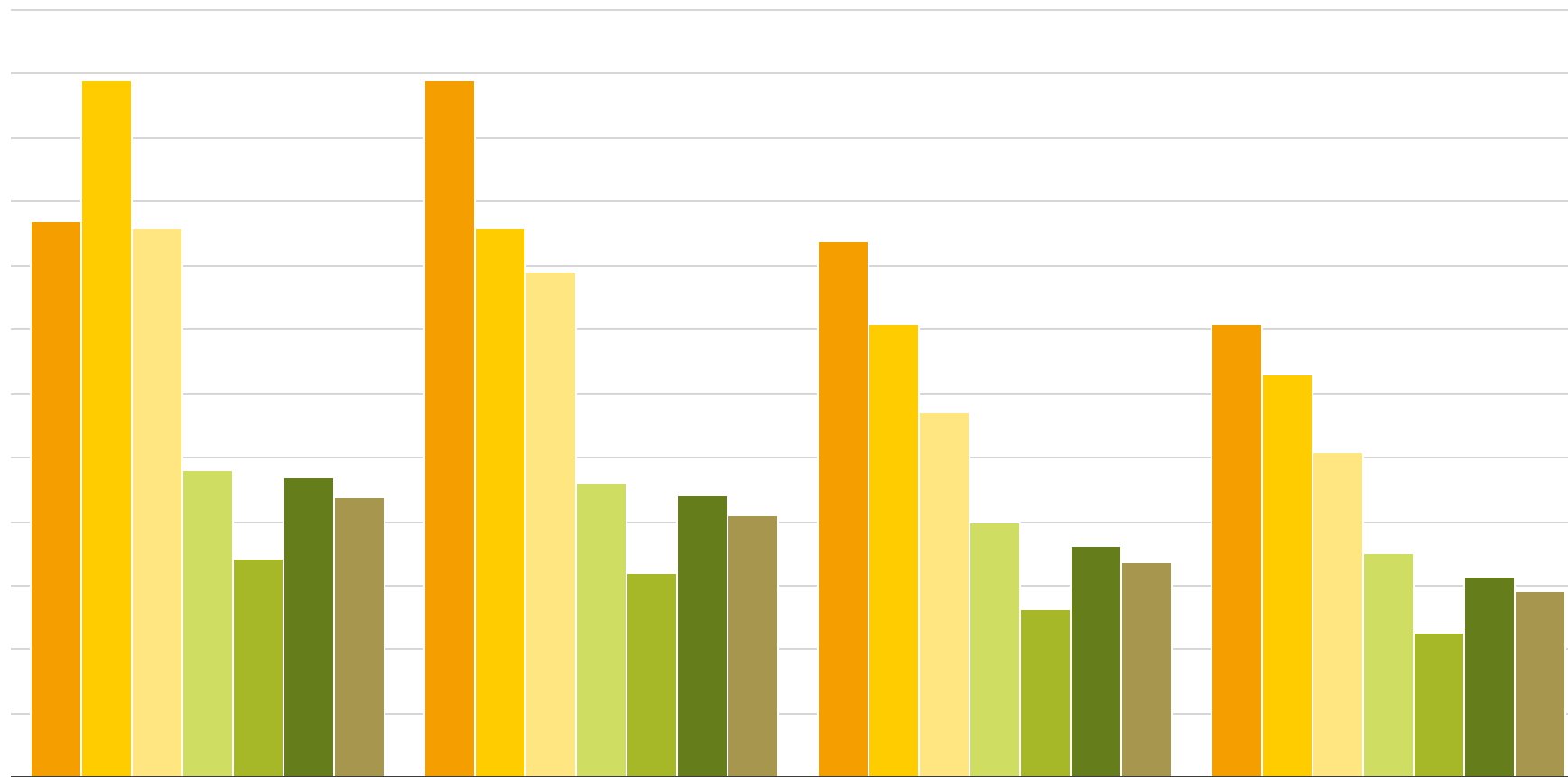
The Renewable Energy Directive³ is the legal framework for the development of clean energy across all sectors of the EU economy.

Frameworks

1) Renewable fuel of non-biological origin, include renewable hydrogen and its derivatives. 2) The reform under "Fit for 55" reduces the number of allowances on the market and increases funding for decarbonisation. 3) Commission Delegated Regulations (EU) 2023/1184 and (EU) 2023/1185.

Hydrogen costs are heavily depending on the country, where grid usage allows for significantly lower costs

Green hydrogen cost (LCOH) for different COD years, PEM electrolyser
€/XX (real 2023)

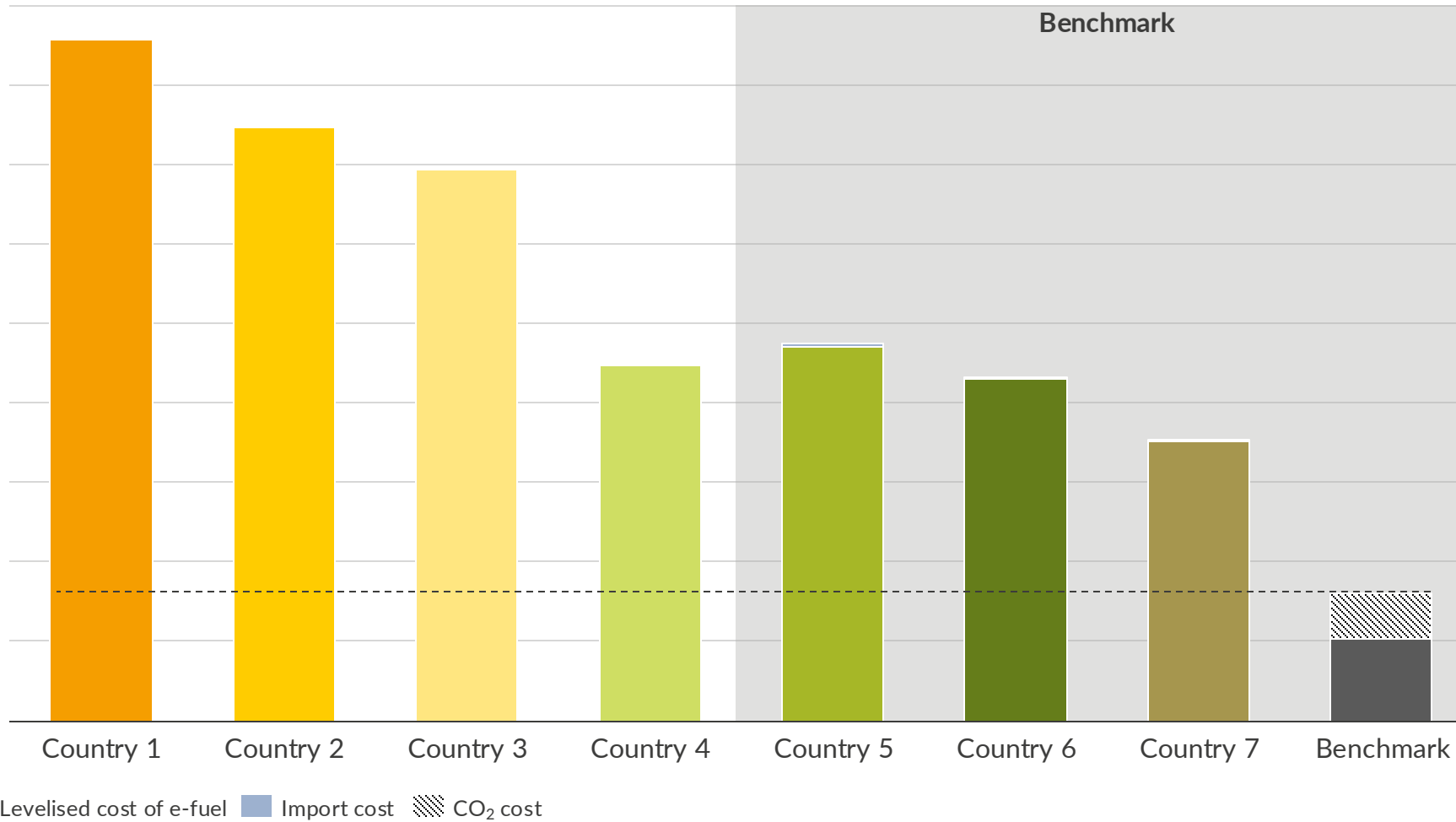


Country 1 Country 2 Country 3 Country 4 Country 5 Country 6 Country 7

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E-kerosene remains significantly more expensive compared to fossil fuel

Levelised cost of e-kerosene in 2030 and benchmark
€/XXX (real 2023)

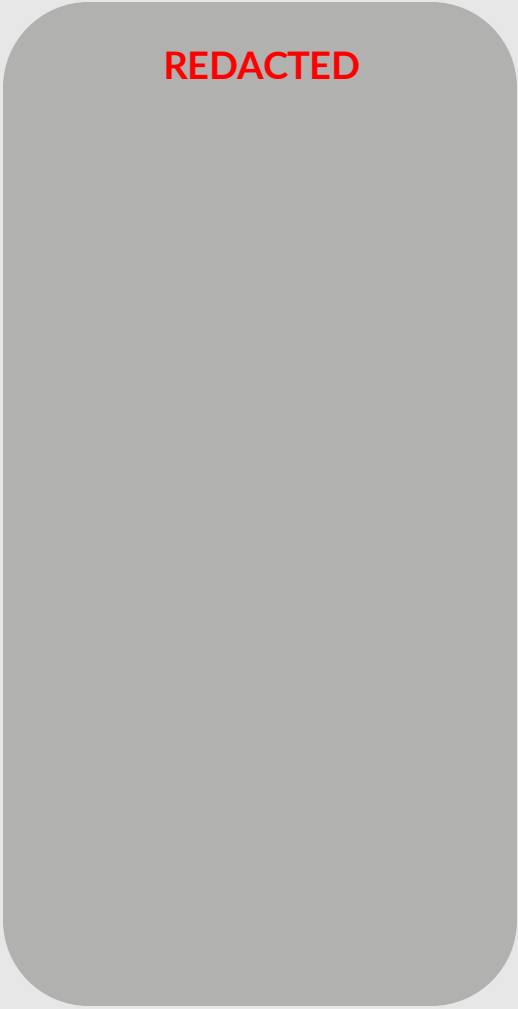
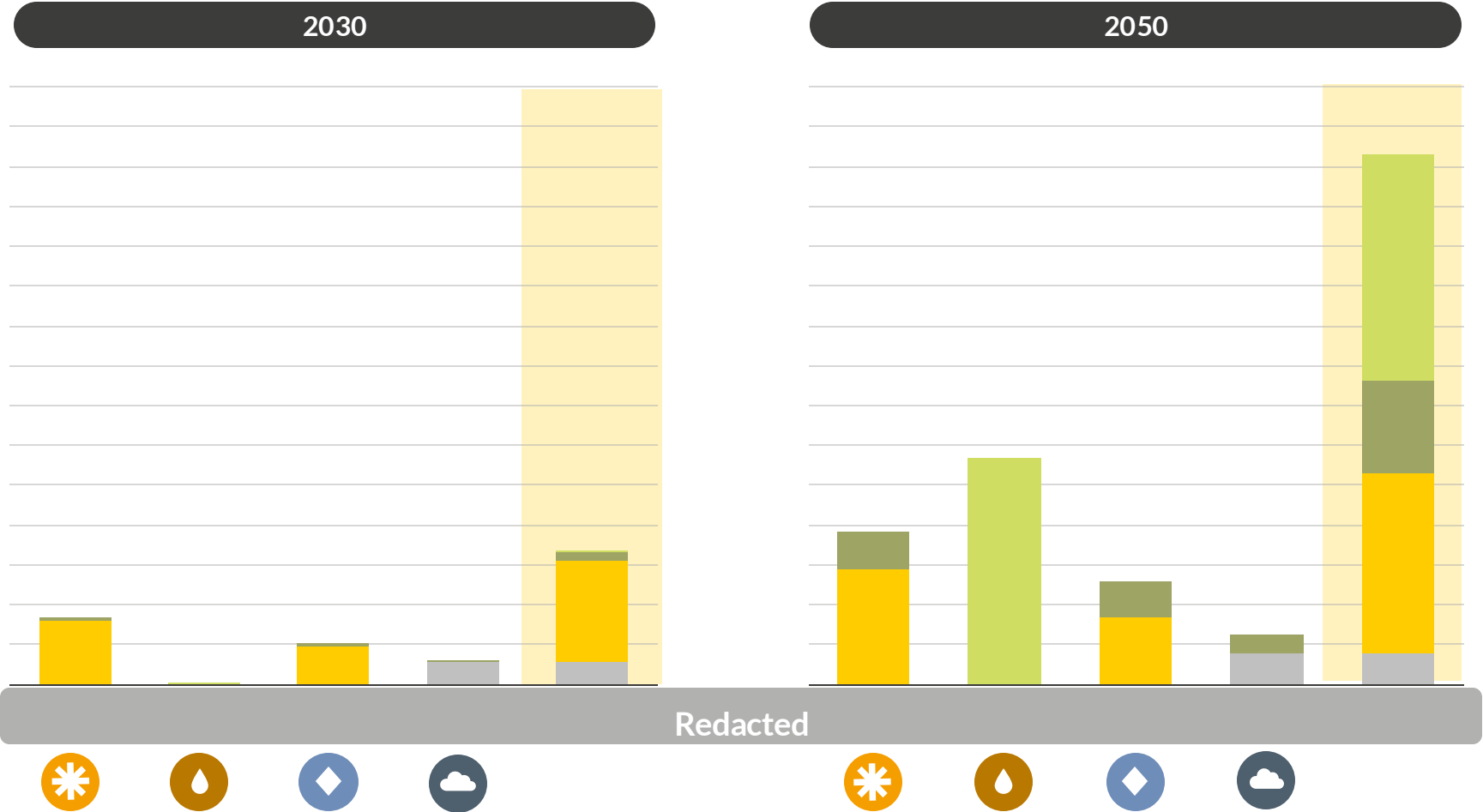


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E-fuel potential market size is XXX by 2030 and XXX by 2050

Final energy consumption, energy use, by “e-fuel relevant” sectors in the EU¹

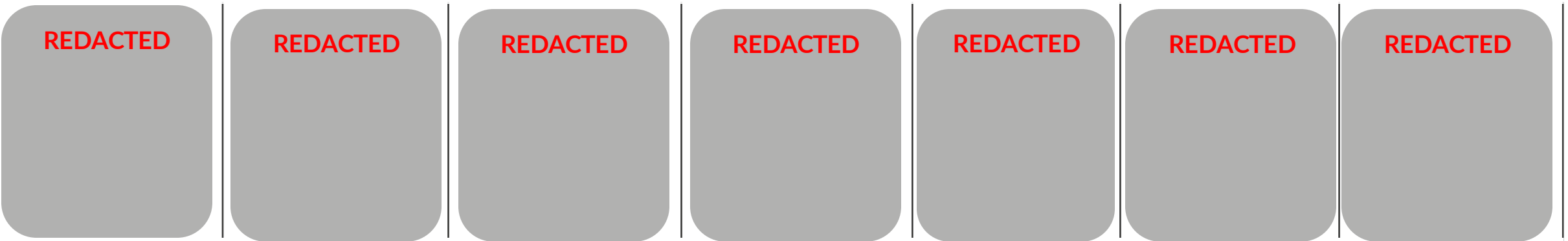
Unit



1) The EU e-fuel potential market sizing is calculated for the 27 European Union countries.

E-fuel floor WtP accounts for current grey fuel prices, avoided penalties related to carbon costs and quota non-compliance

Illustrative levelised floor WtP¹ for RFNBO e-fuels, EU (COD 2030)
€/kg (real 2023)

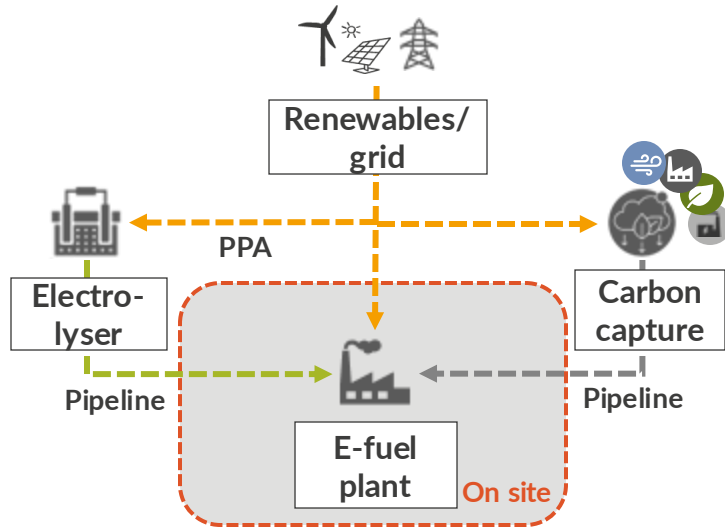


Price of grey fuel
 Carbon costs
 Avoided penalties - non-compliance
 Subsidies
 Floor WtP
 Required green premium
 LCOe-fuel

1) WtP: Willingness to pay.

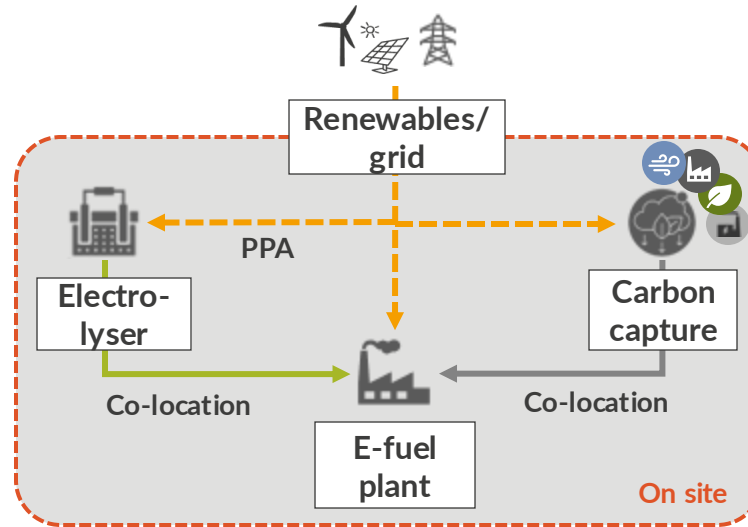
Aurora has constructed a high cost and low cost project set-up sensitivity on the LCOe-fuel

High cost scenario



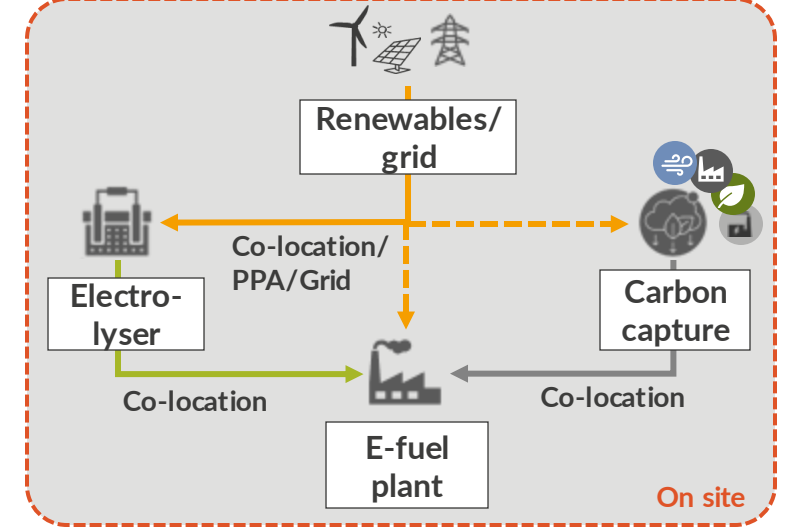
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Base scenario



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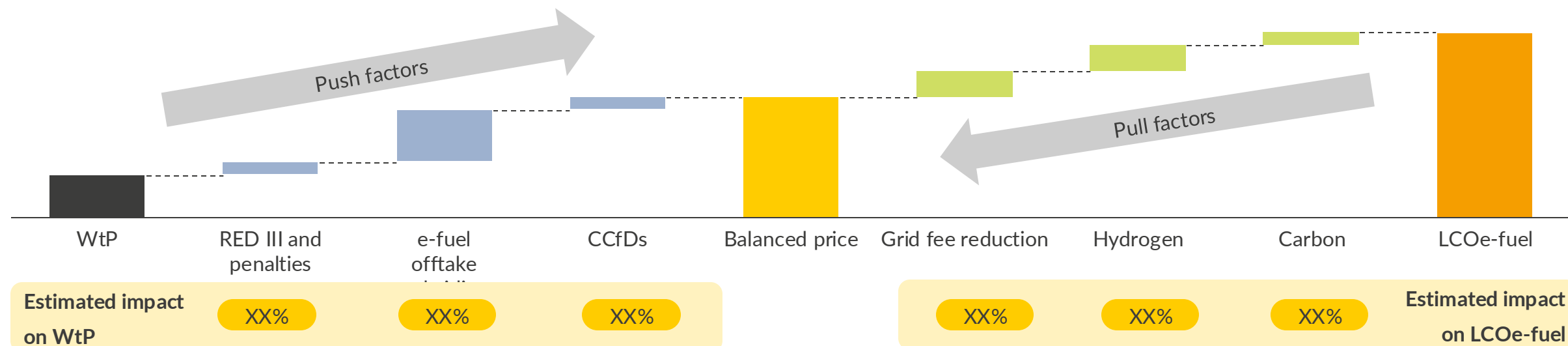
Low cost scenario



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Bridging the gap between WtP and LCOe-fuel will require a combination of policy and regulatory push and pull factors

Illustrative cost and WtP¹ for RFNBO e-fuels
€/kg (real 2023)



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1 Deep-dive

2 Deep-dive

3 Deep-dive

4 Deep-dive

5 Deep-dive

■ WtP ■ Push factors ■ Final price ■ Pull factors ■ LCOe-fuel

1) Willingness to pay.

Contact the authors of the report and experts who have contributed to address any questions



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