

Decarbonisation roadmap for bitumen

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Bitumen users



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How does bitumen contribute to the decarbonisation of downstream applications?

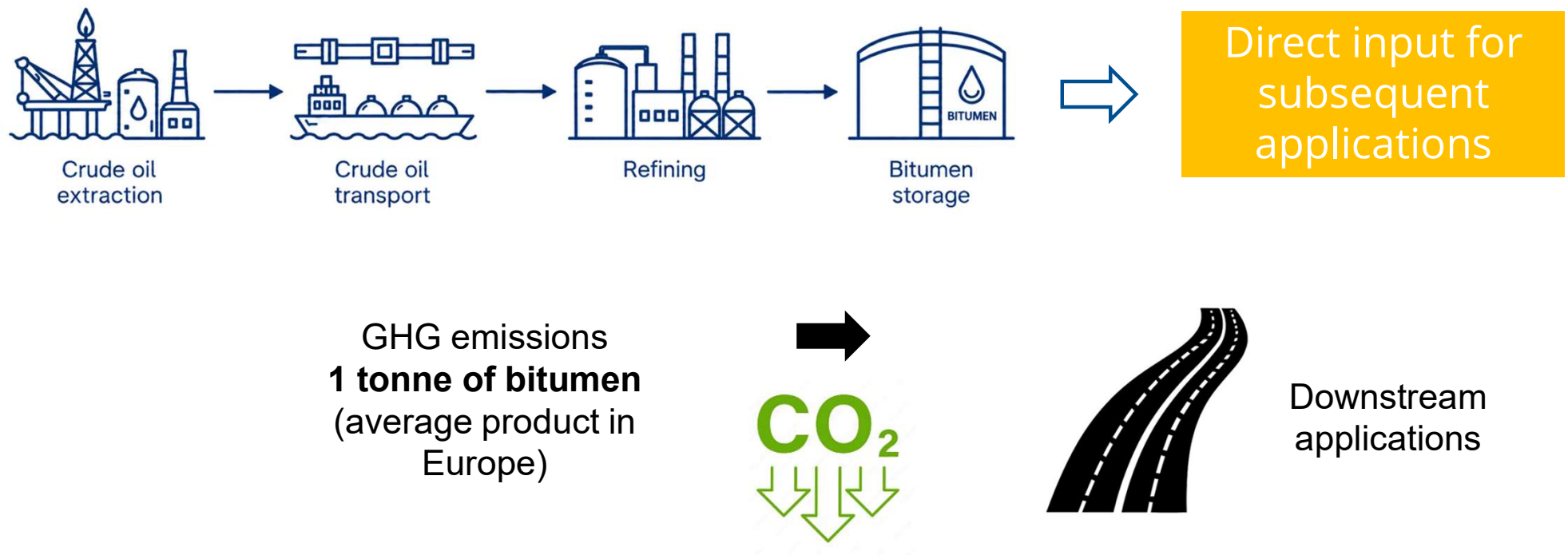


Decarbonisation roadmap

Collective, realistic & ambitious target of the European bitumen industry

Developped with the support of Deloitte

Scope: cradle to gate



Reference year & time coverage

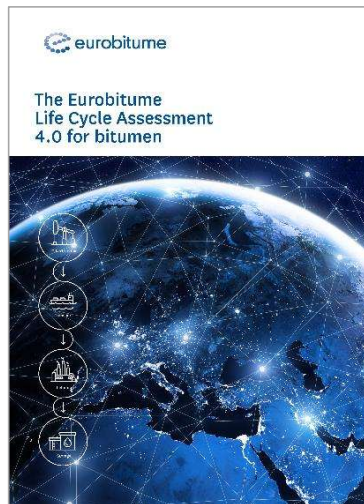
1990

Retrospective scenario



2023

Reference year
LCA 4.0



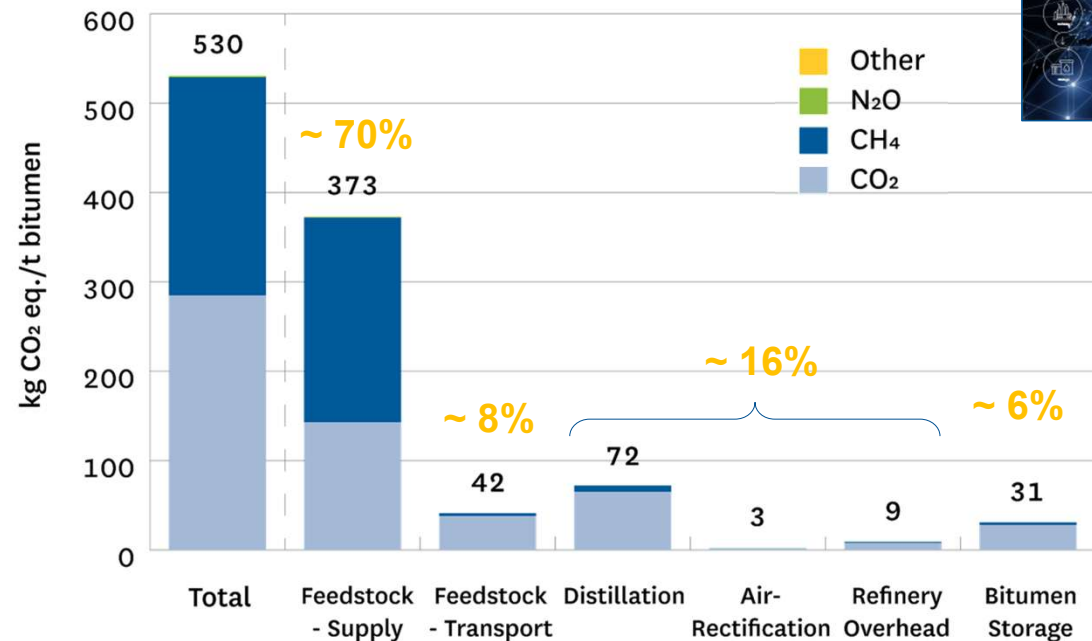
2030-2050

Future scenario

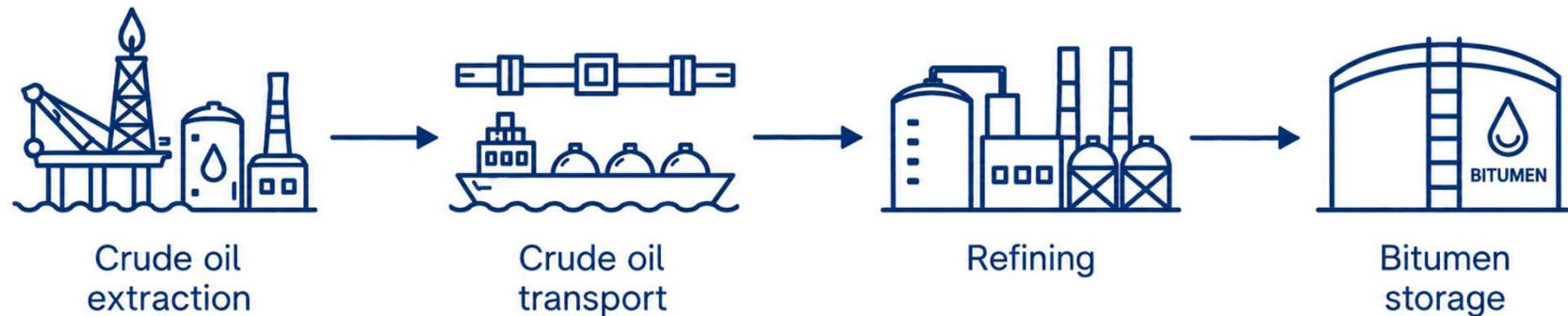


LCA 4.0 as foundation for the roadmap

- Crude oil extraction: **~ 70 % of GHG emissions of bitumen**
- **Key parameters**
 - Importance of the **database** used for the crude oil (country-specific)
 - Importance of the **crude oil basket**
 - Importance of the modelling of methane emissions (LCA 4.0: Global Methane Tracker of the IEA): **> 50 % of GHG emissions of crude oil**



Estimation of GHG emissions in 1990 (vs. 2023)



- Reduction of methane emissions (venting to flaring)
- Energy efficiency

$\text{CH}_4 \times 1,5$

$\text{CO}_2 \times 1,6$

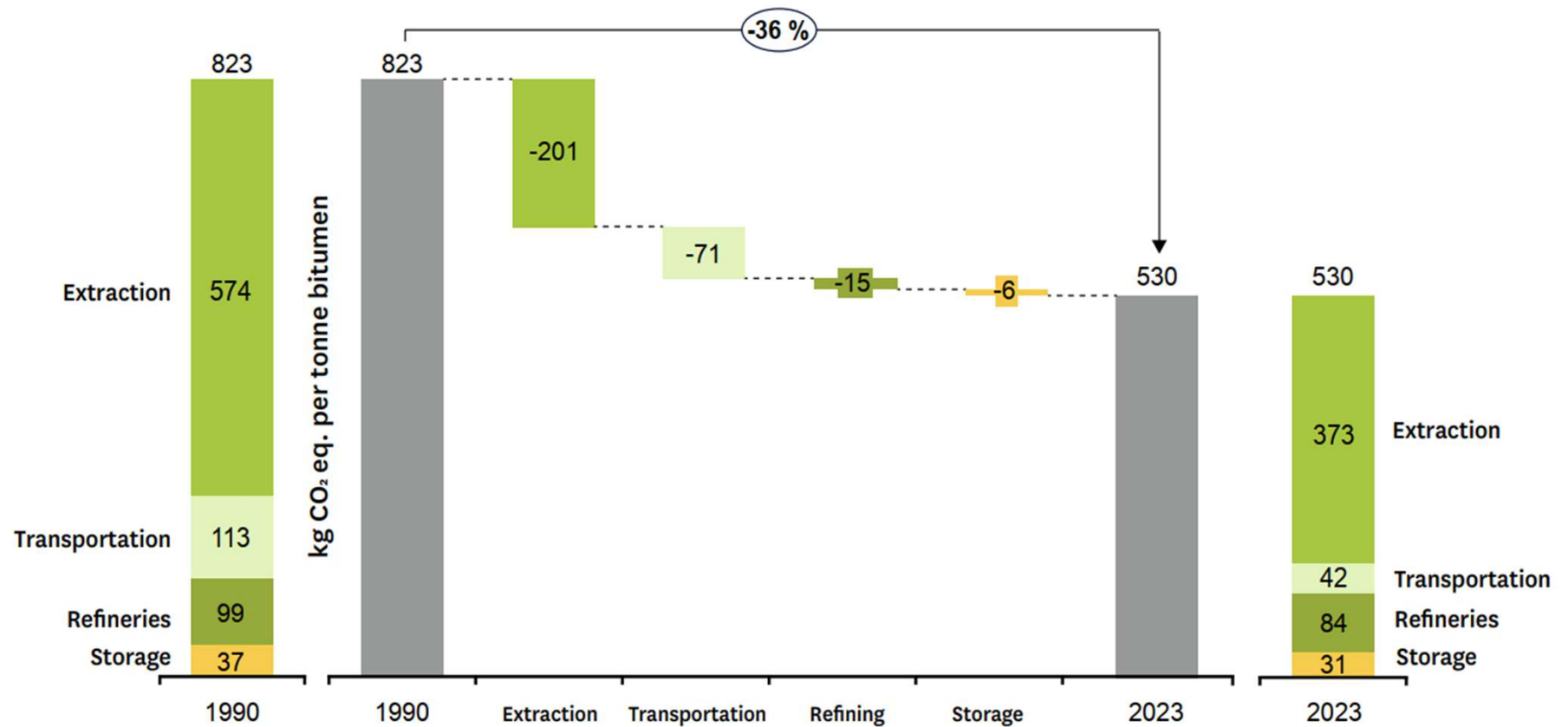
- Enhanced ship design
- Larger vessels size
- Optimised operational speed

$\text{CO}_2 \times 2,7$

- Energy efficiency (heat recovery systems, energy savings, heat integration, more efficient equipment)

$\text{CO}_2 \times 1,2$

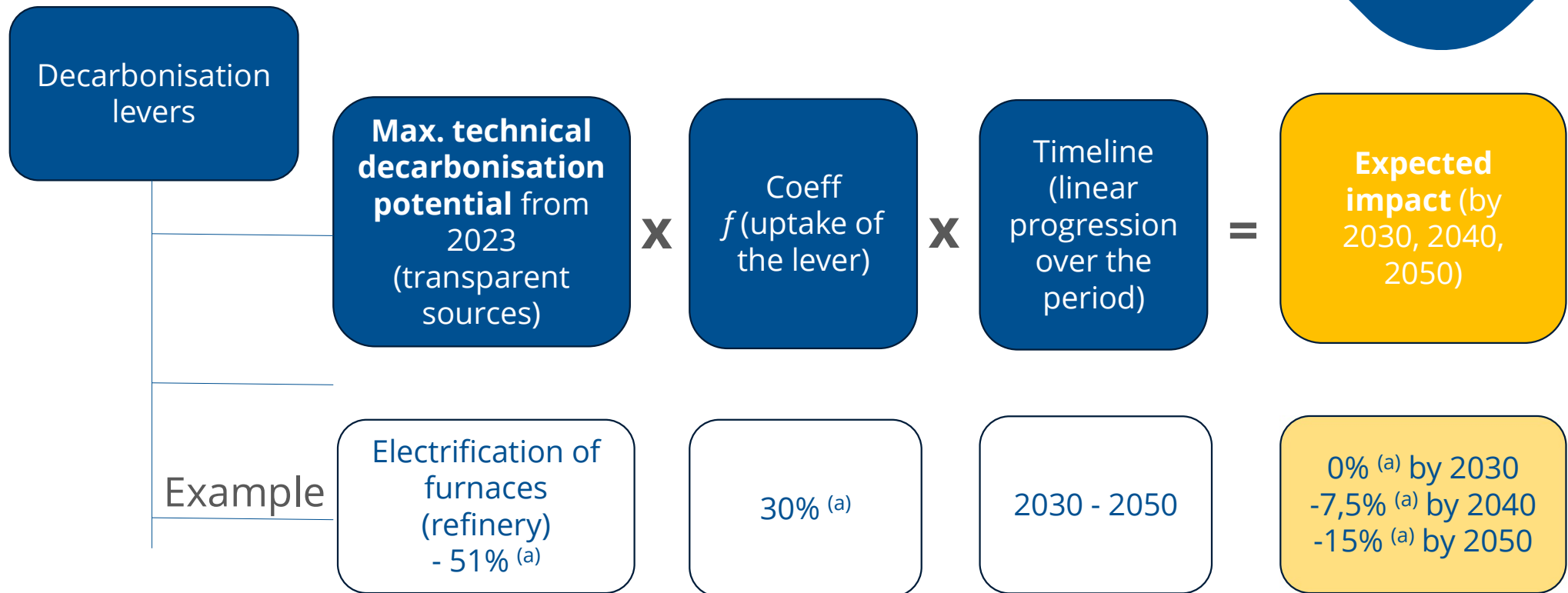
Estimation of the evolution of cradle-to-gate bitumen emissions from 1990 to 2023



Analysis of the decarbonization levers by 2050

	LCA share	Decarbonisation levers	Expected impact	Feasibility
Crude oil extraction	70%	Minimize leaks and conduct regular leak detection and repair (LDAR)	Medium	High
		Minimize venting (e.g. Venting recovery units)	Medium	High
		Electrification of auxiliary equipment (e.g., pumps, compressors)	Medium	Medium
		Application of CCS technologies	High	Low
		Improve flaring	Medium	High
		OGMP 2.0 reporting (level 4 & 5)	Indirect	Medium
Transportation	8%	Switch tankers from Heavy Fuel Oil (HFO) to Liquefied Natural Gas (LNG)	Medium	Medium
		Switch tankers from HFO/LNG to low-carbon fuels	High	Low
		Electrification in short-sea & inland, as well as hybrid systems for deep-sea	Medium	Medium
		Electrification in pipeline operations	Medium	Medium
		Increasing pipeline use over tanker routes	High	Low
		Optimisation of transport distances	Low	Medium
Refineries	16%	Electrification of furnaces (heat)	High	Medium
		Replacement of heavy oil with natural gas-fired furnace	Medium	Medium
		Continued improvements in overall energy efficiency	Low	Medium
		Use of low-carbon fuels for heating purposes	High	Low
Storage	6%	Electrification of storage heating	High	Medium
		Continued improvements in overall energy efficiency	Medium	Low

Calculation - Methodology



^(a) GHG reduction (% / 2023) at the refinery stage

Assumptions & sources

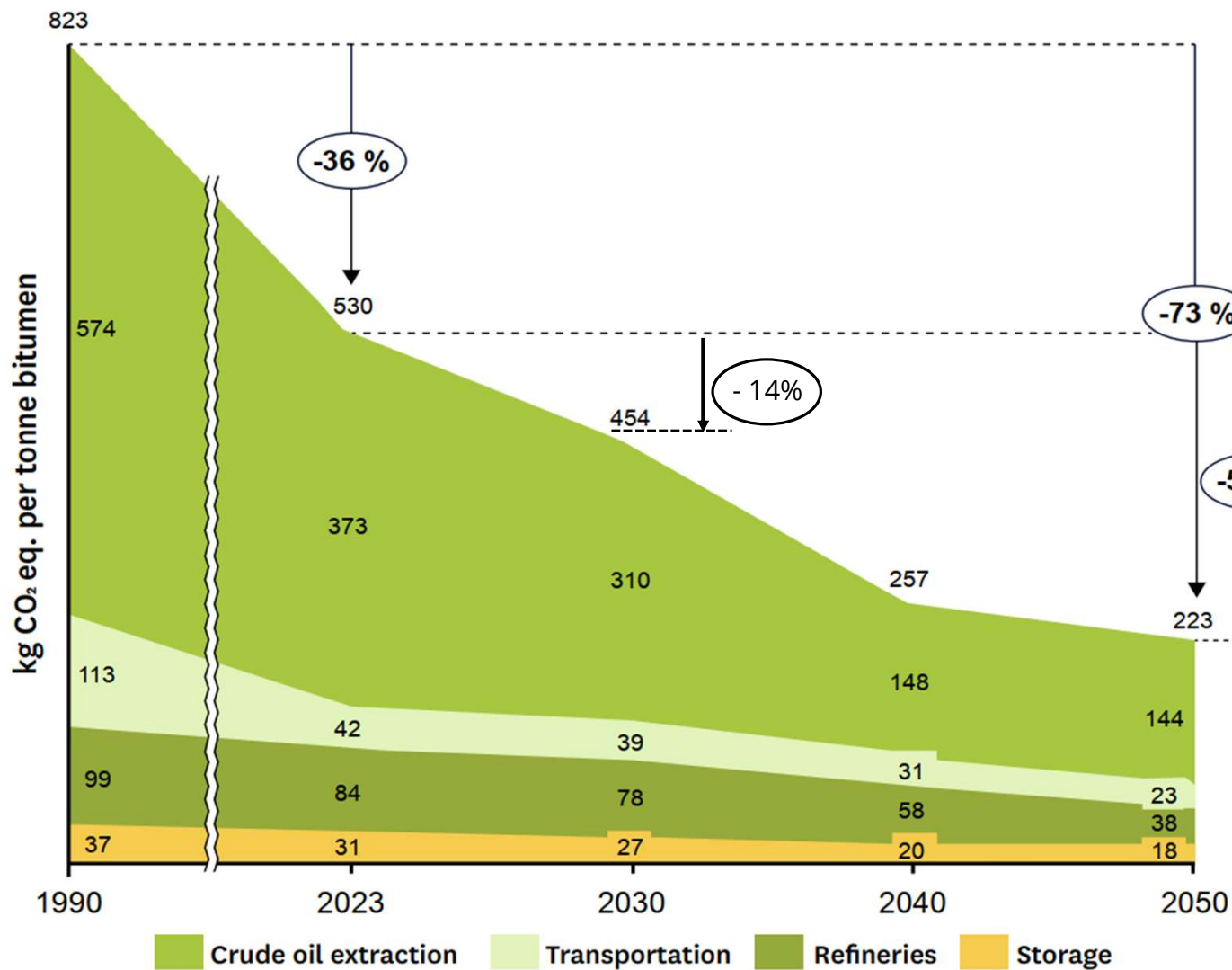
- Description of the lever
- Technical reduction potential
- Justification & sources
- Uptake coefficient
- Update justification
- Result (quantification of the reduction)

eurobitume

Crude Oil Extraction

Decarbonisation lever	Technical Reduction Potential	Justification Sources for Technical Reduction Potential	% Supply Chain Step Emissions Covered by Lever	Uptake of Lever	Uptake Justification	Reduction Applied to Value Chain Step
Use equipment designed to minimize leaks and conduct regular leak detection and repair (LDAR)	-18 %	Derived from IEA Methane Tracker "Annual, Biannual, Quarterly and Continuous LDAR", "Replace compressor seal or rod and pumps" methane abatement levers for offshore and onshore oil operations corrected for regions (Africa, Middle East, North America, South & Central America) Link	61 %	100 %	Reduction potential of IEA methane tracker already accounts for market uptake. Regions included: Europe, Africa, Middle East, North America, Central & South America.	-11 %
Implement methane management systems to minimize venting and uncontrolled gas releases	-36 %	Derived from IEA Methane Tracker "Vapor recovery units", "Associated gas utilisation", "blowdown capture", "Replace with instrument air systems" methane abatement levers for offshore and onshore oil operations corrected for regions (Europe, Africa, Middle East, North America, South & Central America) Link	61 %	100 %	Same as Above	-22 %
Electrification of auxiliary equipment (e.g., pumps, compressors) [Methane impact]	-8 %	Derived from IEA Methane Tracker "replace with electric motor" methane abatement lever for offshore and onshore oil operations corrected for regions (Europe, Africa, Middle East, North America, South & Central America) Link	61 %	100 %	Same as Above	-5 %

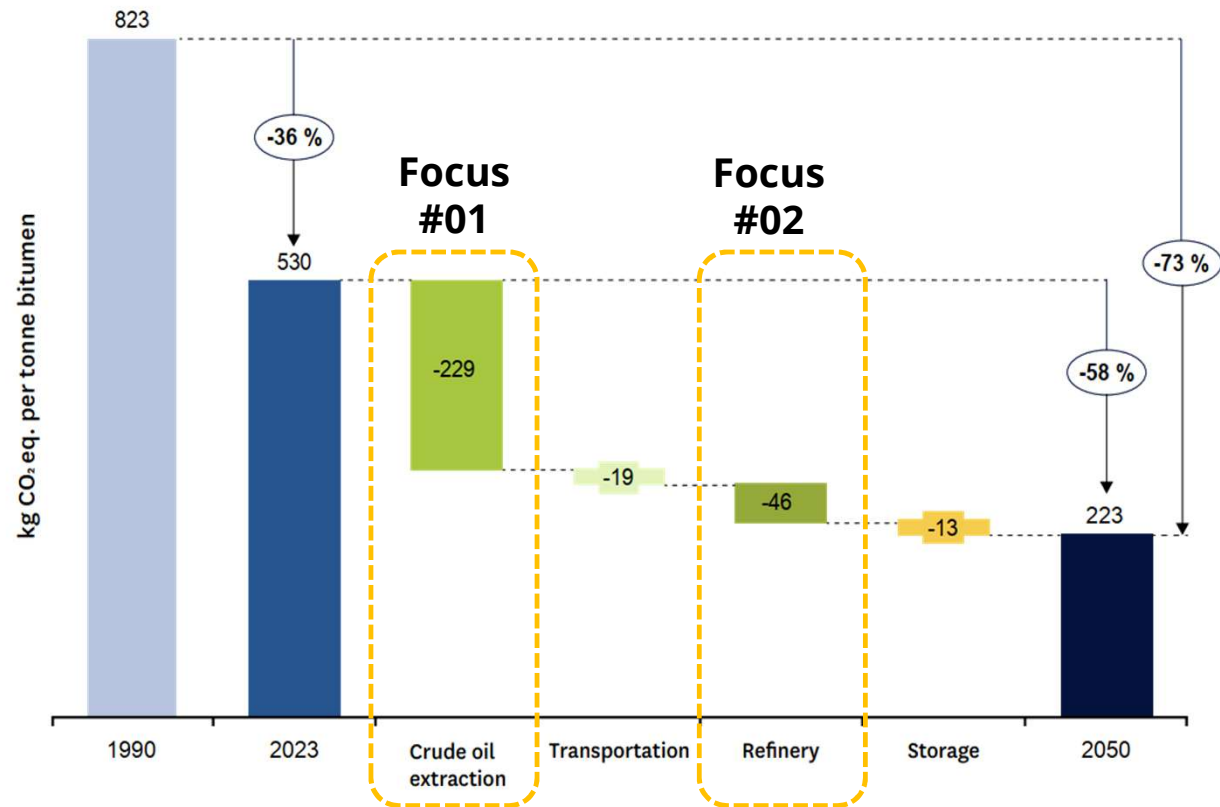
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Decarbonisation
roadmap 1990 ->
2050

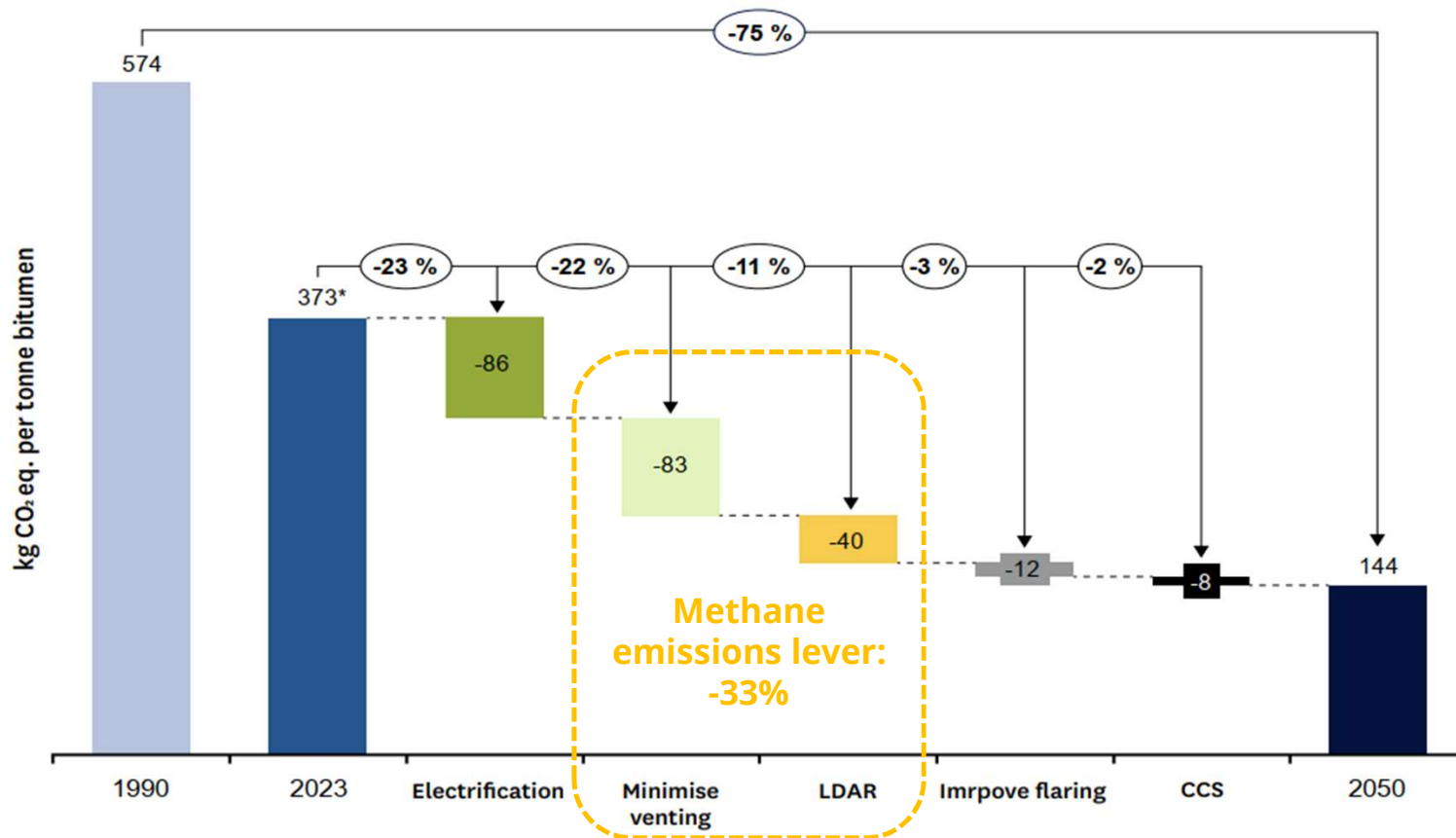
Decarbonisation roadmap

- By production stage
- 1990 - 2050



Focus #01

Crude oil extraction

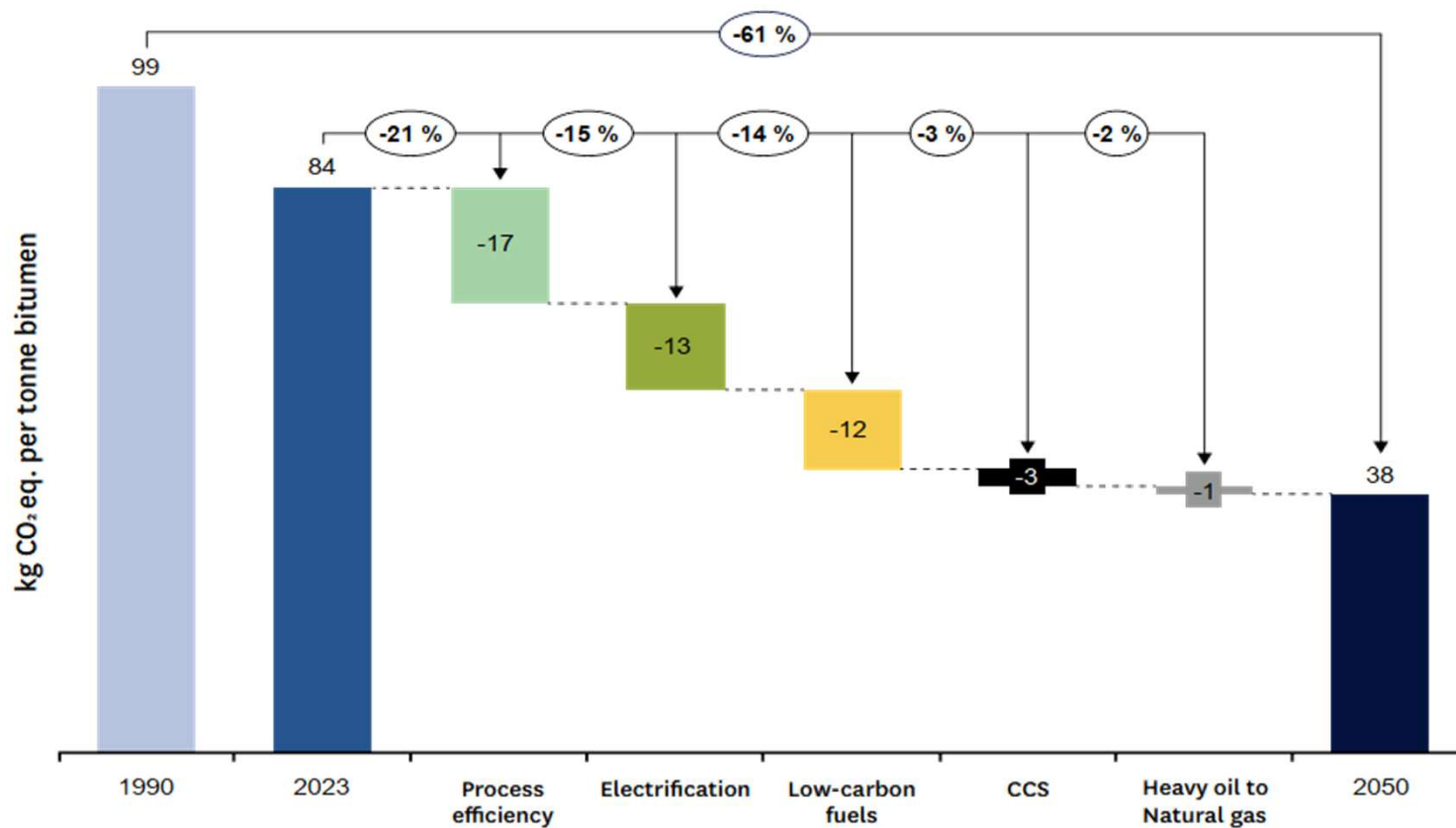


* Main source: IEA
Methane Tracker

LDAR: Leak detection
and repair
CCS: Carbon capture
and storage

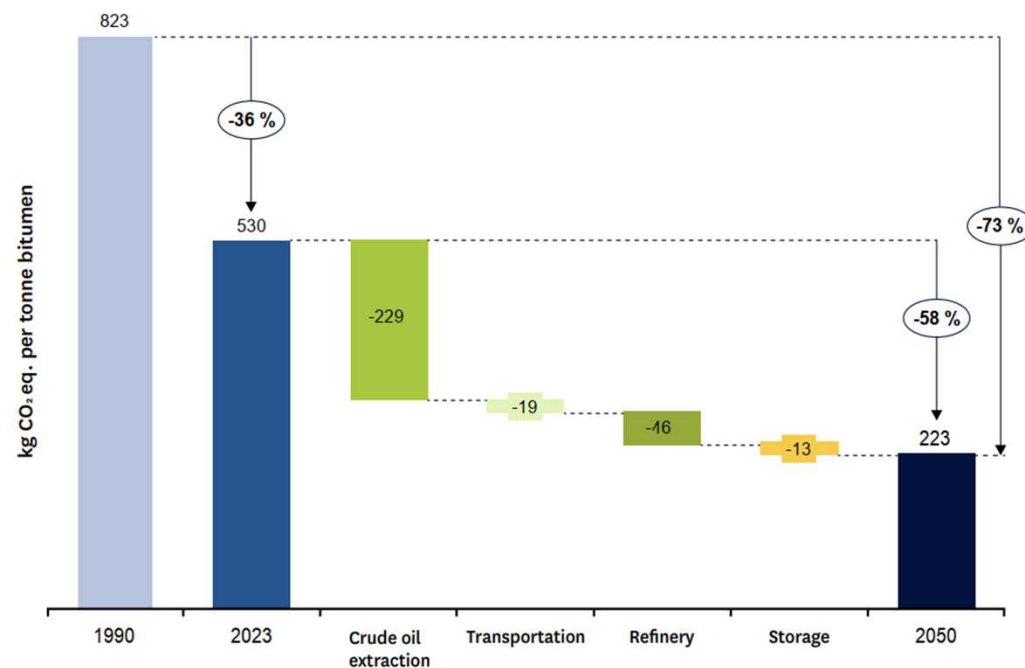
Focus #02

Refinery processes



Key success factors

- Reliable access to **low-carbon electricity** and **low-carbon fuel** at competitive costs
- **Supplier engagement**
 - Bitumen producers have a limited operational control over crude oil extraction
 - But need to ensure that their crude oil suppliers enable them to comply with Methane Emissions Regulation



In summary



- A collective, realistic but ambitious objective for the European bitumen industry
- A significant input and contribution for downstream decarbonisation roadmaps
- Report publicly available
- **Next steps: Eurobitume Sustainability roadmap for bitumen (Q1 2027) will complete the sustainability picture**

Thank you!



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