

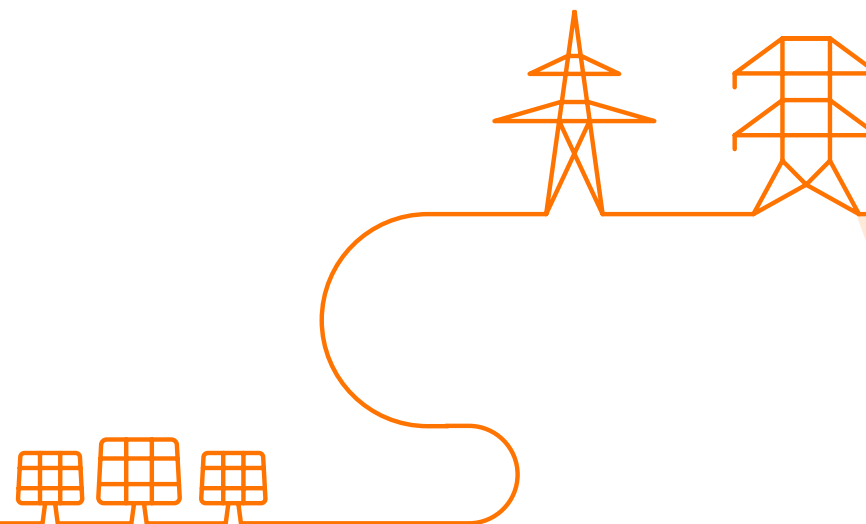
# WG Adequacy #32

27/08/2024

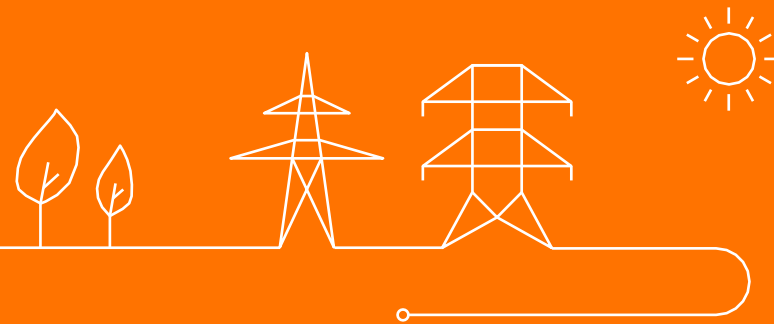


# Agenda

- Welcome
- Results PRICED study – load estimations
- CRM design update – baseline
- Next meetings



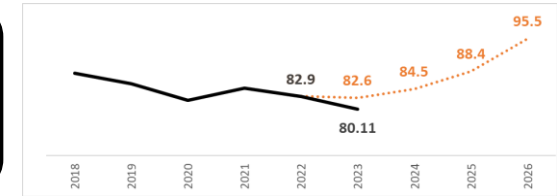
# Results PRICED study



# Study PRICED: Price-Linked Electricity Demand evolutions

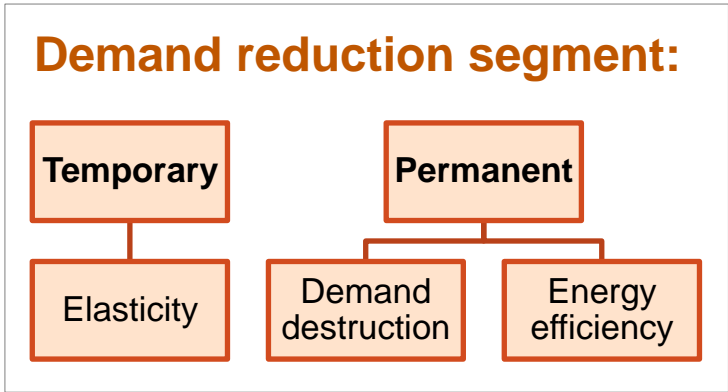
Why?

Review load projections considering the realised 2022 & 2023 load.



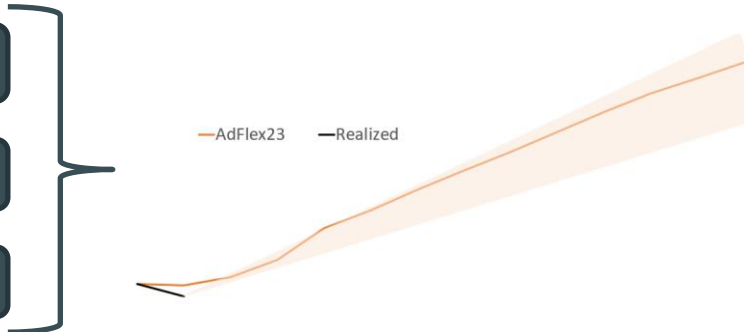
How?

Capture electricity demand evolution in the last 5 yrs related. do this per sectors and end-uses\*.  
  
Analyse sales of appliances data per energy efficiency



What?

- Definition of permanent demand destruction
- Electricity elasticity model
- Energy efficiency model



\*e.g.: residential – space heating, industry - chemicals



**Study PRICED  
Presentation by E-CUBE**

# ELIA - PRICED

Presentation to stakeholders

27 August 2024



# Agenda

1. Executive Summary
2. Industry
3. Residential
4. Tertiary

# Introduction

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## Context, objectives and scope of work

- As part of the preparation for the AdeqFlex 2025 study, Elia mandated E-CUBE to:
  - Identify what drove changes in electricity consumption in Belgium over 2019-2023, and how much each of the following drivers impacted consumption: electrification of end uses, energy efficiency, permanent demand destruction, elasticity of demand
  - Propose assumptions regarding energy efficiency of end uses from 2024 to 2035
- The scope of this work is limited to industry, residential (households), and tertiary (services) sectors. Transportation (incl. EV charging), data centers and agriculture are not within the scope of this study.
- This work should serve for Elia to define the price elasticity of electricity demand in order to sensitize future consumption as a function of electricity price

## Methods and sources

- This study relies on the analysis of historical consumption data, correlation and causation analysis between consumption and various drivers, bottom-up modelling of certain end uses, public reports and articles, and interviews with experts and stakeholders both within and outside Elia
- The availability and granularity of data regarding consumption and drivers is a limiting factor of this study: some data was not immediately available that would have been useful for this work. The work on the industrial sector relies primarily on precise, comprehensive and recent consumption data provided by Elia; the work on the residential sector relies on less granular consumption data for Belgium and for Flanders, and on a bottom-up model of the stock of household electrical appliances in Belgium. For lack of precise data on consumption and drivers, the approach on the tertiary sector is based on a comparison with the residential sector and with other countries (France, Germany)
- E-CUBE thanks all stakeholders who contributed data and insights to this work

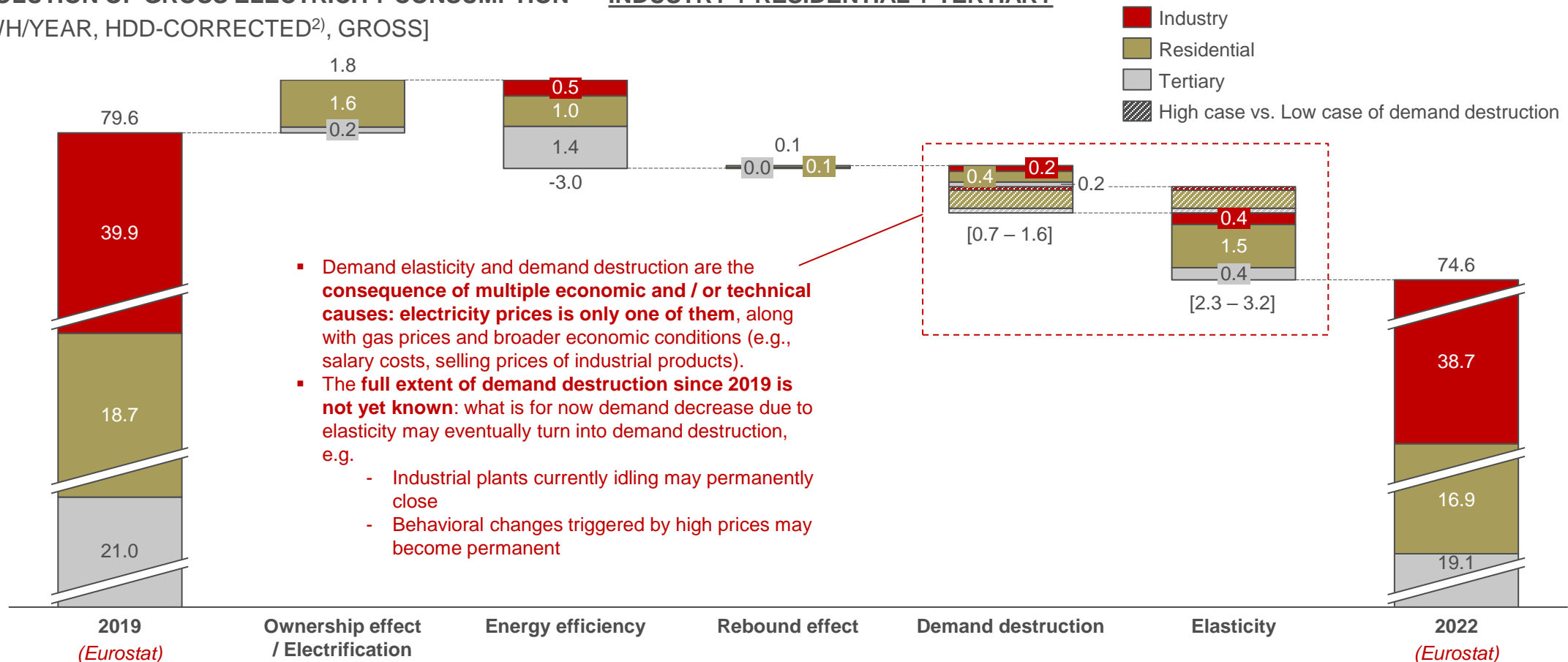
## Recommendation for future updates

- To facilitate future updates of this work and contribute to a better understanding of what drives electricity consumption in Belgium, E-CUBE would recommend acting towards
  - Systematically sharing and aggregating data on consumption and drivers between stakeholders (DSOs, TSOs, regulators, federal and regional administrations and statistical offices)
  - Centralizing this data and centralizing its analysis in order to minimize cost and maximize benefits for stakeholders
  - Creating more data on consumption patterns and drivers by sector through field surveys of industrial and commercial consumption and drivers



# Summary: Demand destruction may have caused a 0.7 to 1.6 TWh/year decrease from 2019 to 2022, however part of what is now labelled as elasticity (2.3 to 3.2 TWh/year) may turn out to be destruction as well

EVOLUTION OF GROSS ELECTRICITY CONSUMPTION<sup>1)</sup> – INDUSTRY + RESIDENTIAL + TERTIARY  
 [TWH/YEAR, HDD-CORRECTED<sup>2)</sup>, GROSS]



**Caveat: values for industry differ in the following pages that show 2019-2023 evolution for industry (vs 2019-2022 on this page)**

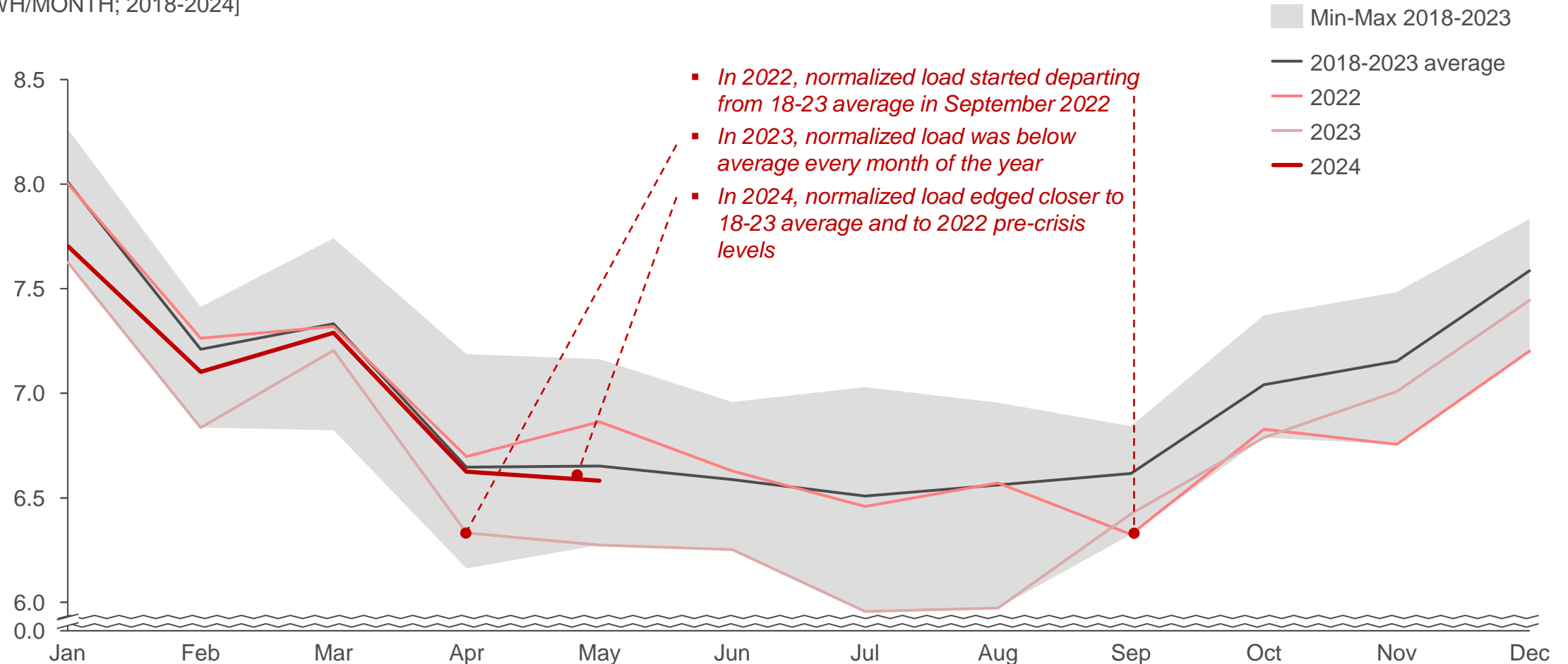
1) Excl. electricity production and storage, data centers, transportation; 2) Except for industry, for which the correlation between electricity consumption and temperature is not significant and does not need correction

Source: Eurostat, E-CUBE Strategy Consultants analysis

# Since March 2024, the Belgian normalized load (gross ACH offtake + gross DSO offtake) seems to be back close to pre-crisis (i.e. 2022) levels

## NORMALISED LOAD IN BELGIUM

[TWH/MONTH; 2018-2024]



# Our study intended to rely on multiple sources through wide data collection, but many limitations were found in the process

## MAIN DATA SOURCES USED FOR THE STUDY

	Residential	Tertiary	Industrial	
<b>Consumption data</b>	Metering data from DSOs or TSOs			<b>TSO data is available, but DSO data is limited in time coverage and granularity</b>
<b>STATBEL surveys</b>	Microdata from Household Budget Survey	Microdata from PRODCOM and “Structure des entreprises” surveys		<b>No microdata available within timeframe, relying on public datasets only</b>
<b>Transversal interviews</b>	Electricity suppliers, DSOs, Electricity supply brokers			<b>7 interviews conducted, with limited information regarding residential and tertiary sectors Cf. next page</b>
<b>Sector-specific interviews</b>	n.a.	Facility manager associations	Large industrial consumers Industrial associations	
<b>Literature review</b>	Behavioural studies / surveys (IPSOS, IFOP, ADEME,...) Studies from other European countries (RTE, Fraunhofer, BdeW, ...) Specialised press by industrial sector European publications (JRC-IDEES, Ecodesign studies, Eurostat, ...)			

# Agenda

1. Executive Summary

2. Industry

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# Method

## *WP #1 – Industry*

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### **1) For each industrial sector:**

- a. Analyze gross TSO-connected consumption by industrial sector (and by customer or site when necessary) month by month over January 2018 – March 2024 (Elia data)
  - Identify the general trend for each sector
  - Explain outlier events (e.g., decrease in electricity consumption over 2 months due to refinery turnaround)
  - Confirm the absence of temperature-dependence of consumption in each sector (Elia heating degree-days)
- b. Analyze net DSO-connected consumption by industrial sector month by month over January 2017 – December 2023 on the Fluvius network (Fluvius data)
- c. Estimate impact of energy efficiency (EBO, RTE/CEREN data)

### **2) For sectors whose consumption decreased since mid-2021:**

- a. Identify sites that closed (Press)
- b. Research consumption drivers (e.g. production output from STATBEL's PRODCOM data)

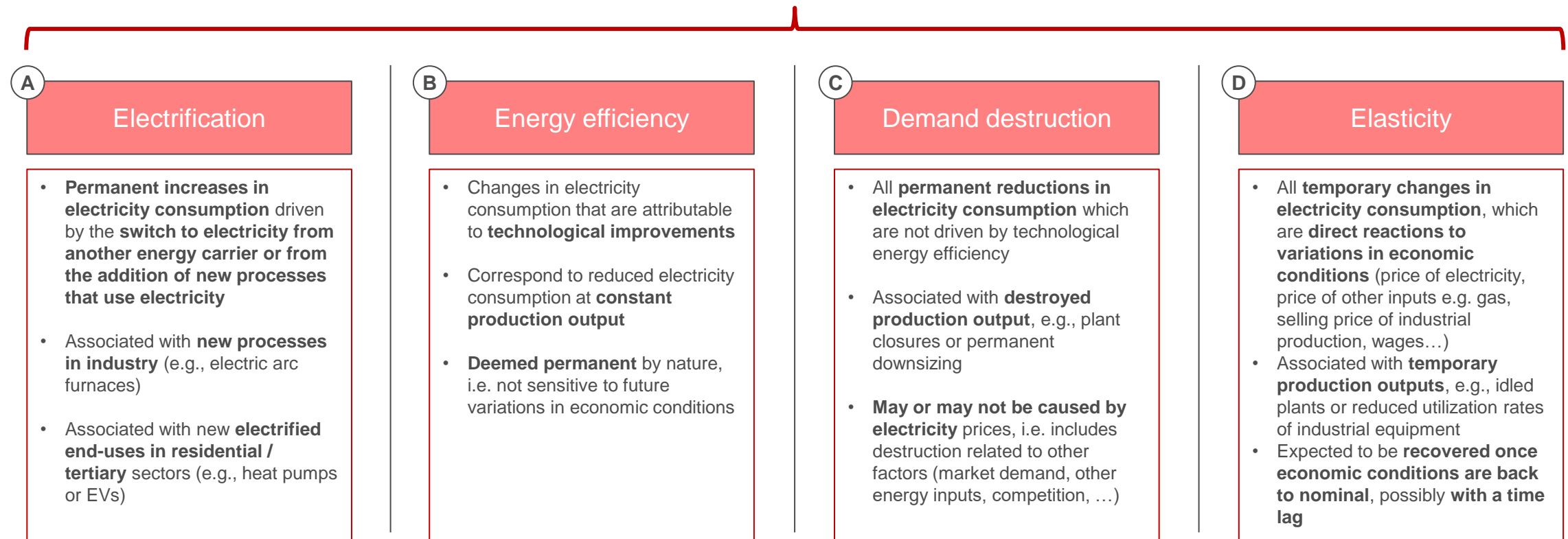
### **3) For all sectors:**

- a. Confirm / correct E-CUBE analysis through interviews (Elia Key Account Managers, Market stakeholders)

# The evolution of electricity demand can be broken down into electrification, energy efficiency, demand destruction and demand elasticity: we propose definitions for those terms

## DECOMPOSITION OF THE EVOLUTION OF ELECTRICITY DEMAND BY COMPONENT

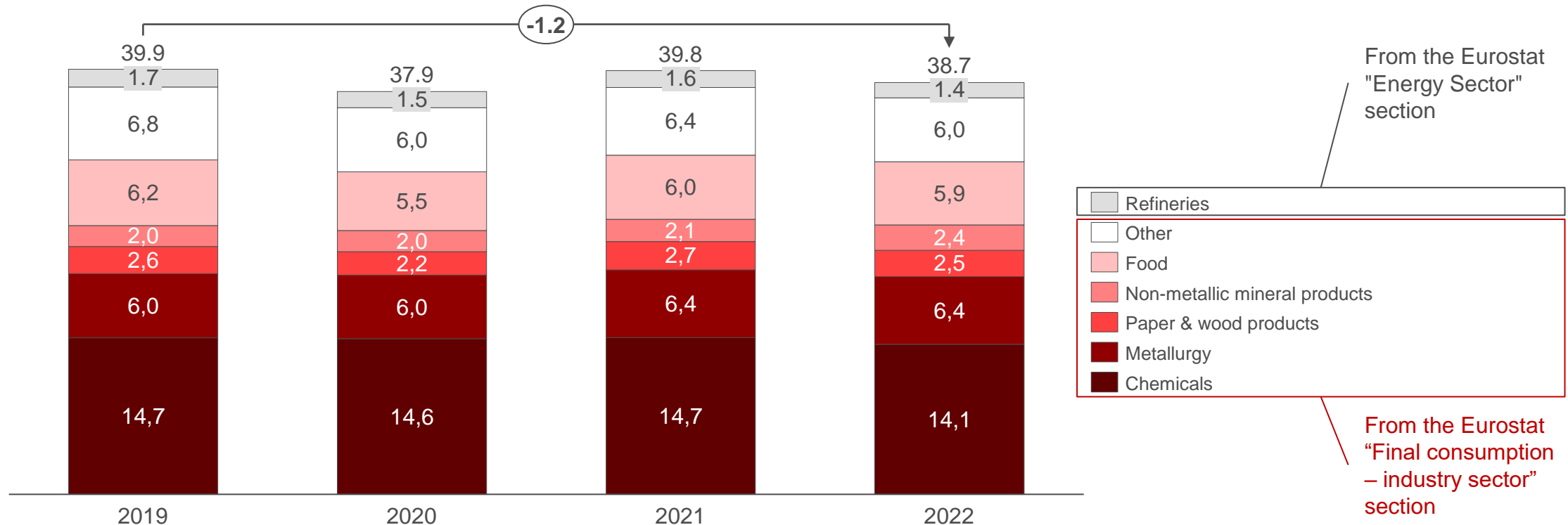
### Components of electricity demand evolution 2019-2023



*Based on Elia numbers, not a focus of E-CUBE's work*

# Back-up: we base our breakdown of total industrial electricity consumption in 2019 and 2022 on Eurostat data

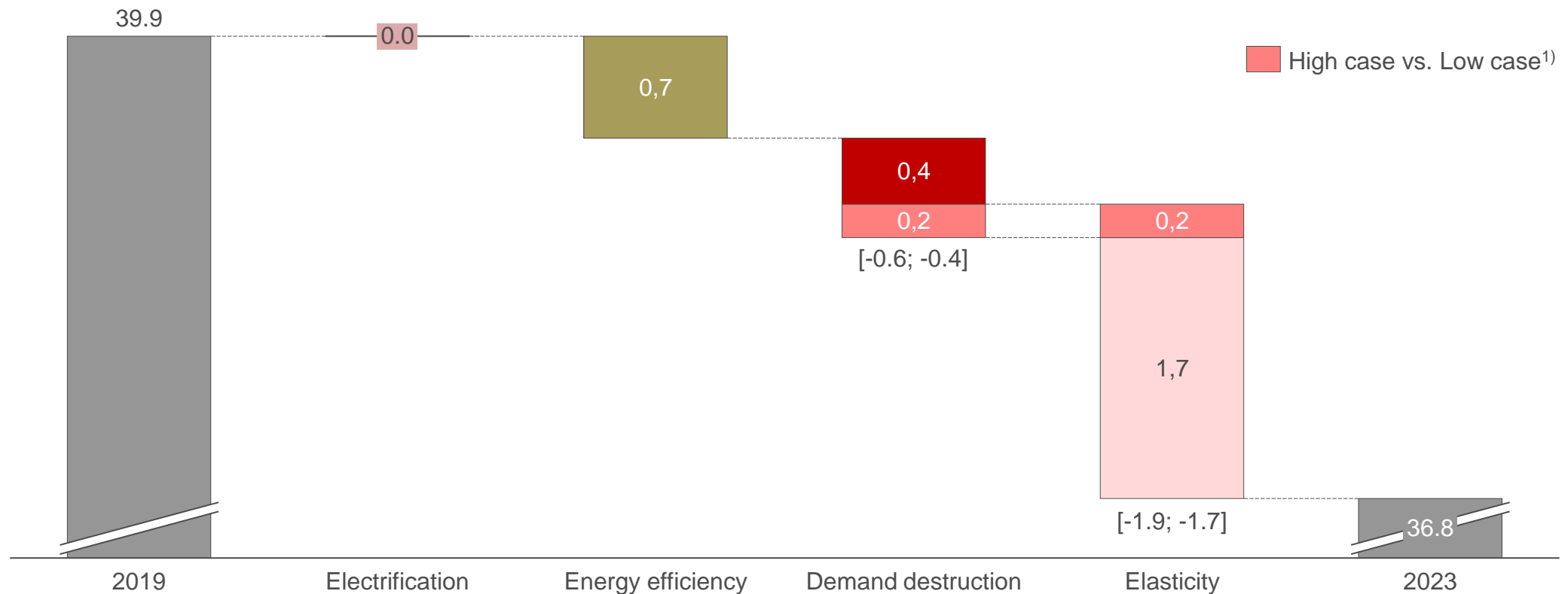
**INDUSTRIAL ELECTRICITY CONSUMPTION – EXCL. “ENERGY SUPPLY”**  
 [TWH/YEAR, GROSS, NOT HDD-CORRECTED]



# The drop in industrial electricity consumption from 2019 to 2023 seems to be mainly demand elasticity (5.4% to 6.0% of 2019 consumption) [2/2]

**INDUSTRIAL ELECTRICITY CONSUMPTION (TSO-CONNECTED + DSO-CONNECTED) – EXCL. “ENERGY SUPPLY”**

[TWH/YEAR; GROSS]



Belgian industrial electricity consumption 2019 according to Eurostat<sup>2)</sup>

(A)

(B)

(C)







(D)

E-CUBE estimate for Belgian industrial electricity consumption (2023 Eurostat data not yet available)

1) See definitions of “High case” and “Low case” for demand destruction in section (C); 2) Including Eurostat “industry sector”, “Refining” and part of “electricity and heat production” (excluding power generation & storage)



# The largest consumption declines were in the Chemicals (mostly demand elasticity), Cement (mostly demand elasticity) and Paper (demand destruction & elasticity) sectors [2/2]

Electricity consumption 2023 vs. 2019 (TWh/year)		(A) Electrification	(B) Energy efficiency	(C) Demand destruction <sup>1)</sup>	(D) Elasticity of demand	
TSO + DSO						
	Chemicals	-2.4 (TSO)	0.0 (Elia)	Some -0.2	[-0.4; -0.2]	High [-1.9; -1.7]
	Manufacture of metals	+0.2 (TSO)	0.0 (Elia)	Some -0.1	0	Some +0.3
	Coke & refining	-0.1 (TSO)	0.0 (Elia)	Very limited -0.0	0	Some -0.1
	Non-metallic mineral products	-0.2 (TSO)	0.0 (Elia)	Very limited -0.0	0	Some -0.2
	Paper products	-0.5 (TSO)	0.0 (Elia)	Some -0.1	[-0.2; -0.2] <sup>2)</sup>	Some [-0.2; -0.2]
	Food	-0.4 (Fluvius)	0.0 (Elia)	Some -0.1	~0	Some -0.3
	Other industries	+0.4	0.0 (Elia)	Some -0.1	~0	Some +0.5
	<b>Weighted total<sup>3)</sup></b>	<b>-3.1</b>	<b>0.0</b>	<b>-0.7</b>	<b>[-0.7; -0.4]</b>	<b>[-2.0; -1.7]</b>







**Caveat:** demand may only be “elastic” up to a certain point: if a difficult market situation persists for too long, the elasticity may turn into demand destruction

1) The demand destruction range is defined by two scenarios: one that considers only sites that have already closed (Sappi and smaller sites), and the other that includes sites known to be “at risk”. 2) In 2023, the Lanaken site continued to operate, so the destruction of demand will not reach -15% of the paper’s industry consumption until 2024. 3) Weighted based on the % of each sector in industrial consumption in Belgium according to Eurostat

# B Total electricity savings from energy efficiency (0.5% p.a. over 19-23 and 0.2% p.a. over 24-35) are broken down by industrial sector based on EBO energy efficiency data for all energies

## ENERGY EFFICIENCY BY INDUSTRIAL SECTOR (TSO-CONNECTED + DSO-CONNECTED)

EBO data is used to break down electricity efficiency savings between industrial sectors

	EBO <sup>1)</sup> implemented energy efficiency measures <i>(Flanders, all energies)</i>		E-CUBE energy efficiency assumption <i>(Belgium, electricity)</i>	
	2018-2022 CAGR (% p.a.)	2019-2023 CAGR (% p.a.) <sup>2)</sup>	2019-2023 CAGR (% p.a.) <sup>2)</sup>	2024-2035 CAGR (% p.a.) <sup>2)</sup>
 Chemicals	-0.8%	-0.5%	-0.5%	-0.2%
 Metals	-0.4%	-0.3%	-0.3%	-0.1%
 Refining	-0.8%	-0.5%	-0.5%	-0.2%
 Paper	-0.9%	-0.6%	-0.6%	-0.2%
 Cement & fiberglass	-0.8%	-0.5%	-0.5%	-0.2%
 Food	-1.1%	-0.7%	-0.7%	-0.2%
Other	n.a.	-0.5%	-0.5%	-0.2%
<b>TOTAL</b>		<b>-0.5%</b>	<b>-0.5%</b>	<b>-0.2%</b>

1) Flemish Energy Policy Agreement Committee 2) As a % of 2022 industrial electricity consumption in Belgium

Source: Flemish energy and climate agency (2022); *GT L'industrie et le secteur de l'énergie* (RTE, 2019); *Commissie Energiebeleidsovereenkomst* (EBO); E-CUBE Strategy Consultants analysis

# C E-CUBE defines a low case of demand destruction in which only sites already closed are included, and a high case in which sites currently idling and at risk of permanent closure are also included

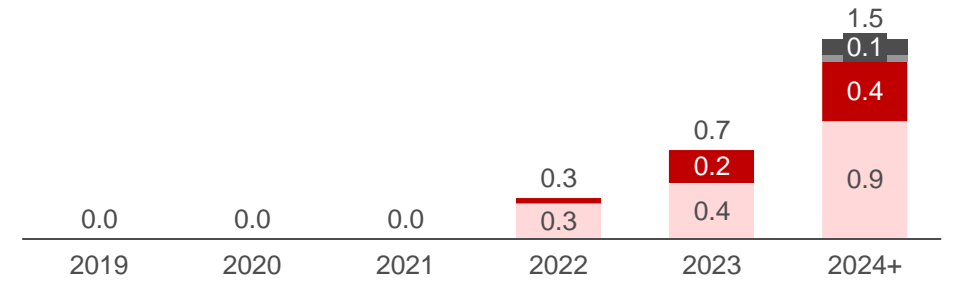
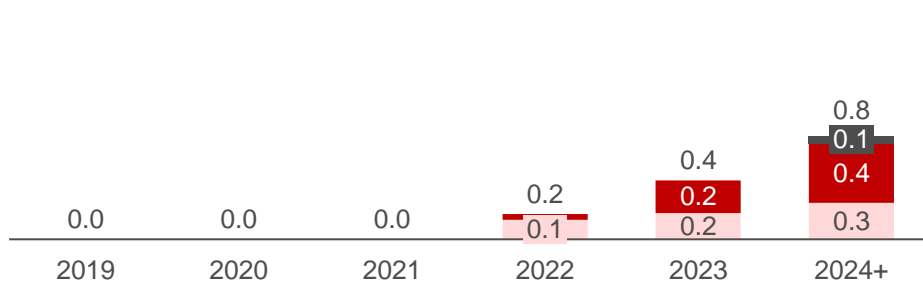
**DESTRUCTION OF INDUSTRIAL ELECTRICITY DEMAND  
(TSO-CONNECTED AND DSO-CONNECTED)**  
[TWH DESTROYED VS. 2019/YEAR]



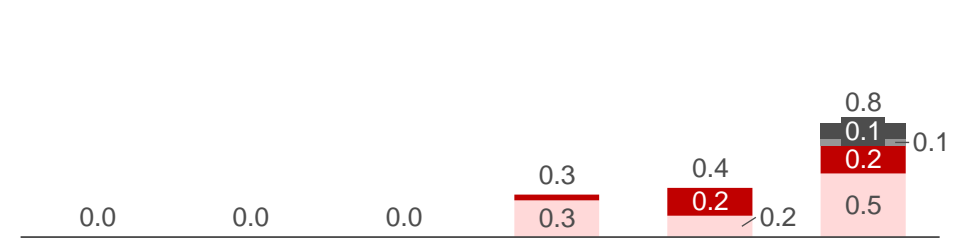
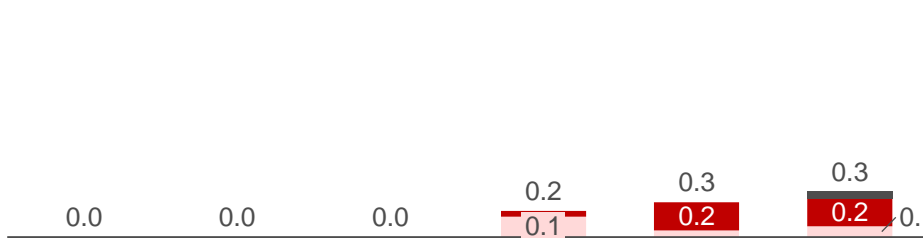
## Low case – Permanently closed plants

## High case – Permanently closed plants + plants currently idling which may eventually permanently close

Demand destruction -  
Compounded



Demand destruction -  
Yearly addition



Scope

- Only plants that have already permanently closed and whose consumption decreased before the end of 2023 (1 chemical site, 1 paper site, 1 metallurgy site and 1 “other industries” site)

- Plants included in the Low case
- Plants considered “at risk” (4 chemical sites, 1 food site, 1 other site), assuming a gradual reduction of their consumption between 2022 and 2024.

C

# While demand destruction appears limited over 2019-2023 (mainly Sappi), certain sites are still at risk of permanent closure: high electricity prices is only one of the contributing factors

Legend: Closed At risk

EXAMPLES OF CLOSED SITES AND SITES AT RISK OF CLOSURE<sup>1)</sup>

		Context
	<b>Petrochemicals plant</b>	There could be a risk of closure for some Belgian petrochemicals plants: <b>refining capacity is decreasing in Europe</b> (e.g. planned closure of the Grangemouth refinery in the UK by 2025)
	<b>INEOS</b>	INEOS has proposed the <b>mothballing of one of its PTA units</b> (Purified Terephthalic Acid) which is already off-line since May-22. (CAVEAT: At this stage, INEOS has not announced a permanent closure)
	<b>3M</b>	3M is looking at options to further accelerate the <b>exit from manufacturing PFAs chemicals</b> (health issues), leading to the idling of its Zwijndrecht facility in Belgium. <b>~300 FTEs</b>
Other industries		The closure of Audi's Brussels plant appears likely: it was dedicated to the production of the Q8 e-tron model, which is due to be <b>relocated to China and Mexico</b> . <b>~3,000 FTEs</b>
	<b>CALLEBAUT</b>	Chocolate maker Barry Callebaut has announced a restructuring plan that could reduce part of its business in Belgium, in particular the Wieze and Hal factories. <b>~500 FTEs</b>
	<b>Celanese</b>	Celanese plans to cease production in Mechelen (acquired from DuPont in Nov-22) in Sept-24, citing <b>high operating costs as one of the reasons</b> for the closure. <b>~220 FTEs</b>
	<b>sappi</b> <small>The word for fine paper</small>	Graphic paper production ceased in Dec-23 at Sappi's Lakanen mill, with <b>closure scheduled to conclude in Q2 2024</b> . This is due to the lack of competitiveness in the graphic paper market.
	<b>ARLANXEO</b> <small>Performance Elastomers</small>	In June-23, Arlanxeo announced the closure of its Antwerp plant. <b>~278 FTEs</b>
Other industries	<b>VAN HOO</b>	Van Hool has decided to <b>transfer bus production to Macedonia</b> , which accounts for around half of its business (R&D and the trailer division are still profitable and remain in Belgium). <b>~1,250 FTEs</b>
	<b>INNOVIA</b>	CCL Industries, a speciality label, security, and packaging solutions provider, has confirmed its plans to permanently close its Innovia business operations in Merelbeke by Q1 2024. <b>~120 FTEs</b>
Other industries	<b>Mc Three</b>	MC Three Carpets (textile industry) declared <b>bankruptcy</b> in January 2024. <b>~278 FTEs</b>

1) Refining (Dec-23); INEOS (Nov-23); 3M (Sep-23); Audi (Feb-24); Callebaut (Feb-24); Celanese (Feb-24); Sappi (Jan-24); Arlanxeo (Jun-23); Van Hool (Mar-24); Innovia (Dec-23); MC Three Carpets (Jan-24)

Source: Press review; E-CUBE Strategy Consultants analysis

# Decrease in industrial activity can be associated with output cuts, plant idling, mothballing or permanent closure: these decisions are based on production economics, for which electricity price is one of many drivers

## Output cut

Voluntary (i.e. non-technical) reduction in production compared to nominal plant capacity

## Plant idling

“Temporary closure of a plant, e.g. lasting only a few months during a period of poor demand. Systems at the site are kept running and personnel remain on site, ready to start up the facility quickly when needed.” (ICIS)

## Plant mothballing

“Long-term closure of a plant, often for an undefined period. Systems are shut down and put in a state of hibernation. With equipment inactive, maintenance minimal, or teams perhaps disbanded, restarting the plant can be problematic.”<sup>1)</sup> (ICIS)

## Permanent closure

Permanent end to operations, often associated with an obligation to clean up the site (e.g. dig out soil): since this can prove expensive, plants can be mothballed for 5 to 10 years before being permanently closed

**Industrial players base these decisions on the assessment of all economic drivers:**

### Selling price drivers:

- Demand
- Competition merit order
- ...

### Cost drivers:

- Input materials
- Gas
- Electricity *Electricity is one of the cost drivers*
- Wages
- ...

1) When mothballing in the chemicals industry “petroleum products are removed, tanks are purged with nitrogen, and pumps and compressors lubricated to prevent damage.”

# Agenda

1. Executive Summary
2. Industry
3. Residential
4. Tertiary

# Method

## *WP #1 – Residential*

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### **1) Build a detailed bottom-up consumption model for 2019-2022 electricity consumption**

- a. # households and equipment rate (STATBEL and GfK data)
- b. Energy efficiency
  - For most end uses (space heating, water heating, dishwashers, washing machines, refrigerators, freezers, ventilation, lighting, cooking): based on a model of the stock of appliances by vintage and by efficiency level (GfK, Delta-EE data)
  - For other uses (electronic devices, small appliances etc): based on analysis from the European Commission's Ecodesign Impact Assessments and RTE
- c. Behavioural changes (Polls)
  - Sense-checked for share of elasticity vs. demand destruction based on previous studies on elasticity of demand

### **2) Estimate the likelihood that behavioural changes are permanent and estimate their impact on energy consumption**

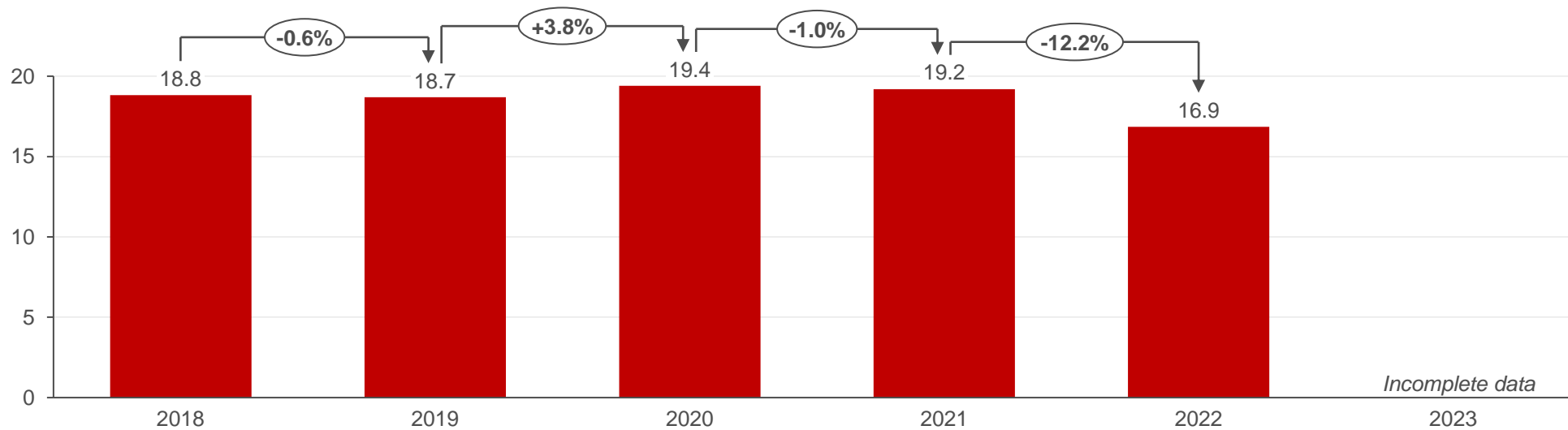
# Agenda

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# According to Eurostat data, residential electricity consumption dropped by ~12% in 2022, following the energy crisis

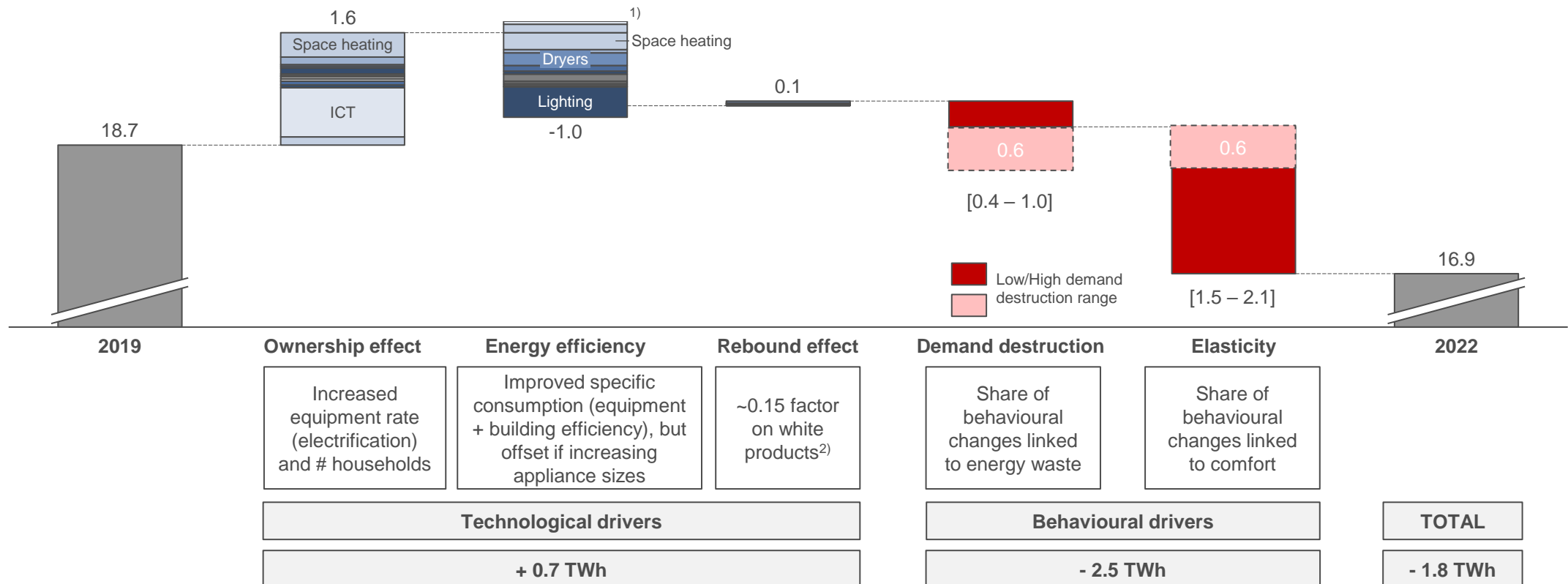
**YEARLY RESIDENTIAL ELECTRICITY CONSUMPTION, BY GRID OPERATOR**  
 [TWH/YEAR, HDD-CORRECTED, GROSS]



\* "Other" DSO data extrapolated from total residential consumption, as reported by Eurostat. [Includes Self-produced electricity.](#)  
 Source: ORES (open data); Fluvius; Eurostat ;E-CUBE Strategy Consultants

# Out of a total ~1.8TWh drop in residential demand, the largest contributing driver is estimated to be demand elasticity due to rising prices

**EVOLUTION OF GROSS RESIDENTIAL ELECTRICITY CONSUMPTION**  
 [TWH/YEAR, HDD-CORRECTED, GROSS]



1) "Negative energy efficiency" on ICT and other devices reflect the fact that the mix of electrical devices has changed: the average appliance consumes more, but they are not the same appliances (in kind and size) in 2022 as in 2019

2) E-CUBE applies a rebound effect only for white products because for other end uses the rebound is embedded in energy efficiency assumptions (which are based on Ecodesign studies)

# Energy efficiency impacted consumption downwards by ~5-6% over 19-22 (all other things equal), but this impact is more than offset by ownership increases (i.e. households having more electrical appliances)

End use	Share of residential elec. 2019	Ownership impact [19-22, %]	Energy efficiency impact [19-22, %]	Rebound effect [19-22, %]	Total impact [19-22, %]
Space heating	22%	8%	-6%	0%	3%
Hot water heaters	7%	8%	-4%	0%	5%
Dryers	6%	2%	-16%	2%	-11%
Refrigerators	6%	2%	-7%	1%	-3%
Dishwashers	4%	10%	-6%	1%	6%
Washing machines	3%	4%	-16%	2%	-9%
Freezers	3%	2%	-4%	1%	-1%
Ventilation	1%	19%	-13%	0%	6%
Ovens	4%	5%	-4%	1%	2%
Hobs	4%	6%	-1%	0%	6%
Lighting	12%	2%	-20%	0%	-18%
ICT	21%	18%	1%	0%	19%
Others	6%	11%	11%	0%	22%
<b>Total</b>	<b>100%</b>	<b>8.6%</b>	<b>-5.6%</b>	<b>0.4%</b>	<b>3.4%</b>

Increased equipment rate (electrification) and # households

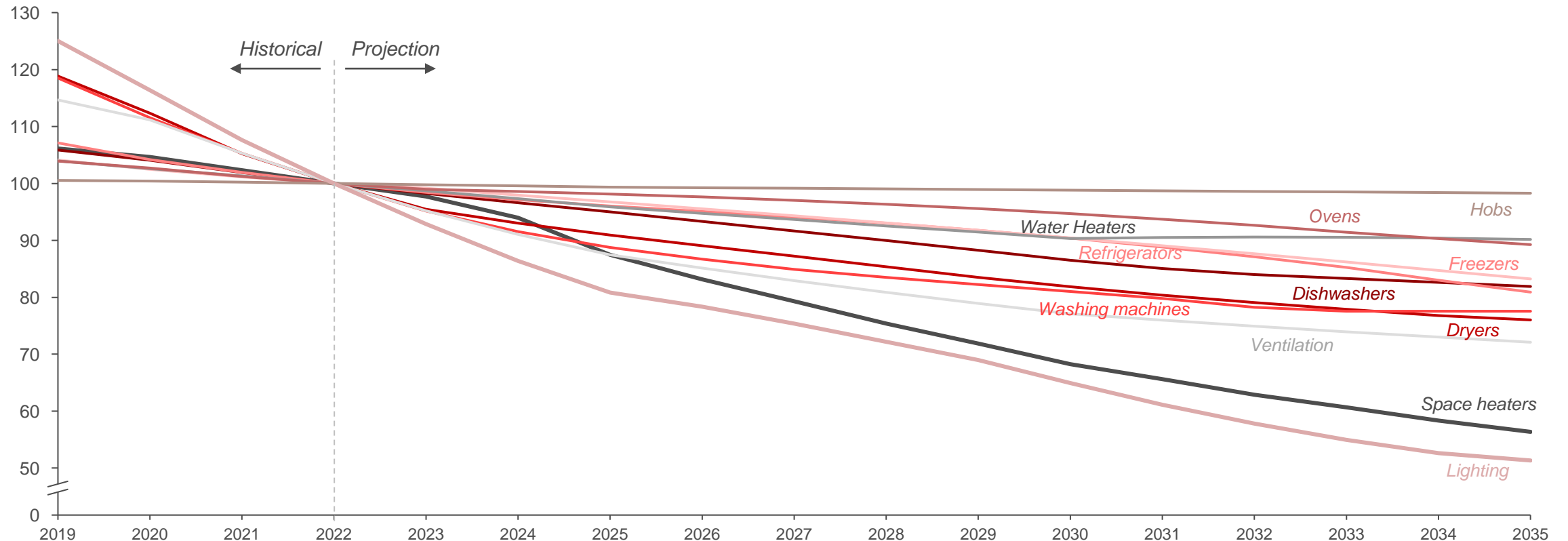
Lower specific consumption (from higher efficiency of equipment and buildings) partly offset by higher appliance size

~0.1 TWh rebound

# Specific consumption gains per appliance vary widely by appliance type, and include both improving efficiency and increasing appliance size

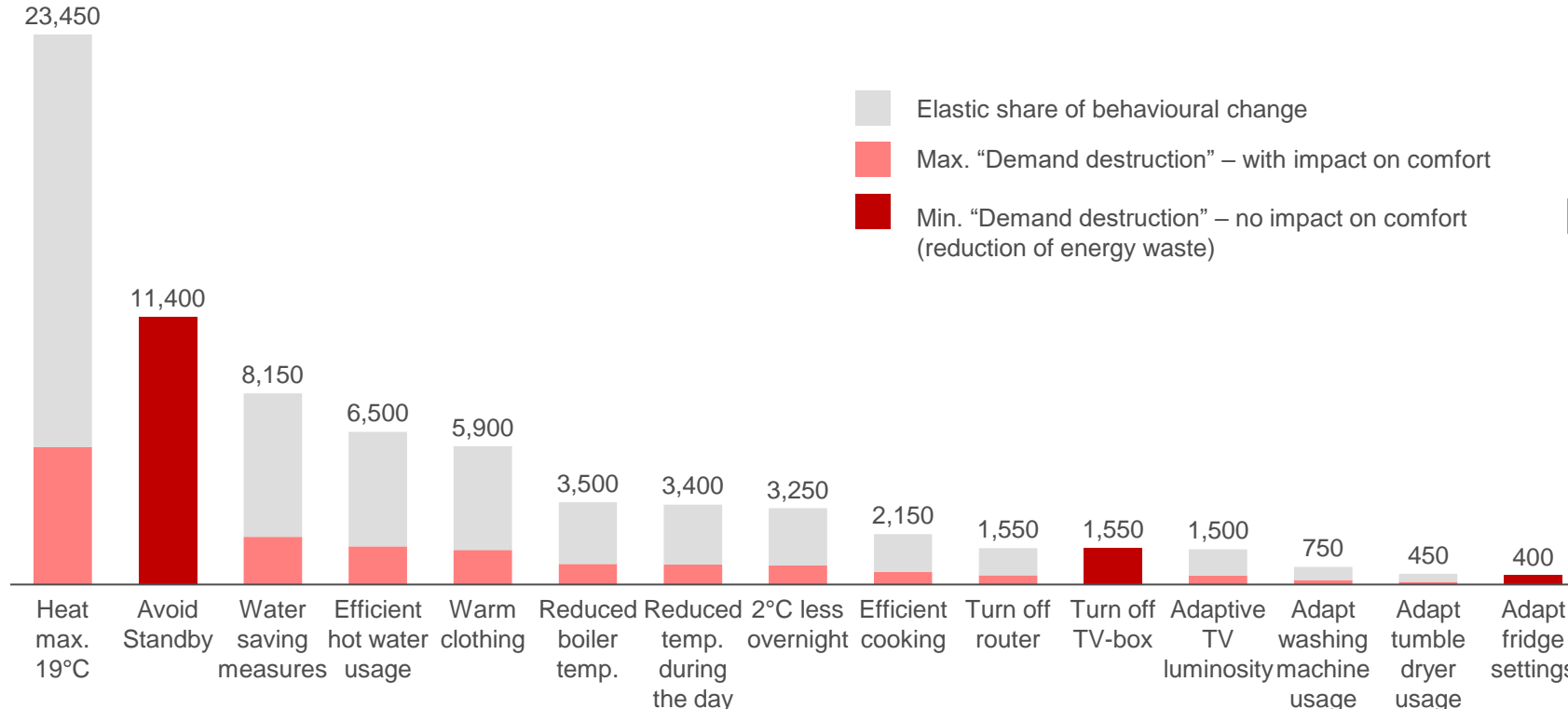
## ELECTRICITY CONSUMPTION BY END USE

[kWh<sub>elec</sub> p.a. / appliance; Base 100 in 2022]



# 15-40% of the consumption decrease caused by behavioural changes in households since mid-2021 could be expected to be permanent, although it is difficult to pinpoint

TOTAL SAVINGS POTENTIAL FROM SELECTED BEHAVIOURAL FOR HOUSEHOLDS  
[GWH, FRANCE]



- Minimum behavioural changes** that can be expected to remain permanent: they are a pure reduction in energy waste but do not impact comfort
  - Based on estimates of the savings potential from different behavioural changes, this is assessed to lie around **~15-20% of efficiency measures**
- Maximum range would be** if all households for whom the main driver to lower consumption was environmental (vs financial) maintained their behavioural changes permanently
  - Based on an IPSOS / RTE survey, this is estimated to be **27%** of households in France
  - It implies **~35-40% of permanent demand destruction as an upper bound**

15-40% of “permanent” changes would represent **0.4 – 1.0 TWh of “demand destruction”**

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# Method

## *WP #1 – Tertiary*

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### **1) Model the impact of office occupancy**

- a. Assess correlation between consumption and occupancy in Belgium (Eurostat and MatchOffice data)
- b. Correct 2019-2022 data for occupancy

### **2) Model other “ownership” factors**

- a. Increased equipment rate (electrification) (based on Elia assumptions)
- b. Increased # m2 of tertiary surface (based on JRC-IDEES and CLIMACT data)

### **3) Estimate the impact of energy efficiency gains**

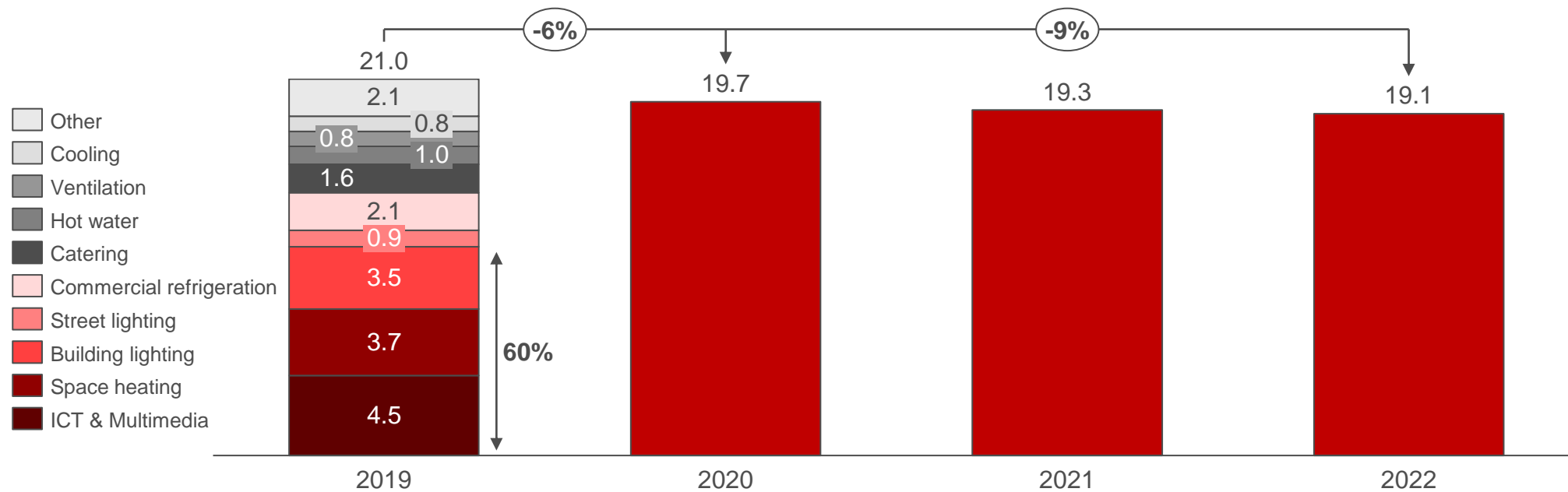
- a. Break down consumption by end use (based on Eurostat and JRC-IDEES data)
- b. Apply assumed energy efficiency gains

### **4) Estimate the likelihood that behavioural changes are permanent and estimate their impact on energy consumption**

# Tertiary consumption dropped in 2020 (COVID), then remained constant; main end-uses ICT, Space heating and Lighting account for ~60% of total

## TERTIARY ELECTRICITY CONSUMPTION

[TWH/YEAR, EXCL. DATA CENTRES, HDD-CORRECTED, GROSS]

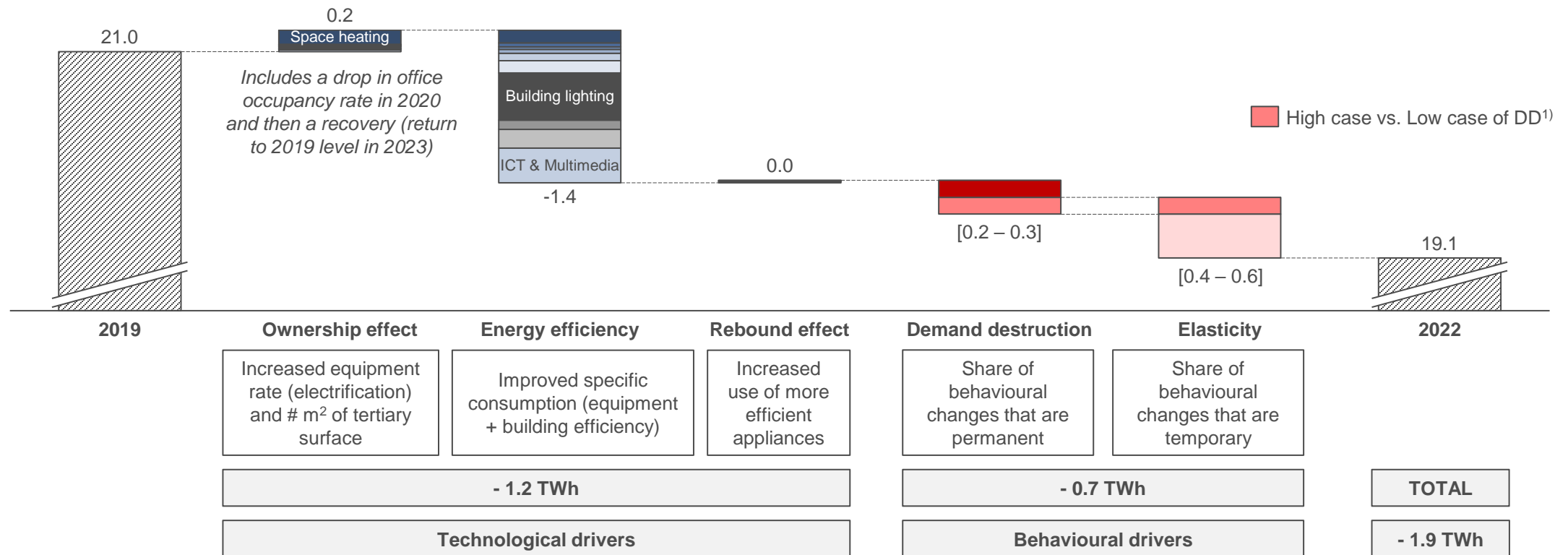


1) The JRC-IDEES data gives a split by tertiary end use but only go up to 2021, while the Eurostat data is aggregated and go up to 2022. Total tertiary consumption for 2019-2021 is the same in JRC-IDEES and Eurostat.  
 Source: Eurostat (19-22 totals); JRC-IDEES (split by end-use 2019)



# Energy efficiency (-1.4 TWh) and behavioural changes (-0.7 TWh) explain most of the reduction in tertiary demand

**EVOLUTION OF GROSS TERTIARY ELECTRICITY CONSUMPTION**  
 [TWH/YEAR, EXCL. DATA CENTRES, HDD-CORRECTED, GROSS]

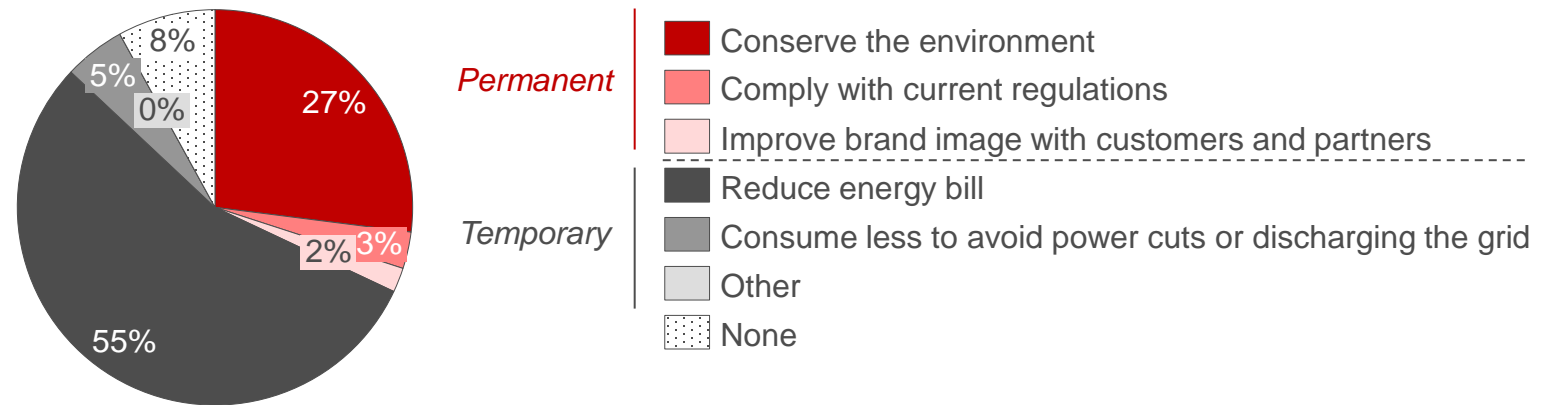


1) Demand destruction in “behavioural drivers” accounts for 22 to 42% (i.e., 32% +/-10%)

# In France, the main driver for energy savings can be considered “permanent” for only ~32% of corporate electricity consumers: other drivers (e.g. “reduce energy bill”) can be considered temporary



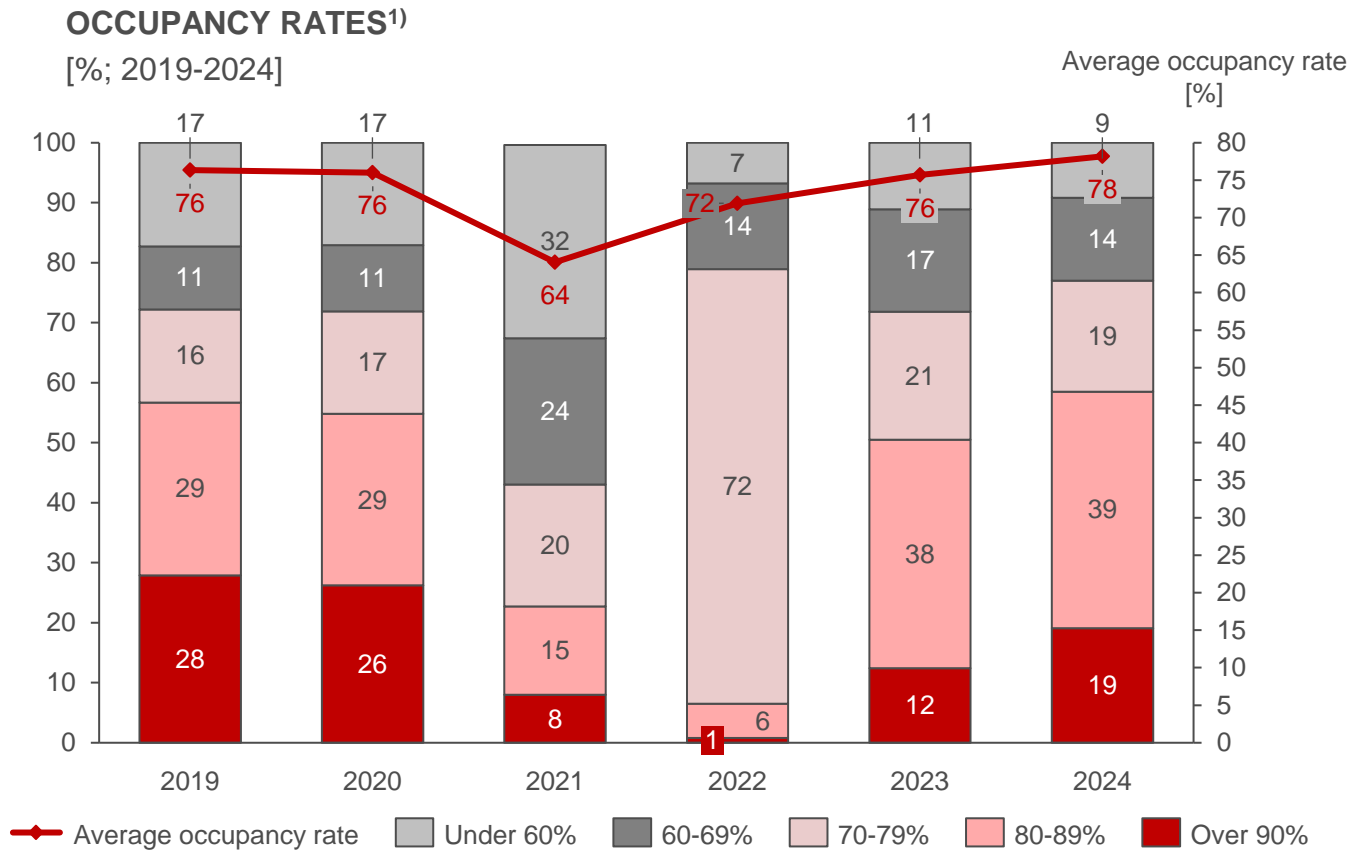
MAIN REASONS STATED BY COMPANIES (INDUSTRY & TERTIARY) TO MAKE ENERGY SAVINGS [%; 2024]



~32% of companies state a “permanent” driver as the main driver to save electricity  
 → E-CUBE assumes that **demand destruction represents between 22% and 42% (i.e. 32 +/-10%<sup>1)</sup>** of “behavioural” decrease in tertiary consumption


1) +/- 10% is the same range as for the residential sector

# Building occupancy is strongly correlated with a drop in consumption post COVID: it only came back to pre-covid level in 2024



- Average office occupancy **dropped from 76% to 64% during the Covid crisis**
- In 2023, it returned to its 2019 value (i.e. 76%)
- Office occupancy has a major impact on electricity consumption in the tertiary sector, which helps to explain the variations observed

1) Industry survey from 2019 to 2024, Match Office  
Source: MatchOffice; E-CUBE Strategy Consultant analysis



Forecast (MW)  
— Confidence Boundaries (P10 - P90)

COO ENERGY SUP 1	6	18	
COO ENERGY SUP 2			49 % 1143 MWh
PLATE TURBINE			34 % 950 MWh
PLATE PUMP			-10 % -88 MWh
FILT ACE			63 % 768 MWh
NRV			2 MW
SI			-190 MW
R2			162 MW
ID Bid Level			-45 MW
			-145 MW

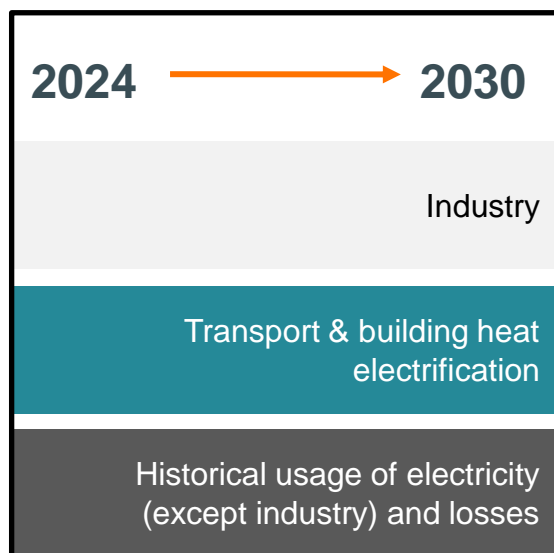
Friday, July 28, 2017 2:31:22 PM

Forecast (°C)  
— Seasonal Boundaries (P10 - P90 - P95)

# Elia's proposals for the load trajectories for the CRM calibration of the 2026-27/Y-1, 2027-28/Y-2 and 2029-30/Y-4 auctions

## What is included in the proposed load trajectories?

### Proposed load trajectories for the CRM calibrations of 2024



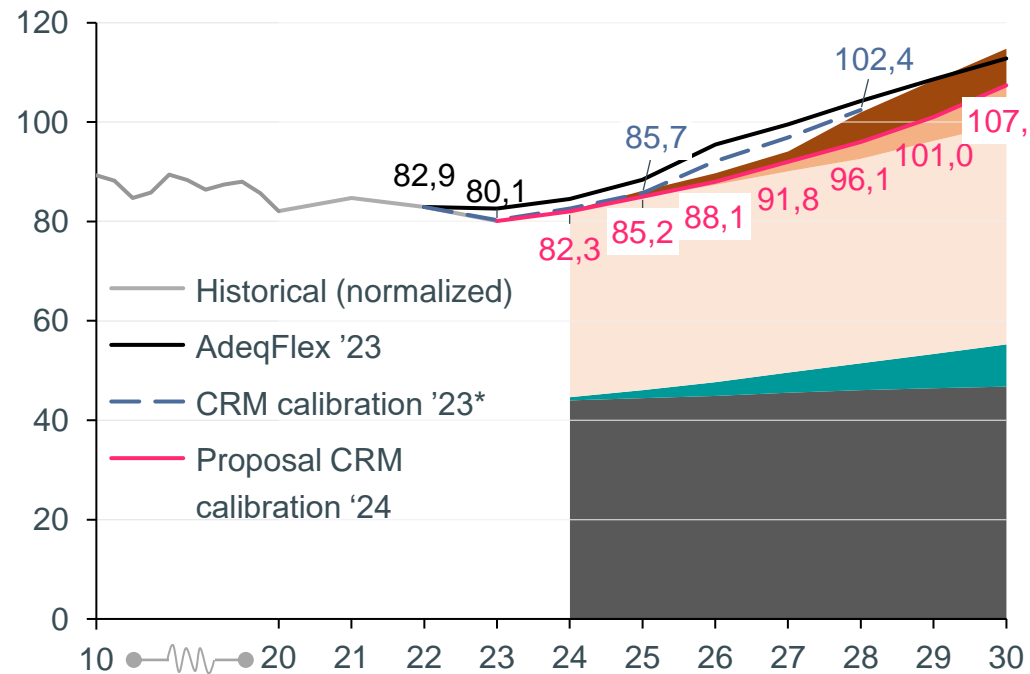
### Several improvements have been introduced

- Insights in industry electrification based on detailed bottom-up input from Elia's industrial customers
- Insights from the PRICED study performed by E-Cube affecting demand destruction and recovery in the residential, tertiary and industry sectors.
- Proposal of multiple sensitivities covering industry electrification, demand destruction and recovery

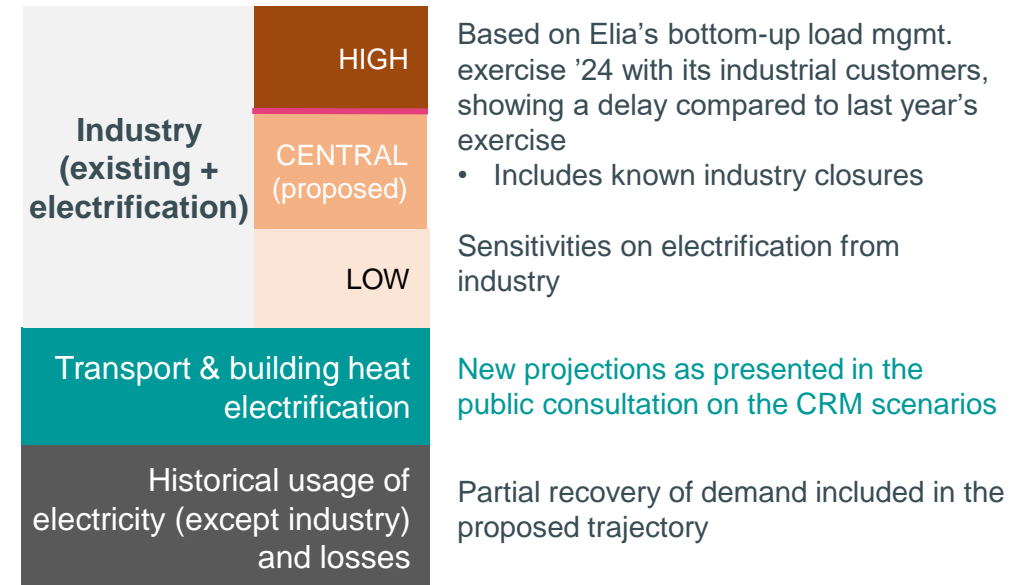
Further updates will be made in the context of AdeqFlex'25 based on the latest trends, DSO alignment, ..

# Elia's proposal is outlined below and compared to previous forecasts

Comparison of load proposal to previous trajectories  
 (Note that shared areas show contributions to increase after '24 per segment)

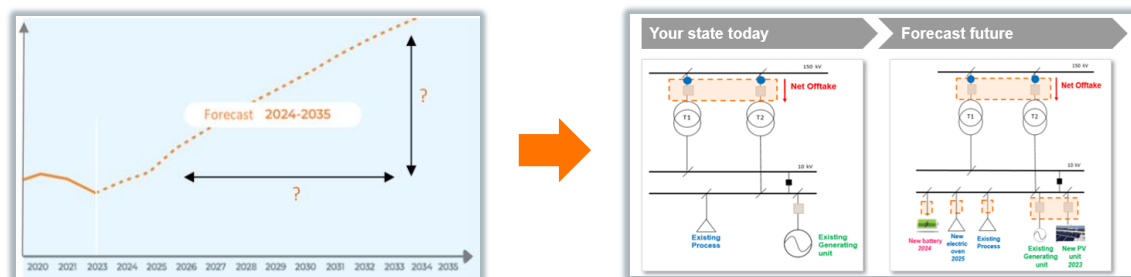


\* load trajectory based on the values selected by the Minister for the calibration of the 2025-26/Y-1 and 2028-29/Y-4 auctions



# Elia's load mgmt. exercise gathers detailed bottom-up input from its industrial customers to help forecast industry electrification

## Goal - detailed bottom-up input to improve forecasts

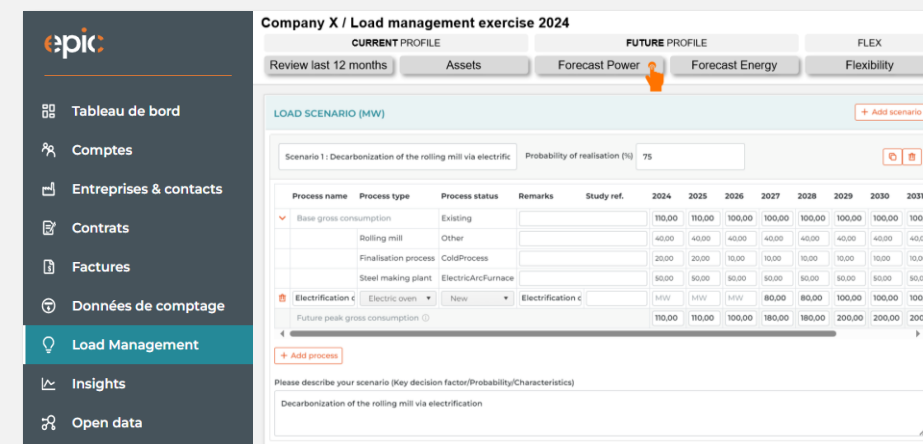


## Focus of Load management data in 2024

- *Estimates of future gross consumption (peak power & energy)*
- *Scenario approach (with customer specified probabilities)*
- *Description of processes underlying gross consumption and flexibility (current & future)*

## 💡 Illustration

Customers define scenarios for their future gross consumption through customer portal

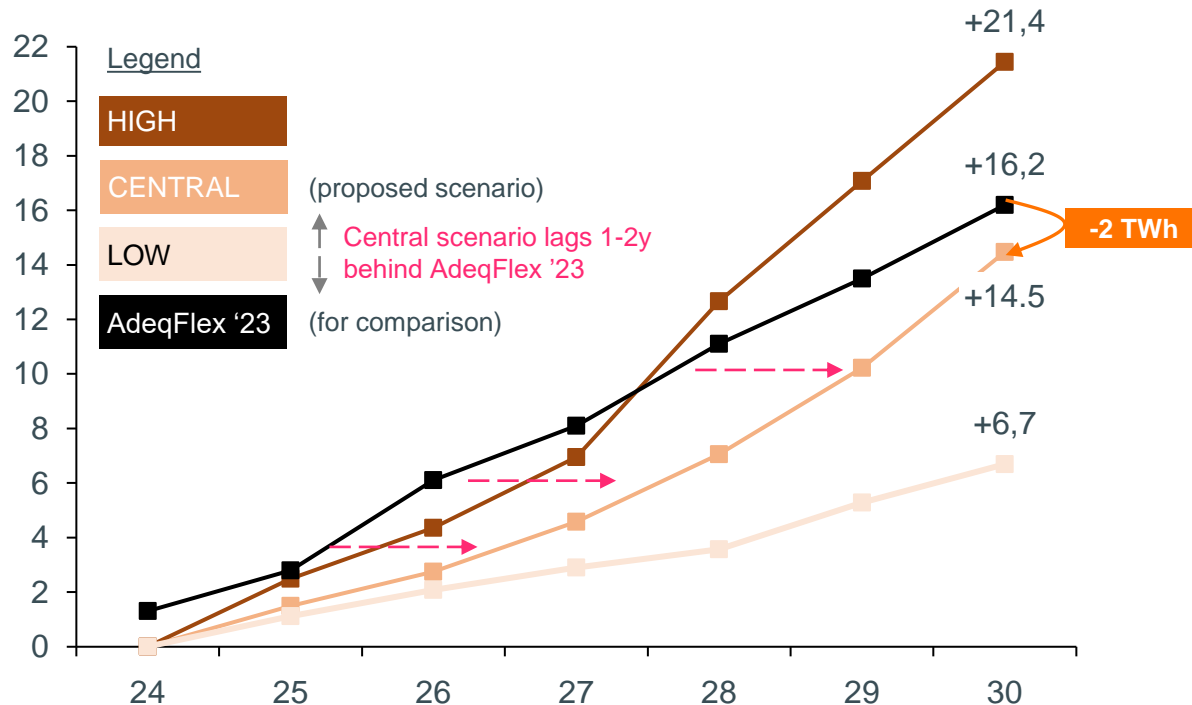


Process name	Process type	Process status	Remarks	Study ref.	2024	2025	2026	2027	2028	2029	2030	2031
Base gross consumption	Existing				110,00	110,00	100,00	100,00	100,00	100,00	100,00	100,00
Rolling mill	Other				40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00
Finalisation process	ColdProcess				20,00	20,00	10,00	10,00	10,00	10,00	10,00	10,00
Steel making plant	ElectricArcFurnace				90,00	90,00	90,00	90,00	90,00	90,00	90,00	90,00
Electrication c	Electric oven	New	Electrication c		MW	MW	MW	80,00	100,00	100,00	100,00	100,00
Future peak gross consumption						110,00	110,00	100,00	180,00	180,00	200,00	200,00

Industry	HIGH
	CENTRAL (proposed)
	LOW

# Industry consumption is expected to add 14 TWh by '30

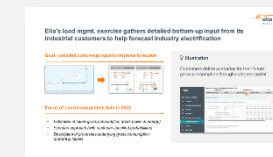
Increase in gross industry consumption, in TWh



## How was this estimated?

**TSO conn.**

Based on load mgmt. exercise '24: Elia initiative mapping bottom-up electrification plans of its industrial customers



**DSO conn.**

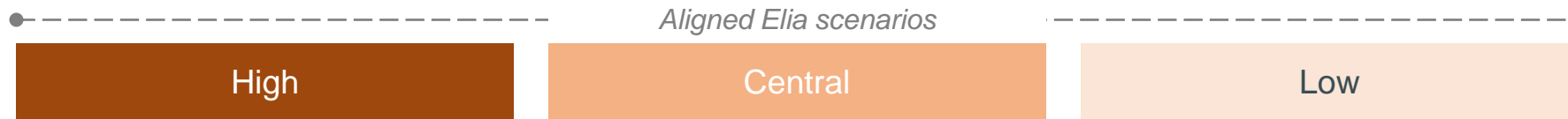
Top-down adjustment of AdeqFlex '23 estimate based on trends observed at TSO level; this will be further refined for AdeqFlex '25 in collaboration with DSO's

Elia considers that this covers the entire increase in electricity consumption from industry and therefore covers

- New usages (= additional electrification)
- Recovery in electricity consumption compared to 2023 as also analysed in the PRICED study
- Growth from existing usages



# Submitted scenarios of biggest customers aligned to 3 scenarios



For **15 biggest players** accounting for 80% of increase in power, scenarios are realigned

	High	Central	Low
<b>Data centers</b>	Datacenter consumption grows exponentially as uptake of AI demands more and more computing power	Growth materializes in next 3 years and then continues at the same rate as in '24-'27 after that	Growth materializes in next 3 years as players try to enter AI market first, but remains flat after
<b>Heavy industry</b>	Most optimistic customer scenarios materialize, thanks to positive technological results on electrification and strong governmental support	Companies electrify partially or with a 2-year delay compared to their most optimistic scenario, helped by moderate governmental support	Companies continue as-is or with a 4-year delay compared to their most optimistic scenario, due to technological infeasibility and/or low governmental support

Scenarios of **remaining tail of 112 grid users**, good for 20% of increase, are aligned mechanically










Highest submitted forecast

Weighted combination of scenarios by reported probability

Lowest submitted forecast

Industry	HIGH
	CENTRAL (proposed)
	LOW

# PRICED study: plant closures could lead to between 0,3 and 0,8 TWh of future demand destruction

	<b>sappi</b> The word for fine paper	Graphic paper production ceased in Dec-23 at Sappi's Lakanen mill, with <b>closure scheduled to conclude in Q2 2024</b> . This is due to the lack of competitiveness in the graphic paper market.
	<b>ARLANXEO</b> Performance Elastomers	In June-23, Arlanxeo announced the closure of its Antwerp plant. <i>~278 FTEs</i>
Other industries	<b>VAN HOO</b>	Van Hool has decided to <b>transfer bus production to Macedonia</b> , which accounts for around half of its business (R&D and the trailer division are still profitable and remain in Belgium). <i>~1,250 FTEs</i>
	<b>INNOVIA</b>	CCL Industries, a speciality label, security, and packaging solutions provider, has confirmed its plans to permanently close its Innovia business operations in Merelbeke by Q1 2024. <i>~120 FTEs</i>
Other industries	<b>Mc Three</b>	MC Three Carpets (textile industry) declared <b>bankruptcy</b> in January 2024. <i>~278 FTEs</i>
	<b>Petrochemicals plant</b>	There could be a risk of closure for some Belgian petrochemicals plants: <b>refining capacity is decreasing in Europe</b> (e.g. planned closure of the Grangemouth refinery in the UK by 2025)
	<b>INEOS</b>	INEOS has proposed the <b>mothballing of one of its PTA units</b> (Purified Terephthalic Acid) which is already off-line since May-22. (CAVEAT: At this stage, INEOS has not announced a permanent closure)
	<b>3M</b>	3M is looking at options to further accelerate the <b>exit from manufacturing PFAs chemicals</b> (health issues), leading to the idling of its Zwijndrecht facility in Belgium. <i>~300 FTEs</i>
Other industries		The closure of Audi's Brussels plant appears likely: it was dedicated to the production of the Q8 e-tron model, which is due to be <b>relocated to China and Mexico</b> . <i>~3,000 FTEs</i>
	<b>CALLEBAUT</b>	Chocolate maker Barry Callebaut has announced a restructuring plan that could reduce part of its business in Belgium, in particular the Wieze and Hal factories. <i>~500 FTEs</i>
	<b>Celanese</b>	Celanese plans to cease production in Mechelen (acquired from DuPont in Nov-22) in Sept-24, citing <b>high operating costs as one of the reasons</b> for the closure. <i>~220 FTEs</i>



**Known closures**  
Lead to **0,3 TWh** of demand destruction

This is included in the reference scenario

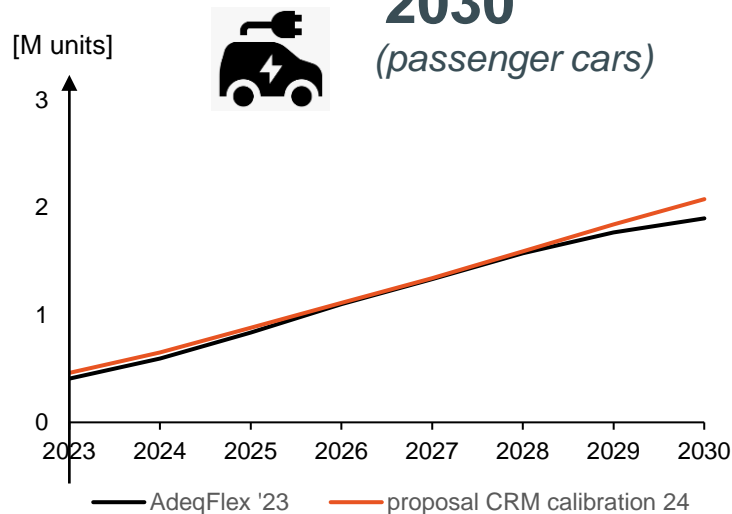


**Potential closures**  
Could lead to an additional **0,5 TWh** of demand destruction

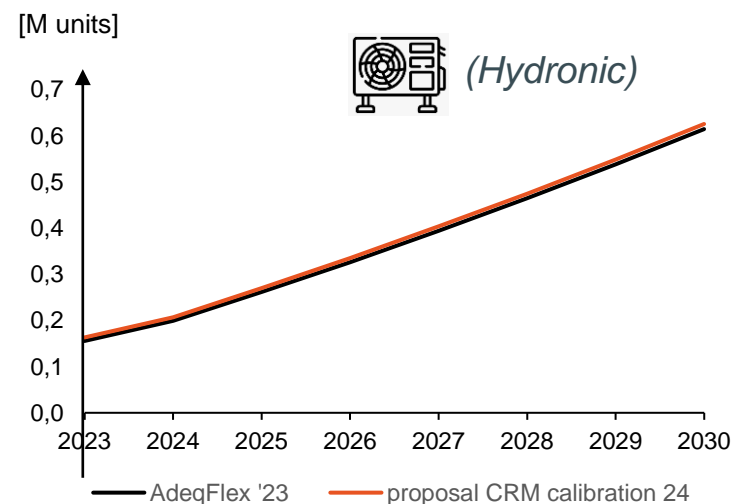
This could be included as part of a sensitivity

- Demand destruction before 2024 is accounted for by calibrating on the load of 2023
- Demand destruction in industry is linked to macro-economic conditions
- No future demand destruction is considered for the residential and tertiary sectors because of lower electricity prices

# The EV and HP assumptions as presented in the public consultation lead to an increase of 7,8 TWh between 2023 and 2030

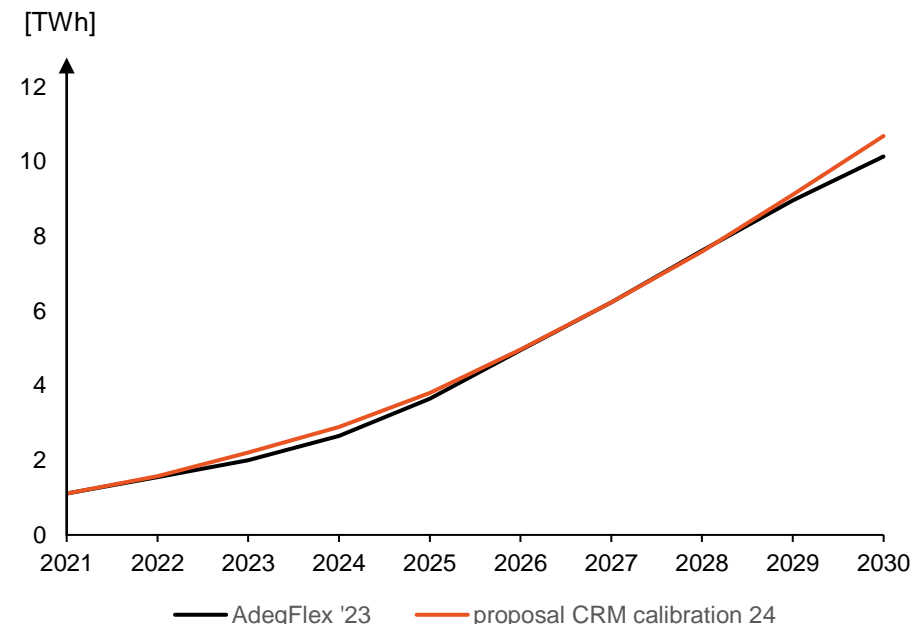


- More EV sales than foreseen in 2023
- Increase mainly driven by company cars



- More HP sales than foreseen in 2023
- Future trends kept constant as signs of slowing trend and no policy changes

## Transport & building heat electrification load



### Buses, trucks & vans kept as in AdeqFlex'23

→ Revision foreseen based on historical data, DSO discussions and potential new regulation & trends

# PRICED study: demand recovery in the residential and tertiary sectors is spread in time

## Demand recovery

1

### Absolute value:

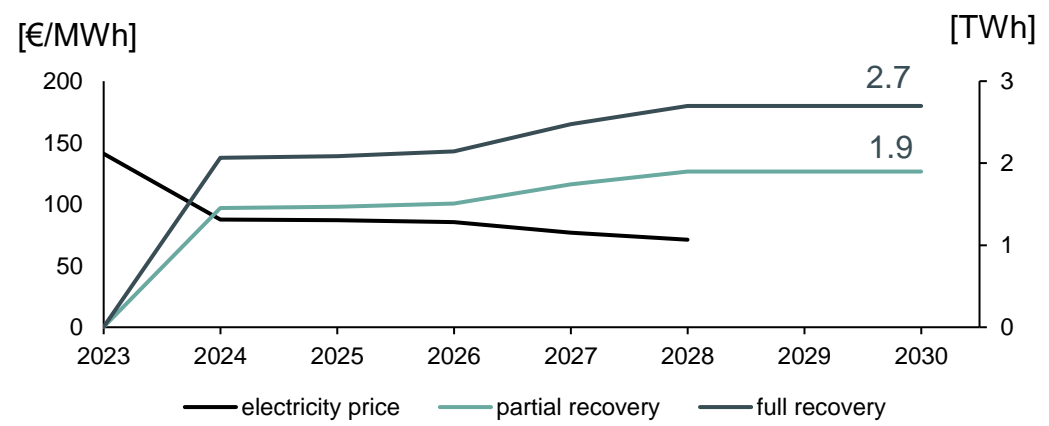
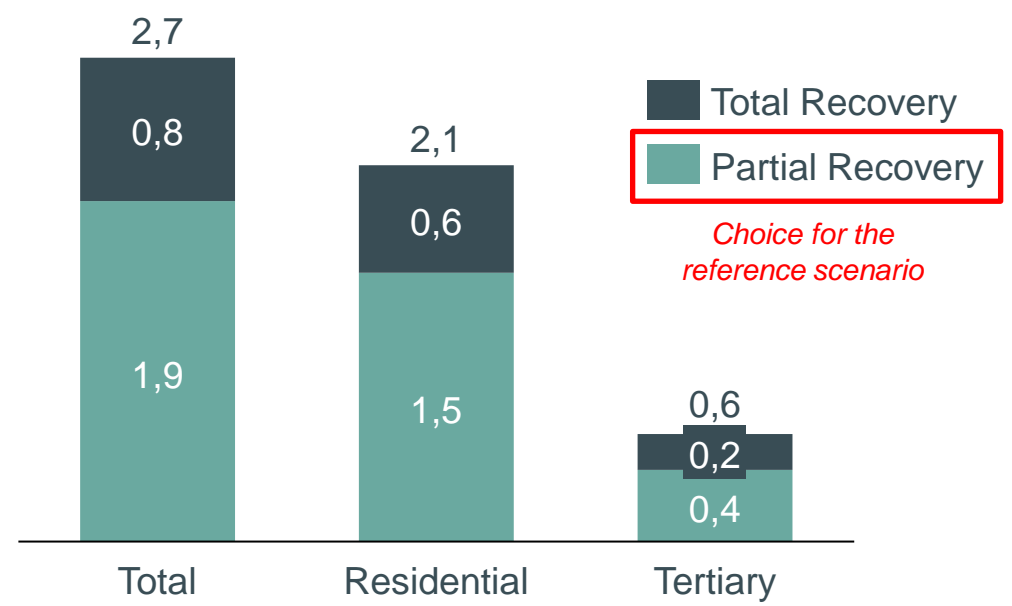
Obtained by E-Cube. Two scenarios have been developed:

- *Partial Recovery*: slight improvement of economic conditions & price forwards materialise
- *Total Recovery*: further improvement of economic conditions & low energy prices

2

### Temporal spread:

Demand recovery is assumed to be correlated to the electricity price. Therefore, the recovery is spread across the years based on electricity price forwards up to 2028<sup>(1)</sup>.

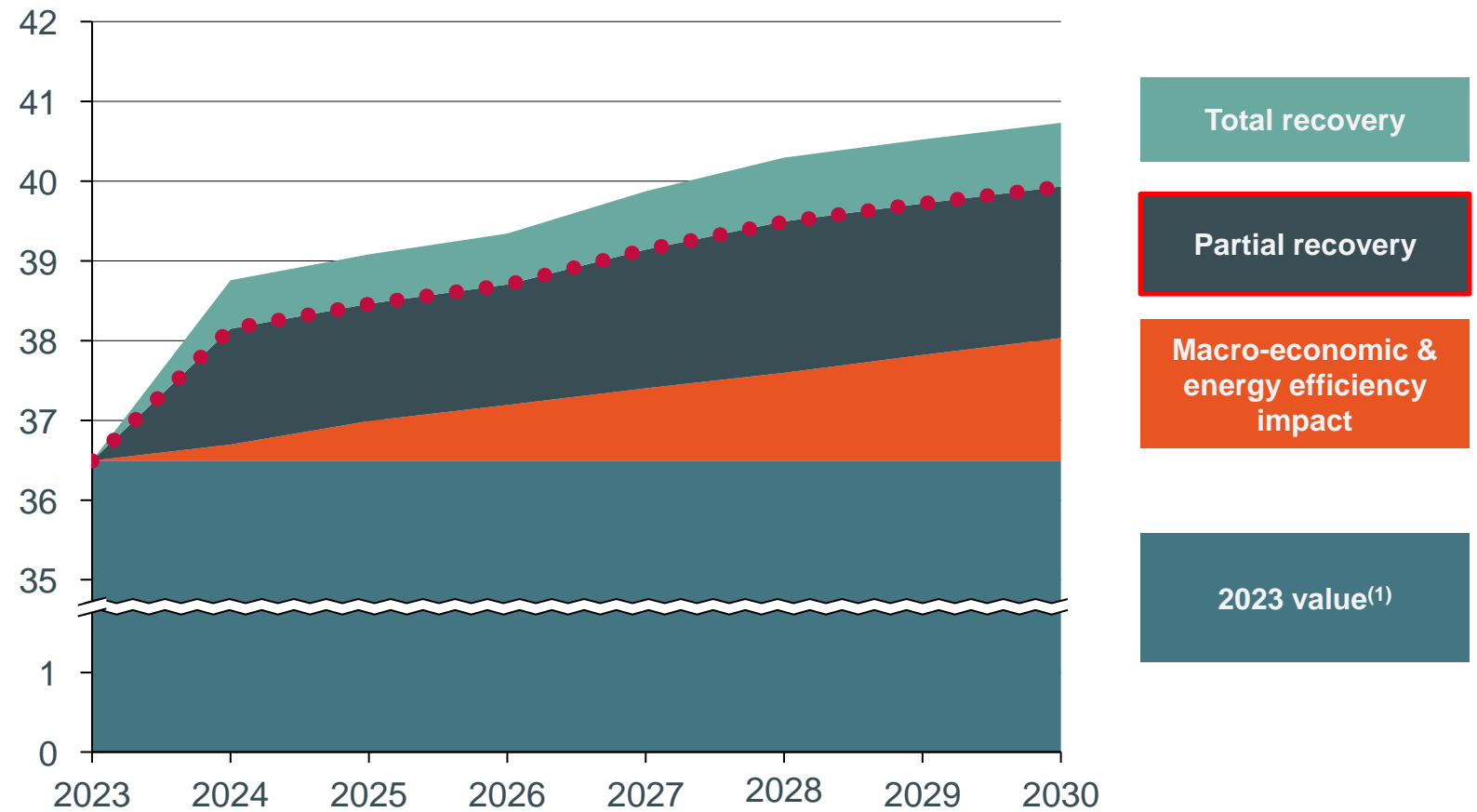


(1) [Ice Endex Power BE \(elexys.be\)](https://www.ice.com) & [Futures \(eex.com\)](https://www.eex.com)

# The increase in electricity consumption from residential, tertiary, agriculture and existing transport is the net result of positive macro-economic trends and energy efficiency improvements between 2023 and 2030

- Net increase in electricity consumption via:
- + Demand recovery in tertiary and residential sectors
  - + Macro-economical impacts
    - + Increased purchasing power in residential sector
    - + Increased economic activity in tertiary sector
  - Improvements in energy efficiency in buildings, agriculture & railway transport

Evolution of electricity demand [TWh] *excl. grid losses, industry, HP & EV*



Note:  
(1) 2023 value does not include consumption from industry, grid losses, EVs and HPs

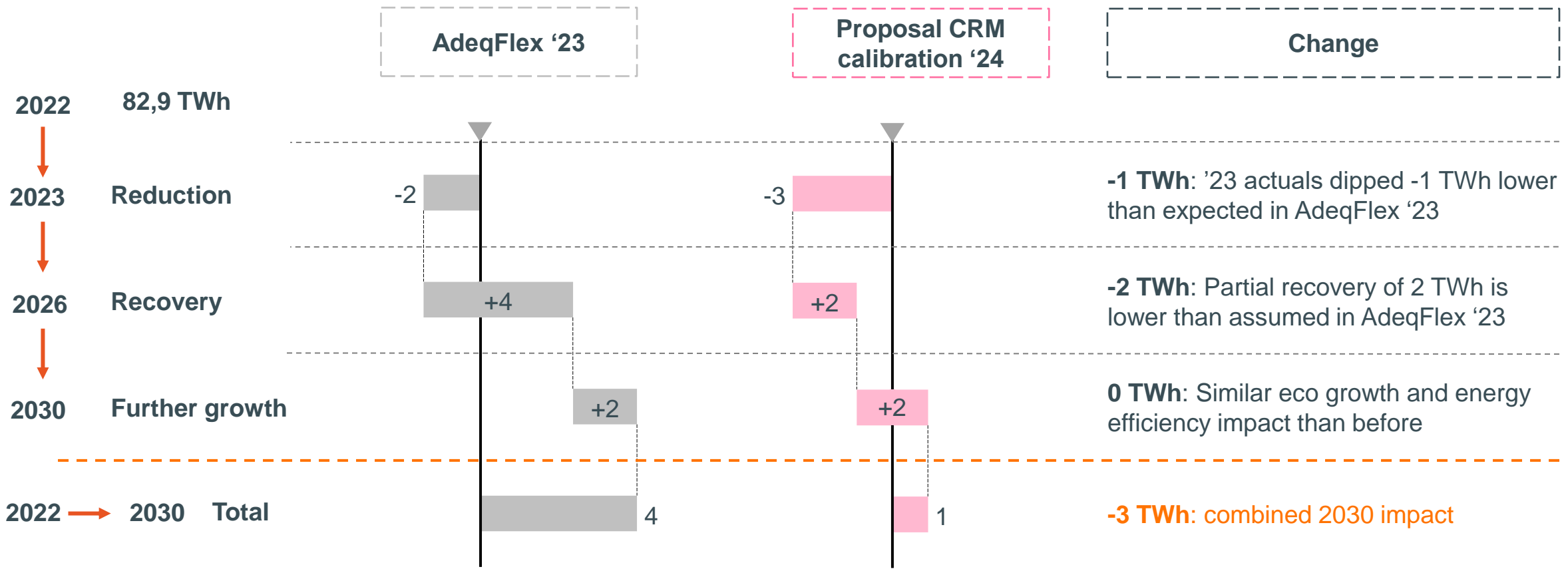
# Detailed view on the relative contributions of various sectors

Evolution of electricity demand [TWh] *excl. supply losses, industry, HP & EV*



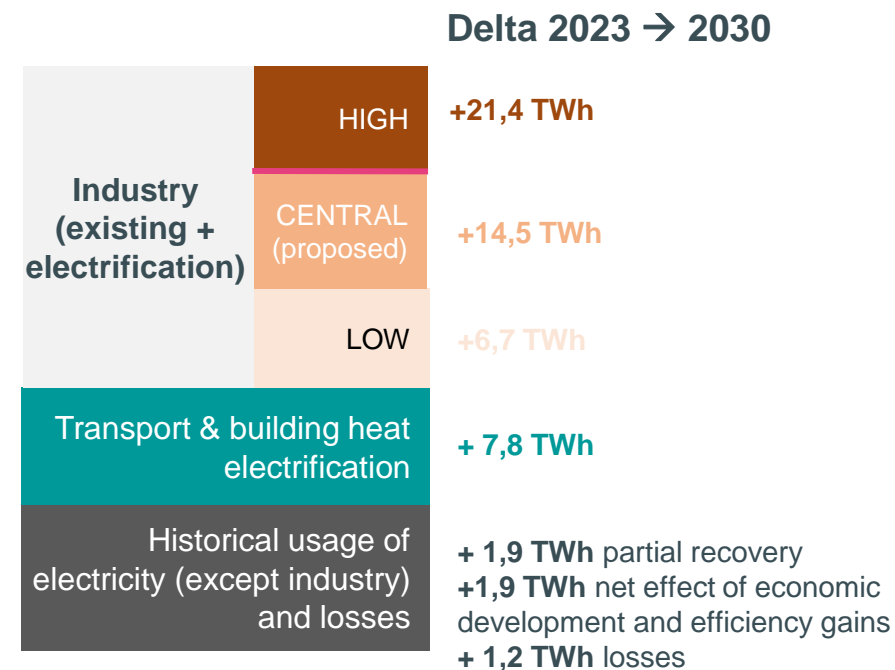
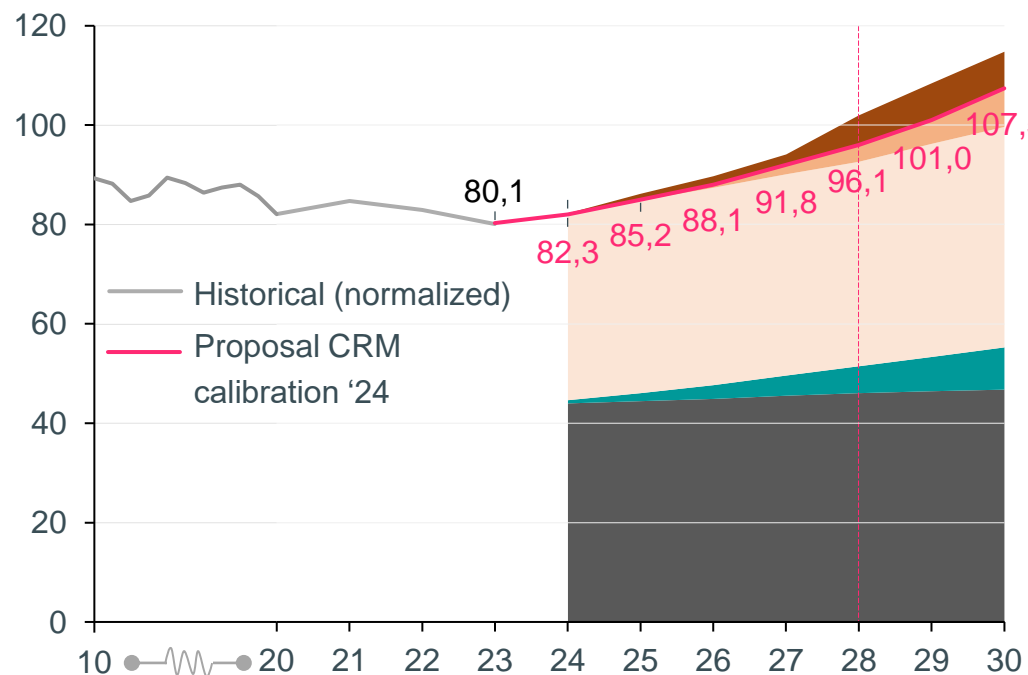
- Agriculture:**
  - Energy efficiency
- Residential:**
  - Energy efficiency
  - + Macro-economical impact: more appliances
- Tertiary:**
  - Energy Efficiency
  - + Macro-economical impact: increased economic activity
- Transport:**
  - Energy efficiency

# Existing usages expected -3 TWh lower than AdeqFlex'23 by 2030, due to more reduction in 2023, and a more modest recovery



# The increase in load between 2023 and 2030 can mainly be attributed to electrification of transport, heat and industry

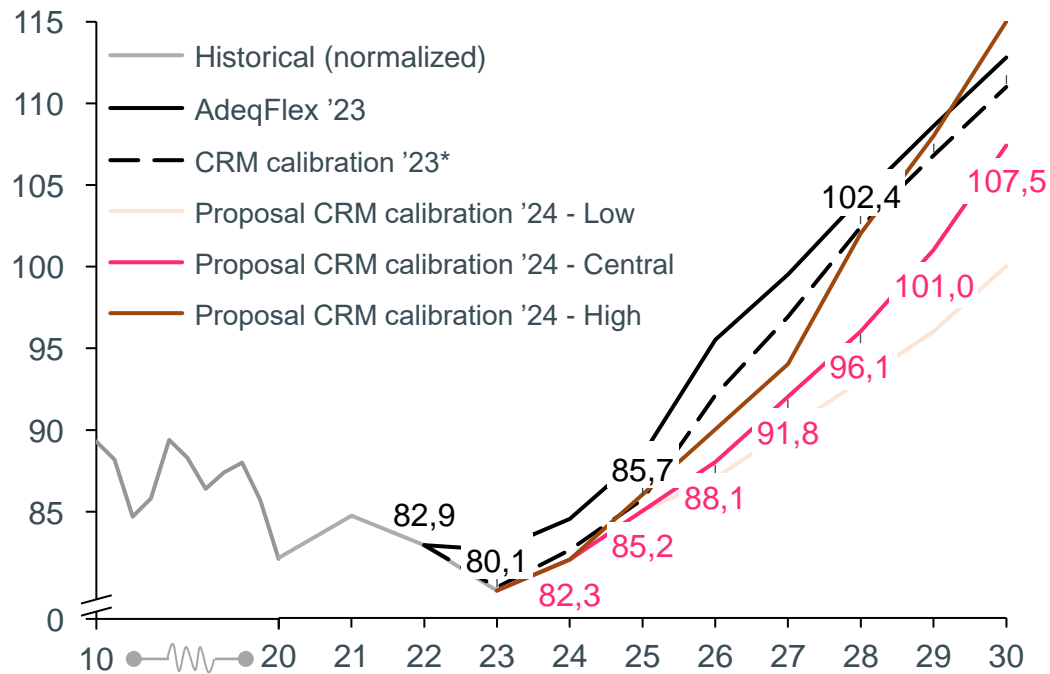
Overview of the load increase per block between 2023 and 2030 in TWh





# Elia proposes the trajectory including the central electrification assumptions for industry, 0,3 TWh of demand destruction in industry and a partial recovery of 1,9 TWh in the residential and tertiary sectors

Comparison of load forecasts in TWh – Total load including losses  
 (Note that shared areas show contributions to increase after '24 per segment)



\* load trajectory based on the values selected by the Minister for the calibration of the 2025-26/Y-1 and 2028-29/Y-4 auctions

Sensitivities presented in the graph cover the electrification in industry

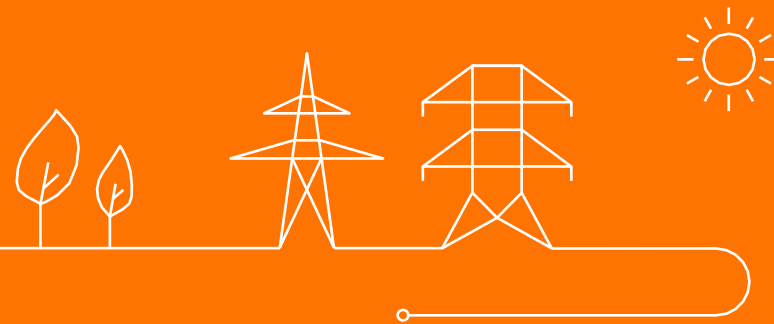
Sensitivities could also be added on:

- More demand destruction in industry: - 0,5 TWh
- More recovery in residential and tertiary: + 0,8 TWh

### Elia's proposal

- 2026-27/Y-1: 88,1 TWh
- 2027-28/Y-2: 91,8 TWh
- 2029-30/Y-4: 101,0 TWh

# CRM design update



## CRM design – baseline

During the summer months Elia has continued to gather input on the CRM baseline design following bilateral discussion with several stakeholders.

Focus of the design improvements:

1. Simplifying and improving the accuracy of the existing High X of Y methodology
2. Introducing a new declarative baseline method in parallel

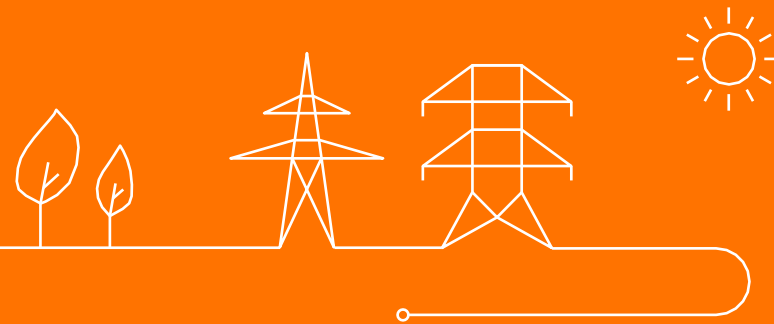


The resulting proposals are gathered in a **baseline design note that will be published on Friday 30/08**

Elia invites all stakeholders to react on the proposals contained in the note



# Next meetings



## Next meetings

- **September TBD: Workshop on CRM design**
- **Monday 23/09/2024 (moved from June 26th)**
  - Presentation of the BluePrint study
- **Friday 27/09/2024 : WG Adequacy (09:30 AM to 12:30 PM)**
- **Tuesday 5/11/2024 (moved from 29/10/2024) : WG Adequacy (09:30 AM to 12:30 PM)**

Please find further information on the next meetings through the [WG Adequacy webpage](#)



Thank you.



Thank you.

