ELIA - PRICED

Presentation to stakeholders

27 August 2024

Agenda

Introduction

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

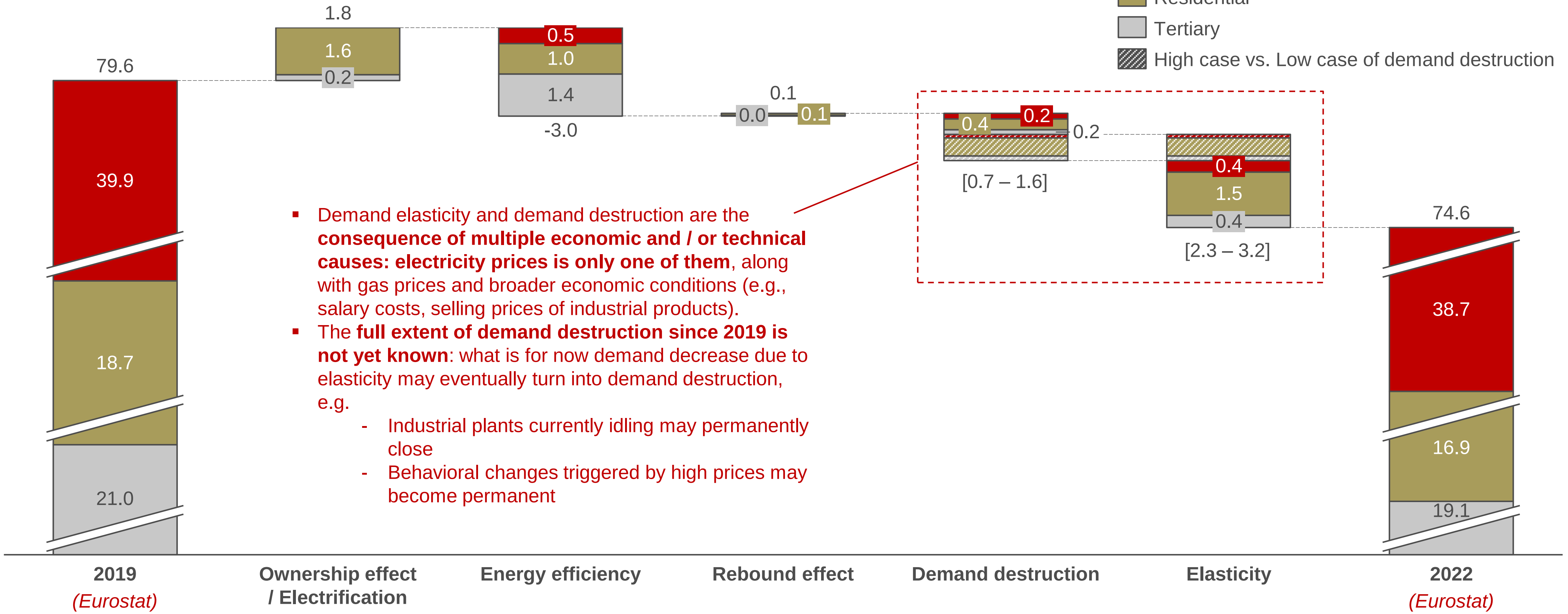
Recommendation for future updates

- 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[1] – INDUSTRY + RESIDENTIAL + TERTIARY

[TWH/YEAR, HDD-CORRECTED[2], GROSS]



- Demand elasticity and demand destruction are the **consequence of multiple economic and / or technical causes: electricity prices is only one of them**, along with gas prices and broader economic conditions (e.g., salary costs, selling prices of industrial products).
- The **full extent of demand destruction since 2019 is not yet known**: what is for now demand decrease due to elasticity may eventually turn into demand destruction, e.g.
  - Industrial plants currently idling may permanently close
  - Behavioral changes triggered by high prices may become permanent

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

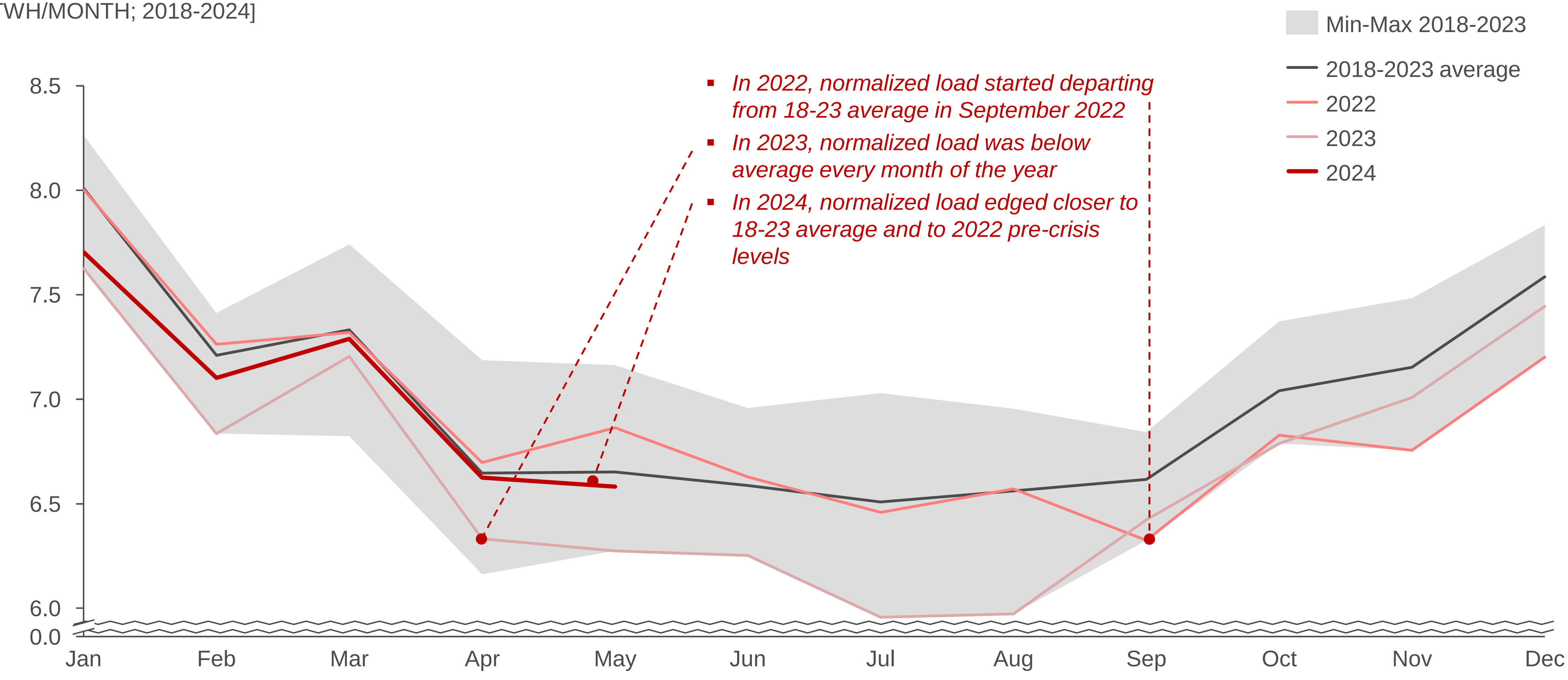
1) Excl. electricity production and storage, data centers, transportation; 2) Except for industry, for which the correlation between electricity consumption and temperature is not significant and does not need correction

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]



Source: Elia (load); Synergrid (HDD data)

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	
Consumption data	Metering data from DSOs or TSOs			**TSO data is available, but DSO data is limited in time coverage and granularity**
STATBEL surveys	Microdata from Household Budget Survey	Microdata from PRODCOM and “Structure des entreprises” surveys		**No microdata available within timeframe, relying on public datasets only**
Transversal interviews	Electricity suppliers, DSOs, Electricity supply brokers			**7 interviews conducted, with limited information regarding residential and tertiary sectors Cf. next page**
Sector-specific interviews	n.a.	Facility manager associations	Large industrial consumers Industrial associations	
Literature review	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

Method

WP #1 – Industry

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

A Electrification

- **Permanent increases in electricity consumption** driven by the **switch to electricity from another energy carrier or from the addition of new processes that use electricity**
- Associated with **new processes in industry** (e.g., electric arc furnaces)
- Associated with new **electrified end-uses in residential / tertiary** sectors (e.g., heat pumps or EVs)

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

B Energy efficiency

- Changes in electricity consumption that are attributable to **technological improvements**
- Correspond to reduced electricity consumption at **constant production output**
- **Deemed permanent** by nature, i.e. not sensitive to future variations in economic conditions

C Demand destruction

- All **permanent reductions in electricity consumption** which are not driven by technological energy efficiency
- Associated with **destroyed production output**, e.g., plant closures or permanent downsizing
- **May or may not be caused by electricity** prices, i.e. includes destruction related to other factors (market demand, other energy inputs, competition, …)

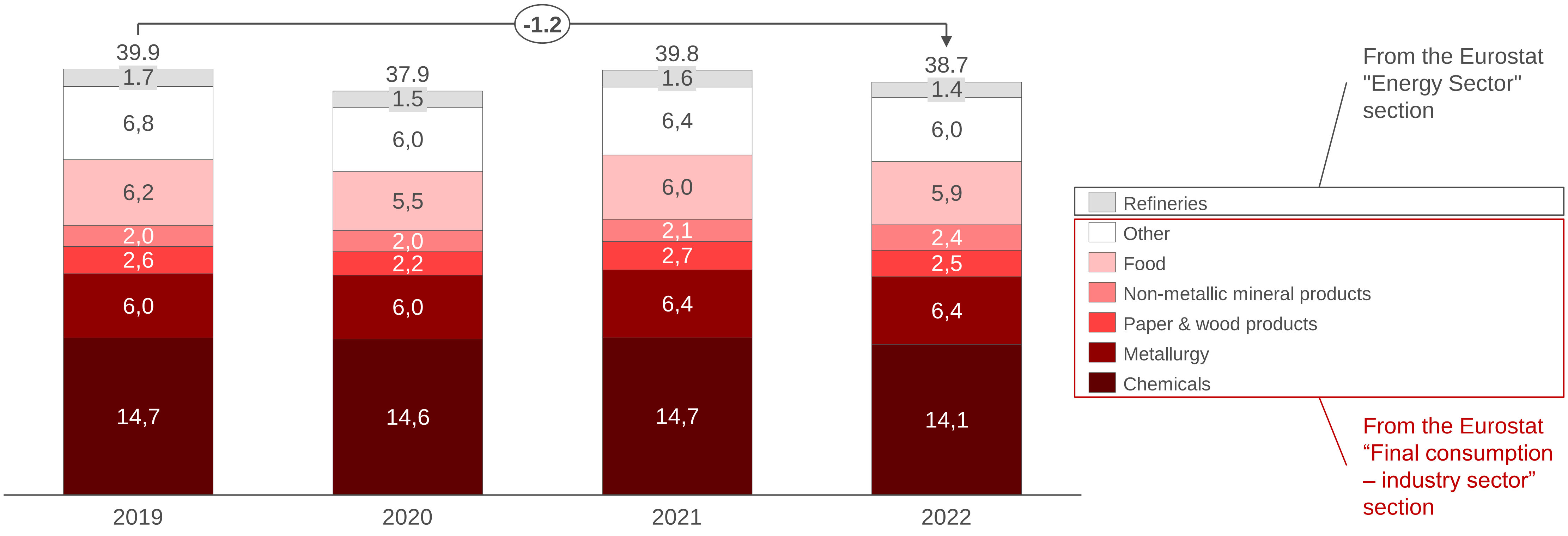
D Elasticity

- All **temporary changes in electricity consumption**, which are **direct reactions to variations in economic conditions** (price of electricity, price of other inputs e.g. gas, selling price of industrial production, wages…)
- Associated with **temporary production outputs**, e.g., idled plants or reduced utilization rates of industrial equipment
- Expected to be **recovered once economic conditions are back to nominal**, possibly **with a time lag**

Source: E-CUBE Strategy Consultants

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]

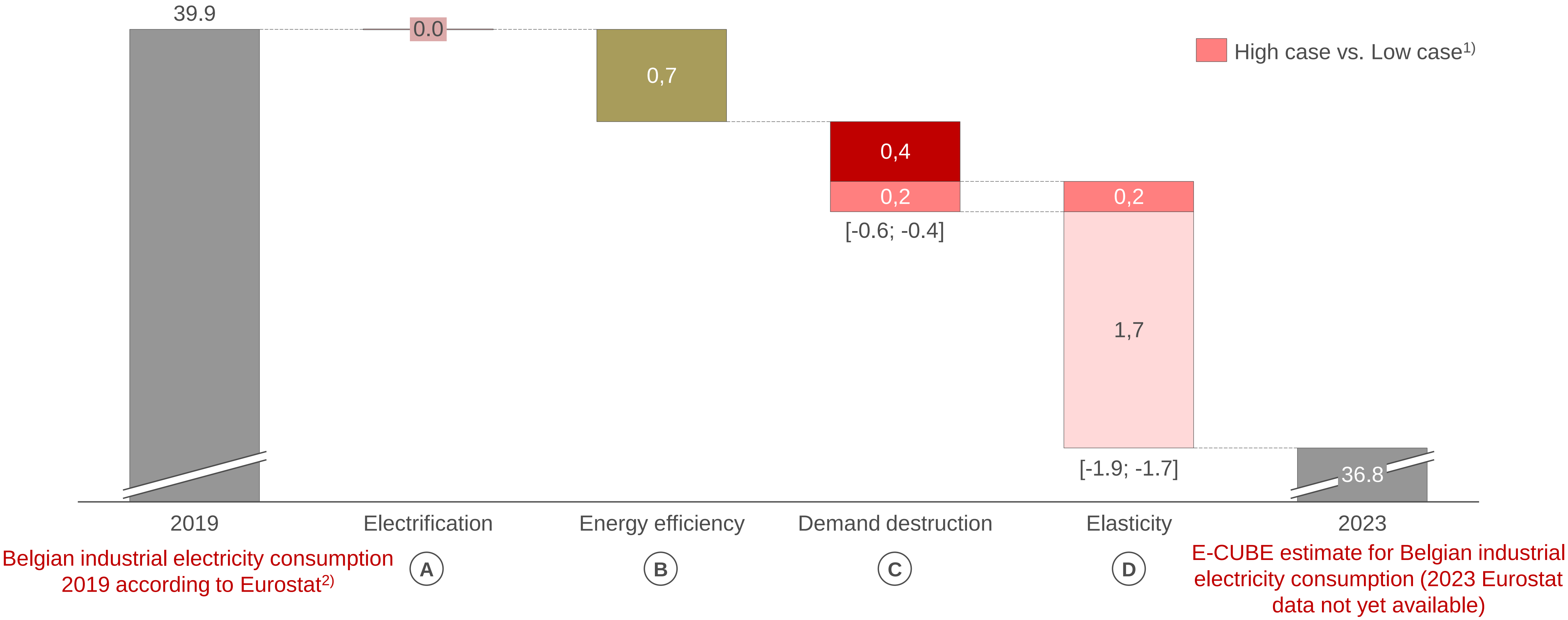


Source: Eurostat

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]



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)

Source: Eurostat, Elia data; E-CUBE Strategy Consultants

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*)	TSO + DSO	(A) Electrification	(B) Energy efficiency	(C) Demand destruction[1)	(D) Elasticity of demand
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]**[2)	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
Weighted total[3)	**-3.1**	**0.0**	**-0.7**	**[-0.7; -0.4]**	**[-2.0; -1.7]**

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

Source: Elia data; E-CUBE Strategy Consultants

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

B

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

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

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

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

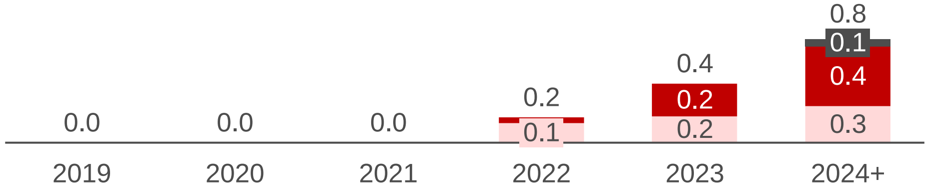
DESTRUCTION OF INDUSTRIAL ELECTRICITY DEMAND (TSO-CONNECTED AND DSO-CONNECTED)
[TWH DESTROYED VS. 2019/YEAR]

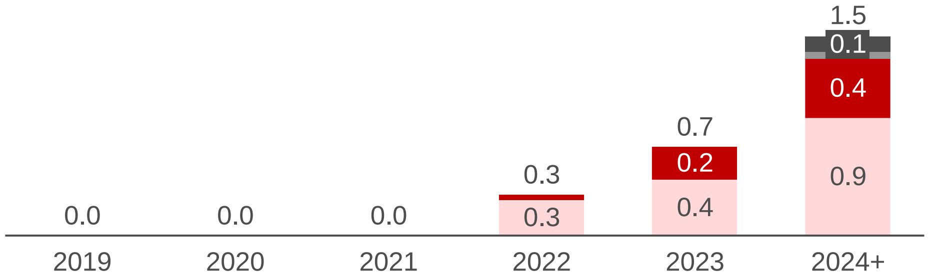
Chemicals · Refineries · Non-metallic mineral products · Other · Metallurgy · Paper & wood products · Food

Low case – *Permanently closed plants*

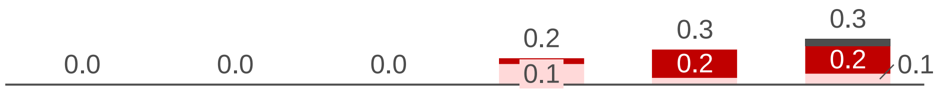
High case – *Permanently closed plants + plants currently idling which may eventually permanently close*

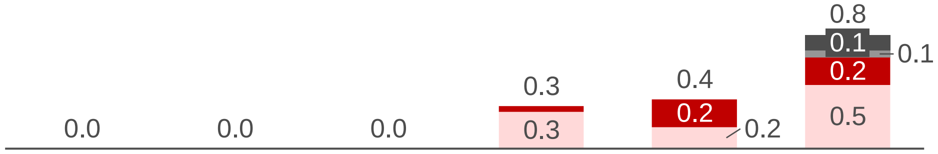
Demand destruction - Compounded





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.

Source: Press review; E-CUBE Strategy Consultants analysis

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[1)]

Sector	Company	Context	Status
	Petrochemicals plant	There could be a risk of closure for some Belgian petrochemicals plants: **refining capacity is decreasing in Europe** (e.g. planned closure of the Grangemouth refinery in the UK by 2025)	At risk
	INEOS	INEOS has proposed the **mothballing of one of its PTA units** (Purified Terephthalic Acid) which is already off-line since May-22. (CAVEAT: At this stage, INEOS has not announced a permanent closure)	At risk
	3M	3M is looking at options to further accelerate the **exit from manufacturing PFAs chemicals** (health issues), leading to the idling of its Zwijndrecht facility in Belgium. *~300 FTEs*	At risk
Other industries	Audi	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 **relocated to China and Mexico**. *~3,000 FTEs*	At risk
	CALLEBAUT	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. *~500 FTEs*	At risk
	Celanese	Celanese plans to cease production in Mechelen (acquired from DuPont in Nov-22) in Sept-24, citing **high operating costs as one of the reasons** for the closure. *~220 FTEs*	At risk
	sappi (The word for fine paper)	Graphic paper production ceased in Dec-23 at Sappi's Lakanen mill, with **closure scheduled to conclude in Q2 2024**. This is due to the lack of competitiveness in the graphic paper market.	Closed
	ARLANXEO (Performance Elastomers)	In June-23, Arlanxeo announced the closure of its Antwerp plant. *~278 FTEs*	Closed
Other industries	VANHOOL	Van Hool has decided to **transfer bus production to Macedonia**, which accounts for around half of its business (R&D and the trailer division are still profitable and remain in Belgium). *~1,250 FTEs*	Closed
	INNOVIA	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. ~120 FTEs	Closed
Other industries	Mc Three	MC Three Carpets (textile industry) declared **bankruptcy** in January 2024. ~278 FTEs	Closed

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."[1)](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."
Source: ICIS, E-CUBE Strategy Consultants

Agenda

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

Method

WP #1 – Residential

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

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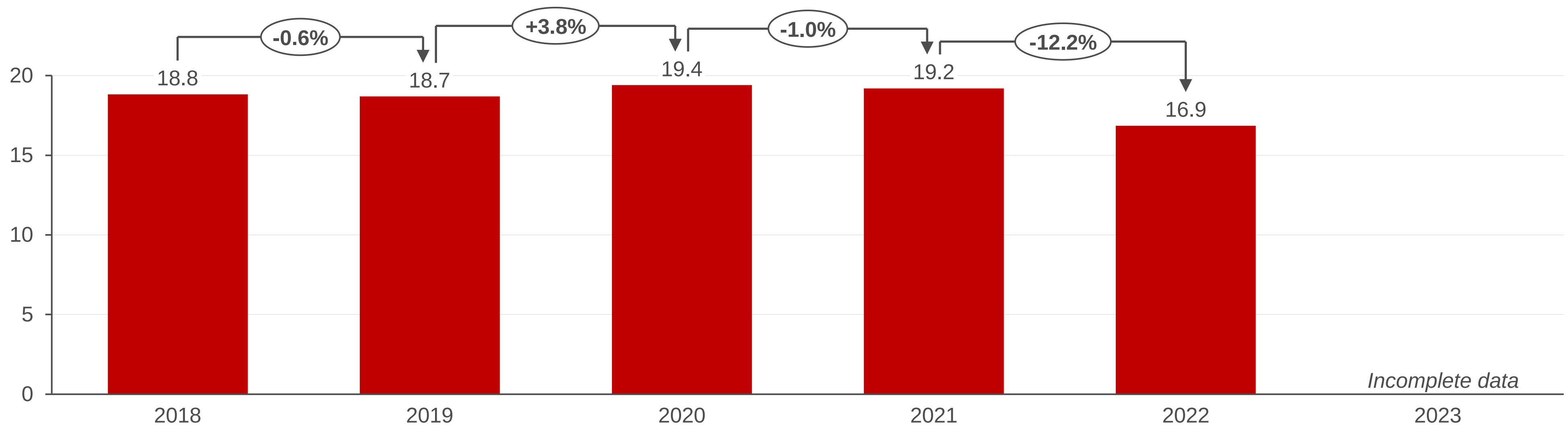
According to Eurostat data, residential electricity consumption dropped by ~12% in 2022, following the energy crisis

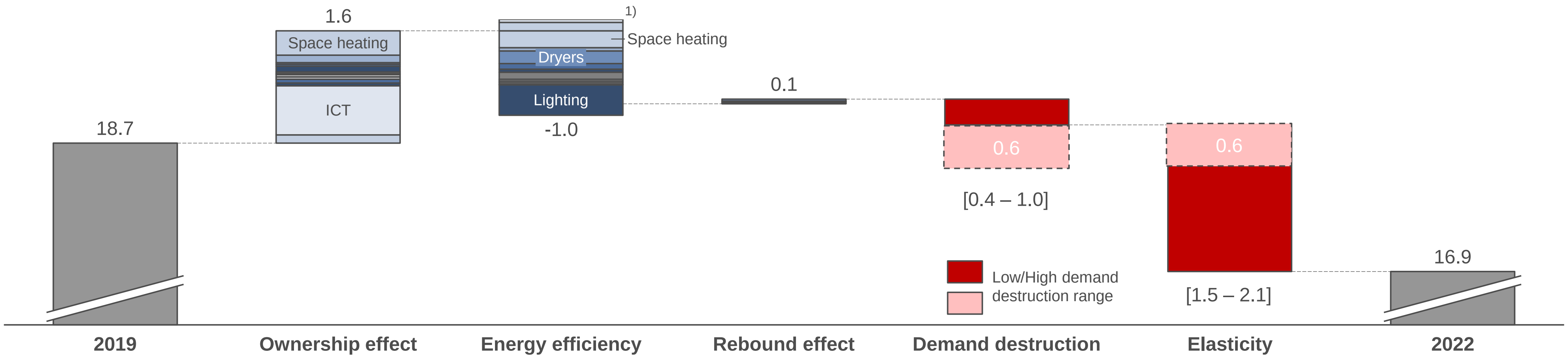
YEARLY RESIDENTIAL ELECTRICITY CONSUMPTION, BY GRID OPERATOR
[TWH/YEAR, HDD-CORRECTED, GROSS]



* "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]



Ownership effect	Energy efficiency	Rebound effect	Demand destruction	Elasticity	2022
Increased equipment rate (electrification) and # households	Improved specific consumption (equipment + building efficiency), but offset if increasing appliance sizes	~0.15 factor on white products[2)]	Share of behavioural changes linked to energy waste	Share of behavioural changes linked to comfort	
Technological drivers			**Behavioural drivers**		**TOTAL**
+ 0.7 TWh			**- 2.5 TWh**		**- 1.8 TWh**

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)

Source: E-CUBE Strategy Consultants analysis

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, %] [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%
Total	**100%**	**8.6%**	**-5.6%**	**0.4%**	**3.4%**

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

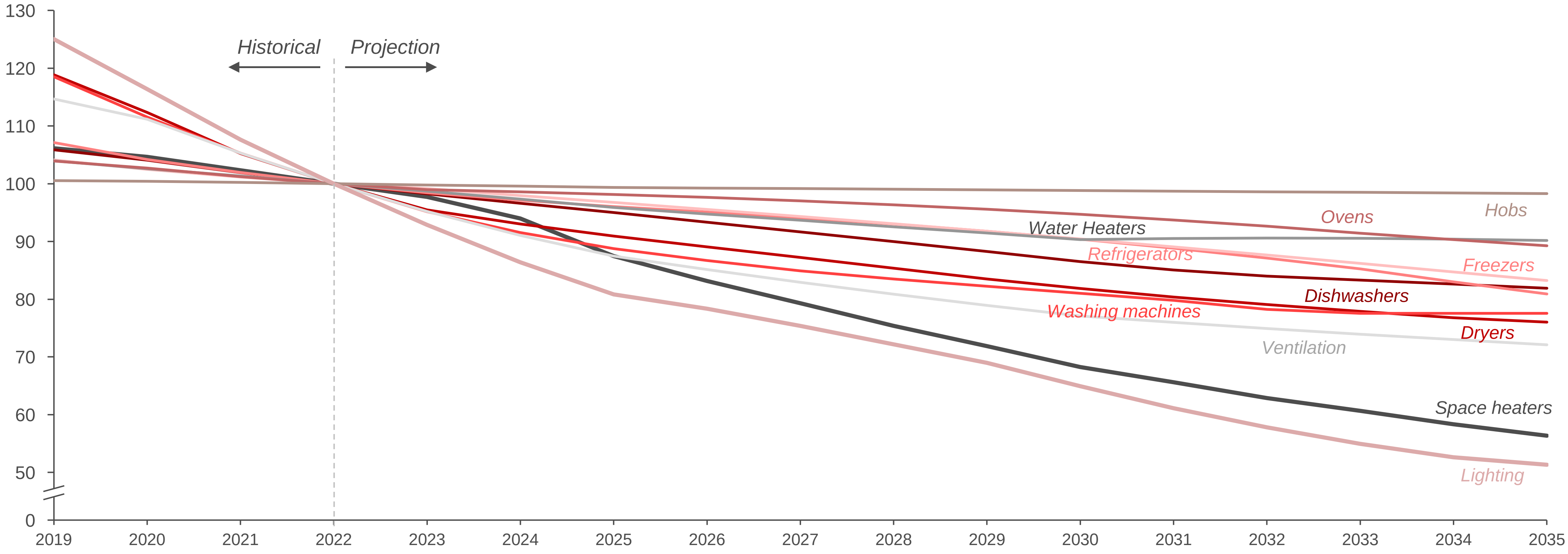
1) “Negative energy efficiency” on ICT and other devices reflect the fact that the mix of electrical devices has changed: the average appliance consumes more, but they are not the same appliances (in kind and size) in 2022 as in 2019

Source: E-CUBE Strategy Consultants analysis

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

ELECTRICITY CONSUMPTION BY END USE

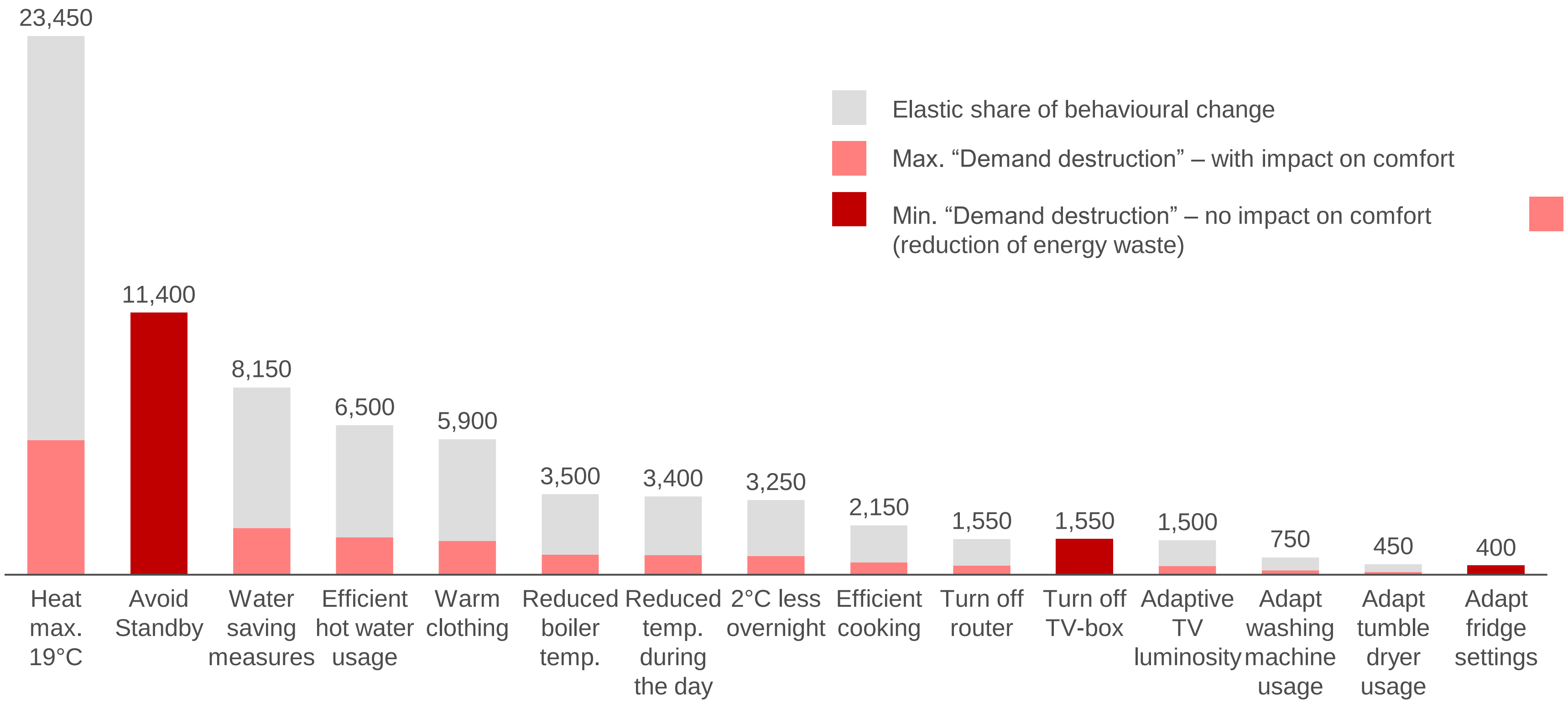
[kWh_{elec} p.a. / appliance; Base 100 in 2022]



Sources: GfK; STABEL; EU's Ecodesign report; E-CUBE Strategy Consultants Analysis

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"**

Source: Negawatt; E-CUBE Strategy Consultants analysis; IPSOS / RTE

Agenda

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2. Industry

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Method
WP #1 – Tertiary

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

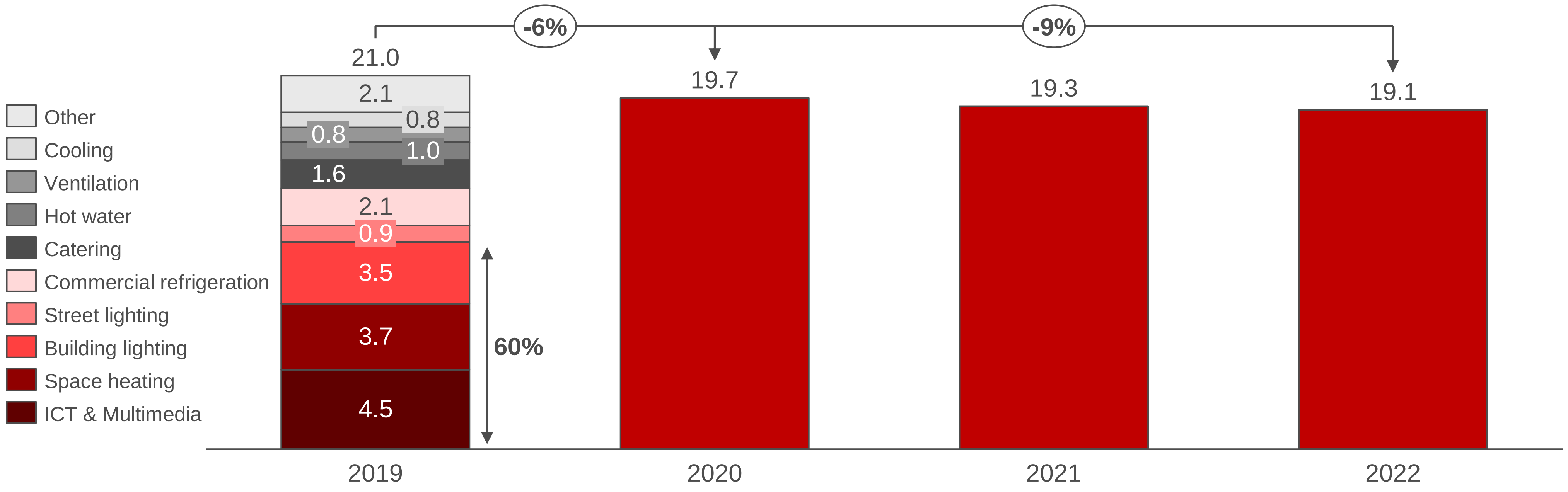
a. Break down consumption by end use (based on Eurostat and JRC-IDEES data)
b. Apply assumed energy efficiency gains

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]

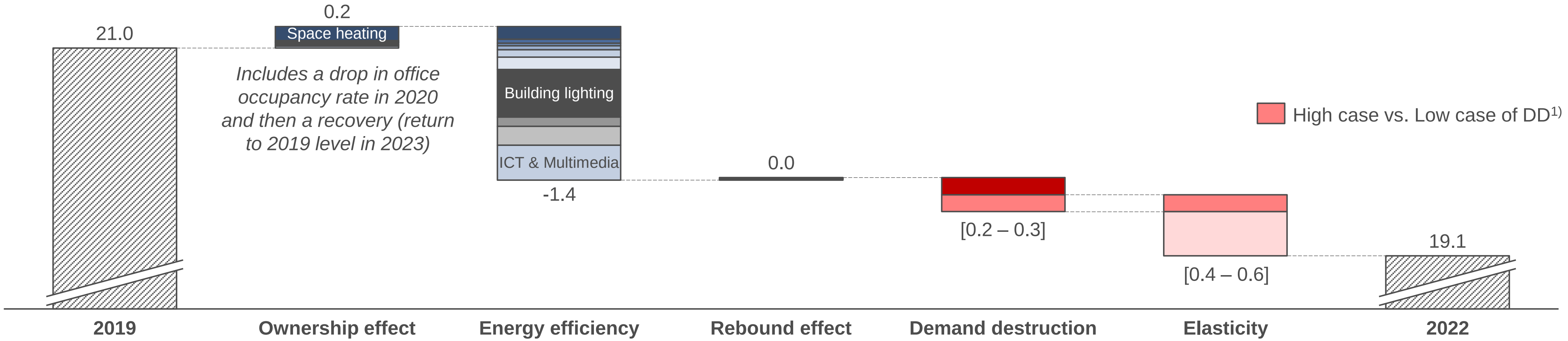


1) The JRC-IDEES data gives a split by tertiary end use but only go up to 2021, while the Eurostat data is aggregated and go up to 2022. Total tertiary consumption for 2019-2021 is the same in JRC-IDEES and Eurostat.

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]

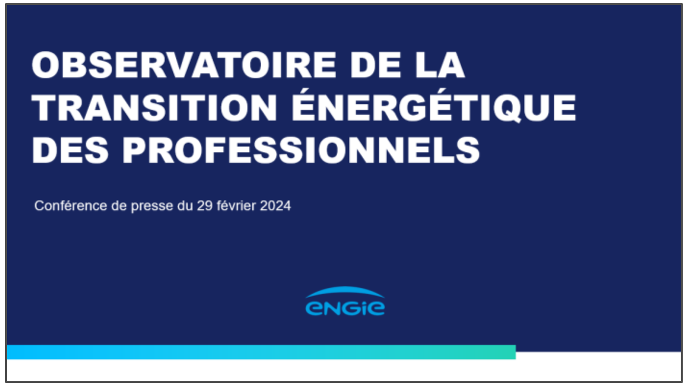


Ownership effect	Energy efficiency	Rebound effect	Demand destruction	Elasticity	2022
Increased equipment rate (electrification) and # m² of tertiary surface	Improved specific consumption (equipment + building efficiency)	Increased use of more efficient appliances	Share of behavioural changes that are permanent	Share of behavioural changes that are temporary	
- 1.2 TWh			**- 0.7 TWh**		**TOTAL**
Technological drivers			**Behavioural drivers**		**- 1.9 TWh**

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

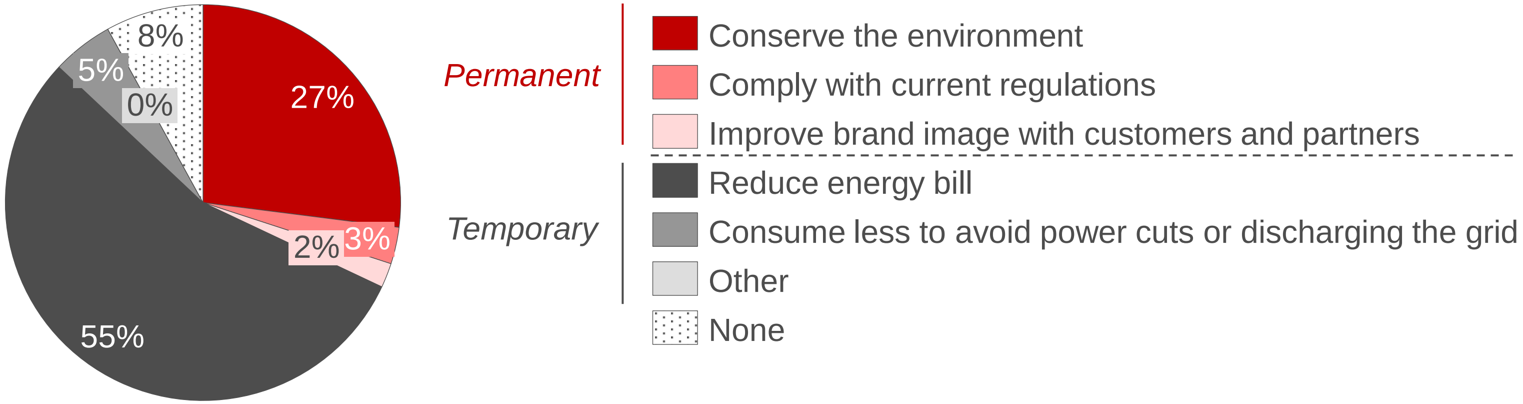
Source: E-CUBE Strategy Consultants analysis

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


OBSERVATOIRE DE LA TRANSITION ÉNERGÉTIQUE DES PROFESSIONNELS

Conférence de presse du 29 février 2024

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



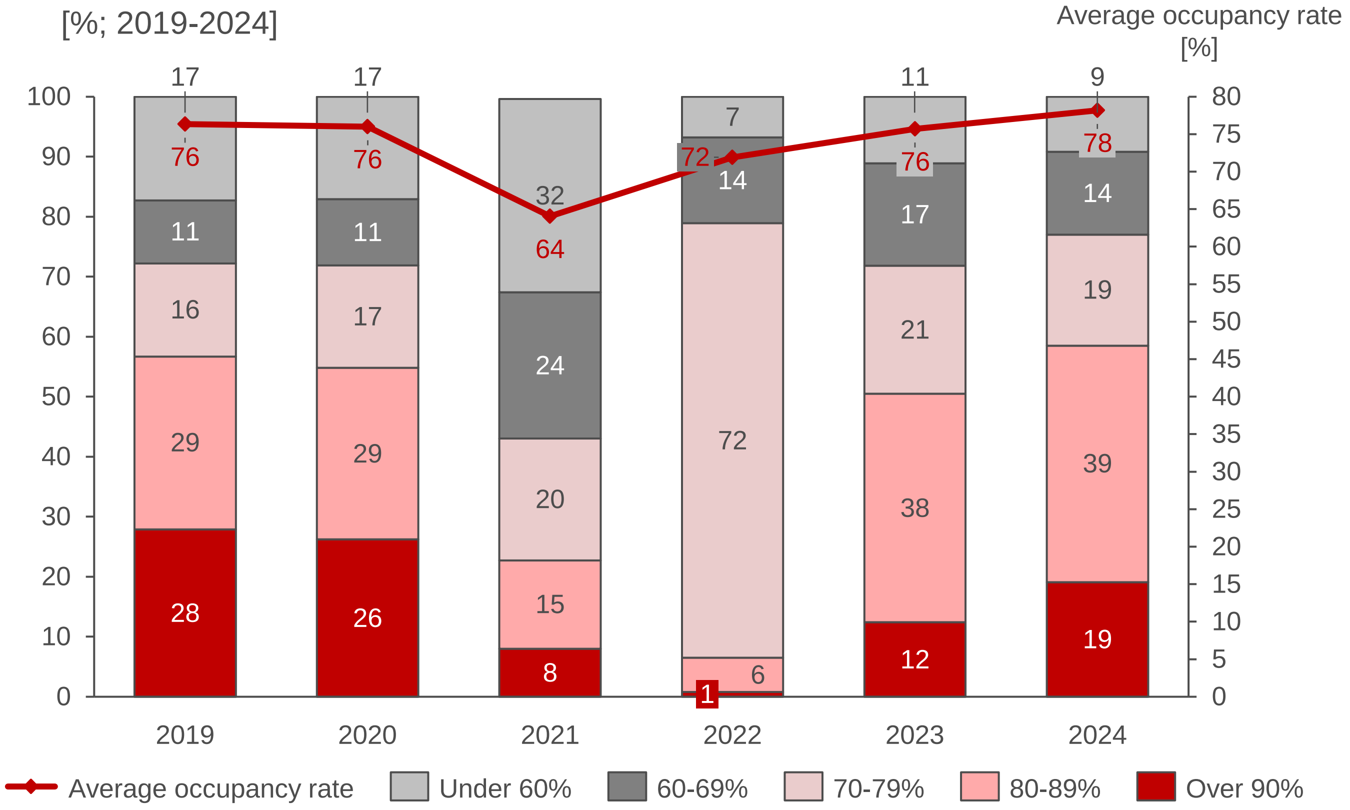
~32% of companies state a "permanent" driver as the main driver to save electricity
→ E-CUBE assumes that **demand destruction represents between 22% and 42% (i.e. 32 +/-10%[1]) of "behavioural" decrease in tertiary consumption**

1) +/- 10% is the same range as for the residential sector
Source: "Observatoire de la transition énergétique des professionnels" (Engie-IFOP-ADEME, 2024); E-CUBE Strategy Consultant analysis

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

OCCUPANCY RATES[1)]

[%; 2019-2024]



- 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