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# The first energy labels for professional cooling appliances – lessons learnt and comparison with energy regulation for household appliances

MAIKE HEPP, STEFFEN HEPP - TOPTEN

# Presenter's Short Biography



Maike Hepp

Since 2016: Project Manager at Topten Switzerland

- Product expert for professional & commercial refrigeration appliances: technical expertise, contacts with manufacturers, retailers, buyers, policy recommendations, rebate programmes
- CH project leader for H2020 project “HACKS – Heating and Cooling Know-How and Solutions” regarding energy efficient heating and cooling of private housing



PgCert Global Environmental Challenges, University of Edinburgh

Bachelor of Science, Leuphana University, Environmental Sciences



# Presenter's Short Biography

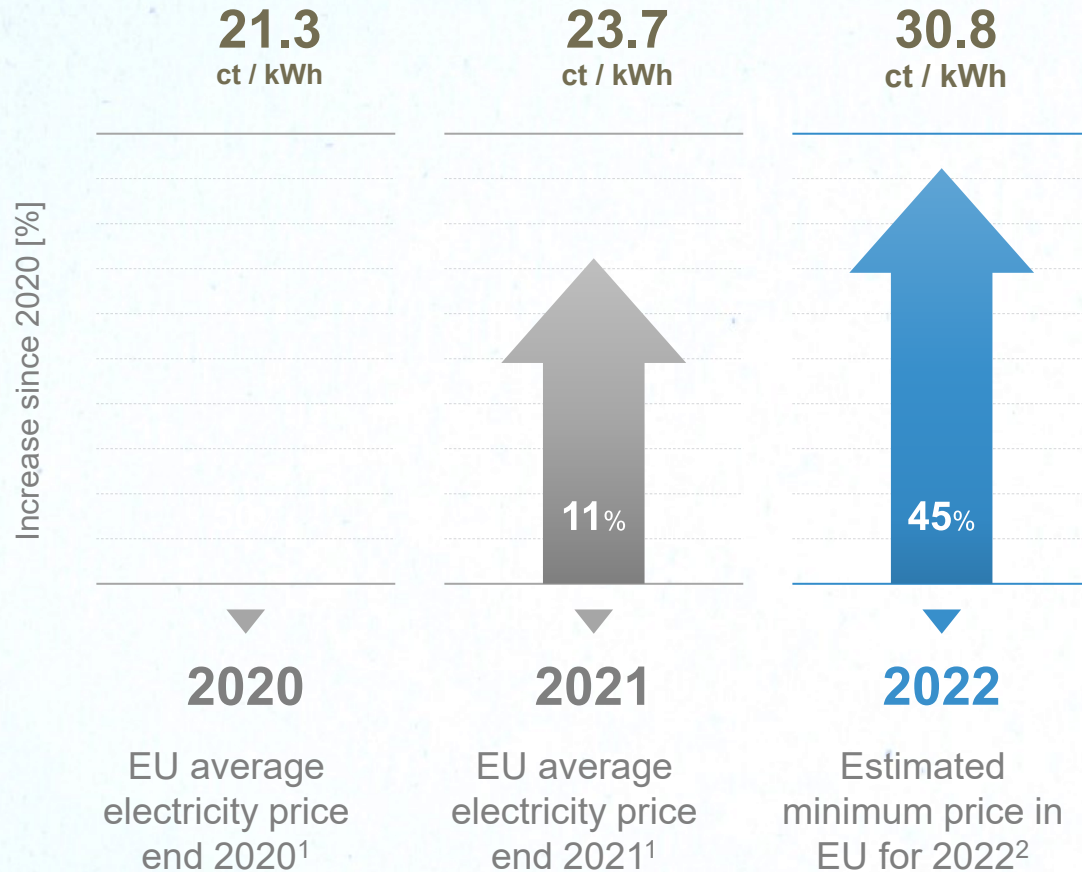


Steffen Hepp

- Since 2021: Project Manager at Topten Switzerland
- Focus areas & expertise:
  - Professional and commercial refrigeration
  - Circular economy and repairability
  - Electronics & Solar energy
- 5 years experience in Consumer Goods Industry
- Background in Industrial Engineering (B.Sc) and Technology & Innovation Management (M.Sc) from Università Bocconi
- From North of Germany, Baltic Sea



# Energy Efficiency – economic advantage on the B2B market



Financial saving potential through efficiency has increased by ~ 50 % since 2020

<sup>1</sup> <https://ec.europa.eu/eurostat/de/web/products-eurostat-news/-/ddn-20220429-2>

<sup>2</sup> [https://www.allianz-trade.com/en\\_global/news-insights/economic-insights/energy-prices-household-income-squeeze.html](https://www.allianz-trade.com/en_global/news-insights/economic-insights/energy-prices-household-income-squeeze.html)



# Topten product lists of top products

- Online platform for best products
- 13 B2B refrigeration product lists, 755 products
- 2 million pageviews/year
- Basis for rebate programmes
- European platform: [topten.eu](http://topten.eu)

The screenshot shows the topten.eu website interface for 'Energy Efficient Vertical Display Cabinets (Plug-In)'. The page includes a navigation bar with categories like Household, Lighting, Office & TVs, Cars, Building Components, and Professional Appliances. Below the navigation, there are filters for Brand, Temperature class, Type of cabinet, and Total net volume (l). The main content area displays a table of 43 items, with the first three rows visible below.

	Brand & Model	Energy	Type	Dimensions	Cost (€)
	Jordao Cooling Systems FUTURO 2 - 700 P CP CG	Energy (kWh/year): 1'478 Efficiency index (%): 8,8 Temperature class: M1 Climate class: 3	Vertical display refrigerator	Total net volume (l): 793 Total display area (m²): 3,01	Electricity in 8 years: €2'365
	Pastorfrigor s.p.a. Genova OV Doors 1875 R290 3M1 90-205 Series products: Genova OV Doors 1875 R290 3M0 90-205	Energy (kWh/year): 1'661 Efficiency index (%): 9,9 Temperature class: M1 Climate class: 3	Vertical display refrigerator	Total net volume (l): 1'453 Total display area (m²): 3,00	Electricity in 8 years: €2'657
	Pastorfrigor s.p.a. Genova OV Doors 1250 R290 3M1 75-205 Series products: Genova OV Doors 1250 R290 3M0 75-205	Energy (kWh/year): 1'230 Efficiency index (%): 9,9 Temperature class: M1 Climate class: 3	Vertical display refrigerator Heavy-duty	Total net volume (l): 769 Total display area (m²): 1,95	Electricity in 8 years: €1'968



Display refrigerators



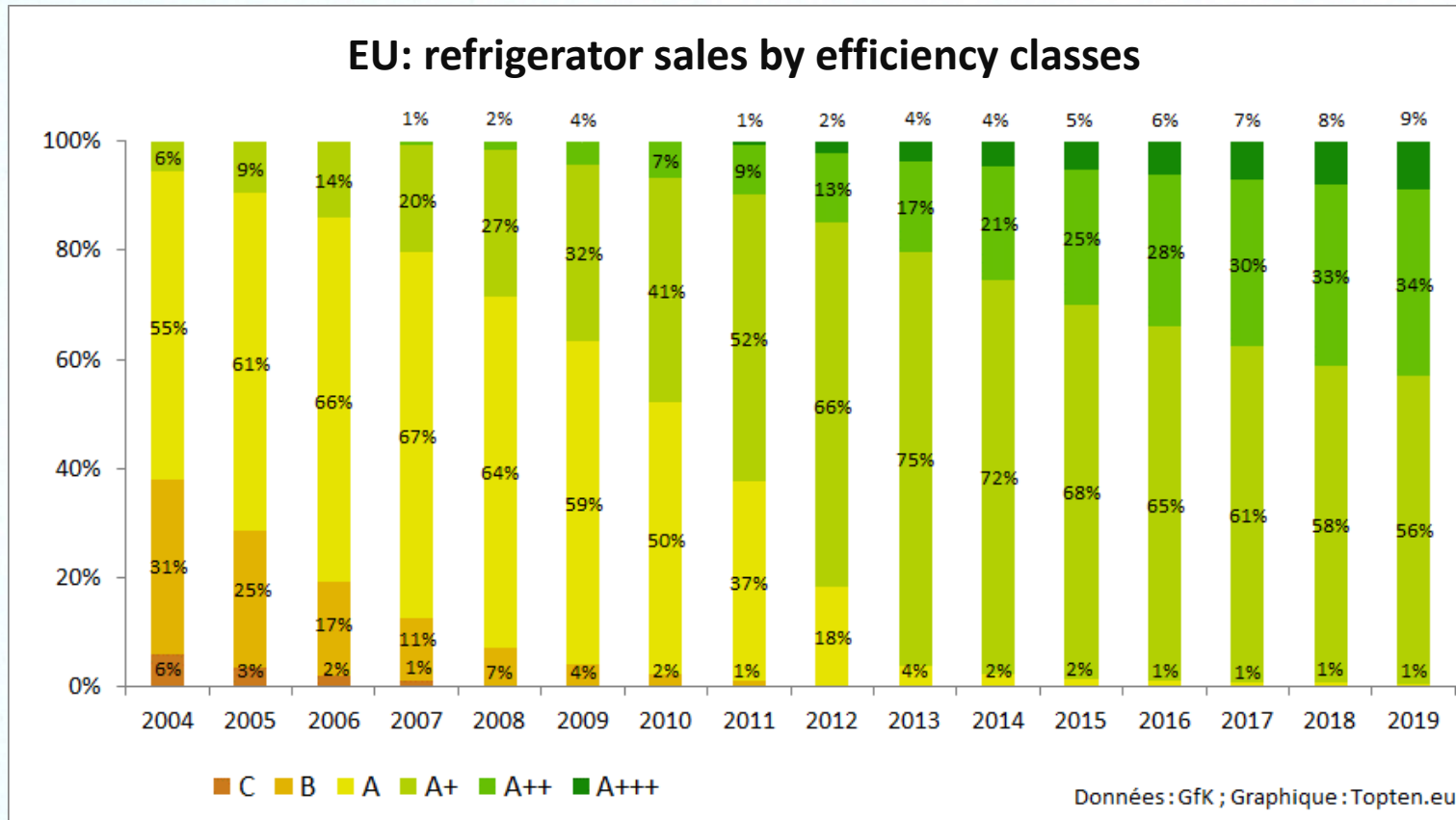
Medicine cabinets,  
wine coolers,  
minibars



Storage refrigerators

# Household Refrigerators and Energy Labels

Success story: Energy regulation for household refrigerators in Europe



**Often used arguments in Business-2-Business (B2B) markets:**

- ❗ *“Unsafe for refrigerated content”*
- ❗ *“Efficiency technologically not possible”*
- ❗ *“Too expensive -> market collapse”*

# EU Regulations for B2B Refrigeration Categories

- EN 2015/1094 (Label)

- ✓ Professional refrigerated storage cabinets

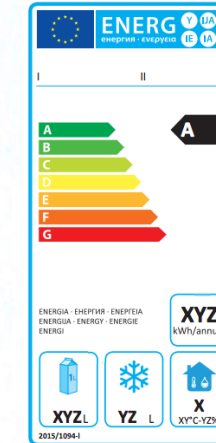
- EN 2015/1095 (Ecodesign)

- ✓ Professional refrigerated storage cabinets
- ✓ Blast cabinets
- ✓ Condensing units
- ✓ Process chillers

- EN 2019/2024 (Ecodesign) & EN 2019/2018 (Label)

- ✓ Refrigerating appliances with a direct sales function :
  - Beverage coolers
  - Ice-cream freezers
  - Integrated & remote refrigerated supermarket cabinets (horizontal & vertical, chilled & frozen)
  - Refrigerated vending machines

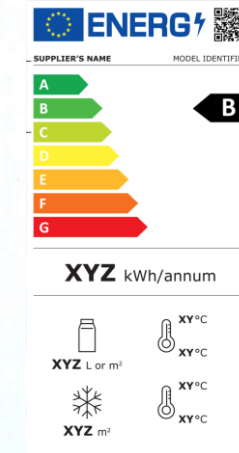
1 July 2016



1 July 2019

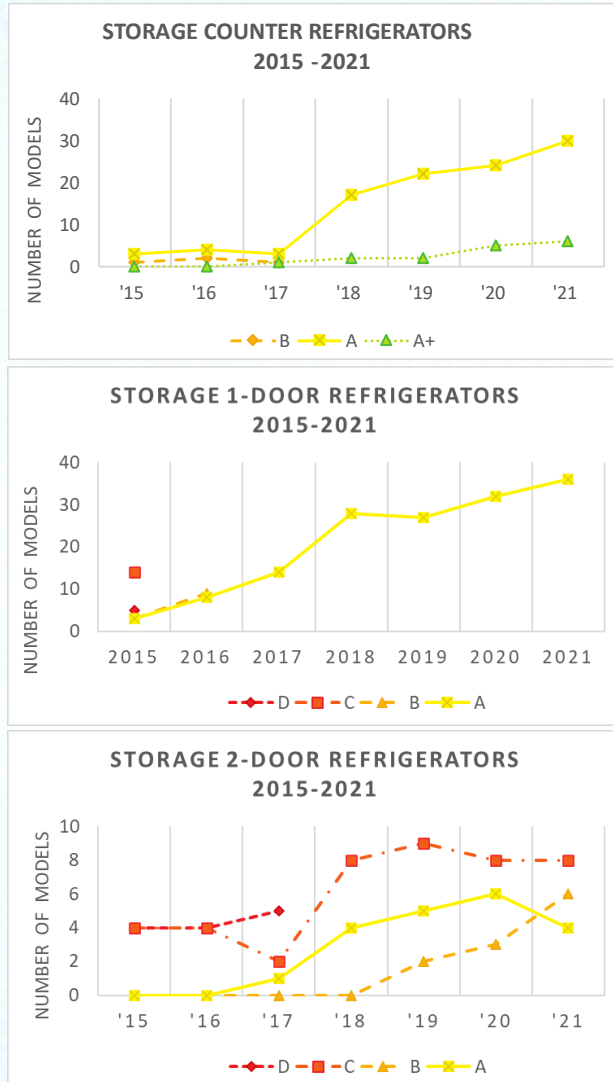


1 March 2021





# BAT Development Professional Storage Refrigerators



Significant market transformation since 2016

## Storage counter refrigerators:

- First A+ appliances in first year after new label
- Steady growth of A+ and A devices

## Storage 1-door refrigerators:

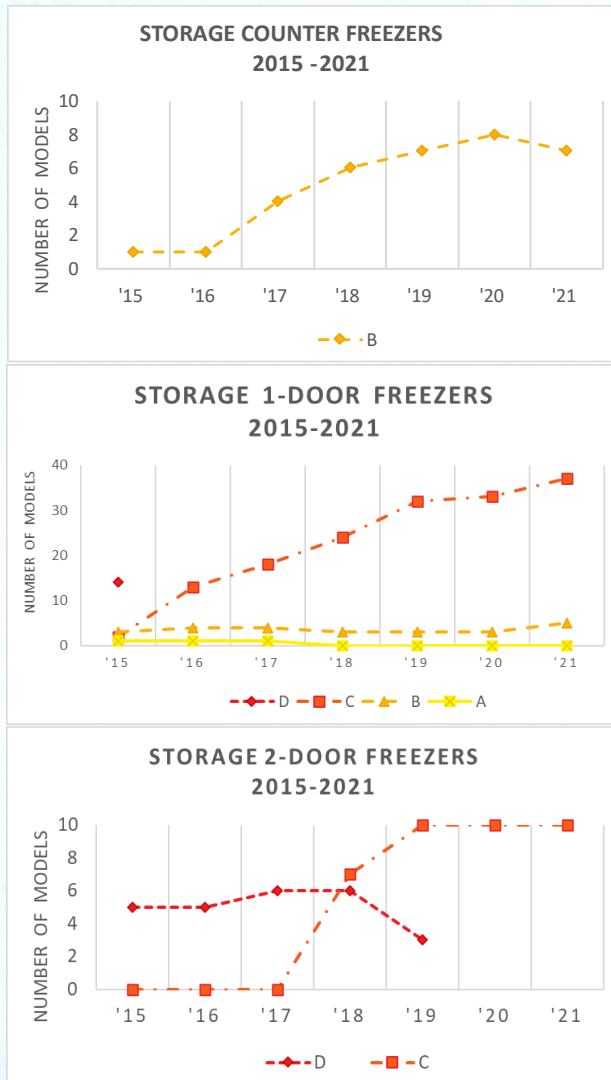
- Before label, classes A-D considered “best available technologies” (BAT)
- 36 class A models by 17 manufacturers within 5 years

## Storage 2-door refrigerators:

- BAT models in classes A-C
- Class A and B models slowly increasing on market



# BAT Development Professional Storage Freezers



Significant market transformation since 2016

## Storage counter freezers:

- Steady increase of class B models
- No class A or A+ models yet available

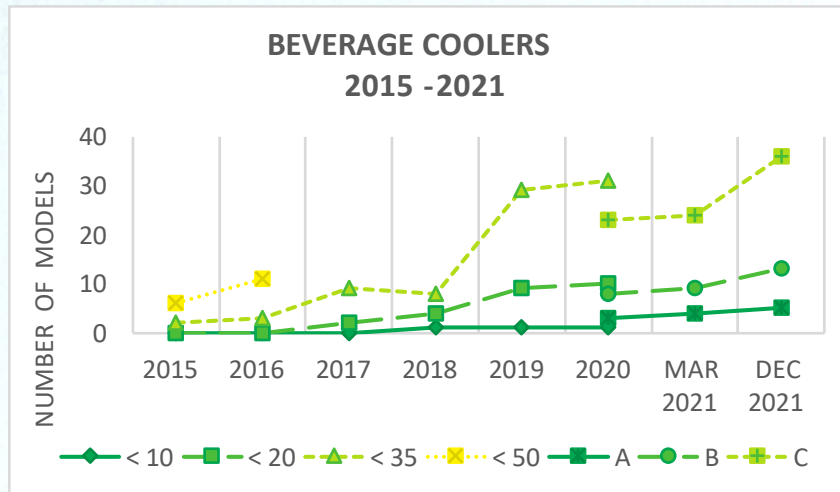
## Storage 1-door freezers:

- Class C models increasing over 5 years
- Class A and B models stagnating / wrongly declared

## Storage 2-door freezers:

- Strong increase in Class C models, now stagnating for 3 years
- No class A or B models yet available

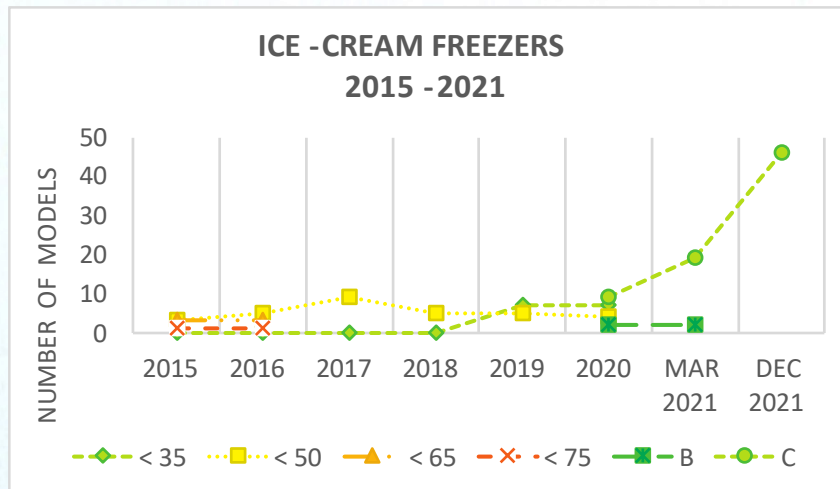
# BAT Development Commercial Display Refrigerators



Label since 01 March 2021

**Beverage coolers:**

- Class A and B models on the market upon start of label
- High number of class C models available
- CH: stricter MEPS than EU

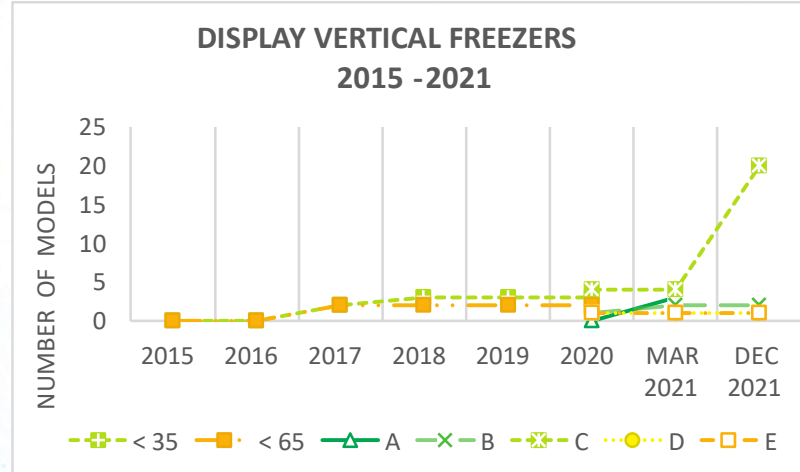
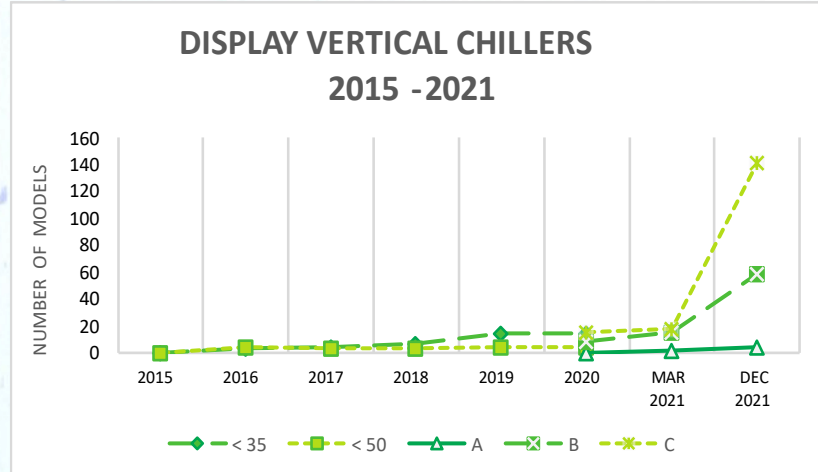
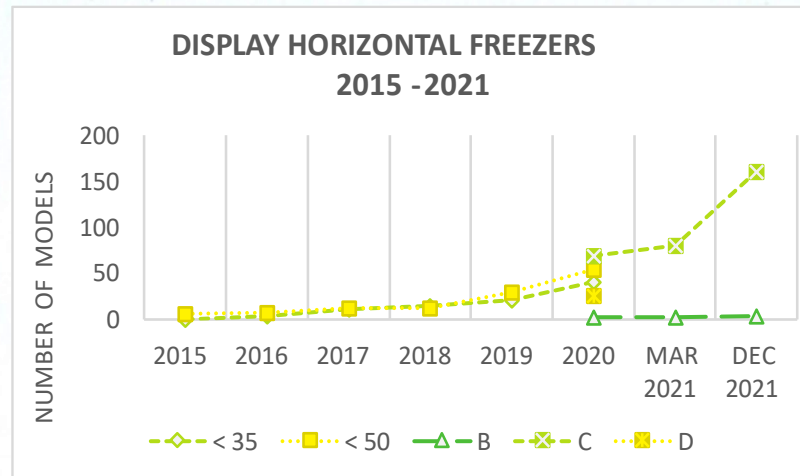
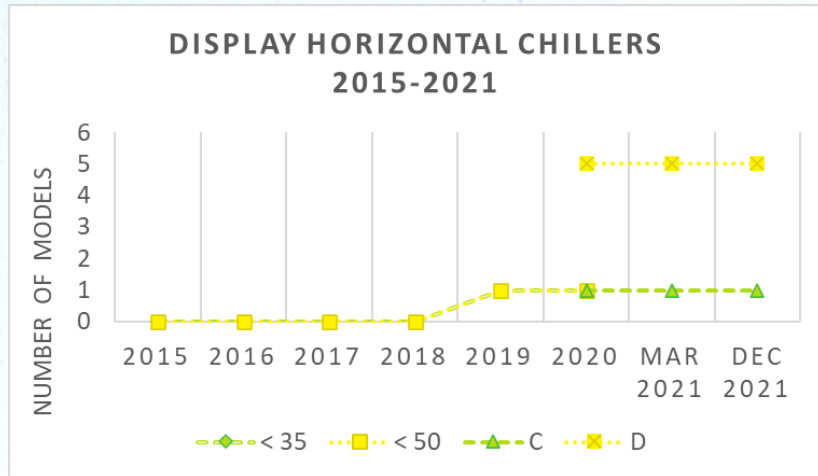


**Ice-cream freezers:**

- Before label process, class D (EEI 50) considered BAT
- 46 class C models since re-start of policy process in 2018



# BAT Development Commercial Display Refrigerators



- Class A models for vertical chillers and freezers already available
- **Strong market transformation since announcement of label**

# Remote Commercial Supermarket cabinets

## All Vertical Chillers

Class	Entries	%
A	0	0%
B	798	1%
C	13295	19%
D	18403	26%
E	12622	18%
F	18314	26%
G	7845	11%

## Chillers with doors <sup>1</sup>

Class	Entries	%
A	0	0%
B	779	3%
C	13088	42%
D	15940	51%
E	1160	4%
F	29	0%
G	33	0%

## Open chillers <sup>2</sup>

Class	Entries	%
A	0	0%
B	19	0%
C	207	1%
D	2463	6%
E	11462	28%
F	18285	45%
G	7812	19%

## All vertical freezers

Class	Entries	%
A	0	0%
B	0	0%
C	24	1%
D	1022	22%
E	1165	25%
F	1181	25%
G	1291	28%

- No development over time available yet
- Remote chilled cabinets reach up to class B
- Vertical freezers reach max. class C
- Clear efficiency gains through doors

Source: <https://eprel.ec.europa.eu/screen/home>, May 16th 2022

<sup>1</sup> Family cabinet code: RVC4

<sup>2</sup> Family cabinet code: RVC1 and RVC2

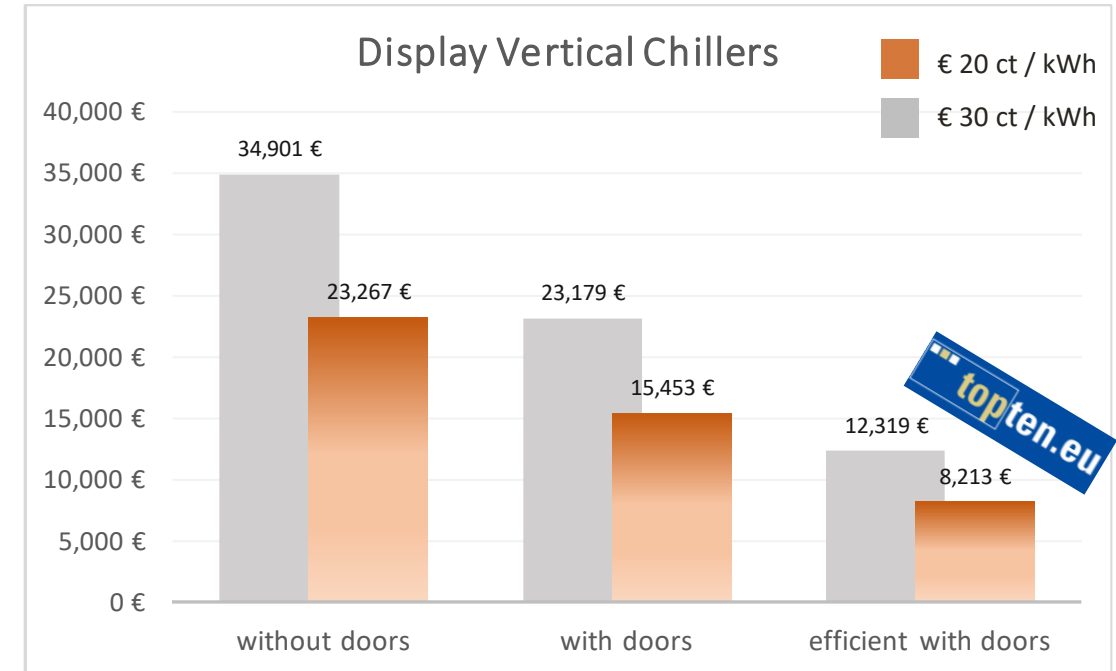


# Saving Potential Vertical Supermarket Chillers

Many categories of new label for refrigerating appliances with direct sales function already have class A models (EEI<10) and EEI = 100 MEPS -> 90% EEI saving potential

## Display Vertical Chillers (plug-in):

- Often open for convenience food
- BAT model uses almost 3x less energy compared to open model (~70% savings)
- Studies show no long-term overall change in revenue (barrier of doors vs. “cold-feet effect” of open appliances)



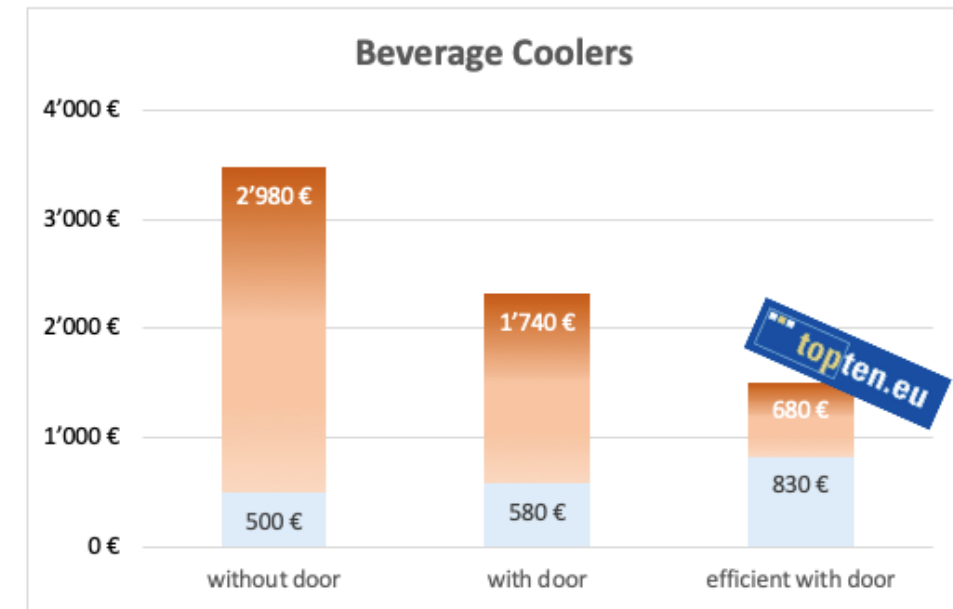
TDA (m <sup>2</sup> )	4.1	4.1	4.3
Energy	14'542 kWh/a	9'685 kWh/a	5'133 kWh/a
Electricity costs <sup>1</sup>	23,267 €	15,453 €	8,213 €
Electricity costs <sup>2</sup>	34,901 €	23,179 €	12,319 €

<sup>1</sup> 0.2 EUR / kWh, 8 years

<sup>2</sup> 0.3 EUR / kWh, 8 years

# Saving Potential Beverage Coolers

- Top-efficient model saves **75 %** energy compared to smaller inefficient open model and **60 %** compared to average model with door
- Life-time cost of efficient model is half of open inefficient appliance
- Often bulk-purchased by food & beverage companies who loan or rent appliances to vendors



Net volume	500 l	500 l	556 l
Energy	1'860 kWh/a	1085 kWh/a	425 kWh/a
Electricity costs*	2'980 €	1'740 €	680 €
Purchase price	500 €	580 €	830 €
Total costs	3'480 €	2'320 €	1'510 €

\* 8 years, 0.2 € /kWh



# Technical Aspects - Efficient Technologies

## Variable Speed (VS) Compressors:

- Adjust continuously to match output required, ca. 1 energy class difference

## Insulation

- Thickness and quality of insulation

## Double or triple glazing or air curtains

- Type of insulation

## Water loop or remote systems

- Use of waste heat, connecting different types of technologies within the market

## Green refrigerants

- Supported by European F-Gas Regulation
- R290 and R600 have Global Warming Potential (GWP) 3, R404a has GWP 3'922 and R134a has GWP 1'430; leakage is widely common phenomenon

# Financial Aspects - Rebates

## Support purchase of most efficient technologies (BAT)

- In CH implemented since 2014 (Programme 3 ongoing)
- Saved kWh cheaper than purchased kWh

## Multiplier effect

- Buyers and dealers encourage manufacturers to develop high efficiency products that qualify for the rebate programme
- Other manufacturers imitate technological innovations
- Dealers adjust product range towards high efficiency products



### Programme 1 (2014-2017)

- 1.2 mio €
- 5'955 products
- 54.6 GWh total energy savings
- 2.2 ct/kWh cost effectiveness

### Programme 2 (2018-2020)

- 1.8 mio €
- 10'955 products
- 118.5 GWh total energy savings
- 1.5 ct/kWh cost effectiveness

### Programme 3 (2021-2023, ongoing)

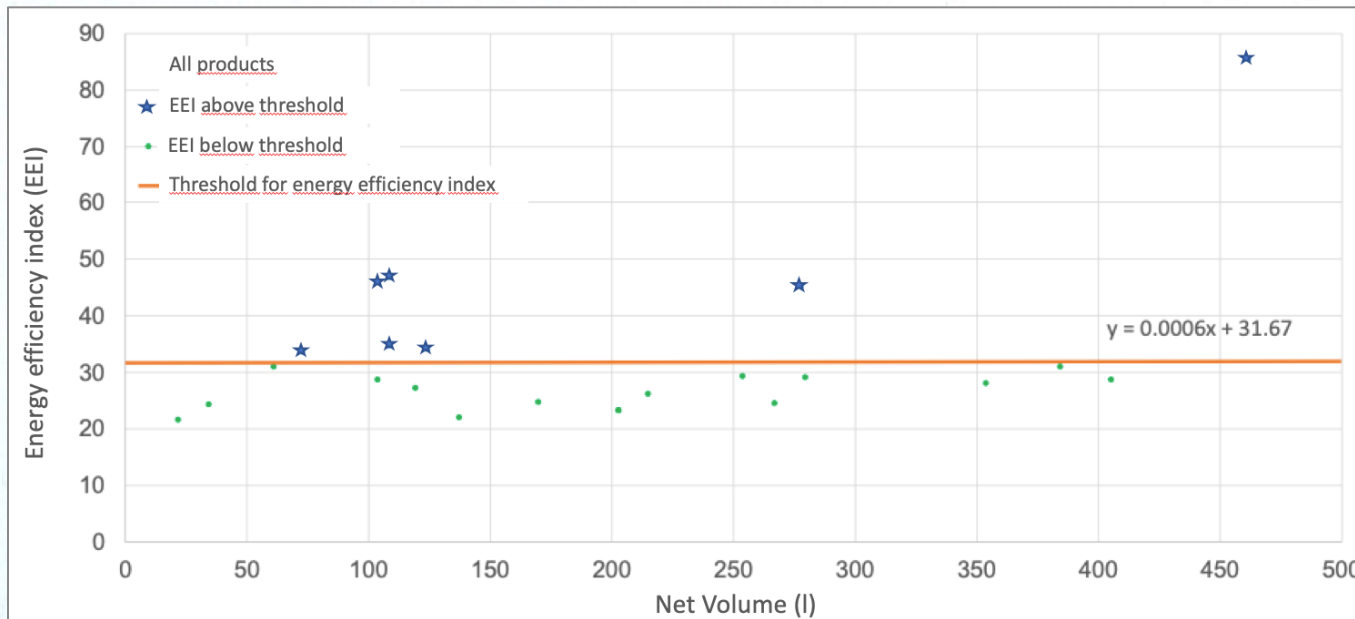
- 1.1 mio €
- 1'647 products
- 18.4 GWh total energy savings
- 2.1 ct/kWh cost effectiveness



# Further B2B Categories – Healthcare Refrigerated Cabinets

Healthcare Refrigerated Cabinets are very similar in construction to professional storage refrigerators

- Test standards available for functionality and energy: DIN 13277:2021
- Online research yielded first available data (EEI calculated analogous to storage refrigerators)



# Further B2B Categories – Healthcare Refrigerated Cabinets

Energy efficiency class equivalent of A+ reached by first model (calculated according to EN 2015/1094)

- Calculations of Swiss study show yearly saving potential of medicine cabinet of 455 kWh (6'825 kWh/15 years lifetime)
  - Efficiency and product safety very compatible
  - Great saving potential, high number of products on the market
- Next step is energy labelling and ecodesign regulation of realize saving potential and provide data transparency



# Conclusions

Energy regulations on B2B market give innovative manufacturers an edge, dealers new sales arguments, investors a chance to make truly informed decisions

1. Energy regulations on B2B market have proven to be **highly effective**
2. Significant market transformation has been triggered and saving potentials realized
3. Full potentials can be realized by increased **market surveillance**
4. Technology transfer between categories is possible
5. Rebate programmes are highly effective policy tools to boost market transformation
6. Further B2B categories are ready to be included in the scope (e.g. refrigerated medicine cabinets)



# Conclusions

Energy regulation on the B2B market enables buyers to realize large financial savings over the product lifetime though the purchase of truly efficient products.



June 1<sup>st</sup>-3<sup>rd</sup>, 2022, Toulouse, France

**Thank you !**