



Association for  
Indoor Climate,  
Process Cooling,  
and Food Cold Chain  
Technologies

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# Commercial fridges: legislation, experience and expectations

Danish Technical Institute Conference: Refrigeration in  
the supermarket sector

# Speaker

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# Roadmap

1. **Commercial refrigeration equipment**
2. EU F-Gas Regulation
3. Commercial refrigeration Equipment: Ecodesign and Energy Labelling draft regulation
  - 3.1 Background
  - 3.2 EU Commission draft Proposal
  - 3.3 Industry position
4. Q&A

# Which equipment do fall in the commercial refrigeration family?

## Ecodesign Lot 12

Main function: sales & display

- Remote display cabinets
- Plug-in cabinets
- Ice-cream freezers
- Commercial beverage coolers

## Ecodesign Lot 1

Main function:  
storage & processing

- Cold rooms

# Which equipment do fall in the commercial refrigeration family? (cont.)

Remote cabinets



Plug-in cabinets



Commercial Beverage Coolers



Cold rooms



Ice-Cream Freezer



Ice cream display

# Roadmap

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# EU F-Gas Regulation

- European Union legislation to **control F-Gases**, including hydrofluorocarbons HFCs (F-Gas Regulation)
- **Limits the total amount** of most important F-gases sold in the EU from 2015 onwards
- **Bans the use** of F-Gases in many new types of equipment where less harmful alternatives are widely available
- **Preventing emissions** of F-Gases from existing equipment



# Refrigerants tomorrow

## F-Gas Regulation timeline

### Remote applications

- 1 Jan 2020: GWP>2500

### R404A phased out

- 1 Jan 2022: GWP>150

### R134A-R410A-R407C phased out



# Refrigerants tomorrow

## F-Gas Regulation timeline (cont.)

### Plug-in applications

- 1 Jan 2020: GWP>2500

### R404A phased out

- 1 Jan 2022: GWP>150

### R134A-R410A-R407C phased out



# Refrigerants tomorrow

## Results of F-Gas Regulation

- EU F-Gas Regulation pushed issue forward worldwide
- Change in refrigerant usage already visible
- Low-GWP and natural refrigerants at the forefront
- **HFC phase down is a reality and return to past very unlikely**



# Refrigerants tomorrow

## Commercial refrigeration (estimates)



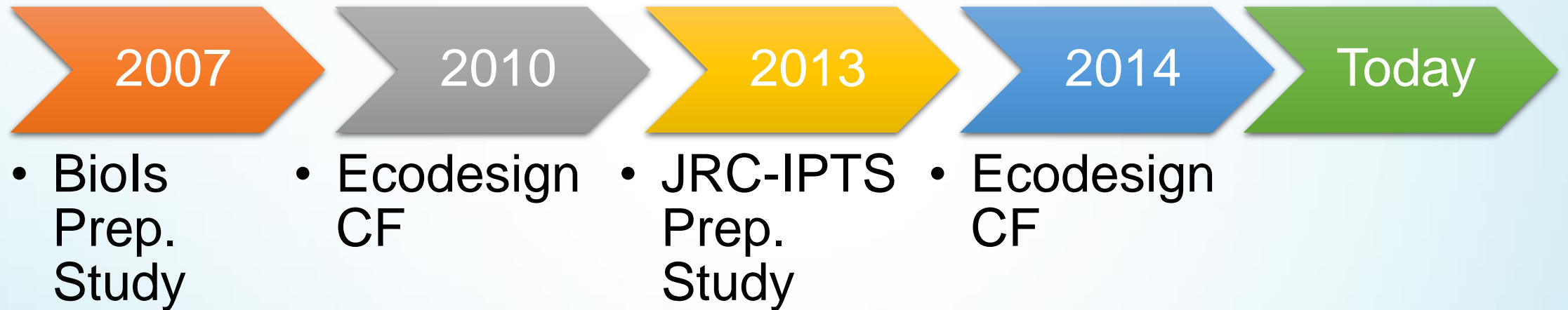
- **Refrigerants**

- Increasing move towards CO<sub>2</sub> (R744) for remote units
  - CO<sub>2</sub> Equatorial line is disappearing
- Propane (R290) for integral units

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# Commercial refrigeration Equipment: Ecodesign and Energy Labelling draft regulation Background



# Commercial refrigeration Equipment: Ecodesign and Energy Labelling draft regulation

## Background (cont.)

- Eurovent PG-RDC has provided JRC-IPTS with 1600 energy consumption datapoints
- Eurovent/EPEE Position Paper on the Preparatory Study
- EU Commission Ecodesign and Energy labelling Draft Regulation shared with Eurovent PG-RDC
- Eurovent Position Paper on the Commission draft Proposals



2013

2014

2015

# Commercial refrigeration Equipment: Ecodesign and Energy Labelling draft regulation **EU Commission draft proposal**

AEC = Annual Energy  
Consumption of the cabinet in  
kWh/year

SAEC = Standard Annual  
Energy Consumption of the  
cabinet in kWh/year

- $EEI = (AEC/SAEC) \times 100$
- $AEC = E_{24h} \times 365$
- $SAEC = (M + N \times Y) \times 365$
- $Y = TDA$  or Net Volume

The major role  
is played by  
these M and N



# Commercial refrigeration Equipment: Ecodesign and Energy Labelling draft regulation **EU Commission draft proposal**

## EU Commission proposed segmentation

1. Remote and Integral cabinets same family
2. Remote Chilled Vertical and Semi-Vertical same family
3. Horizontal Chilled
4. Vertical Frozen
5. Horizontal Frozen
6. Commercial Beverage Coolers
7. Ice-Cream Freezers



# Commercial refrigeration Equipment: Ecodesign and Energy Labelling draft regulation **EU Commission draft proposal**

Category	Value for M	Value for N
Beverage coolers	2.1	0.006
Small ice-cream freezers	2.0	0.009
Vertical, semi-vertical and combined supermarket frozen cabinets	1.6	19.1
Horizontal supermarket freezer cabinets	4.2	9.8
Vertical, semi-vertical and combined supermarket chilled cabinets	9.1	9.1
Horizontal supermarket chilled cabinets	3.7	3.5

# Commercial refrigeration Equipment: Ecodesign and Energy Labelling draft regulation **EU Commission draft proposal**

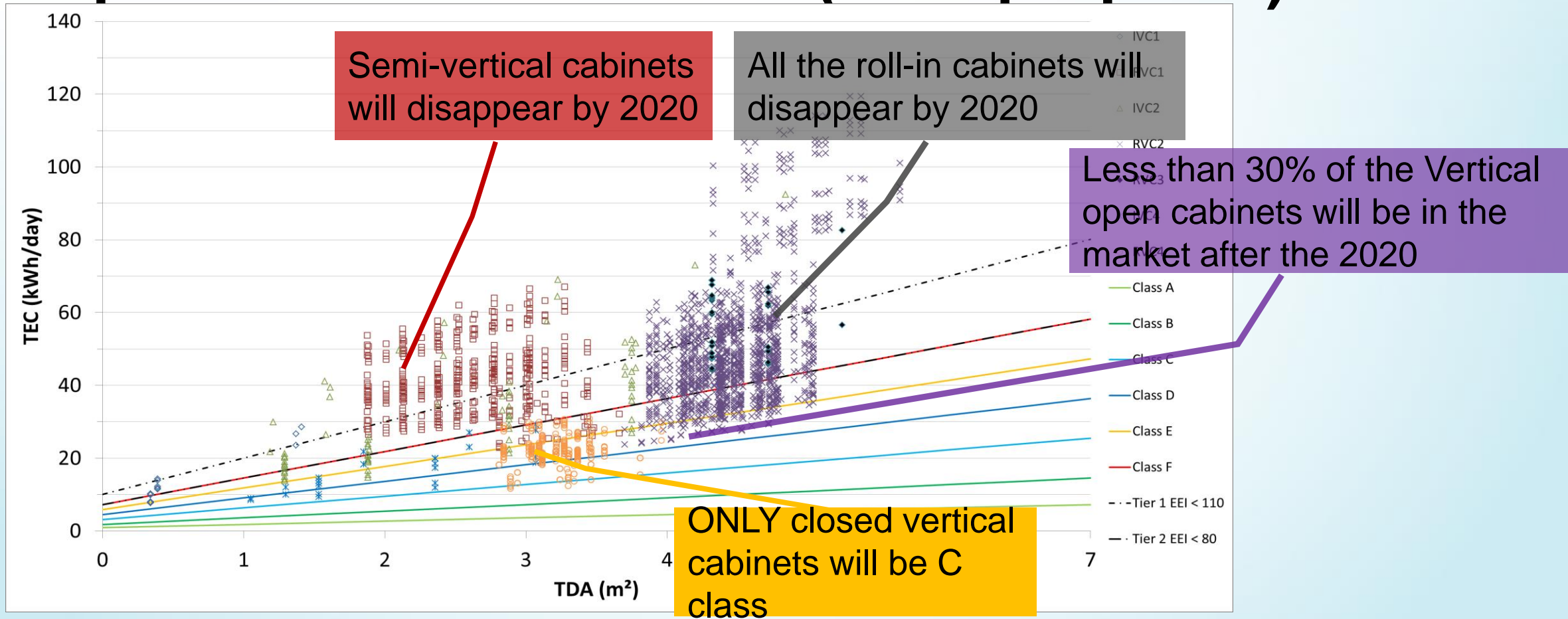
## 2014 EEI Proposal

1. 1 JAN 2017: EEI < 150
2. 1 JAN 2019: EEI < 130
3. 1 JAN 2021: EEI < 110

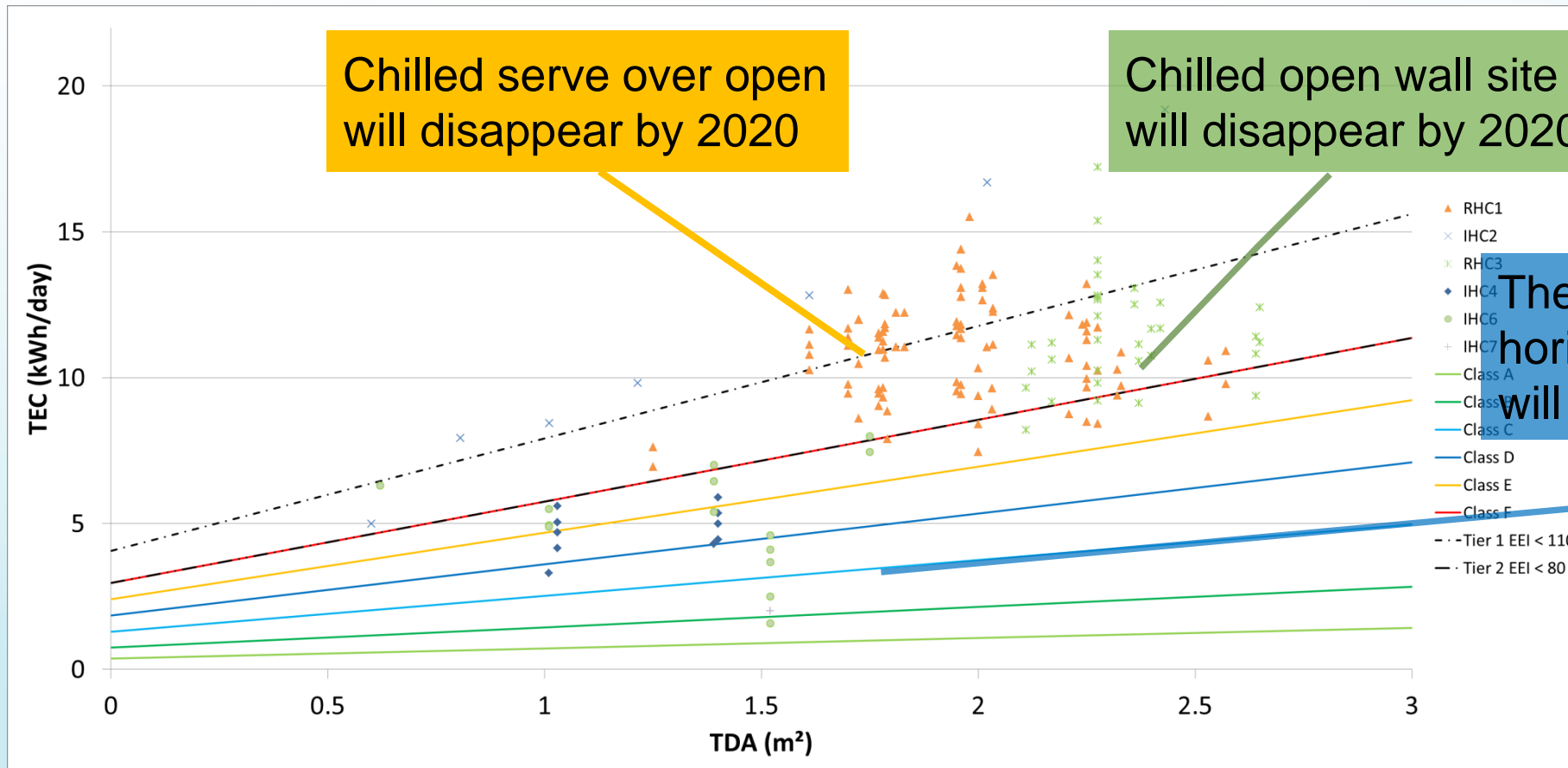
## 2015 EEI Proposal

1. 1 JAN ~~JUL~~ 2017: EEI < ~~150~~ **110**
2. 1 JAN ~~2019~~ **2020**: EEI < ~~130~~ **80**
3. ~~1 JAN 2021: EEI < 110~~

# Commercial refrigeration Equipment: Ecodesign and Energy Labelling draft regulation Impact on Vertical Chilled (2015 proposal)



# Commercial refrigeration Equipment: Ecodesign and Energy Labelling draft regulation Impact on Horizontal Chilled (2015 proposal)

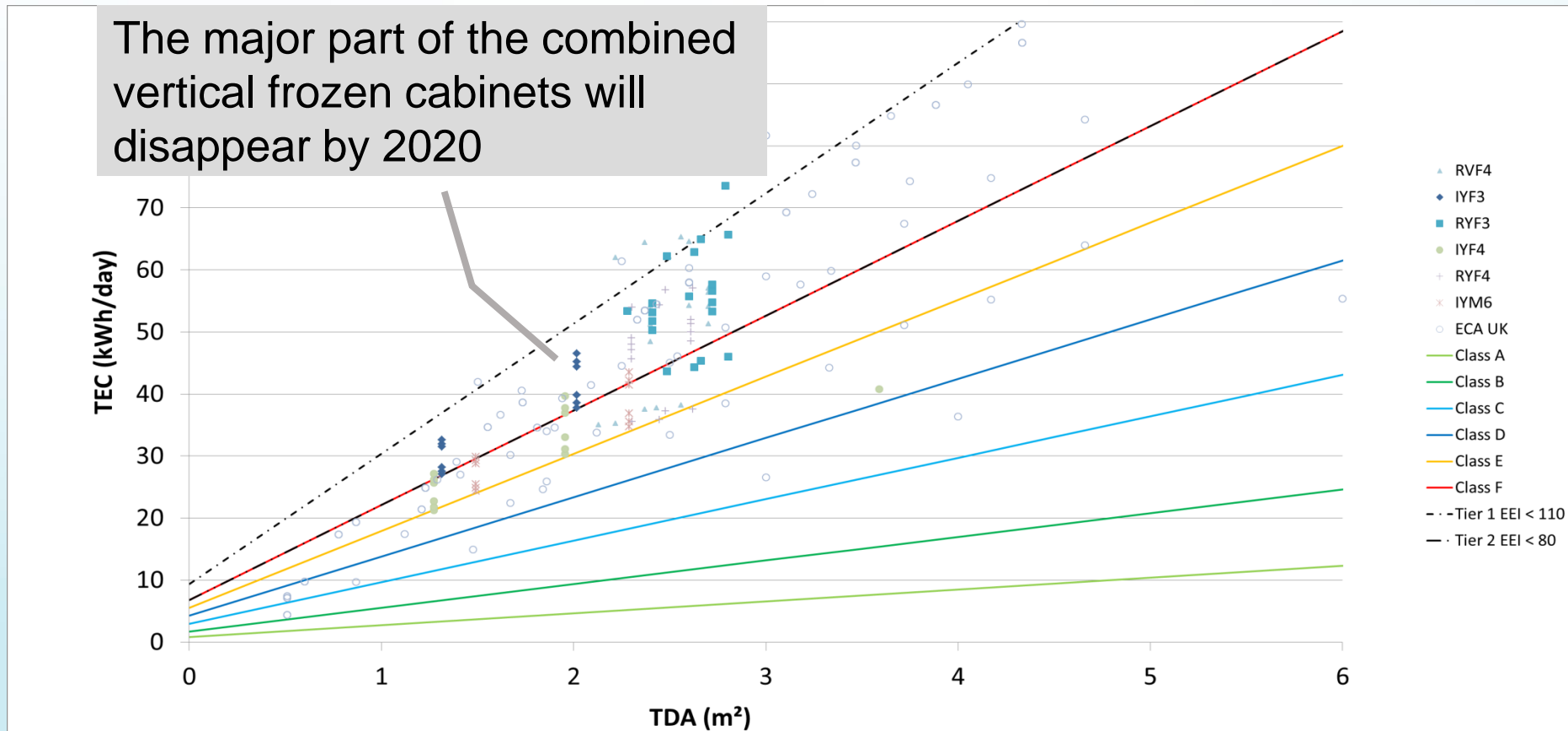


Chilled serve over open will disappear by 2020

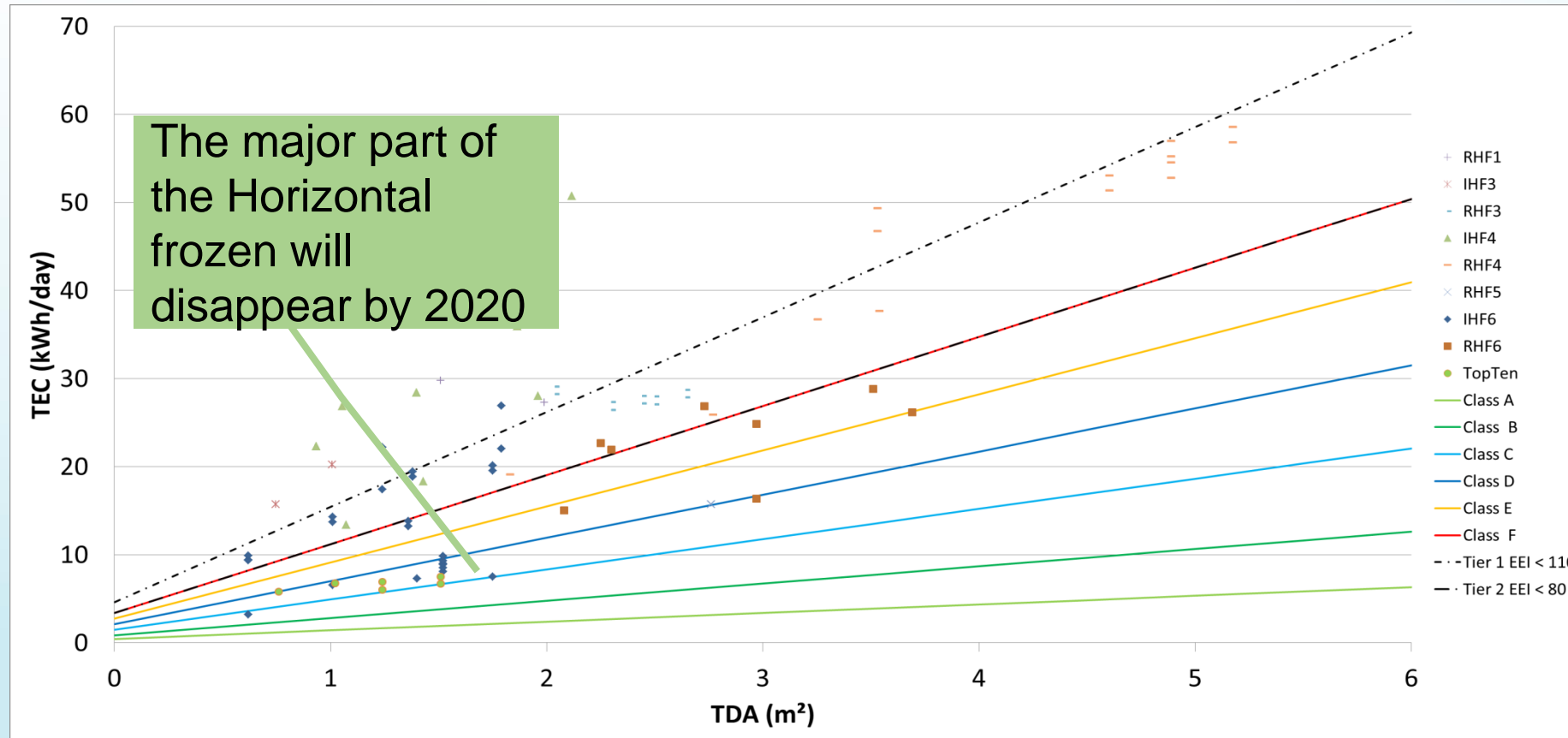
Chilled open wall site will disappear by 2020

The major part of remote horizontal chilled cabinet will disappear by 2020

# Commercial refrigeration Equipment: Ecodesign and Energy Labelling draft regulation Impact on Vertical Frozen (2015 proposal)



# Commercial refrigeration Equipment: Ecodesign and Energy Labelling draft regulation Impact on Vertical Frozen (2015 proposal)



# Commercial refrigeration Equipment: Ecodesign and Energy Labelling draft regulation

## Industry Position

1. Ecodesign and Energy Labelling measures are powerful tool to promote the energy efficiency
2. The products' characteristics and physics as well as the customers behaviour must be taken into account → **compare apple with apple**





# Commercial refrigeration Equipment: Ecodesign and Energy Labelling draft regulation **Industry Position (cont.)**

1. Segmentation between remote and integral units
2. Segmentation between Vertical, Semi-Vertical, and Roll-in chilled cabinets
3. Segmentation per product temperature



# Commercial refrigeration Equipment: Ecodesign and Energy Labelling draft regulation **Industry Position (cont.)**

- $SAEC = (M + N \times Y) \times 365 \times \underline{C} \times \underline{P}$
- C= Product Temperature Coefficient
- P= Remote/integral unit coefficient



# Commercial refrigeration Equipment: Ecodesign and Energy Labelling draft regulation

## Product segmentation: Industry Proposal

	Product Family	DG-ENER Coefficients		Eurovent Coefficients	
		M	N	M	N
Temp. application		M	N	M	N
Chilled	Remote Vertical	9,1	9,1	<b>8,56</b>	<b>10,72</b>
	Remote Semi-Vertical	9,1	9,1	<b>9,65</b>	<b>12,08</b>
	Remote Roll-In	9,1	9,1	<b>9,24</b>	<b>11,57</b>
Frozen	Remote Vertical	1,6	19,1	<b>7,51</b>	<b>19,34</b>
	Remote Horizontal	4,2	9,8	<b>3,98</b>	<b>10,27</b>

# Commercial refrigeration Equipment: Ecodesign and Energy Labelling draft regulation

## Product temp. segmentation: Industry Proposal

Cabinet Family	Temperature Class	C
Vertical Chilled	3M2	1 (baseline)
	3H	0,82
	3M1	1,15
Horizontal Chilled	3M2	1 (baseline)
	3H	0,92
	3M1	1,08
Vertical Frozen	3L1	1 (baseline)
	3L2/L3	0,9
Horizontal Frozen	3L1	1 (baseline)
	3L2/L3	0,92

# Commercial refrigeration Equipment: Ecodesign and Energy Labelling draft regulation

## Remote & Plug-In segmentation: Industry Proposal

Cabinet Family	P
Supermarket Remote	1
Supermarket Plug-In	1,1

# Q&A

Thanks for you attention!

