Household refrigeration: What is the good EEI formula?

Anette Michel
Topten International Services/ for ECOS

Domestic refrigerators & freezers stakeholder meeting,
1. July 2015, Brussels

topten.eu

ECOS

EEI formula

Resulting Efficiency Index ➔ basis for Label class , MEPS

EEI = AEc / SAEc

Measured Energy consumption of model x (kWh/year)

The reference: 'Standard Energy consumption' (kWh/year), depending on volume (and more?)

SAEc approach No. 1: “Technical”

- Today’s formula and CECED’s proposal
- Technical view point: SAEc is defined by the technical difficulty of a product to reach a specific efficiency
- Less efficient design options are helped with higher (less ambitious) SAEc and ‘correction’ or ‘compensation’ factors
- E.g. combi fridge-freezers, upright freezers, tropical compressors, no-frost, inbuilt, Chill-compartment, multi-door, glass-door, etc.

SAEc approach No. 1: “Technical”

- It is easier for products with these features to reach good efficiency
- Today: best efficiency for inbuilt frost-free refrigerator-freezers with chill compartment and compressors designed for the tropics
- High ‘efficiency’ products have high price premium (because of extra features, not only efficiency)
- Difficult to set ambitious MEPS
  - Because of high price premium
  - Because low efficiency products do not necessarily use more energy, but have less extras and are simpler

SAEc: Today

SAEc = Veq*M+N+CH

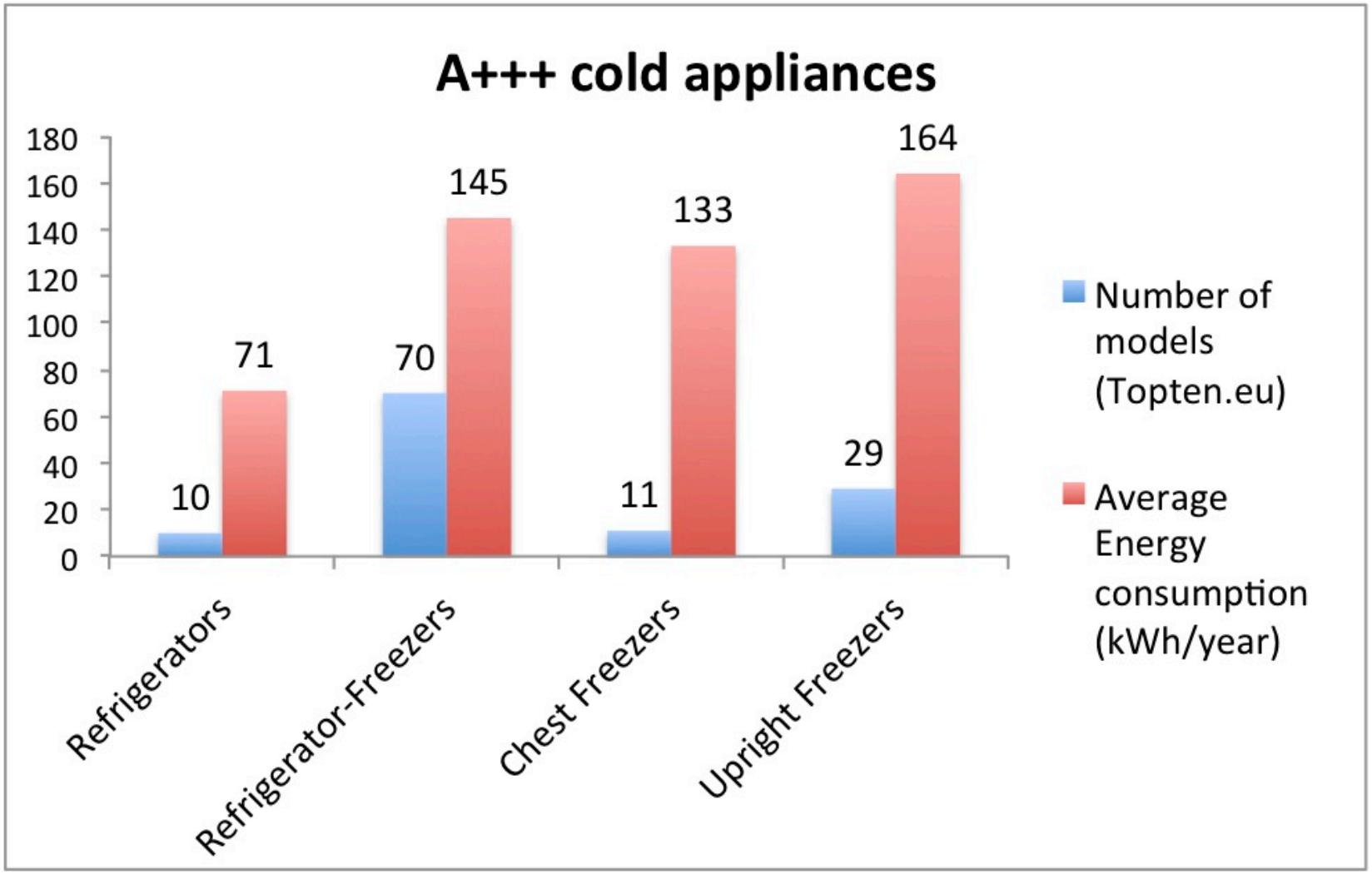
Equivalent Volume **Veq** depends on
- compartment temperature
- frost-free
- climate class
- built-in

Chill compartment?
➔ 50 kWh/year allowance

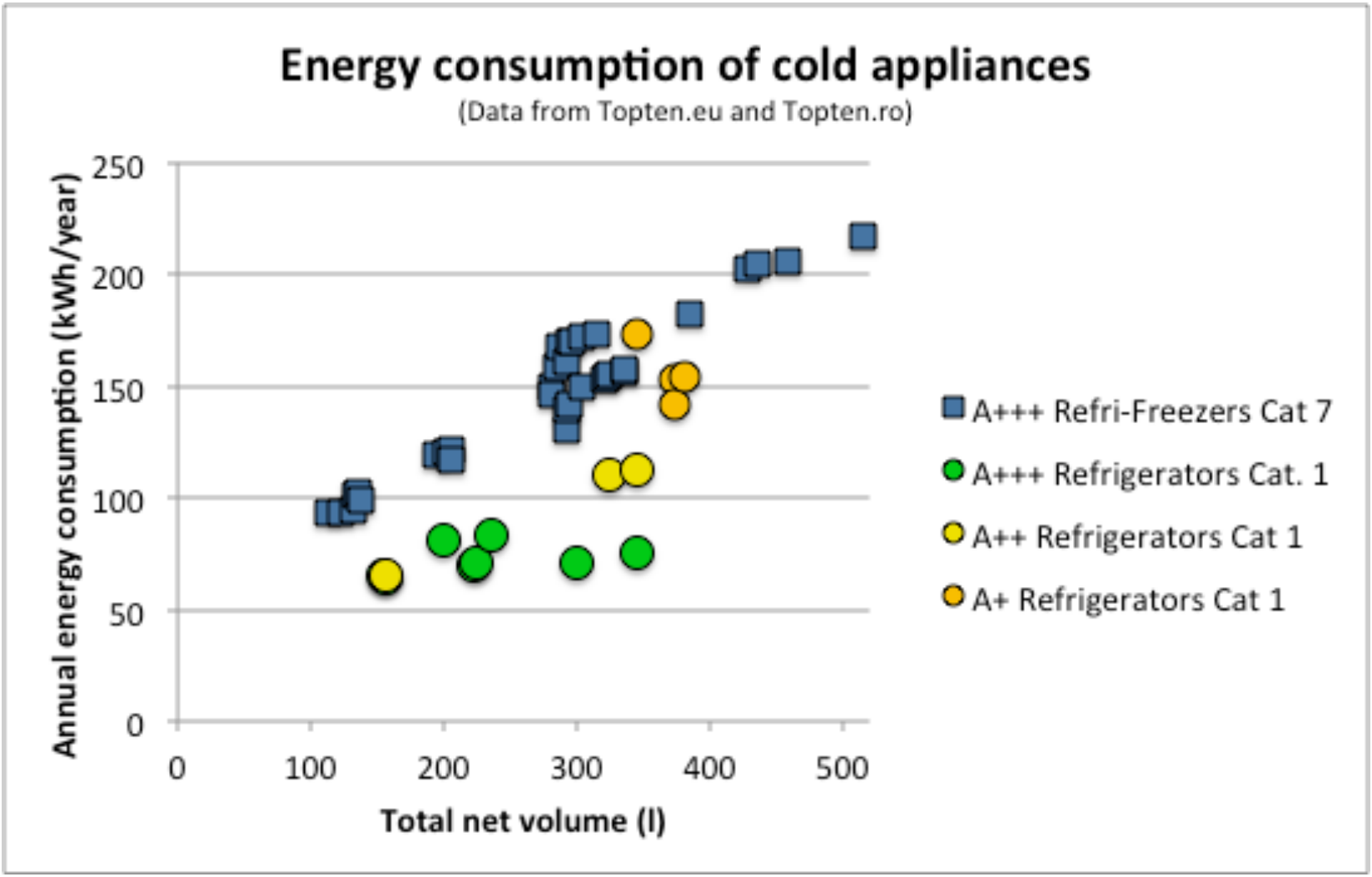
M + N (= reference line) defined by 1 of 10 categories (4 'active')

Formula favours built-in, frost-free combi fridge-freezers (steeper reference line) with chill compartment that are fit for the tropics

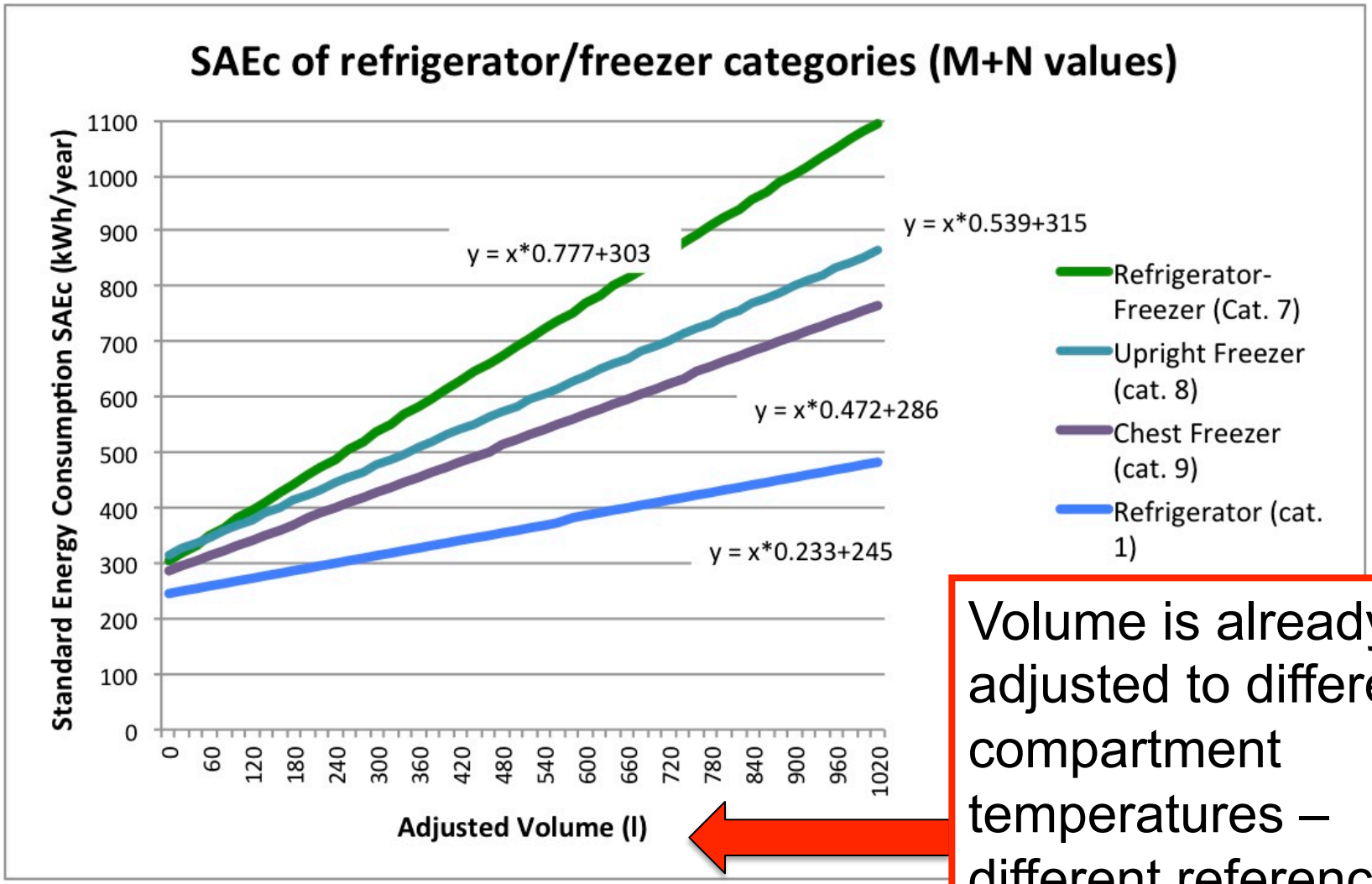
7x more combi models in A+++ than refrigerators, despite double energy consumption



Today: Difference of 2 classes between cat. 1 and 7



Today: different reference lines ('M' + 'N')



Volume is already adjusted to different compartment temperatures – different reference lines are not needed!

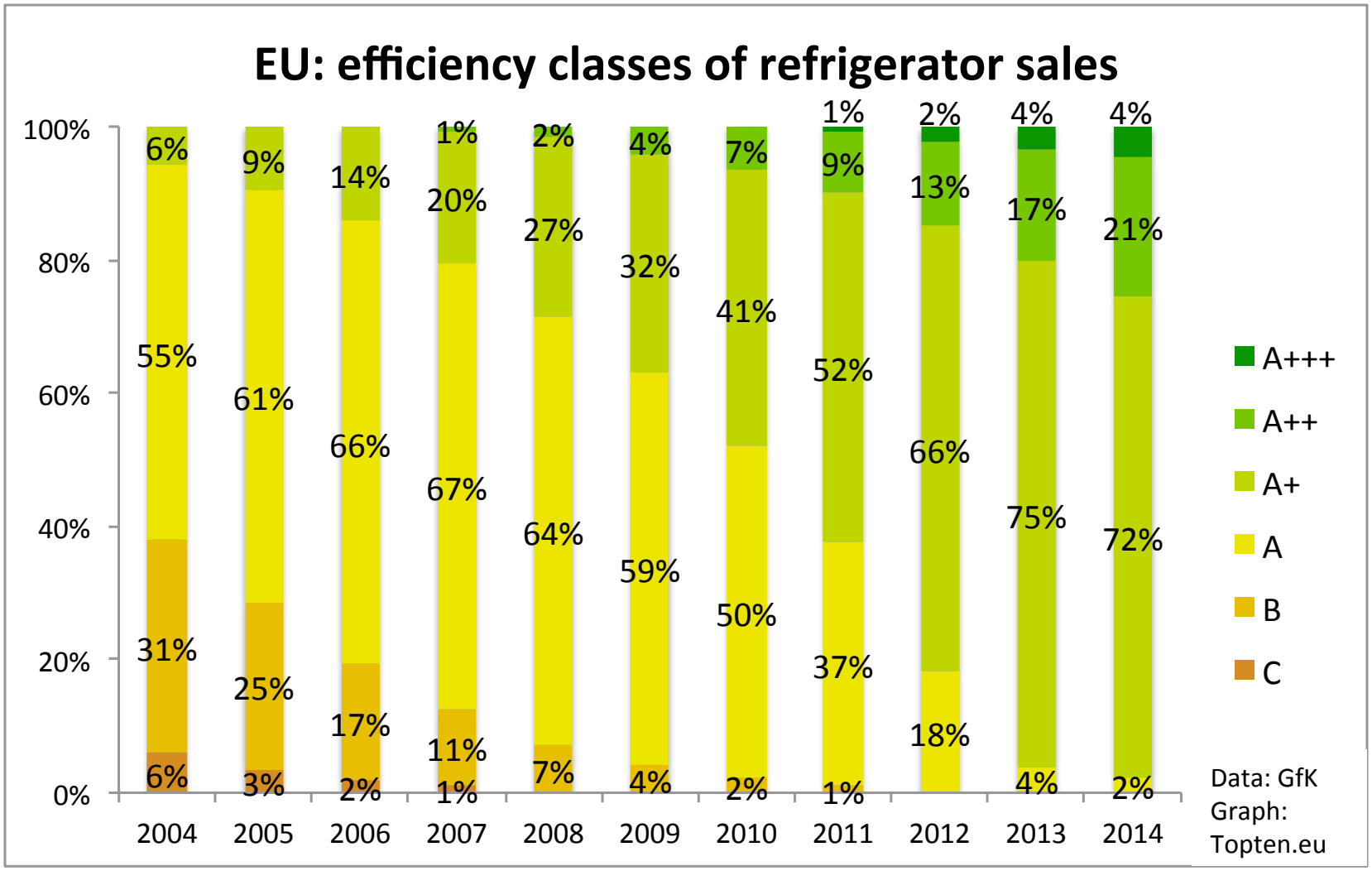
topten.eu

ECOS

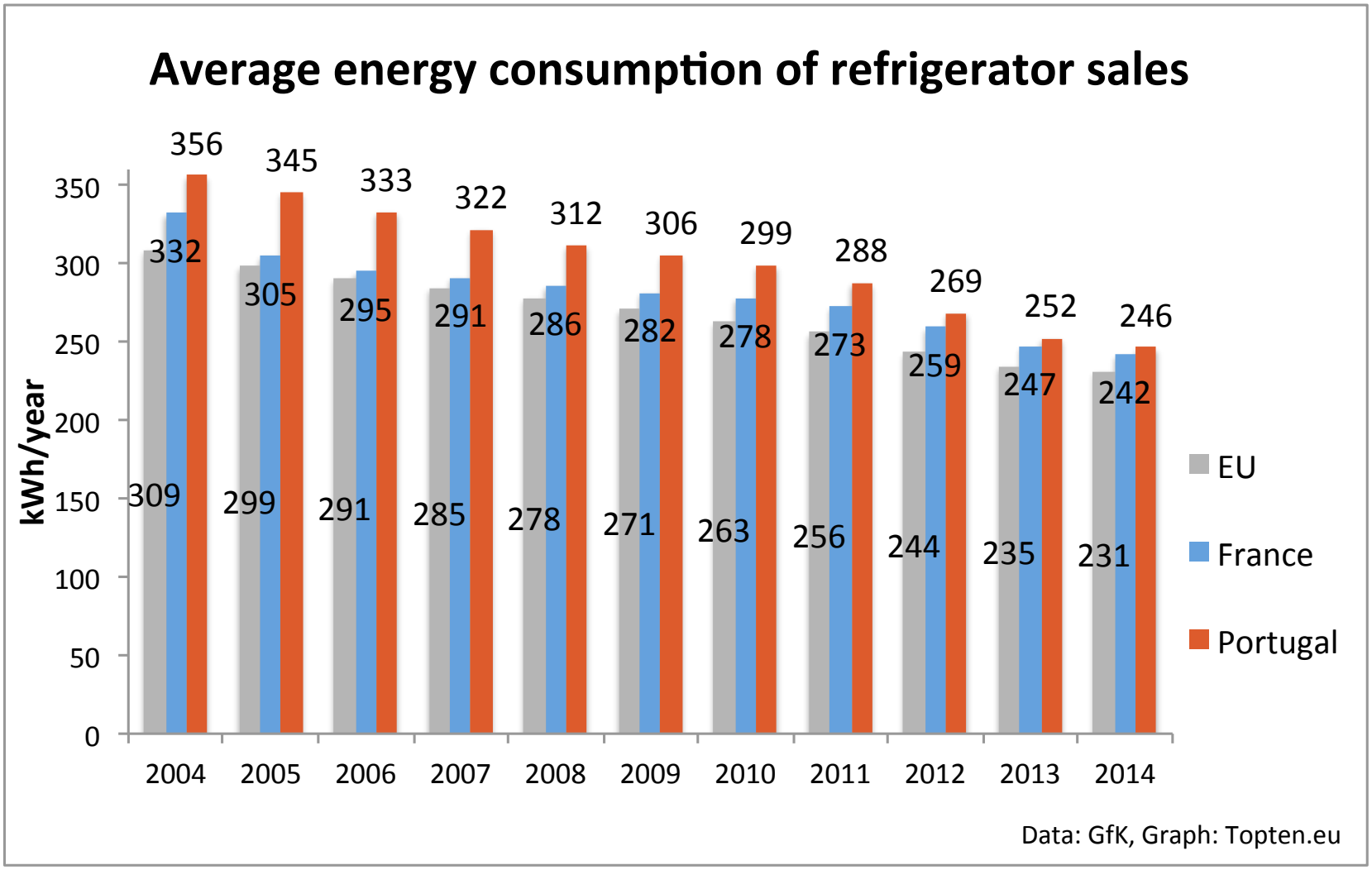
Today: different reference lines for categories

- Example: an A+ fresh food compartment of 300 liters at 5°C can use
  - 104 kWh/year if it's a cat. 1 refrigerator
  - 177 kWh/year (**+70%**) if it's part of a cat. 7 refrigerator-freezer
- '*There is no technical reason for this difference*' says also Re/genT (p.34 'Categories')
- System with different reference lines (and correction factors) is highly intransparent

34% efficiency improvement in 10 years



25% energy reduction in 10 years



Efficiency not enough linked to energy consumption

The Topten Market monitoring (June 2015) report based on GfK sales data shows that

- the **average efficiency index has improved by 34%** from 2004 – 2014,
- but the **average annual energy consumption** has only been **reduced by 25%** over this period.

➢ More than one third of potential energy savings is lost

- The volume has been nearly stable over this period
- Instead of by lower energy consumption, better efficiency is assumedly reached by a shift to more fridge-freezers and products making use of correction factors (frost-free, tropical, inbuilt, chill).

SAEc approach No. 2: “Transparency”

- Environmental NGO’s proposal
- Label’s purpose is to inform consumers transparently about efficiency and energy consumption
- One reference line (SAEc) is sufficient, no allowances for extra features are needed. Different compartment temperatures are accounted for with Veq
- Extras can offer practical services to users and have their justification on the market, but their lower efficiency must not be hidden
- Consumers should be able to make an informed choice on types and extra features

SAEc : Environmental NGO's proposal

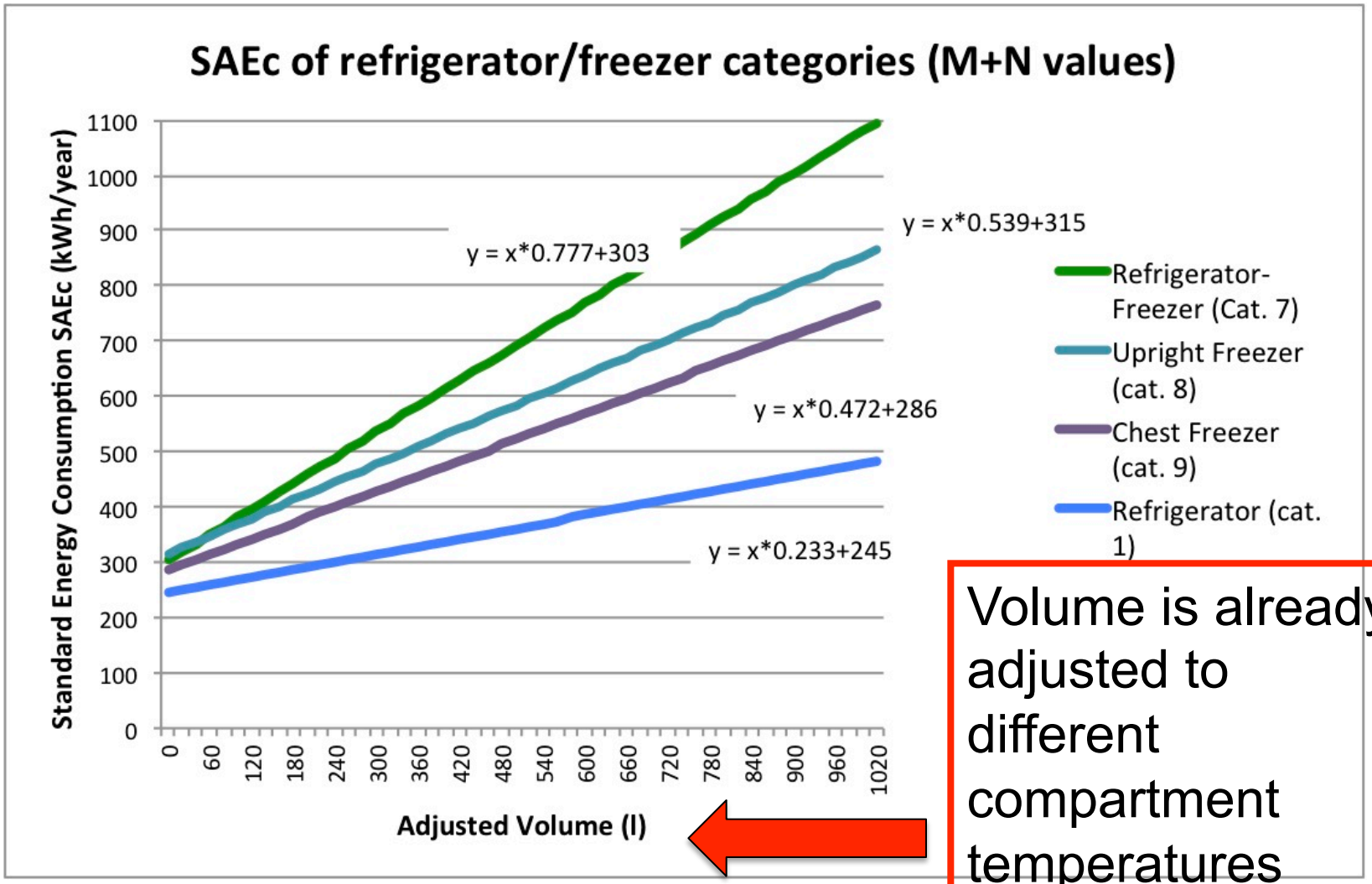
SAEc = Veq*M+N

Equivalent Volume **Veq** depends on compartment temperature

M =0.233, N= 245 (current reference line of cat. 1-3), or lower (after 20 years of successful efficiency improvement!)

- Equal treatment of all categories, no allowances/ compensations for extra features. If these use more energy, it shows on the Label.
- Simplicity ➔ transparency ➔ market surveillance

Cat. 1 equation should apply for all categories



Volume is already adjusted to different compartment temperatures

Non-linear reference line?

- Also a non-linear reference line that is no longer favouring larger products should be considered
- However, the current cat. 1 reference line is very flat and does not allow for high additional energy consumption for larger products
- A linear formula is much simpler and makes market surveillance easier
- More important than a switch to a curved reference line is that there is only 1 (flat) line and no correction / compensation factors

Labelling Directive 2010/30

'The provision of (…) information on the specific energy consumption energy-related products…'

- *…'should influence the end-user's choice in favour of* ***those products which consume (…) less energy*** *(…),*
- *'It should also (…) encourage the* ***efficient use*** *of these products…'*

Transparent Energy Label

If the Label is to bring **transparency to consumers,**

- It should treat **all technologies, shapes etc**. exactly **equally**
- There must be **no bonuses for extra-features**
- '**Efficiency**' must apply uniquely to a product's **primary function**. For cold appliances: amount (=volume) and degree (comp. temperature) of 'cold'.

Thanks for your attention!

Anette.Michel@topten.eu