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Refrigeration Technology

TNO, The Netherlands

Energy labelling for transport refrigeration in the European Union

Branchentagung Berlin - 2005

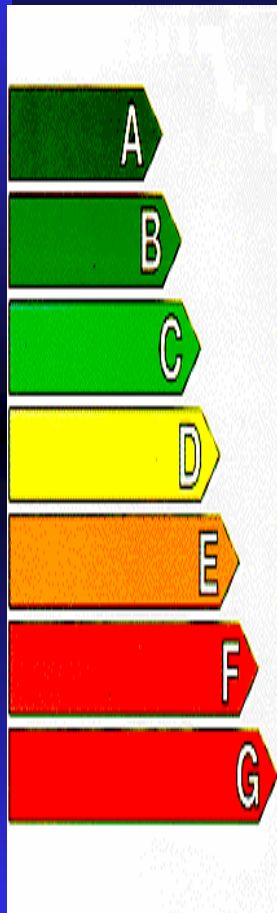
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D.U.H / U.B.A. / DTI / VDKL

Personal Introduction S.M. van der Sluis, M.Sc.

- Involved in development of 1st EU label
- EU Label Studies (RDC, Airco/HP, Refrigerated Transport - 1999)
- TNO – ATP test station Zevenhuizen NL
- FKW GmbH (Hannover)
- TNO – EuP Ecolabel tender 2005
- IIR (Paris) Section D – Storage & Transport

Overview of Presentation



- EU directives
- Purpose and results
- Energy labelling studies / methodology
- Labelling for Transport Refrigeration
- Voluntary agreements / Certification
- Catching the train?
- Conclusions

EU energy efficiency regulations

- Energy labeling for consumer products
(informative)
- Energy efficiency standards
(restrictive)
- EuP Ecolabel (B2B)
(under development)

Intelligent Energy  Europe



EU Implementing directives

Energy labelling directives in force:

Household electric refrigerators, freezers and their combination

Commission Directive 2003/66/EC of 3 July 2003 amending Directive 94/2/EC implementing Council Directive 92/75/EEC with regard to energy labelling of household electric refrigerators, freezers and their combinations,
Official Journal L170 of 09.07.2003, p. 10-13

Electric ovens	(2002/40/EC of 8 May 2002)
Air Conditioners	(2002/31/EC of 22 March 2002)
Lamps	(98/11/EC of 27 January 1998)
Dishwashers	(97/17/EC of 16 April 1997)
Combined Washers – Driers	(96/60/EC of 19 September 1996)
Electric tumble driers	(95/13/EC of 23 May 1995)
Washing machines	(95/12/EC of 23 May 1995)



EU Implementing directives

Minimum efficiency requirements in force:

Fluorescent lighting

Directive 2000/55/EC of the European Parliament and of the Council of 18 September 2000 on energy efficiency requirements for ballasts for fluorescent lighting, Official Journal L 279 of 01.11.2000, P. 33-38

Household electric refrigerators, freezers and combinations

Directive 96/57/EC of the European Parliament and of the Council of 3 September 1996

Hot-water boilers

Council Directive 92/42/EEC of 21 May 1992

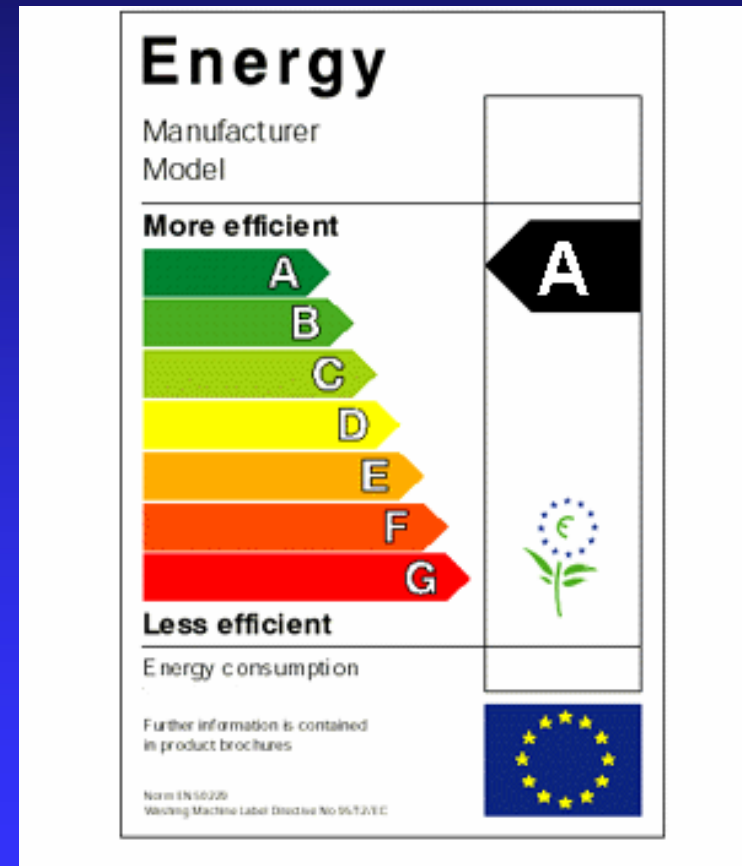


Energy labeling: what is the aim?

- To provide an easy to use tool for the user in selecting energy efficient equipment, without detailed technical knowledge.
- To create a challenge for manufacturers to distinguish their brand on the market on the basis of energy efficiency (sometimes supported by financial incentives)

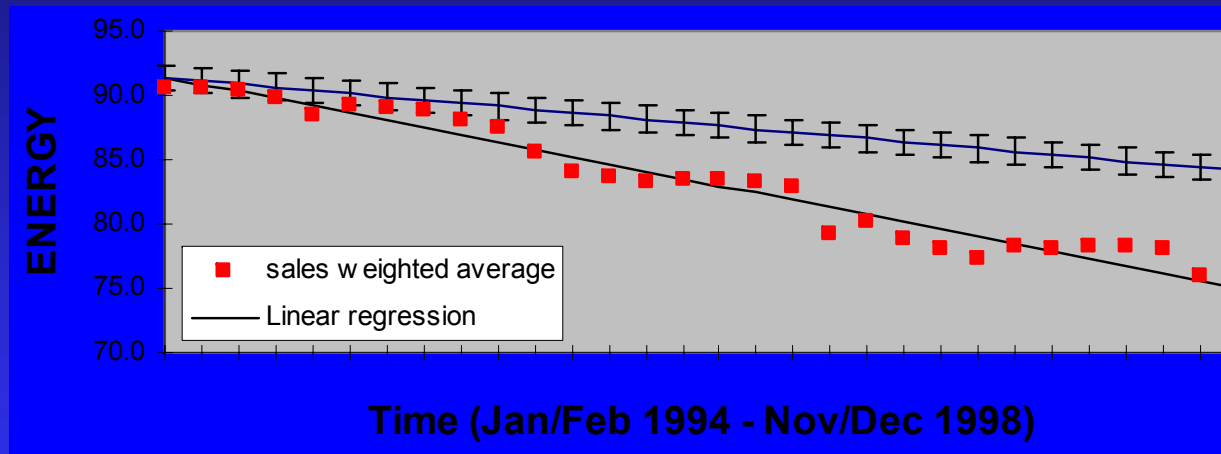
Energy labeling: basics

- Comparison basis for electric appliances
- Inform buyer in a simple manner (A....G)
- One appearance in EU for all appliance groups



Results: does labelling work?

- Energy use decreases quicker with labeling.



- New energy saving technologies are introduced quicker in countries with labeling .

Energy labelling studies

- Define product(s) and categories
- Inventory of Market & Manufacturers.
- Define “basecase” and improvement potential
- Set labelling criteria (A,B,C,D,...)

- TNO performed studies on:
 - ◆ Household refrigerators
 - ◆ Refrigerated Display Cabinets
 - ◆ Airconditioners, dehumidifiers and Heat Pumps
 - ◆ Refrigerated Transport (report on www.tno.nl)



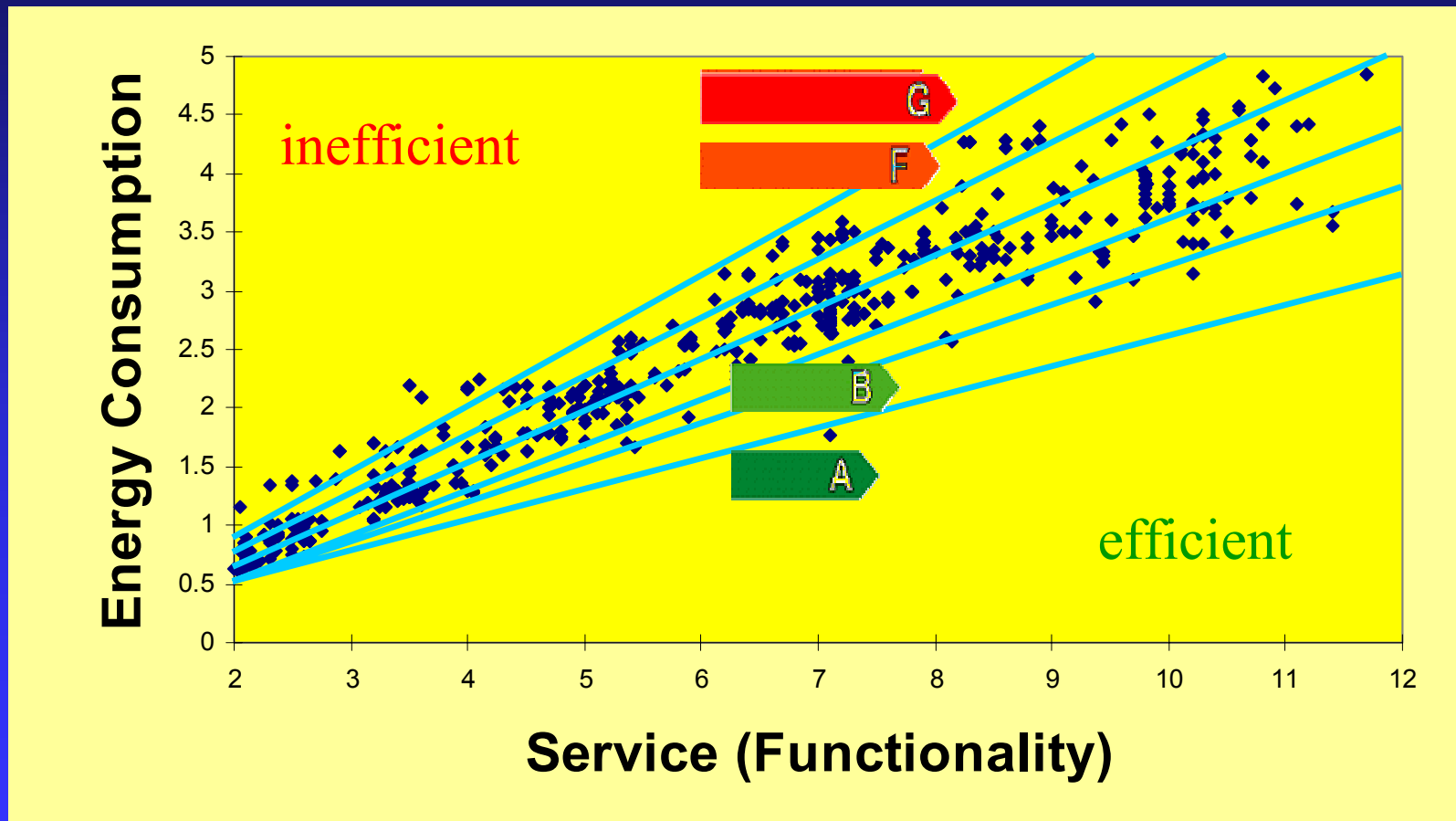
Methodology (1): definitions

- Product grouping / Categorisation:
 - ◆ compare apples to apples
 - ◆ Refrigerators \diamond freezers

- Energy Consumption measurement standard

- “Functionality”
 - ◆ The service rendered to the user

Methodology (2): statistics





Energy labelling in Refrigerated Transport (1999 study TNO)

- Refrigerating Units (bodies also covered)
- Units categorisation step 1:
 - ◆ diesel direct
 - ◆ diesel direct / electric
 - ◆ diesel generator / electric
 - ◆ truck engine generator / electric
 - ◆ hydraulic motor
 - ◆ belt driven
- Units categorisation 2: normal / cooling only / multi evap.

Refrigerating Units labelling (2)

- Measurement method cf. ATP for COSP
 - ◆ full load (no additional testing costs)
 - at 0 °C or average 0 °C and -20 °C
 - ◆ part load corrections
 - (on/off versus modulating)
 - ◆ (on/off vs modulating)

Refrigerating units labelling (3)

- Proposed values for market average COSP per category, based on measurements at ATP stations TNO, Cemagref, CNR-ITEF.
- Recommendation: start experimental voluntary energy labelling scheme
- No follow-up by EU
(focus of EU was on consumer products)



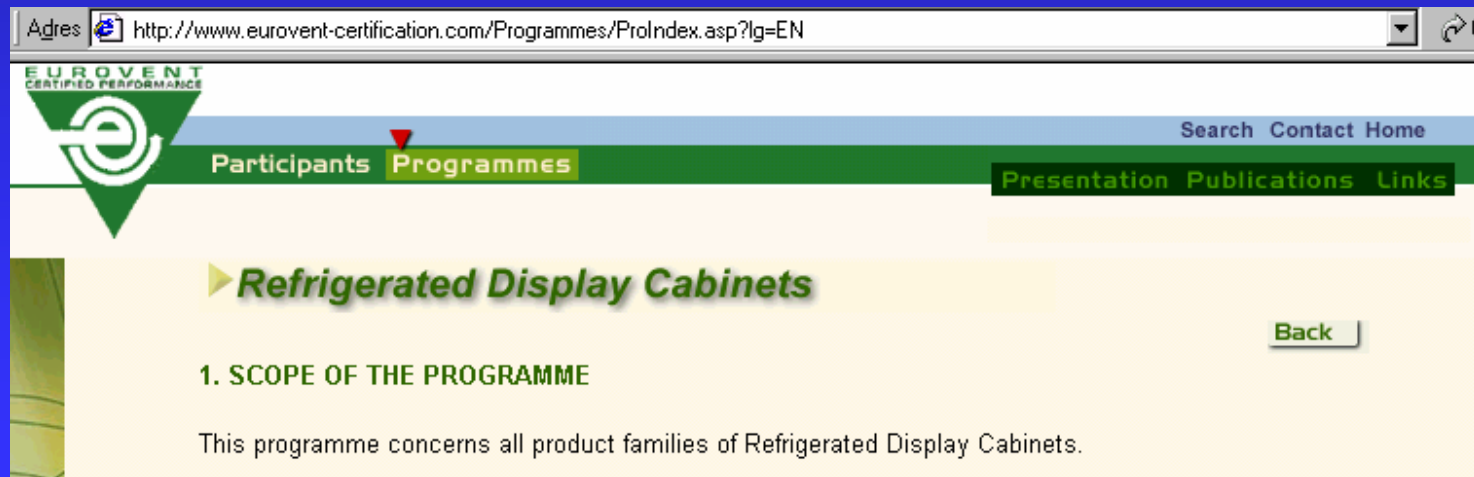
Voluntary scheme example: Refrigerated Display Cabinets

- Monthly list of “A-label” cabinets
- NL “Stimeck” subsidy (later: EIA tax reduction)
- Voluntary, participation by major EU players
- Placement on basis of manufacturer’s data.
- Verification on random & “challenge” basis

Verification outcome	Until mid 1999	Total 2001
conformity of declaration & result	4	10 (12)
non-conformity	5	9

Development into certification

- Label for refrigerated display cabinets (1995)
- Stimeck & Amendments by Eurovent (1997)
- Eurovent certification scheme
- Certification measurements at TNO laboratory



The voluntary EU Eco label

- Voluntary Eco labelling schemes exist under the EU eco labelling directive
- These schemes often contain elements related to energy consumption
- European Eco Labelling Board
- Current initiative: Heat Pumps
- Possibilities for Transport Units?



Jumping on the Train?

- New energy labelling initiatives in B2B are under consideration under the new “EuP” or so-called eco-label directive
- Studies for 14 product categories have been tendered (October 2005).
- Full energy labelling studies, including eco-labelling elements.
- No refrigerated transport

Ecolabel “tender” subjects

- Definition of the product category and definition of the system boundaries for eco design
- Economic and market analysis
- Behavior of product buyers and users and description of local infrastructure
- System Analysis
- Definition of Base-Case
- Technical Analysis (Technical options LCC)
- Scenario-, policy-, impact- and sensitivity analysis



Ecolabel “tender” lots

- Lot 1: boilers and combi-boilers (gas/oil/electric)
- Lot 2: water heaters (gas/oil/electric)
- Lot 3: Personal Computers (desktops & laptops) and computer monitors
- Lot 4: imaging equipment: copiers, faxes, printers, scanners,
- Lot 5: consumer electronics: televisions
- Lot 6: standby and off-mode losses of EuPs
- Lot 7: battery chargers and external power supplies
- Lot 8 : office lighting
- Lot 9: (public) street lighting
- Lot 10: residential room conditioning appliances (airco and ventilation)
- Lot 11: electric motors 1-150 kW and
- Lot 12: commercial refrigerators and freezers
- Lot 13: domestic refrigerators and freezers
- Lot 14: domestic dishwashers and washing machines.



Concluding remarks

- Energy labels are effective instruments in consumer products.
- Transport Units Energy labelling study available (1999 data)
- Voluntary schemes / certification schemes can be effective when there are “benefits”
- Eco-label provides voluntary basis
- New B2B energy label opportunities under the EuP directive. We should add Transport Units Case study.