

Agenda item 4.1 (b)

Paragraph 20 (a) (b) of the annotated agenda,
Annex 3, 4 to the 74th MP meeting report

Methodology and tool: Energy efficient refrigerators and air conditioner (RAC)

CDM EB 97

Bonn, Germany, 30 October to 3 November 2017



Procedural Background

- EB 96 considered the:
 - a) the new methodological tool “TOOLXX: Determination of standardized baselines for energy-efficient refrigerators and air-conditioners”, and
 - b) new methodology "AM00XX: Energy efficient refrigerators and air-conditioners for households”
- EB 96 requested further work to address:
 - a) Autonomous eff. improvement of appliances during the period covering:
 - the data vintage considered for the SBL,
 - the period of validity of the SBL and
 - the period of the first crediting period of the project applying the SBL;
 - b) Any differences in the size of the PJ appliance as compared to the BL, to enable more accurate estimation of BL emissions



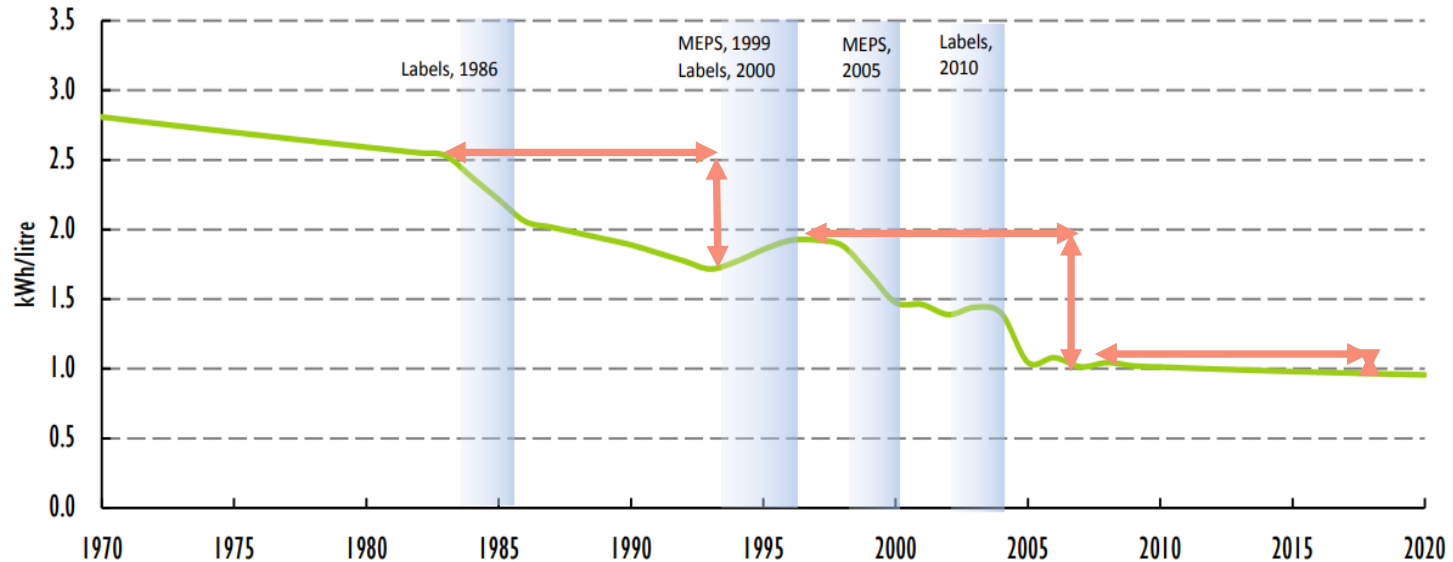
Purpose

- Propose a package of documents in response to EB mandates:
 - a) A revised tool to standardize baseline parameter **(RAC Tool)**
 - b) A new methodology for estimating baseline emission and monitoring **(RAC Meth)**



Issue 1: Autonomous efficiency improvement (AEI) of RAC appliances

Figure 3.13 Energy efficiency of refrigerator capacity in Australia and policy developments, 1970-2020



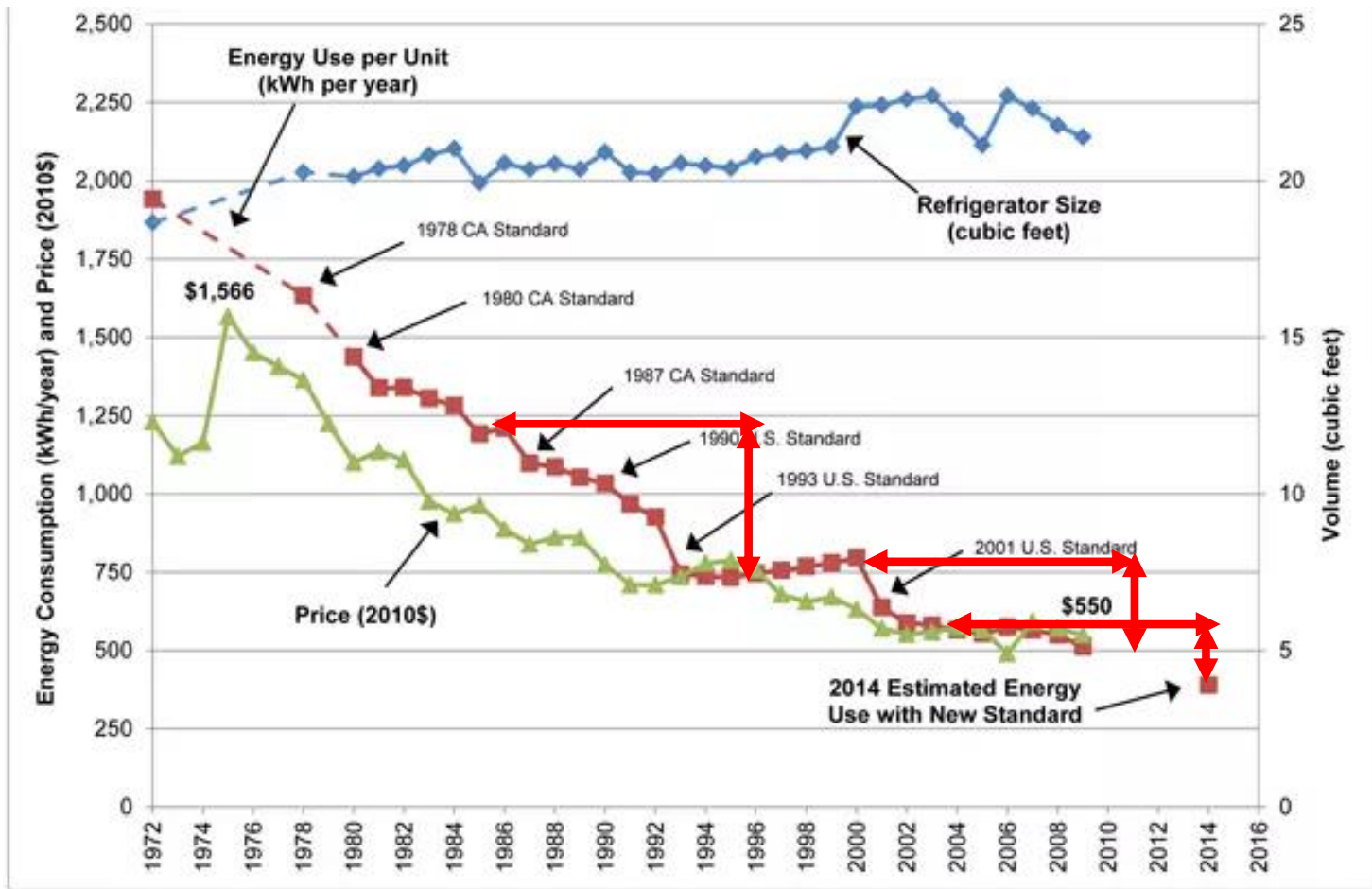
Note: kWh = kilowatt-hours.
Source: IEA 4E TCP, 2015.



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Issue 1: Autonomous efficiency improvement of RAC appliances



Sources: Association of Home Appliance Manufacturers (AHAM) for energy consumption and volume; U.S. Census Bureau for price

- Notes:
- a. Data includes standard-size and compact refrigerators.
 - b. Energy consumption and volume reflect the DOE test procedure published in 2010.
 - c. Volume is adjusted volume, which is equal to the fresh food volume + 1.76 * freezer volume.
 - d. Prices represent the manufacturer selling price (e.g. excluding retailer markups) and reflect products manufactured in the U.S.



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Key issues and proposed solutions

- **Issue 1: account autonomous eff. Improvement**

Proposal:

- a default annual eff increase of 2% for air-conditioners and 1.5% for refrigerators;
- where SB is updated following expiry of 3 yrs validity, actual market data on annual efficiency increase instead of default values may be used
- Adjustment introduced in RAC meth

Rationale:

- EE of RAC equipment in the market will likely increase over time.
- Regular update of the SB would capture the effect
 - Registered PAs/PoAs applying the approved SB values need additional adjustments to be conservative.
- IEA studies on impact MEPS showed 16% (fridge) and 23% (AC) EE improvement in 10 years (2005-2015).



- **Issue 2:** Accounting for size difference of BL and PJ refrigerators

Proposal:

- Baseline factor ($EC_{90/80,p}$, $SEC_{90/80,q}$, $EEI_{90/80,r}$) are determined for each volume class for BL and PJ equipment
- Introduced in RAC tool

Rationale:

- to exclude any potential effects of difference in volume of BL and PJ refrigerators on the efficiency and ER estimates



Accounting for size difference of BL and PJ refrigerators

- SB for refrigerators is determined per range of volume class
- **$EC_{90/80,p}$** : **range** less than or equal to 40 L, for example, a volume class can be from 100 L to 140 L
- **$SEC_{90/80,q}$** : <100 L and >400 L are grouped in separate volume classes;
 - Between 100-400 L, create a separate volume class for every 50 L difference (e.g. 100 -150 L, 150- 200 L)
- **$EEl_{90/80,r}$** : <200 L are grouped in separate volume classes for every 50 L difference (e.g. 100-150 L, 150-200L)
 - Models between 200-600 L may be grouped in one volume class
 - Models above 600 L may be grouped under one volume class
- Volume of PJ and BL refrigerators shall belong to the same volume class.
 - determined at the time of determination of BL factor and are valid for project.
 - recommended to define the volume class covering possible refrigerator sizes sold in the host country



Impacts

- Simplified and standardized methods are likely to result in positive impacts on CDM projects and PoA development, as well as reduce costs of development of SB in the RAC sector.
- The proposed work does not foresee any cost implications for third parties/stakeholders with no potential for any negative impacts



Recommendations to the Board

- To adopt:
 - a) New methodology AM00XX “Energy-efficient refrigerators and air-conditioners”
 - b) New methodological tool “Determination of standardized baselines for energy efficient refrigerators and air conditioners for households”

