

Mapping & Benchmarking of Domestic Refrigerated Appliances (Updated)

The IEA's 4E Mapping and Benchmarking Annex provides policy makers with evidence based comparisons of the performance of products across international boundaries. This allows benchmarking of the success of national policies in managing product energy consumption and efficiency and enables identification of opportunities to further optimise product performance.

This briefing updates and expands the outcomes of the international comparison of domestic refrigerated appliances and includes data analysis of information drawn from Australia, Austria, Canada, Denmark, EU, Republic of Korea, UK and USA. It is one of a series of briefings covering commercial, domestic and industrial products.



Observations for Policy Makers

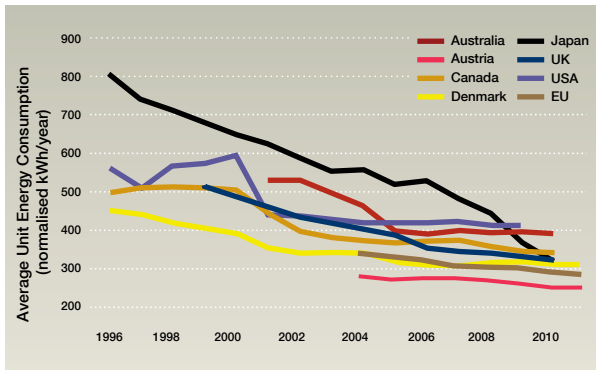
- **The average energy efficiency of refrigerated appliances has been improving** in almost all regions. However, the rate of improvement varies significantly. At least part of the improvement results from increased average product size rather than reduced energy consumption. Consequently, countries/regions should monitor markets closely to ensure that apparent improvements in efficiency are not masking consumer migration to larger, higher energy consuming products.
- **The improvement in refrigerated appliance efficiency has resulted from very different regional policy approaches.** For example, the combination of MEPS and energy labels has resulted in similar outcomes to the Japanese Top Runner approach. However, irrespective of approach, the most successful outcomes have resulted where frequent revisions to policy have maintained momentum in product improvements.
- **While historically it was appropriate for refrigerator efficiency to be based on the adjusted volume of the appliance,** the extensive range of product sizes now available in all markets means this is no longer the case. A more appropriate basis for policy would be to define refrigerator efficiency as a function of the adjusted surface area of the appliance. This would encourage more efficient design across the full range of product sizes.
- **If the Policy Makers ultimate goal is reduced energy consumption rather than improved appliance efficiency,** consideration should be given to setting maximum product energy consumption limits, and/or requiring efficiency levels to become more stringent as appliance size increases.
- **Evidence from appliances in the Japanese market shows that there is still significant room for improvement** in the efficiency of refrigerated appliances before technological barriers are potentially reached.

More Information

All publicly available Annex mapping and benchmarking outputs are available on the Annex website at <http://mappingandbenchmarking.iea-4e.org>.

For further information email: contact@mapping.iea-4e.org

Key Findings



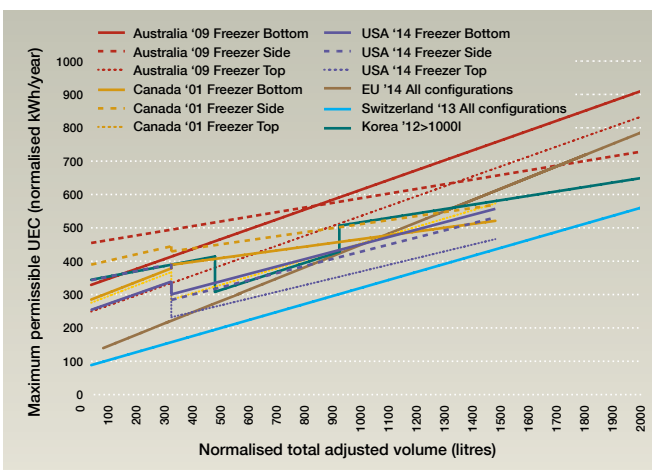
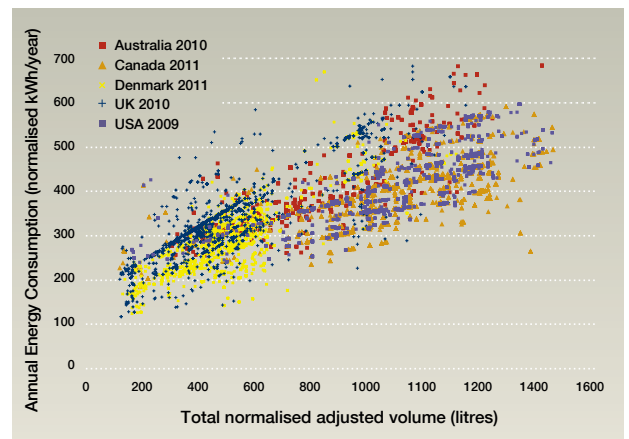
Significant Reductions in Consumption

All countries/regions have seen significant falls in the unit consumption of refrigerated appliances over the past 15 years. Despite significant differences in volume, the energy consumption of refrigerator/freezer combinations is converging towards a range of 250-400 kWh/year from an initial spread of 450-800 kWh/year.

Major Potential for Improvement

Of the products currently available, the most efficient refrigerated appliances consume less than half the energy of the least efficient appliances of a similar size. Hence, there are opportunities for significant and *immediate* improvements in appliance efficiencies in most markets.

A step to realising these improvements for refrigerator/freezer combinations would be the adoption of MEPS levels similar to the EU 2014 (or ideally Swiss 2013) requirements for smaller units, and the USA 2014 requirements for larger units. For upright and chest freezers, significant benefit would be gained from the adoption of MEPS levels similar to the EU 2014.



The Basis for Regulation can be Improved

The use of linear functions based on adjusted volume for setting MEPS and label thresholds is hampering improvement in product performance. Changing the threshold values to a curved function based on adjusted surface area could maximise energy savings, particularly from larger products.

Technology Barriers to Efficiency Improvement have not been reached

Due to the specific policy and cultural background in Japan, technological innovation is almost always led by refrigerator/freezer combinations in the 400-500 litre range. Average Japanese products in this size range are significantly more efficient than products elsewhere and demonstrate technology barriers to improvements in product efficiencies have not yet been reached.

