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Policy Brief: Improving the energy performance of domestic cold appliances

July 2008

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A Policy Brief for improving the energy performance of domestic cold appliance appliances

Evidence, analysis, targets and indicative standards

Overview

1. This Policy Brief represents the outcome of the public consultation on domestic cold appliances, which was carried out earlier this year. This is in accordance with the announcement in the Energy White Paper of 23 May 2007 where the Government said it would publish a series of consultation papers setting out its analysis of how the performance of energy using products will need to improve over the next 10–20 years, including proposals for product standards and targets to phase out the least efficient products¹. This forms part of a wider annual review and policy development process, supporting delivery of the Government's objectives for energy and sustainable consumption and production.

2. To achieve the product standards and targets, a range of measures and approaches is required. These may include international agreements, European and domestic legislation and voluntary action through the supply chain to enhance markets for the most cost-effective energy efficient goods and services. In the Energy White Paper, the Government announced a range of policies to support delivery.

3. We believe that the standards will provide retailers, manufacturers and service providers with a benchmark to improve the performance of products they provide. In addition, we are encouraging industry to deliver improvements in product standards.

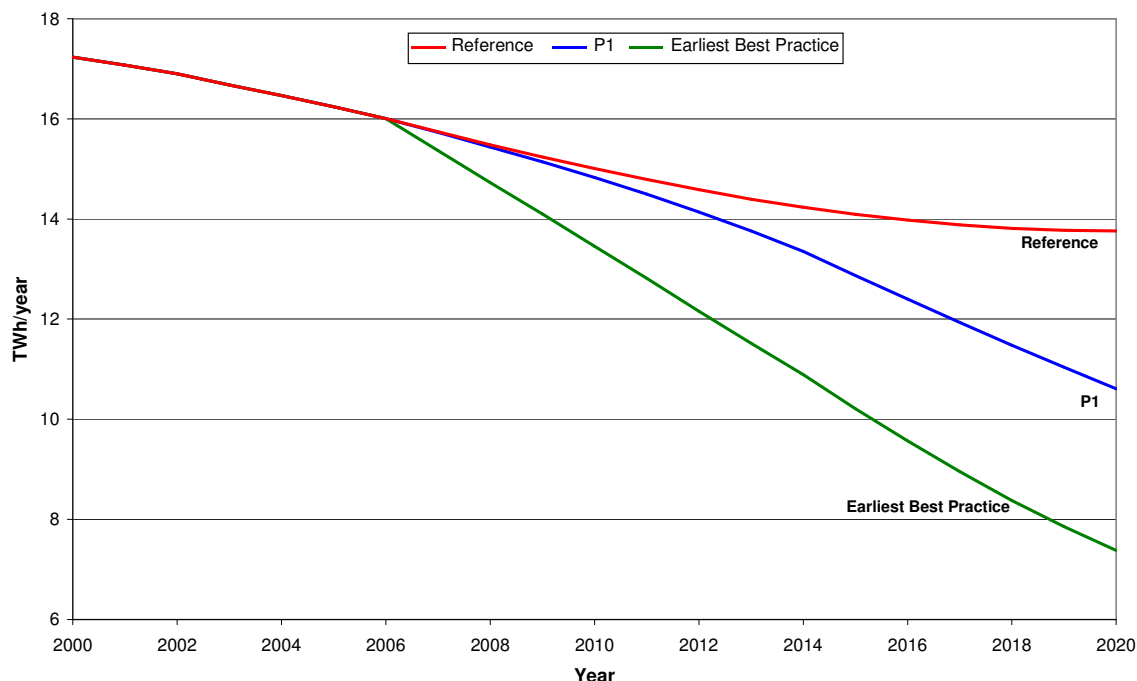
4. This Policy Brief addresses in-use energy consumption and carbon emissions associated with the following domestic cold appliances: refrigerators, fridge-freezers, upright freezers and chest freezers. It excludes products such as beer, wine and drinks chillers, all products that use absorption technology and those that are fuelled by gas, either alone or as an alternative for electricity. Commercial refrigeration products are covered in a separate Policy Brief.

How we expect domestic cold appliances to contribute to future energy consumption

5. The following graph shows the Government's projections for energy use by domestic cold appliances.

¹ See Energy White Paper (23 May 2007), para. 2.102.

Total in-use energy consumption of UK domestic cold appliances (see scope in paragraph 4)



6. The Reference² projection takes into account underlying trends in markets and technologies and the estimated or implicit impacts of historical and current policy measures. It does not, as yet, take account of the impact of policies announced in the Energy White Paper of 23 May 2007, which are still being developed and are not targeted at specific products (eg Carbon Emissions Reduction Target (CERT) and successor schemes). The intention is to revise these projections once it becomes clearer how these new policy measures will affect domestic cold appliances.

7. The Earliest Best Practice (EBP) projection shows what would happen if all new UK sales were based on the most resource efficient options, currently A++ products, taking into account design and production cycles, but not taking account of price or other market barriers.

8. The P1 projection sets a target level of ambition that the Government is proposing could be delivered at a reasonable cost, taking into account such things as current UK and global performance benchmarks, economies of scale and the capacity of the supply chain to take coherent action to deliver more energy efficient products³.

² The Reference line or 'REF' is included as a baseline against which progress towards absolute consumption targets can be monitored. It also permits us to measure the impact of market changes in response to published targets and delivered policy measures and to assess the need for additional action. REF is updated to estimate the aggregate impact of existing policy measures, superimposed on underlying market trends, on the supply, sales and use of domestic cold products – and, therefore, on household energy consumption. The effectiveness of market transformation policy, taken as a whole, may be assessed as the extent to which it modifies REF.

³ These market-based estimates for P1 are cross-compared with the performance improvements that could be envisaged through a set of ambitious but feasible policy options, over and above those

9. In theory, delivery of EBP would result in energy use falling by over one half to 7.4 TWh⁴ by 2020, compared to 2006. This would represent an energy saving of 6.4 TWh (0.8 MtC, 2.9 Mt CO₂)⁵ over the Reference projections for 2020.

10. The proposed P1 target would result in energy use from domestic cold appliances falling to around 10.6 TWh by 2020. This would represent an energy saving of 3.1 TWh (0.4 MtC, 1.4 Mt CO₂)⁶ over the Reference projections for 2020.

11. We estimate that the P1 target would be achieved if, on average, products supplied and brought into use each year were to meet the indicative performance standards set out in the Appendix. These P1 targets and product standards take into account:

- Benchmark product designs and technologies.
- Underlying market and technology trends.
- The scope for delivering policy benefits at reasonable cost.

12. We estimate this market shift could be delivered at reasonable cost. For example, cold appliances are available in EU Energy Label classes A+ and A++. An A+ rated model uses 24% less energy than the A-rated equivalent, and the A++ version would use 45% less than the A-rated model. Models with A+ and A++ EU Energy Label ratings have only limited availability and market penetration in the UK to date but demonstrate that products can be made for the UK consumer market. Sales of A+ and A++ in 2006 in 10 Western European countries reached an average of 13.8% of total cold appliance sales; in the UK alone, the figure for A+ and A++ was 3.8% of total sales, indicating that the UK is below the average for Western Europe⁷. The average selling price in the UK for an A+ rated products is typically 50% more than for A-rated products. The exception is for fridge-freezers where the average selling prices of A+ and A-rated products are similar. However, this disguises the fact that the types of model sold at A+ rating are not directly comparable in that they are not generally frost-free whereas the majority of A-rated products are frost-free. Frost-free products are generally more expensive than non-frost free, and this should also be expected for A+ rated models.

included in the Reference line to check their feasibility. Section 3 of this Policy Brief (policies, risks and measures) describes these along with the associated risks and proposed strengthening initiatives.

⁴ 1 terawatt-hour (TWh) = 1,000,000,000 kilowatt-hours (kWh).

⁵ Carbon emissions for electricity are calculated from Government predictions of the electricity generation mix. Oil and gas are converted using standard Government factors. See MTP Briefing Note BNXS01 at:

www.mtprog.com/ApprovedBriefingNotes/pdf.aspx?intBriefingNoteID=150

⁶ However, some of the energy an appliance uses provides useful heat and, when this is reduced, the heating system will have to provide more heat (also known as the heat replacement effect, HRE), so the net carbon reduction taking the HRE into account is 0.3 MtC, 1.0 MtCO₂. See MTP Briefing Note BNXS05 for further explanation at:

www.mtprog.com/ApprovedBriefingNotes/pdf.aspx?intBriefingNoteID=151

⁷ See MTP Briefing Note BNC14 at

<http://www.mtprog.com/ApprovedBriefingNotes/pdf.aspx?intBriefingNoteID=402> for more details on the market for A+ and A++ in the UK and other EU countries.

13. If we are on track to deliver this target we would expect to see substantial shifts in the market, for example:

2010: 100% of sales of cold appliances are EU energy label A-rated or better. Average annual energy consumption reduced to 193 kWh for chest freezers, 218 kWh for upright freezers, 398 kWh for fridge-freezers, and 169 kWh for refrigerators.

2015: 100% of sales of cold appliances are A+ or better. Average annual energy consumption reduced to 138 kWh for chest freezers, 142 kWh for upright freezers, 265 kWh for fridge-freezers, and 114h kW for refrigerators.

2020: Over 80% of sales for all cold appliances are A++ rated. Average annual energy consumption reduced to 118 kWh for chest freezers, 131 kWh for upright freezers, 216 kWh for fridge-freezers, and 99 kWh for refrigerators.

14. Our analysis indicates, in principle, that the P1 target is achievable through normal market mechanisms, supported by policies to be implemented as announced in the Energy White Paper.

15. This is in line with the approach taken in the EU's Eco-design of Energy-using Products Framework Directive (EuP), which encourages voluntary actions where appropriate.

16. The Government is committed to working with retailers, manufacturers and suppliers to overcome barriers that might impede progress, and to promote delivery of these indicative standards more widely in the market. We will, therefore, work with the full range of policies outlined in the Energy White Paper. Where international or domestic measures rely on performance standards, we propose that we should seek to align them with the indicative standards outlined in this Policy Brief. In particular, we will:

- Press for EuP measures to adopt performance requirements for domestic cold appliances in line with our indicative standards, whilst acknowledging the Single Market legal base for EuP and recognising that final performance requirements will need to be fully harmonised across the whole of the European Union.
- Encourage, for example through the International Task Force for Sustainable Products (ITFSP), a network for compliance activities.
- Work with the Energy Saving Trust's (EST) Energy Saving Recommended (ESR) scheme to update criteria for domestic cold appliances in light of our indicative standards.
- Seek to agree terms for an International Organization for Standardization (ISO) test protocol for worldwide use.
- Use the indicative standards to identify the most appropriate minimum and/or forward looking standards for use in Government procurement.
- Work to secure a revision to the current mandatory EU Energy labelling regime to deliver improved consumer information.

17. In this Policy Brief, we set our P1 target and indicative standards based on our current understanding of what is necessary and deliverable. That analysis may change over time, for example, if new efficient technologies enter the market faster than expected; or if consumer trends change; or through international or EU action;

or through policies on carbon emissions reduction more generally. We intend to maintain a continued active dialogue with businesses in the supply chain. The aim will be to review progress and to annually update this analysis, the P1 target and the indicative standards for domestic cold appliances, among others, following consultation and review.

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1 Status of Policy Brief

18. This Policy Brief is issued as part of an annual process, as announced in the Energy White Paper, to review and update the Government's published analysis, projections, P1 target and indicative standards for more sustainable products. This updated version takes into account the views received following the first consultation and, so far as possible, addresses substantial issues raised.

2 Market overview

19. As set out above, this Policy Brief addresses in-use energy consumption and carbon emissions associated with the following domestic cold appliances: refrigerators, fridge-freezers, upright freezers and chest freezers.

20. The majority of UK households own at least one refrigerated appliance. Technology developments tend to be applied across all the different types (ie refrigerator, fridge-freezer, upright freezer and chest freezer).

2.1 Trends

21. The energy efficiency of cold appliances has improved significantly since the introduction of energy labelling – for example a typical new upright freezer uses 26% less energy than in 2000. In addition, the introduction of the minimum standard regulation in 1999 means those products with efficiencies of D or worse (or F or worse for chest freezers) are no longer available. Manufacturers' voluntary agreements at EU level have also encouraged the production of A-rated models and discouraged the production of C-rated models (D and E for chest freezers).

22. For all the appliance types, except chest freezers, over 50% of sales are for A-rated or above products. However, sales of A+ and A++ are still small. Currently, the improvement to, or marketing of, A+ and A++ appliances appears to be a big step change (eg for fridge-freezers, around 80% of sales are for A-rated but only around 2% are A+ rated). This is compounded by the fact that the UK market favours frost-free products and there are few frost free A+ and A++ models available.

23. Vacuum insulated panels (VIPs) may be able to reduce the energy consumption of cold appliance by around 50% compared to existing technologies deployed on these products. However, at present there is limited information available in this area and it is unlikely that this technology will emerge at a competitive price for some time given the likely increased costs. The most energy efficient models available in 2007 were A++ rated⁸ and did not typically use VIPs. It is not known how far the A++ rating could be improved with other technological options and with the use of VIPs. The proposed standards make no assumptions as to the type of technology used.

⁸ An A++ rated product used 45% less energy than the comparable A-rated product.

2.2 Price

24. In general, the market is extremely price sensitive with manufacturers under pressure to offer products at the lowest possible cost. This may be a barrier to improving energy efficiency, as anything perceived to have the potential to add cost (eg a shift to vacuum insulated panels or other new technology) is treated with caution. However, it should be noted that the improvements in efficiency seen over the last ten years have coincided with a decline in purchase price. There is currently a difference in the price to consumers of comparable A+ and A rated products that is greater than the energy savings made during the lifetime of the product. Consumers may be reluctant to pay the higher prices on the basis of efficiency without recouping the additional investment.

2.3 Innovation

25. Innovation is an important factor in market development and is covered in Section 4.2.

3 Policies, risks and measures

26. In the Energy White Paper, the Government said it would:

- Take steps within the UK to improve the take up of energy efficient products and work internationally, and through the EU to stimulate global innovation and competition to raise standards and to bring a greater choice and efficient products to UK consumers.
- Deliver on our Gleneagles G8 commitments to promote international co-operation on product labelling and standards and help develop practical standards to reduce standby power.
- Work with the UK supply chain to encourage delivery of more efficient goods and services.
- Publish a series of consultation papers setting out our analysis of how the performance of energy using products will need to improve between now and 2020, including proposals for indicative product standards and initiatives to phase out the least efficient products.

27. As set out above, our analysis indicates, in principle, that the P1 target is achievable through normal market mechanisms, supported by policies to be implemented as announced in the Energy White Paper.

28. In this Section we consider the potential for policy to assist in delivering P1. We identify:

- Policies we believe are already helping to deliver higher environmental performance standards.
- Supporting policies that could assist in delivering P1 in the event that the market fails to deliver it.
- The risks that these policies may not deliver efficiency improvements.

- Further actions that may be necessary to achieve the Government’s targets.

29. Figures 3.1–3.4 illustrate how existing policy instruments and initiatives could support delivery of more efficient new cold appliances.

30. The graphs plot the data in the Appendix (ie the indicative performance standards for the basket of new products), which correspond to the P1 projection. Also shown on the graph are equivalent performance values for the Reference and EBP projections. These illustrate the sales-weighted average performance of new products under the different projections. The energy label classifications shown refer to the Reference projection.

31. It should be noted that the graphs are based on energy consumption declared for the EU Energy Label scheme. The relative size, and therefore energy consumption, of some products may differ depending on the energy label class. The energy consumption for different energy label classes depends on their size and features as well as their efficiency. Therefore the energy consumption for a particular energy label class can change with time. In addition, the energy consumption may not vary uniformly with energy label class. For instance, a small D-rated fridge-freezer may consume less energy than a larger B-rated product (see Figure 3.2)

Figure 3.1 Indicative Energy Efficiency Index of new refrigerators

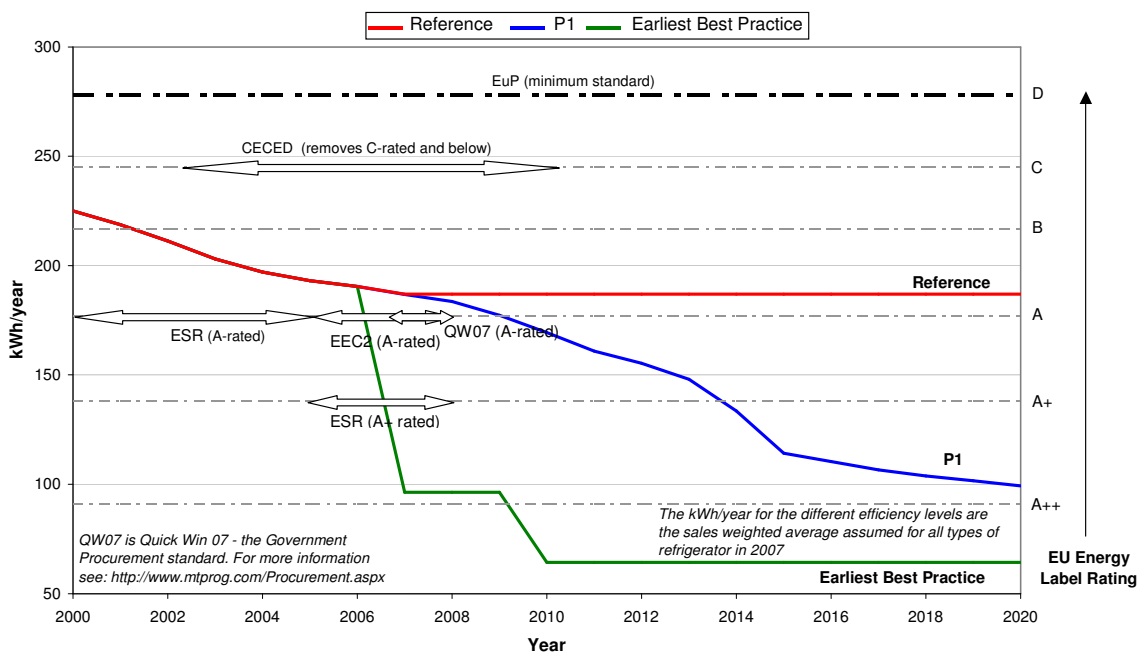


Figure 3.2 Indicative Energy Efficiency Index of new fridge-freezers

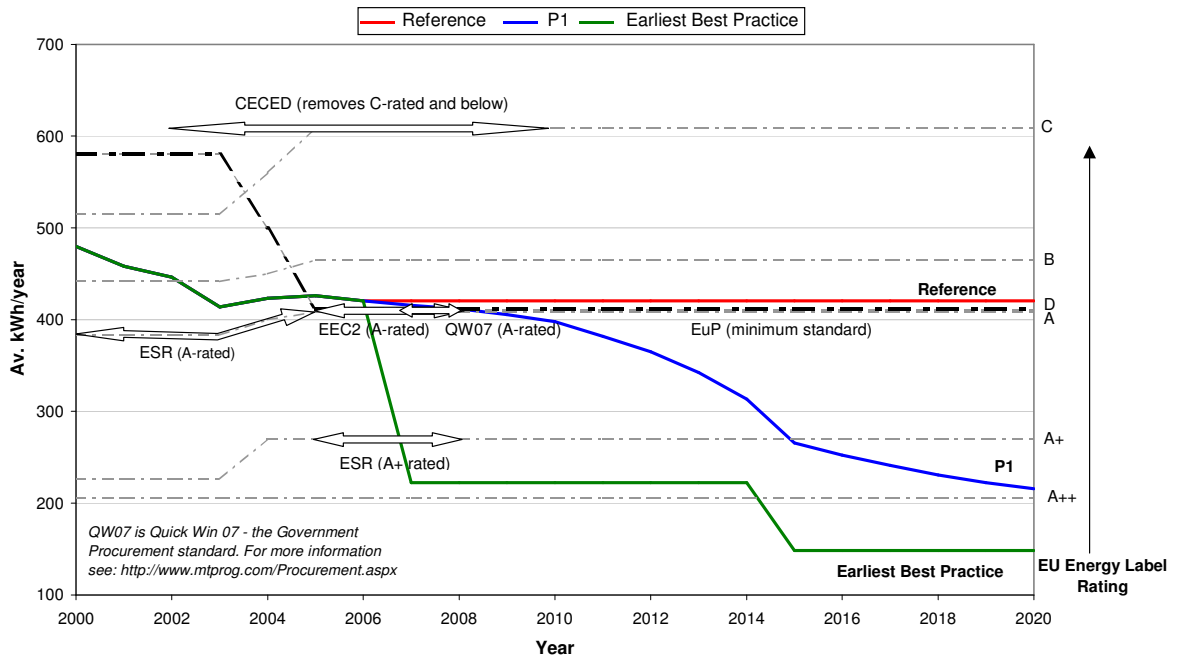


Figure 3.3 Indicative Energy Efficiency Index of new upright freezers

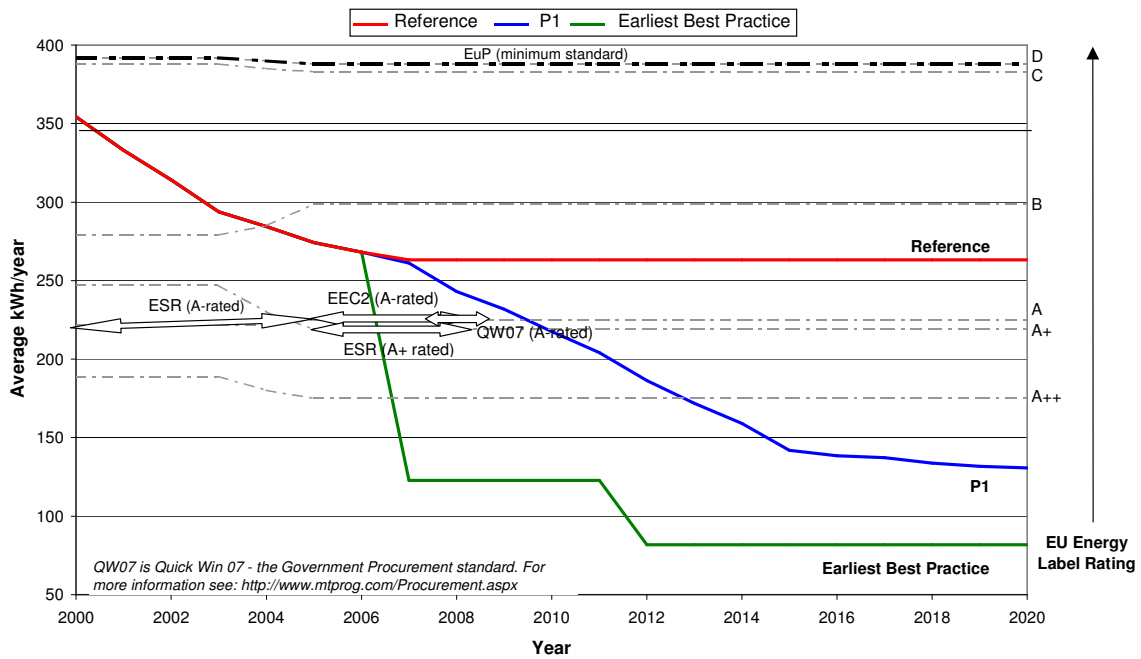
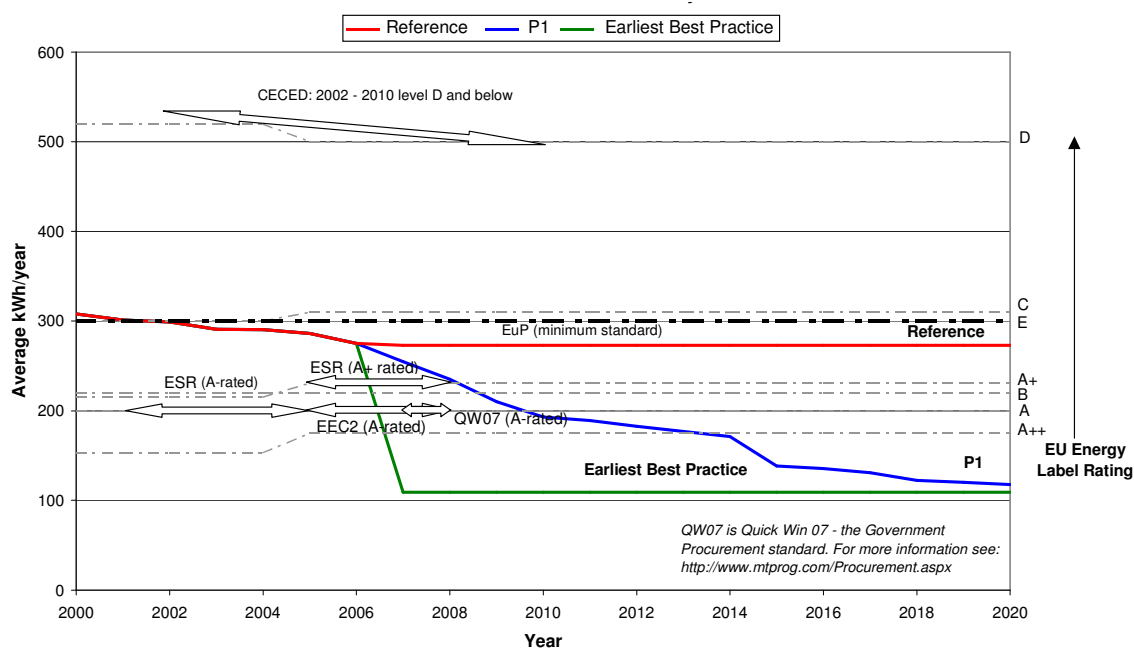


Figure 3.4 Indicative Energy Efficiency Index of new chest freezers



3.1 Market analysis, projections and targets

3.1.1 Current status

32. This is our first Policy Brief resulting from the consultation process that addresses how the performance of domestic cold appliances will need to improve between now and 2020, including proposals for product standards and initiatives to phase out the least efficient products. The intention is to update this analysis on a yearly basis.

33. Tables showing the average performance levels each product group needs to achieve to realise the P1 target are provided in the Appendix. These tables also provide a metric against which developments in the market can be measured.

34. The intention is to continue to monitor progress against the current projection for technology and market development, to consult on the evidence and, annually, to review and update the published analysis and policy response, including indicative product performance levels for new products supplied to the UK market.

Policy: Publish and update UK market and technology plans annually.

Start date: 2007.

Reference: Announcement in Energy White Paper 2007.

Next deliverables:

- 2008: Monitor market developments, refine models and consult on possible amendments to this Policy Brief.
- 2008: Publish updated P1 targets and indicative product standards.

3.1.2 Acknowledged risks

35. There is a risk that products will develop in a direction that differs from that which was initially expected in the projections (ie the P1 target will not be met). To offset this risk, the Government may consider:

- Whether or not more ambitious P1 targets could be set as part of the review process.
- Pursuing measures designed to further accelerate the use of innovative technologies.

36. Weaknesses in knowledge about market and technology trends, and the relationship between the performance of products measured under test conditions and what is achieved in real life could all lead to reduced effectiveness of the policy programme.

Strengthening initiatives

- Ongoing: Government will continue to monitor areas to identify where it may be beneficial to strengthen the evidence base on domestic cold products.

3.2 Engaging the supply chain

3.2.1 Supply chain initiatives

Current status

37. In line with announcements in the Energy White Paper, the Government will ask major UK manufacturers and retailers to compete to supply domestic cold products in line with the indicative standards set out in the Appendix.

Acknowledged risks

38. The supply chain initiative may not deliver the Government's P1 target or product standards.

Strengthening initiatives

- 2008: Government will continue to consider where further actions could be employed to encourage retailers to work to meet more ambitious P1 targets and product standards. This could help to sustain successful supply chain initiatives.
- 2008: Government will continue to review opportunities to encourage retail best practice, for example, by providing buyers guides through the EST's ESR scheme for retailers (see Section 3.4.2).

3.2.2 Metrics: market development

Current status

39. At present, there are no tools developed to enable product designers and specifiers to assess product energy efficiency performance against the Government's indicative performance standards.

Acknowledged risks

40. Without a tool to enable evaluation of performance against Government targets, there may be no simple way to assess or report progress against indicative performance standards.

Strengthening initiatives

- 2008: A 'Red-Green calculator' has been developed for consumer electronic products using a simple points-based currency for ranking the impact of products over their life. The tool returns a red or green verdict on each parameter, product or basket of goods, taking into account sales-weighted averages. This tool could be adapted for domestic cold products, and used by retailers, manufacturers and service providers to assess and, possibly, to report progress⁹.

3.3 EU and international policy actions, programmes and initiatives

41. Domestic cold products are internationally traded goods where unilateral UK policy actions may have only a limited impact on the design of products placed on the UK market. Therefore, the Government has committed to work at international level to promote action to bring forward more sustainable products.

3.3.1 International collaboration

Current status

42. The UK is committed to promoting international co-operation¹⁰ on product labelling and standards and, generally, on policy towards more sustainable products.

43. Defra has been instrumental in establishing the ITFSP¹¹ which seeks to ensure the harmonisation of policy options with those of other countries to maximise impact in a global market led by the supply chain. Defra operates the secretariat for the ITFSP.

44. Within the ITFSP, product working groups called Global Sustainable Product Networks (GSPNs) have been established for lighting, electric motors, home

⁹ Additional information on the Red-Green calculator is available at www.mtprog.com/retailer.aspx

¹⁰ For example, the International (Marrakech) Task Force on Sustainable Products (see www.itfsp.org).

¹¹ See www.itfsp.org for details.

entertainment equipment and compliance. These are developing test standards (where needed) and a harmonised set of product performance standards.

Policy: Supporting the ITFSP.

Start date: June 2006.

Reference: See www.itfsp.org

Next deliverables:

- 2008: meeting to launch a European network for compliance activities.

Acknowledged risks

45. There is a risk that commitment to the ITFSP and the GSPNs will not be sustained by all international partners or that insufficient implementation support will be provided.

Strengthening initiatives

- Ongoing: Government will continue to review the effectiveness of this initiative.
- It may be feasible to run the GSPNs on a more informal basis to continue influencing major international partners.

3.3.2 Mandatory performance standards

Current status

46. The Framework Directive on the Eco-design of Energy-using Products (2005/32/EC)¹², adopted in 2005, allows the European Commission to set performance requirements for products placed on the EU market. Preparatory product studies are underway for domestic cold appliances as part of the first round of studies¹³. The UK is contributing evidence into the preparatory studies and the Government will be pushing for ambitious, but realistic and achievable standards to be adopted.

47. The existing EC minimum standard for cold appliances limits the selling of appliances with efficiencies worse than C (or E for chest freezers). This was implemented via EU Directive 96/57/EC¹⁴ and UK Statutory Instrument 1997 No. 1941. Along with other existing minimum performance standards for lighting ballasts and boilers it has now been brought within the EuP Framework Directive.

48. The European Committee of Domestic Equipment Manufacturers (CECED) introduced a voluntary Industry Commitment¹⁵ in 2002 that aims to restrict sales of appliances to those with efficiencies of Energy Label class B (Energy Efficiency Index 0.75) or better. This voluntary commitment covers CECED members only and only includes those manufacturers within the EU and Turkey.

¹² See MTP Briefing Note BNXS03 at:

www.mtprog.com/ApprovedBriefingNotes/pdf.aspx?intBriefingNoteID=389

¹³ Information on the progress and consultation process can be found at www.ecocold-domestic.org

¹⁴ See MTP Briefing Note BNXS37 at:

<http://www.mtprog.com/ApprovedBriefingNotes/PDF.aspx?intBriefingNoteID=396>

¹⁵ See www.ceced.org/IFEDE/easnet.dll/ExecReq/WPShowItem?eas:dat_im=010039

49. The initial voluntary commitment was updated in 2004 to reflect the division of EU Energy Label class A into A, A+ and A++, and set a target for a sales-weighted fleet average efficiency of Energy Efficiency Index (EEI) 0.55 by 31 December 2006. In the event of a lack of policy support for this, an EEI of 0.57 was adopted.

Policy: EU Framework Directive for Eco-design of Energy-using Products (EuP).

Start date: 2005 (Framework Directive adopted).

Reference: http://ec.europa.eu/energy/demand/legislation/eco_design_en.htm

Next deliverables:

- 2008/09: Provide information and support to the European Commission to facilitate an uplift in minimum standards via the EuP process.
- 2010: Revised EU wide minimum standards expected to enter into force.

Acknowledged risks

50. Timing for delivery of standards via EuP is uncertain. Delivery of the UK's preferred standards via EuP is also uncertain since the EuP has a Single Market legal base so any final performance requirements will need to be fully harmonised across the whole of the European Union.

51. There is also a significant risk that current regulatory processes will not be able to respond sufficiently nimbly to a rapidly changing market, leading to ineffective regulation and market drivers.

Strengthening initiatives

- 2008: The Government will consider the value of including a mechanism for regular review and updating of product criteria in the product implementing measure.
- Ongoing: The Government will continue to monitor the effectiveness of the regulatory processes in question. The Government will also consider whether to press the European Commission to ensure domestic cold products remain a priority for regulatory action under this Directive. However, the current timetable indicates that standards will not come into force before 2009 at the earliest. The Government will work with the supply chain in an effort to phase in new standards in advance of this measure (see Section 3.2.1).

3.3.3 Product information

Current status

52. The EU Framework Directive¹⁶ 'The indication by labelling and standard product information of the consumption of energy and other resources by household appliances' (Directive 92/75/EEC) makes comparative labelling compulsory in all member states for those products subject to implementing directives. The Framework Directive came into force in 1992, with the first labels on cold appliances coming into effect in 1995.

¹⁶ <http://www.mtprog.com/ApprovedBriefingNotes/PDF.aspx?intBriefingNoteID=396>

53. For refrigeration appliances, EU Directive 1994/2/EC was implemented in the UK in 1995 by Statutory Instrument 1994 No. 3076, which specified the A to G efficiency ratings and other labelling requirements. EU Directive 2003/66/EC, implemented in the UK in June 2004 (SI 2004 No. 1468¹⁷) amended the A efficiency classification to include A+ and A++. This extension of the levels of performance to A+ and A++ was agreed by Member States as a short-term measure, pending review of the Framework Directive, to stimulate competition from the most efficient products¹⁸.

54. The EU Energy Label has helped to improve the energy efficiency of cold appliances by stimulating competition. It also provides information that can be used in other policy measures (eg ESR and CERT). As the label is now twelve years old, we consider that a review is long overdue.

55. Work is currently underway to review the mandatory EU labelling regime. It is currently anticipated that the European Commission will reveal its initial proposals in 2008. This will run alongside work currently in progress for the EuP Directive.

Policy: EU Framework Directive for Energy Labelling.

Start date: 1995.

Reference: Directive 92/75/EEC.¹⁹

Next deliverables:

- 2008: Provide information and support to the European Commission to facilitate review of the Energy Label.
- 2010: Possible new or revised EU directive produced.
- 2011: New UK regulations implementing EU directive, if introduced.

Acknowledged risks

56. Timing for delivery of new labels via a revised directive is uncertain.

Strengthening initiatives

- Ongoing. No review is currently scheduled for this specific implementing measure but the Government will continue to consider what action is required in this area to reinforce proposals for removing the worst performing products via an EuP implementing measure.

3.3.4 Metrics: test methodologies

Current status

57. The test method for calculating the efficiency of refrigeration products is BS EN 153: 2006 Methods of measuring the energy consumption of electric mains operated household refrigerators, frozen food storage cabinets, food freezers and

¹⁷ The Energy Information (Household Refrigerators and Freezers) Regulations 2004; www.opsi.gov.uk/si/si2004/20041468.htm

¹⁸ For more information, see MTP Briefing Note BNC07 Domestic Cold Appliance EC Energy Label Revision (<http://www.mtprog.com/ApprovedBriefingNotes/pdf.aspx?intBriefingNoteID=82>).

¹⁹ http://ec.europa.eu/energy/demand/legislation/domestic_en.htm

their combinations, together with associated characteristics. BS EN 153 was published September 2006 following a revision to the European standard for the energy consumption of domestic refrigerators, EN 153, issued in August 2006. For information on these standards, see Market Transformation Programme (MTP) Briefing Note BNC10 Energy Efficiency Test Methodologies for Domestic Cold Appliances.²⁰

Policy: Use of 2006 revision of the test standard for EU Energy Labelling.

Start date: 2007.

Reference: MTP Policy Brief BNC10 Energy Efficiency Test Methodologies for Domestic Cold Appliances.

Next deliverables:

- 2008: EN 153:2006 replaced EN 153:1995 on 30 June 2008.

Acknowledged risks

58. Development of formal test standards may not keep pace with policy needs. For example it is necessary for those who write the standards that are essential for the delivery of the Directive to be mindful of the uses to which they are put, and also for those who write the Directives to be aware of the standards development process. The two areas should not be allowed to get out of step.

59. Compliance testing is made difficult by the tolerance currently permitted in the test standard, which is, in turn, enshrined into the Energy Label. It has also been argued that the standard does not reflect real-life situations sufficiently and the standard is not appropriate for a worldwide market. Thus there is the risk that other policies based on these test standards are less effective than they could be.

Strengthening initiatives

- The Government will consider what action is needed to support the standards writing process and ensure that the standards meet the needs of current and future policies. Issues such as tolerances need to be addressed during the standards making process to ensure that policies can deliver their potential.

3.4 UK policy actions, programmes and initiatives

3.4.1 Public procurement

Current status

The Government published its Sustainable Procurement Action Plan (SPAP) in March 2007, re-affirming its commitment to use Government procurement to drive the market for energy efficient products. Alongside the Action Plan, it published updated and extended standards for an increased range of products that are mandatory for Central Government departments. Defra consulted on energy efficient products, which has informed the minimum mandatory standards for this product group in the revised **Buy Sustainable Quick Wins** (published in July 2008). We are

²⁰ www.mtprog.com/ApprovedBriefingNotes/pdf.aspx?intBriefingNoteID=285

reviewing the approach to setting mandatory standards with the newly formed Centre of Expertise for Sustainable Procurement.

60. Guidance on energy efficiency and energy savings as possible assessment criteria in public sector tendering was published in July 2008 as part of the Energy Services Directive. The Directive also sets out a number of options relating to public sector procurement of energy using products, buildings and energy services, which the Government consulted during the winter of 2007.

61. The NHS (England) published its Sustainable Procurement Action Plan in August 2007. Similar action plans for local authorities are being produced.

62. The Government is also committed to identifying stretching forward-looking standards to provide longer-term signals to business and to encourage innovation, for example through the use of the 'Forward Commitment Procurement' Model.²¹

Policy: UK Government Sustainable Procurement Action Plan.

Start date: 2007.

Reference: <http://www.sustainable-development.gov.uk/publications/pdf/SustainableProcurementActionPlan.pdf>

Next deliverables:

- 2008: Revised Government procurement standards announced.

Acknowledged risks

63. Specifying fixed threshold values in procurement specifications may result in 'lock in' to incumbent technologies by excluding alternative products and lead to innovation being stifled. Outcome-based specifications, along with challenging and progressive threshold values, can help to minimise this.

Strengthening initiatives

- 2008: The Government will consider including standards specifically for the procurement of domestic cold products, where applicable, within its formal procurement guidelines that are at or above the indicative standards in the Appendix.
- Strengthened leadership and scrutiny of performance on sustainable procurement throughout Government as set out in the SPAP.
- Transforming Government procurement agenda will build procurement capabilities and capacities within Departments and improve delivery of agreed policies.

3.4.2 Product information

Current status

64. The EST's ESR scheme²² endorses products that comply with specified product performance criteria. It serves both as a recognition of manufacturers' efforts

²¹ See www.berr.gov.uk/files/file35312.pdf

²² www.energysavingtrust.org.uk/energy_saving_products/

towards efficiency best practice and as a straightforward consumer label. It was first established in 2000 and is reviewed annually.

65. The ESR scheme aims to identify and endorse up to the top 20% of products on the UK market based on energy efficiency. The criteria for refrigerated appliances were reconfirmed during 2006 as A+ or A++ EU Energy Label classes.

Policy: Energy Saving Recommended scheme.

Start date: 2000.

Reference: Energy Saving Recommended website.²²

Next deliverables:

- 2008: Energy Saving Trust and stakeholders to review criteria.
- 2008: Government to support the scheme manager with information regarding UK market developments and other comparative schemes.

Acknowledged risks

66. The lack of reliable or effective consumer information could prevent consumers making an informed choice and prevent effective competition on energy efficiency issues.

Strengthening initiatives

- 2008: Government will continue to monitor the effectiveness of product information and, if necessary, consider whether to task the EST to increase the level of support it provides to retailers to improve practices.

3.4.3 Energy Efficiency Commitment/Carbon Emission Reduction Target

Current status

67. The Energy Efficiency Commitment (EEC) scheme²³ puts an obligation on energy suppliers to meet a target for improvement in energy efficiency among household customers. Energy suppliers are not expected or required to deliver particular amounts of any measure or product to meet their obligations. As part of the development of the legal obligation the Government develops an Illustrative Mix of the type and number of measures that suppliers might use to meet the target proposed.

68. EEC 2, the current three-year phase (2005 – 2008) can support A, A+ and A++ EU Energy Label rated refrigerated appliances.

69. Development of the third phase of the Household Energy Supplier Obligation between 2008 and 2011, which will be called CERT, was completed early in 2008. Support for A+ and A++ appliances is included in CERT. The effects of the EEC scheme on the domestic refrigerated appliance market in the UK are discussed in MTP Briefing Note BNC14 UK Market for A+ and A++ Refrigerated Appliances.²⁴

²³ <http://www.defra.gov.uk/environment/climatechange/uk/household/eec/>

²⁴ www.mtprog.com/ApprovedBriefingNotes/pdf.aspx?intBriefingNoteID=402

Policy: Carbon Emission Reduction Target.

Start Date: 2007.

Reference: Carbon Emissions Reduction Target 2008-2011 Market Transformation Action.²⁵

Next deliverables:

- 2008: CERT 2008-2011 agreements to be set up (public energy suppliers, manufactures, retailers, local authorities and housing associations).

Acknowledged risks

70. CERT is based on carbon savings, rather than specific products provided. Although EEC has made significant contributions to previous market transformations in the energy efficiency of household products, there is no guarantee that CERT will deliver any particular level of market transformation for any specific measure or product.

71. The public may resist a greater transformation to the most energy efficient products if the prices remain higher than standard products. The range of products on offer must also meet consumer needs.

Strengthening initiatives

- 2010: Government will monitor the effectiveness of CERT. The Government has said that a household Supplier Obligation in some form will continue to 2020, although the policy instrument has yet to be developed. A call for evidence on the post-2011 phase closed on 14 September 2007.²⁶ Depending on the detailed design, there could be an opportunity to include innovative technology such as vacuum insulated panels and variable speed compressors in the scheme to bring forward the next generation of refrigerated products.

3.5 Other policies with potential to impact on domestic cold products

3.5.1 Act on CO₂

72. The Government has initiated an 'Act on CO₂' campaign to help the general public make the link between their individual actions and climate change. A carbon calculator at www.direct.gov.uk/actonco2 allows an individual or household to calculate the carbon footprint resulting from their home, appliances and personal travel. It then offers a tailored action plan with simple tips for reducing that footprint. The calculator takes a number of domestic cold products into account in its 'home' section.

²⁵

<http://www.ofgem.gov.uk/Sustainability/Environmnt/EnergyEff/CERT/Documents2/Market%20Transfor mation%20vfinal.pdf>

²⁶ www.defra.gov.uk/environment/climatechange/uk/household/supplier/pdf/evidence-call.pdf

3.5.2 Promoting pro-environmental behaviour

73. The Government is developing a stronger consumer-facing strategy to promote pro-environmental behaviour, covering the four major consumption impacts of homes, food, personal transport and tourism. This includes setting prioritised behaviour goals (which include better energy management and buying more energy efficient products), audience segmentation and consumer insight, re-organisation of structures and programmes and partnership working. As this work is still in its infancy, there are no domestic cold product-specific initiatives yet in place, but the broader implications of the policy are potentially significant for all products.

3.5.3 Smart metering

74. The Energy White Paper set out a number of policies on energy billing and metering, designed to reduce energy consumption. The Department for Business, Enterprise and Regulatory Reform (BERR, formerly the DTI) consulted on the implementation of these policies (the consultation period closed on 31 October 2007). In summary, these are:

- To promote awareness of domestic energy use through a requirement on energy suppliers to present consumption data (preferably in graphical form) on consumers' bills to allow them to compare different periods of energy consumption.
- To provide real-time display units to certain customers so that they can see in real time, and in a way that is relevant to them, how much electricity they are consuming
- To require the installation of smart meters for business customers above a certain energy usage threshold, where it has been proven to be cost-effective.

75. The Energy White Paper also set out the Government's expectation that smart metering would be introduced in the remainder of the business sector and the domestic sector over the next decade.

3.5.4 Promoting energy/carbon savings in industry and commerce

76. Climate Change Agreements, the EU Emissions Trading Scheme and the imminent Carbon Reduction Commitment are all measures addressing energy and emissions saving in industry and commerce. Innovation in industrial products may stimulate enhancements in the design and manufacture of domestic products.

4 Other potential measures

This Section looks towards other measures that may need to be developed to enable the desired average energy performance to be achieved.

4.1 Private procurement

77. Some savings could be achieved by ensuring that the most efficient appliances and technologies are procured by large property developers of private properties for

pre-installed equipment (ie built-in appliances). This is encouraged through the Code for Sustainable Homes,²⁷ which is the responsibility of the Department for Communities and Local Government. The Code for Sustainable Homes awards credits built-in products that meet minimum standards for carbon emissions and its scope could be expanded to require the most efficient cold appliances.

4.2 Innovation

78. Efficient technologies and designs are already available (including vacuum insulated panels) that offer energy savings over 'traditional' appliances. Any investment in new innovative technologies is unlikely to be seen until the potential of current technologies is explored and greater market penetration achieved.

79. Further research or funding may help to address the performance issues that are holding back the introduction of best technologies such as durability and recyclability. They may also lead to possible reductions in manufacturing and assembly costs.

5 Potential impacts

80. This Section provides a partial analysis of the more significant potential impacts of the proposals contained in this Policy Brief.

5.1 Consumer cost/benefit analysis

81. In general, the purchase of energy efficient appliances is very cost-effective for consumers, with any additional purchase cost easily outweighed by the lifetime savings in energy costs. However, the price of an A+ rated cold appliance is currently sufficiently higher than the A-rated equivalent that consumers will not recover the additional cost through the energy savings over the lifetime of the appliance. However, most consumers make their purchase decisions on initial cost rather than on a lifecycle basis. The market is therefore very price sensitive, with manufacturers under pressure to offer products at the lowest possible cost. This has been a barrier to improving energy efficiency, as anything perceived to have the potential to add cost (eg a shift to vacuum insulated panels) is treated with caution. However, it should be noted that the improvements in efficiency seen over the last ten years have coincided with an overall decline in purchase price.

5.2 Business impacts

82. Only a small number of companies manufacture refrigerators in the UK. Recent years have seen manufacturing transferred from EU countries such as Germany and the UK to Eastern Europe or the Far East where labour costs are lower. Spain and Italy continue to be significant in white goods manufacturing in Europe.

83. If UK consumers are to continue to be supplied with frost-free cold appliances, manufacturers will have to invest in developing new products to meet the indicative

²⁷ www.planningportal.gov.uk/england/professionals/en/1115314116927.html

energy consumption targets in the Appendix. There are very few A+ and A++ products currently available that are frost-free.

84. The majority of refrigeration appliances (93% by weight in 2005) are manufactured overseas and therefore this is where the majority of raw material environmental burdens arise. The amount of waste generated in the manufacturing phase amounts to over five times the weight of the actual appliance. The majority of the waste arising is in the form of ferrous metal, with non-ferrous metal and plastic also making significant contributions.

85. In the UK, waste from domestic cold products was estimated at around 100,000 tonnes in 2006 and this is expected to increase to almost 117,000 tonnes by 2020. In broad terms, cold sector appliances are handled in a resource efficient manner at end of life, with a high percentage of products (nearly 90% by weight) being recycled or re-used. The weight of waste arising as a result of packaging for appliances sold in 2006 was estimated at over 10,000.

86. Refrigeration products are included in the scope of the Waste Electrical and Electronic Equipment Directive (WEEE) and the Restriction of Hazardous Substances Directive (RoHS). Refrigerator appliances with ozone-depleting substances (ODS) are where the main disposal issues occur, as these need to be handled as hazardous waste. Prior to 1994, chlorofluorocarbons (CFCs) and/or hydrochlorofluorocarbons (HCFCs) were used either in the refrigerant of the cooling system or as a blowing agent in the insulating foam. Many manufacturers stopped using CFCs as refrigerant in the mid-1990s, but HCFCs continued to be used as a blowing agent for the insulating foam until 2000. For this reason, a high proportion of refrigerators entering the waste stream will require treatment until at least the middle of the next decade.

6 Further information

87. The following MTP publications (available from www.mtprog.com) are linked to this Policy Brief and present the underlying evidence base of information such as further explanations, definitions, assumptions and important background information:

- BNC07 Domestic Cold Appliance EC Energy Label Revision
- BNC08 Assumptions Underlying Energy Projections for Cold Appliances
- BNC10 Energy Efficiency Test Methodologies for Domestic Cold Appliances
- BNC11 Domestic Refrigeration Standard vs. Real-use Energy Consumption
- BNC14 UK Market for A+ and A++ Refrigeration Products
- BNC15 Other Small Refrigerated Appliances on the UK Market
- IBNC16 Innovation Briefing Note: Vacuum Insulated Panels for Refrigerated Appliances
- BNXS1 Carbon Emission Factors for UK Energy Use

Appendix

Indicative performance standards for domestic cold products

88. Tables A1–A4 show the indicative average performance standards for new products supplied to UK end-users. These correspond with the Government’s underlying published stock models and projected energy consumption in each sector (the P1 target presented in this Policy Brief).

89. These specifications may be used directly in suitable policy instruments (eg the supply chain initiative) and provide a metric against which developments in the market can be measured.

90. The underlying stock modelling is subject to an ongoing consultation and review process. More detail on the modelling, current market analysis and data downloads are available via the MTP’s What-If tool (<http://whatif.mtprog.com>).

Table A1 Target average energy consumption: refrigerators

Year	Annual consumption (kWh/year)
2000	225
2001	219
2002	211
2003	203
2004	197
2005	193
2006	190
2007	187
2008	184
2009	177
2010	169
2011	161
2012	155
2013	148
2014	134
2015	114
2016	110
2017	107
2018	104
2019	102
2020	99

Table A2 Target average energy consumption: fridge-freezers

Year	Annual consumption (kWh/year)
2000	480
2001	458
2002	446
2003	414
2004	423
2005	426
2006	421
2007	416
2008	412
2009	405
2010	398
2011	382
2012	365
2013	342
2014	313
2015	265
2016	252
2017	241
2018	231
2019	223
2020	216

Table A3 Target average energy consumption: upright freezers

Year	Annual consumption (kWh/year)
2000	354
2001	333
2002	314
2003	294
2004	284
2005	274
2006	268
2007	261
2008	243
2009	232
2010	218
2011	204
2012	186
2013	172
2014	159
2015	142
2016	139
2017	137
2018	134
2019	132
2020	131

Table A4 Target average energy consumption: chest freezers

Year	Annual consumption (kWh/year)
2000	308
2001	301
2002	299
2003	291
2004	290
2005	286
2006	275
2007	255
2008	235
2009	210
2010	193
2011	189
2012	183
2013	177
2014	171
2015	138
2016	135
2017	131
2018	122
2019	120
2020	118