BNXS15: Standby power consumption - domestic appliances

Version 1.4

This Briefing Note and referenced information is a public consultation document and will be used to inform Government decisions. The information and analysis form part of the Evidence Base created by Defra's Market Transformation Programme.

1 Summary

Standby power consumption is beginning to appear more frequently on domestic appliances such as washing machines and dishwashers. A new measurement standard has been produced to clarify what is considered as standby on white goods and how this should be measured. The use of this test methodology and associated measurements is considered below, for example, setting standards for the Energy Saving Trust's Energy Saving Recommended criteria.

Research by MTP helps to quantify the level and frequency of standby power consumption and also identifies other 'idle' power consumption (eg when a delay timer is in use).

One of the first round of Eco-design of Energy Using Products (EuP) preparatory studies is considering standby power consumption. The study includes all major appliances considered to present significant standby energy consumption and includes ovens and washing machines.

Standby power consumption on white goods has been considered and sometimes addressed by other countries. This Briefing Note provides some links to relevant information.

2 Introduction

Standby power consumption has been recognised as an issue associated with electronic products (eg TVs) for some years and measures have been taken to minimise its effect on total energy consumption. In white goods (domestic appliances), standby power is also an issue but has not yet been considered to the same degree. Research in 2001 looking at appliances and products in 32 homes estimated that standby power consumption accounted for between 6% and 10% of

annual household electricity demand (measured using a Voltech PM1000 Wattmeter)[1].

3 Test standard

The IEC[2] standard detailing the method for measuring standby power consumption for domestic appliances, IEC 62301 Household Electrical Appliances - Measurement of Standby Power, was published in June 2005. The standard can be previewed (or purchased) at http://www.iec.ch/

How this standard can be applied is being discussed in appropriate appliance standard committees.

4 Standby and 'idle' consumption

Standby power consumption is the "lowest power consumption which cannot be switched off (influenced) by the user and may persist for an indefinite time when an appliance is connected to the main electricity supply". In other words, the energy used when an appliance is simply connected to a power supply (socket) but is not being used in any way.

It should also be considered that, for some domestic appliances, there is energy consumption when the appliance is not obviously carrying out its primary function, for example, when an appliance has reached the end of a cycle but the ‘on’ button is still engaged. This consumption does not fit into the definition of standby power consumption, but could account for a notable amount of energy use. Measures may be appropriate to minimise this energy consumption, but there are likely to be issues regarding the definitions of such power consumption.

This issue is acknowledged by the Australian energy programme for dishwashers, where 'active standby mode', 'delay start mode' and 'end of programme mode' are all identified, with the latter presenting the most common additional energy use to the on-mode.

5 Eco-design of energy using products (EuP) study

Under the EuP Directive the European Commission has commissioned a range of studies in order to recommend ways to improve the environmental performance of products. A specific study (Lot 6) considered standby power consumption. The final drafts of the report for this study were loaded to website in October 2007[3]. The tasks within the study consider definitions and current standards as well as calculating the contribution standby power consumption makes to total energy use.

A working document on possible eco design requirements for standby and off-mode electric power consumption of electrical and electronic household and office

[1] *Suspecting standby? Domestic levels and the potential for household level reductions in the UK.* Environmental Change Institute, Oxford. http://www.eceee.org/conference_proceedings/eceee/2001/Panel_4/p4_14/Paper/
[2] http://www.iec.ch/
[3] Information, progress reports and documents for consultation and publication in relation to the EuP study on standby power consumption can be found at http://www.ecostandby.org/

equipment was discussed at the second meeting of the Eco Design Consultation Forum in October 2007[4]. This proposes standby and off-mode levels that equipment covered by the Waste Electronic and Electrical Equipment Directive (Directive 2002/96/EC) should meet, and identifies some product types that should be excluded from the requirements. The European Commission will now formulate implementing measures for standby, and is expected to vote on them in July 2008.

6 Quantifying standby power consumption

There is little recorded information about standby power in relation to domestic appliances. In order to quantify the associated effects of standby power more information needs to be collected from the marketplace. MTP undertook measurements (March 2004) of different standby and active standby modes on a range of new domestic appliances available in the UK (washing machines, washer dryers, tumble dryers, dishwashers and a few electric cookers).

The limitations of the measurements restricted the different modes measured to:

- Standby (electricity supply connected but no controls engaged).
- 'On' button engaged (only).
- Delay timer.

It is assumed that any consumption from standby will be as a result of devices such as 'anti-flood devices' on wet appliances and clocks on cookers.

The 'on button' mode represents the status of appliances at the end of a programme, while waiting for user attention.

Delay timers are not particularly common, but on appliances where they are used then some level of energy consumption was measured in this waiting mode. In the tables below, the maximum and minimum figures are rounded, and averages are not sales weighted.

Washing machines (91 appliances measured):

Mode	Max (W)	Min (W)	Average (W)	% of models with consumption
Standby	4	1	2.1	19%
'On' button engaged	9	1	3.6	93%
Delay timer operated	11	1	5.5	34%

Dishwashers (47 appliances measured):

Mode	Max (W)	Min (W)	Average (W)	% of models with consumption
Standby	4	3	3.25	4%
'On' button engaged	16	1	2.7	70%
Delay timer operated	16	1	2.9	50%

4 http://ec.europa.eu/energy/demand/legislation/doc/2007_10_19_working_document_standby_offmode.pdf

Tumble dryers (36 appliances measured):

Mode	Max (W)	Min (W)	Average (W)	% of models with consumption
Standby	-	-	-	0%
'On' button engaged	4	1	2.6	38%
Delay timer operated	3	3	2.9	5%

7 Applications of the new test standard

- Determining standby power criteria for the Energy Saving Trust's Energy Saving Recommended (ESR) scheme, on various domestic appliances.
- Targets set to limit standby power consumption (industry agreements or regulations).
- The new Energy Label for electric ovens has a requirement to declare standby power consumption (on the Fiche) as measured using the harmonised standard.
- The white goods industry is waiting for the outcome of the EuP study (the study has reconsidered the definitions of standby which could affect the requirements under the oven energy label directive) and may consider an Industry Commitment to consider standby power consumption[5].

8 Issues

- Now that the test standard has been published, it is hoped that the industry considers this issue for future revisions of energy labelling and/or considers a code of conduct to limit the levels on new appliances.
- Analysis of recently compiled information will aim to identify best practice which can feed into policy options (eg for ESR criteria).
- Creating behavioural-induced standby savings may be difficult owing to the small savings per household that appear to have little significance on a personal level. However, manufacturers could take measures to consider this aspect in the design stages.

9 Approaches from abroad

Information on the US approach to standby power consumption (mainly for ENERGY STAR® electronics products) can be accessed at the following web address: http://www1.eere.energy.gov/femp/procurement/eep_standby_power.html

The Swiss Federal Office of Energy published a report in June 2003 presenting findings from a project measuring standby power consumption. Its main concern was standby consumption from coffee makers and steamers, but the report also provides information on other household appliances[6].

The Australian government has posted product profiles on its Web site. For dishwashers, washing machines and washer dryers, standby consumption is taken into account for the energy efficiency label. Further information on activities relating

[5] Correspondence with AMDEA Feb 07
[6] http://www.electricity-research.ch/pages/berichte/2003/sb03-standby-haushaltsgeraete-3-englisch.pdf

to standby power consumption in Australia is available at:
http://www.energyrating.gov.au/standby.html

Related MTP information

- BNXS36 Estimated UK standby electricity consumption in 2006 considers the wider implications of standby power consumption on all products.
  http://www.mtprog.com/ApprovedBriefingNotes/pdf.aspx?intBriefingNoteID=393
- Standby power consumption assumptions are also covered in the appropriate appliance assumptions Briefing Notes
  - BNW05 Assumptions underlying energy and water projections for washing machines
    http://www.mtprog.com/ApprovedBriefingNotes/pdf.aspx?intBriefingNoteID=125,
  - BNW06 Assumptions underlying the energy projections for tumble driers
    http://www.mtprog.com/ApprovedBriefingNotes/pdf.aspx?intBriefingNoteID=207
  - BNW07 Assumptions underlying the energy projections for dishwashers
    http://www.mtprog.com/ApprovedBriefingNotes/pdf.aspx?intBriefingNoteID=173
- This information is used in the current energy use modelling and the MTP 'What-If Tool'. http://whatif.mtprog.com/

Changes from version 1.3

Update on the EuP study on standby power consumption.

Consultation and further information

Stakeholders are encouraged to review this document and provide suggestions that may improve the quality of information provided, email **info@mtprog.com** quoting the document reference, or call the MTP enquiry line on +44 (0) 845 600 8951.

For further information on related issues visit **www.mtprog.com**