

Water heaters and hot water storage tanks: recommendations for policy design

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Introduction

Topten lists heat pump water heaters available in Europe. Electric water heaters combined with a heat pump are a good alternative to the inefficient resistance heating. Thanks to the heat pump these water heaters are three times as efficient as conventional electric water heaters.

An new ecodesign regulation on hot water heaters and storage tanks will set minimum efficiency requirements, and an energy label for water heaters is in planning. The adoption of the efficiency measures is foreseen for 2011.

Topten welcomes and supports the quick introduction of minimum energy efficiency requirements and an energy labelling scheme for water heaters. In the following certain aspects of the draft regulations are commented on.

Key recommendations on ecodesign and labelling regulation for water heaters and hot water storage tanks

Some of the requirements for water heaters are not ambitious enough. Electric resistance heating should be phased out (with appropriate delay), at least for load profiles M and larger. Combinations with solar energy and heat pump systems allow for better overall efficiency.

Labelling: even for the small sizes an A-label for electric resistance water heaters should not be possible. This can be achieved by restricting the labelling scheme on A to G (no A++ etc.) as always supported by Topten.

Standing losses: the limits for storage tanks are too weak for small volumes. Hot water distribution: in centralised systems with large distribution piping (kept warm by a circulation pump), which are wide spread in Switzerland, distribution losses may be dominant and should be limited by insulation prescriptions. The new Swiss standard SIA 385/1 gives detailed specifications on the subject.

Scope: District heating fed systems should not be excluded, as they are more relevant than solid fuel systems, and storage and distribution losses should be limited as well.

Measurements and calculations: The high level of complexity may lead to mistakes and false declarations, verification may be very cost-expensive and therefore rarely realised. Some of the criteria (e.g. "smart" control) are not yet clear enough. A set of relatively simple testing procedures for a "quick & rough" verification should be developed.

Conclusions on regulation and communication documents (informative)

General: The regulation seems to be very complicated and hard to understand (perhaps easier when knowing well the Preparatory Study?). Calculations are so complex that a bulky communication document is necessary for explanation, which gives references to at least 14 European standards. The high level of complexity may lead to mistakes and false declarations.

Scope: District heating fed systems should not be excluded, as they are more relevant than solid fuel systems, and storage and distribution losses should be limited as well.

Energy efficiency limits: the values of tier 1 and 2 seem to be very weak; even those of tier 3 (5 years), only for XXL - 4XL systems, allow for more than 1/3 losses. Electric water heaters – due to the conversion factor of 2,5 – would have problems with more stringent efficiency limits, but they should be phased out anyway (with appropriate delay). Perhaps the combination of electric and solar energy could substantially mitigate this (not to be recognized at a glance); heat pump systems can comply anyway.

Standing losses: the limits for storage tanks seem to be weak at small volumes but rather stringent for volumes above ca. 500 litres. This may be owed to the calculation method; e.g. for pipe connections losses, which are not lined out (?).

Distribution losses: the calculation of these was not understood in a quick view; it seems larger systems with DHW circulation pump are not treated in at all (only solar pumps)?

Measurements / condition tables in Annex II: Average figures for Europe are problematic, e.g. outdoor temperatures or solar irradiance.

References and links

Heat pump water heaters in Europe: <http://www.topten.info>

WD commission regulation (EU) No. xxx of xx implementing Directive 2009/125/EC regarding water heaters:

http://www.topten.info/uploads/File/draft_water_heaters_ecodesign_regulation_24_June.pdf

WD commission delegated regulation (EU) No. xxx of xx implementing Directive 2009/125/EC with regard to energy labelling of water heaters and hot water storage tanks

http://www.topten.info/uploads/File/water_heaters_working_document_energy_labelling_23_June.pdf

WD draft commission communication in the framework... commission regulation..., 26 pages

SIA 385/1 Domestic hot water supply, fundamentals and requirements (will be available in late 2010)

Position of ECOS, EEB, CAN-Europe, INFORSE-Europe, Greenpeace and WWF on the EC Working Document on possible Ecodesign, Energy labelling and Installation requirements for Water Heaters, July 2010: <http://env-ngo.eup-network.de/>