L.N. 289 of 2008

MALTA RESOURCES AUTHORITY ACT (CAP. 423)

Energy End-use Efficiency and Energy Services Regulations, 2008

IN exercise of the powers conferred by article 28 of the Malta Resources Authority Act, the Minister for Resources and Rural Affairs after consultation with the Malta Resources Authority, has made the following regulations:-

Title, scope and commencement.

1. (1) The title of these regulations is the Energy End-use Efficiency and Energy Services Regulations, 2008.

(2) The scope of these regulations is to transpose Directive 32/2006/EC and to enhance the cost-effective improvement of energy end-use efficiency in Malta by:

(a) removing existing market barriers and imperfections that impede the efficient end use of energy; and

(b) creating the conditions for the development and promotion of a market for energy services and for the delivery of other energy efficiency improvement measures to final consumers.

(3) These regulations shall be deemed to have come into force on the 17th May 2008.

Interpretation.

L.N. 511 of 2004.

2. (1) Unless otherwise stated in these regulations, the definitions in the Malta Resources Authority Act shall apply. The definitions in the Electricity Regulations, 2004, shall also apply, unless they are inconsistent with these regulations.

(2) In these regulations, unless the context otherwise requires:

"Act" means the Malta Resources Authority Act;

"Authority" means the Malta Resources Authority;

"distribution system operator" means a natural or legal person responsible for operating, ensuring the maintenance of and, if necessary, developing the distribution system of electricity in a given area and, where applicable, its interconnections with other

systems, and for ensuring the long term ability of the system to meet reasonable demands for the distribution of electricity;

"energy" means all forms of commercially available energy, including electricity, liquefied petroleum gas, any fuel for heating and cooling, coal, transport fuels excluding aviation and maritime bunker fuels and biomass as defined in the Promotion of Electricity produced from Renewable Energy Sources Regulations, 2004;

L.N. 186 of 2004.

"energy audit" means a systematic procedure to obtain adequate knowledge of the existing energy consumption profile of a building or group of buildings, of an industrial operation and, or installation or of a private or public service, identify and quantify cost-effective energy savings opportunities, and report the findings;

"energy distributor" means a natural or legal person responsible for transporting energy with a view to its delivery to final consumers and to distribution stations that sell energy to final consumers. This definition excludes electricity distribution system operators having the same meaning as that given to distribution system operator;

"energy efficiency" means a ratio between an output of performance, service, goods or energy, and an input of energy;

"energy efficiency improvement" means an increase in energy end-use efficiency as a result of technological, behaviour and, or economic changes;

"energy efficiency improvement measures" means all actions that normally lead to verifiable and measurable or estimable energy efficiency improvement;

"energy efficiency mechanisms" means general instruments used by the Government of Malta to create a supportive framework or incentives for market actors to provide and purchase energy services and other energy efficiency improvement measures;

"energy efficiency improvement programmes" means activities that focus on groups of final consumers and that normally lead to verifiable and measurable or estimable energy efficiency improvement;

"energy performance contracting" means a contractual arrangement between the beneficiary and the provider of an energy efficiency improvement measure, normally an energy service

company, where investments in that measure are paid for in relation to contractually agreed level of energy efficiency improvement;

"energy savings" means an amount of saved energy determined by measuring and, or estimating consumption before and after implementation of one or more energy efficiency improvement measures, whilst ensuring normalisation for external conditions that affect energy consumption;

"energy service" means the physical benefit, utility or good derived from a combination of energy with energy efficient technology and, or action, which may include the operations, maintenance and control necessary to deliver the service, which is delivered on the basis of a contract and in normal circumstances has proven to lead to verifiable and measurable or estimable energy efficiency improvement and, or primary energy savings;

"energy service company" (ESCO) means a natural or legal person that delivers energy services and, or other energy efficiency improvement measures in a user's facility or premises, and accepts some degree of financial risk in so doing. The payment for the services delivered is based, either wholly or in part, on the achievement of energy efficiency improvements and on the meeting of the other agreed performance criteria;

"final consumer" means a natural or legal person that purchases energy for his own end use;

"financial instruments for energy savings" means all financial instruments such as funds, subsidies, tax rebates, loans, third party financing, energy performance contracting, guarantee of energy savings contracts, energy outsourcing and other related contracts that are made available to the market place by public or private bodies in order to cover partly or totally the initial project cost for implementing energy efficiency improvement measures;

"Minister" means the Minister responsible for resources;

"retail energy sales company" means a natural or legal person that sells energy to final consumers;

"small distributor, small distribution system operator and retail energy sales company" means a natural or legal person that distributes or sells energy to final consumers, and distributes or sells less than the equivalent of 75 GWh energy per year or employs

fewer than 10 persons or whose annual turnover and annual balance sheet total does not exceed EUR 2,000,000;

"third-party financing" means a contractual arrangement involving a third party, in addition to the energy supplier and the beneficiary of the energy efficiency improvement measure, that provides the capital for that measure and charges the beneficiary a fee equivalent to a part of the energy savings achieved as a result of the energy efficiency improvement measure. That third party may or may not be an ESCO.

Applicability.

3. These regulations shall apply to:

(a) providers of energy efficiency improvement measures, energy distributors, distribution system operators and retail energy sales companies;

(b) final consumers;

(c) the armed forces, only to the extent that their application does not cause any conflict with the nature and primary aim of the activities of the armed forces and with the exception of material used exclusively for military purposes:

Provided that these regulations shall not apply to those undertakings involved in categories of activities listed in Schedule 1 to the European Community Greenhouse Gas Emissions Trading Scheme Regulations, 2005.

L.N. 140 of 2005.

National indicative targets and measures.

4. (1) An overall national indicative energy savings target of 9 % by the year 2017 shall be achieved by way of energy services and other energy efficiency improvement measures:

Provided that such measures shall be cost-effective, practicable and reasonable:

Provided also that such national indicative energy savings target shall be established and calculated in accordance with the provisions and methodology set out in the First Schedule.

(2) For purposes of comparison of energy savings and for conversion to a comparable unit, the conversion factors set out in the Second Schedule shall apply unless the use of other conversion factors can be justified, while the Third Schedule sets out a list of eligible energy efficiency improvement measures and the Fourth Schedule

establishes a general framework for the measurement and verification of energy savings.

(3) For the purpose of the first Energy Efficiency Action Plan to be submitted in accordance with regulation 13, the Authority shall propose an intermediate national indicative energy savings target by 2011, and provide an overview of a strategy for the achievement of the intermediate and overall targets:

Provided that such intermediate target shall be realistic and consistent with the overall national indicative energy savings target referred to in sub-regulation (1) of this regulation.

(4) The Authority shall submit to the Minister programmes and measures to improve energy efficiency.

(5) The Authority shall also have the overall control and responsibility for overseeing the framework set up in relation to the target mentioned in sub-regulation (1) of this regulation. The Authority shall thereafter verify the energy savings as a result of energy services and other energy efficiency improvement measures including existing national energy efficiency improvement measures, and report the result.

Energy end-use efficiency in the public sector.

5. The Authority shall have the administrative and managerial responsibility to monitor the implementation for the integration of energy efficiency improvement measures by:

(a) publishing guidelines on energy efficiency and energy savings as a possible assessment criterion in competitive tendering for public contracts;

(b) facilitating and enabling the exchange of best practices between public sector bodies for example on energy efficient public procurement practices, both at the national and international level;

(c) monitoring the implementation by the Government of at least two measures from the list set out in the Sixth Schedule;

(d) monitoring that energy efficiency improvement measures are taken by the public sector, focusing on cost-effective measures which generate the largest energy savings in the shortest time span in the public sector:

Provided that such measures shall be taken at the appropriate national and, or local level and may consist of legislative initiatives.

and, or voluntary agreements, or other schemes with an equivalent effect.

Promotion of energy end-use efficiency and energy services.

6. (1) Energy distributors, distribution system operators and, or retail energy sales companies shall:

(a) provide on request, yearly, aggregated statistical information on their final consumers to the Authority:

Provided that such information must be sufficient to properly design and implement energy efficiency improvement programmes and to promote and monitor energy services and other improvement measures;

(b) refrain from activities that might impede the demand for and delivery of energy services and other energy efficiency improvement measures, or hinder the development of markets for energy services and other energy efficiency improvement measures. The Authority shall take the necessary measures to bring such activities to an end where they occur.

(2) Energy distributors, distribution system operators and, or retail energy sales companies, directly and, or indirectly through other providers of energy services or energy efficiency improvement measures shall:

(a) ensure the offer to their final consumers, and the promotion of competitively priced energy services; or

(b) ensure the availability to their final consumers, and the promotion of competitively-priced energy audits conducted in an independent manner and, or energy efficiency improvement measures, in accordance with regulations 9 and 11; or

(c) contribute to the funds and funding mechanisms referred to in regulation 10. The level of such contributions shall as a minimum correspond to the estimated costs of offering any of the activities referred to in this sub-regulation and shall be agreed with the Authority.

Availability of information.

7. (1) The Authority shall ensure that information on energy efficiency mechanisms and financial and legal frameworks adopted with the aim of reaching the national indicative energy savings target is transparent and widely disseminated to the relevant market actors.

(2) The Authority shall also encourage the promotion of energy end-use efficiency and shall establish appropriate conditions for market operators to provide more information and advice to final consumers on energy end-use efficiency.

Availability of qualification, accreditation and certification schemes.

8. The Authority, where it deems it necessary, shall ensure the availability of the requirements related to appropriate qualification, accreditation and certification schemes in order for these to be made available for providers of energy services, energy audits and energy efficiency improvement measures as referred to in sub-regulation (2), paragraphs (a) and (b) of regulation 6, in order to achieve a high level of technical competence, objectivity and reliability.

Financial instruments for energy saving.

9. The Authority shall make available model contracts for those financial instruments available to existing and potential purchasers of energy services and other energy efficiency improvement measures in the public and private sectors.

Funds and funding mechanisms.

10. (1) The Authority may administer funds to subsidise the delivery of energy efficiency improvement programmes and other energy efficiency improvement measures and to promote the development of a market for energy efficiency improvement measures which, shall include the promotion of energy auditing, financial instruments for energy savings and, where appropriate, improved metering and informative billing. The funds shall also target end-use sectors with higher transaction costs and higher risks:

Provided that if established the funds may provide for grants, loans, financial guarantees and, or other types of financing that guarantee results.

(2) In its administration of the funds, the Authority shall not discriminate between final consumers, providers of energy efficiency improvement measures, independent energy advisors, energy distributors, distribution system operators, retail energy sales companies and installers.

(3) The Authority shall ensure that such funds complement and do not compete with commercially-financed energy efficiency improvement measures.

Energy audits.

11. (1) Efficient and high-quality energy audit schemes which are designed to identify potential energy efficiency improvement measures and which are carried out in an independent manner shall be made available to all final consumers, including domestic, commercial

and small and medium-sized industrial consumers, taking into account regulation 10 (1).

(2) Energy audits shall be made available for market segments where they are not sold commercially, taking into account regulation 10 (1).

(3) Energy performance certificates relating to the energy performance of buildings shall be regarded as equivalent to an energy audit meeting the requirements set out in sub-regulations (1) and (2) of this regulation and as equivalent to an energy audit as referred to paragraph (e) of the Sixth Schedule to these regulations.

Metering and informative billing of energy consumption.

12. (1) Energy distributors, distribution system operators and, or retail energy sales companies shall, in so far as it is technically possible, financially reasonable and proportionate in relation to the potential energy savings, provide final consumers making use of electricity, heating and, or cooling and domestic hot water with competitively priced individual meters that accurately reflect the final consumer's actual energy consumption and which provide information on actual time of use:

Provided that when an existing meter is replaced, such competitively priced individual meters shall always be provided, unless this is technically impossible or not cost-effective in relation to the estimated potential savings in the long term:

Provided also that when a new connection is made in a new building or when a building undergoes major renovations, as set out in sub-regulation 3 of regulation 11, such competitively priced individual meters shall always be provided.

(2) Energy billing performed by energy distributors, distribution system operators and retail energy sales companies shall, where appropriate, be based on actual energy consumption and whosoever is responsible for the issuing of such billing shall ensure that this is presented in clear and understandable terms:

Provided that appropriate information shall be made available with the bill in order to provide final consumers with a comprehensive account of current energy costs.

(3) Energy distributors, distribution system operators or retail sale companies shall, where appropriate and in clear and understandable terms, make available to final consumers in or with their

bills, contracts, transactions and, or receipts at distribution stations, the following information:

(a) current actual prices and actual consumption of energy;

(b) comparisons of the final consumer's current energy consumption with consumption for the same period in the previous year;

(c) contact information for consumers' organisations, energy agencies or similar bodies, including website addresses from which information may be obtained on available energy efficiency improvement measures, comparative end user profiles and, or objective technical specifications for energy-using equipment.

Reports.

13. (1) The Authority shall submit to the Minister an Energy Efficiency Action Plan by not later than the 30th March 2011, and another Energy Efficiency Action Plan by not later than the 30th March 2014.

(2) All the reports shall describe the energy efficiency improvement measures planned to reach the targets set out in sub-regulations (1) and (2) of regulation 4, as well as to comply with the provisions on the exemplary role of the public sector and provision of information and advice to final consumers set out in regulations 5 and 7 (2) respectively.

(3) The Energy Efficiency Action Plans shall:

(a) include a thorough analysis and evaluation of the preceding Energy Efficiency Action Plan;

(b) include the final results with regard to the fulfilment of the energy savings targets set out in regulation 4 (1) and (2);

(c) include plans for and information on the anticipated effects of additional measures which address any existing or expected shortfall vis-à-vis the target;

(d) use and gradually increase the use of harmonised efficiency indicators and benchmarks, both for the evaluation of past measures and estimated effects of planned future measures;

(e) be based on available data and supplemented with estimates.

(4) The Energy Efficiency Action Plan shall identify the progress made in achieving Malta's national indicative energy savings targets.

(5) The Minister may approve the reports referred to in this regulation, in whole or in part, with or without modifications or conditions, or may refer it back to the Authority. When such reports are approved, the Authority shall publish the reports together with a statement of the representations it has received and the responses it has made to those representations.

First Schedule

Regulation 4

Methodology for calculating the national indicative energy savings target

The methodology used for calculating the national indicative energy savings target set out in regulation 4 shall be the following:

1. The Authority shall use the annual final inland energy consumption of all energy users within the scope of these regulations for the most recent five-year period previous to the implementation of these regulations for which official data are available, to calculate an annual average amount of consumption. This final energy consumption shall be the amount of energy distributed or sold to final consumers during the five-year period, not adjusted for degree days, structural changes or production changes.

On the basis of this annual average amount of consumption, the national indicative energy savings target shall be calculated once and the resulting absolute amount of energy to be saved applied for the total duration of these regulations.

The national indicative energy savings target shall:

(a) consist of 9 % of the annual average amount of consumption referred to above;

(b) be measured after the ninth year of application of these regulations;

(c) be the result of cumulative annual energy savings achieved throughout the nine-year application period of these regulations;

(d) be reached by way of energy services and other energy efficiency improvement measures.

This methodology for measuring energy savings ensures that the total energy savings prescribed by these regulations are a fixed amount, and thus independent of future GDP growth and of any future increase in energy consumption.

2. The national indicative energy savings target shall be expressed in absolute terms in GWh, or equivalent, calculated in accordance with the Second Schedule.

3. Energy savings in a particular year following the entry into force of these regulations that result from energy efficiency improvement measures initiated in a previous year not earlier than 1995 and that have a lasting effect may be taken into account in the calculation of the annual energy savings. In certain cases, where circumstances can justify it, measures initiated before 1995 but not earlier than 1991 may be taken into account. Measures of a technological nature should either have been updated to take account of technological progress, or be assessed in relation to the benchmark for such measures.

In all cases, the resulting energy savings must still be verifiable and measurable or estimable, in accordance with the general framework in the Fourth Schedule.

Second Schedule

Regulations 4 and 5

Energy content of selected fuels for end use — conversion table (1)

Energy commodity	kJ (NCV)	kgoe (NCV)	kWh (NCV)
1 kg coke	28 500	0,676	7,917
1 kg hard coal	17 200 — 30 700	0,411 — 0,733	4,778 — 8,528
1 kg brown coal briquettes	20 000	0,478	5,556
1 kg black lignite	10 500 — 21 000	0,251 — 0,502	2,917 — 5,833
1 kg brown coal	5 600 — 10 500	0,134 — 0,251	1,556 — 2,917
1 kg oil shale	8 000 — 9 000	0,191 — 0,215	2,222 — 2,500
1 kg peat	7 800 — 13 800	0,186 — 0,330	2,167 — 3,833
1 kg peat briquettes	16 000 — 16 800	0,382 — 0,401	4,444 — 4,667
1 kg residual fuel oil (heavy oil)	40 000	0,955	11,111
1 kg light fuel oil	42 300	1,010	11,750
1 kg motor spirit (petrol)	44 000	1,051	12,222
1 kg paraffin	40 000	0,955	11,111
1 kg liquefied petroleum gas	46 000	1,099	12,778
1 kg natural gas (2)	47 200	1,126	13,10
1 kg liquefied natural gas	45 190	1,079	12,553
1 kg wood (25 % humidity) (3)	13 800	0,330	3,833
1 kg pellets/wood bricks	16 800	0,401	4,667
1 kg waste	7 400 — 10 700	0,177 — 0,256	2,056 — 2,972
1 MJ derived heat	1 000	0,024	0,278
1 kWh electrical energy	3 600	0,086	1 (3)

Source: Eurostat.

(1) 93 % methane.

(2) Member States may apply other values depending on the type of wood most used in the respective Member State.

(3) For savings in kWh electricity Member States may apply a default co-efficient of 2,5 reflecting the estimated 40 % average EU generation efficiency during the target period. Member States may apply a different co-efficient provided they can justify it.

Third Schedule

Regulation 4

Indicative list of examples of eligible energy efficiency improvement measures

This Schedule provides examples of areas in which energy efficiency improvement programmes and other energy efficiency improvement measures may be developed and implemented in the context of regulation 4.

To be taken into account, these energy efficiency improvement measures must result in energy savings that can be clearly measured and verified or estimated in accordance with the guidelines in Schedule 4, and their impacts on energy savings must not already be counted in other specific measures. The following lists are not exhaustive but are intended to provide guidance.

Examples of eligible energy efficiency improvement measures:

Residential and tertiary sectors

(a) heating and cooling (e.g. heat pumps, new efficient boilers, installation/efficient update of district heating/ cooling systems);
(b) insulation and ventilation (e.g. wall cavity and roof insulation, double/triple glazing of windows, passive heating and cooling);

(c) hot water (e.g. installation of new devices, direct and efficient use in space heating, washing machines);

(d) lighting (e.g. new efficient bulbs and ballasts, digital control systems, use of motion detectors for lighting systems in commercial buildings);

(e) cooking and refrigeration (e.g. new efficient devices, heat recovery systems);

(f) other equipment and appliances (e.g. combined heat and power appliances, new efficient devices, time control for optimised energy use, stand-by loss reduction, installation of capacitors to reduce reactive power, transformers with low losses);

(g) domestic generation of renewable energy sources, whereby the amount of purchased energy is reduced (e.g. solar thermal applications, domestic hot water and solar-assisted space heating and cooling);

Industry sector

(h) product manufacturing processes (e.g. more efficient use of compressed air, condensate and switches and valves, use of automatic and integrated systems, efficient stand-by modes);

(i) motors and drives (e.g. increase in the use of electronic controls, variable speed drives, integrated application programming, frequency conversion, electrical motor with high efficiency);

(j) fans, variable speed drives and ventilation (e.g. new devices/systems, use of natural ventilation);

(k) demand response management (e.g. load management, peak shaving control systems);

(l) high-efficiency cogeneration (e.g. combined heat and power appliances);

Transport sector

(m) mode of travel used (e.g. promotion of energy-efficient vehicles, energy-efficient use of vehicles including tyre pressure adjustment schemes, energy efficiency devices and add-on devices for vehicles, fuel additives which improve energy efficiency, high-lubricity oils and low-resistance tyres);

(n) modal shifts of travel (e.g. car free home/office transportation arrangements, car sharing, modal shifts from more energy-consuming modes of transport to less energy-consuming ones, per passenger-km or tonne-km);

(o) car-free days;

Cross-sectoral measures

(p) standards and norms that aim primarily at improving the energy efficiency of products and services, including buildings;

(q) energy labelling schemes;

(r) metering, intelligent metering systems such as individual metering instruments managed by remote and informative billing;

(s) training and education that lead to application of energy-efficient technology and/or techniques;

Horizontal measures

(t) regulations, taxes etc. that have the effect of reducing energy end-use consumption;

(u) focused information campaigns that promote energy efficiency improvement and energy efficiency improvement measures.

Fourth Schedule

Regulation 4

General framework for measurement and verification of energy savings

1. Energy savings measurements and calculations and their normalisation

1.1. Measuring energy savings

General

In measuring the realised energy savings as set out in regulation 4 with a view to capturing the overall improvement in energy efficiency and to ascertaining the impact of individual measures, a harmonised calculation model which uses a combination of top-down and bottom-up calculation methods shall be used to measure the annual improvements in energy efficiency for the EEAPs referred to in regulation 13.

Top-down calculations

A top-down calculation method means that the amount of energy savings is calculated using the national or larger-scale aggregated sectoral levels of energy savings as the starting point. Adjustments of the annual data are then made for extraneous factors such as degree days, structural changes, product mix, etc. to derive a measure that gives a fair indication of total energy efficiency improvement, as described in point 1.2.

This method does not provide exact measurements at a detailed level nor does it show cause and effect relationships between measures and their resulting energy savings. However, it is usually simpler and less costly and is often referred to as ‘energy efficiency indicators’ because it gives an indication of developments.

Bottom-up calculations

A bottom-up calculation method means that energy savings obtained through the implementation of a specific energy efficiency improvement measure are measured in kilowatt-hours (kWh), in Joules (J) or in kilogram oil equivalent (kgoe) and added to energy savings results from other specific energy efficiency improvement measures. The Authority shall ensure that double counting of energy savings, which results from a combination of energy efficiency improvement measures (including mechanisms), is avoided. For the bottom-up calculation method, data and methods referred to in points 2.1 and 2.2 may be used.

The Authority may use further bottom-up measurements in addition to the part prescribed by the harmonised bottom-up model, on the basis of a description of the methodology presented by the Authority.

1.2. How energy savings measurements should be normalised

Energy savings shall be determined by measuring and/or estimating consumption, before and after the implementation of the measure, while ensuring adjustment and

normalisation for external conditions commonly affecting energy use. Conditions commonly affecting energy use may also differ over time. Such conditions may be the likely impact of one or several plausible factors, such as:

(a) weather conditions, such as degree days;

(b) occupancy levels;

(c) opening hours for non-domestic buildings;

(d) installed equipment intensity (plant throughput); product mix;

(e) plant throughput, level of production, volume or added value, including changes in GDP level;

(f) schedules for installation and vehicles;

(g) relationship with other units.

2. Data and methods that may be used (measurability)

Several methods for collecting data to measure and/or estimate energy savings exist. At the time of the evaluation of an energy service or energy efficiency improvement measure, it will often be impossible to rely only on measurements. A distinction is therefore made between methods measuring energy savings and methods estimating energy savings, where the latter is the more common practice.

2.1. Data and methods based on measurements

Bills from distribution companies or retailers

Metered energy bills may form the basis for measurement for a representative period before the introduction of the energy efficiency improvement measure. These may then be compared to metered bills for the period after the introduction and use of the measure, also for a representative period of time. The findings should be compared to a control group (non-participation group) if possible or, alternatively, normalised as described in point 1.2.

Energy Sales data

The consumption of different types of energy (e.g. electricity, gas, heating oil) may be measured by comparing the sales data from the retailer or distributor obtained before the introduction of the energy efficiency improvement measures with the sales data from the time after the measure. A control group may be used or the data normalised.

Equipment and appliance sales data

Performance of equipment and appliances may be calculated on the basis of information obtained directly from the manufacturer. Data on equipment and appliance sales can generally be obtained from the retailers. Special surveys and measurements may also be carried out. The accessible data can be checked against sales figures to determine the size of energy savings. When using this method, adjustment should be made for changes in the use of the equipment or appliance.

End-use load data

Energy use of a building or facility can be fully monitored to record energy demand before and after the introduction of an energy efficiency improvement measure. Important relevant factors (e.g. production process, special equipment, heating installations) may be metered more closely.

2.2. Data and methods based on estimates

Simple engineering estimated data

Simple engineering estimated data calculation without on-site inspection is the most common method for obtaining data for measuring deemed energy savings. Data may be estimated using engineering principles, without using on-site data, but with assumptions based on equipment specifications, performance characteristics, operation profiles of measures installed and statistics, etc.

Enhanced engineering estimated data: Inspection

Energy data may be calculated on the basis of information obtained by an external expert during an audit of, or other type of visit to, one or several targeted sites. On this basis, more sophisticated algorithms/simulation models could be developed and be applied to a larger population of sites (e.g. buildings, facilities, vehicles). This type of measurement can often be used to complement and calibrate simple engineering estimated data.

3. How to deal with uncertainty

All the methods listed in point 2 may entail some degree of uncertainty. Uncertainty may derive from[1]:

(a) instrumentation errors: these typically occur because of errors in specifications given by the product manufacturer;
(b) modelling errors: these typically refer to errors in the model used to estimate parameters for the data collected;
(c) sampling errors: these typically refer to errors resulting from the fact that a sample of units was observed rather than the entire set of units under study.

Uncertainty may also derive from planned and unplanned assumptions; these are typically associated with estimates, stipulations and/or the use of engineering data. The occurrence of errors is also related to the chosen system of data collection that is outlined in points 2.1 and 2.2. A further specification of uncertainty is advised.

The Authority may choose to use the method of quantified uncertainty when reporting on the targets set out in these regulations. Quantified uncertainty shall then be expressed in a statistically meaningful way, declaring both accuracy and confidence level. For example, 'the quantifiable error is found with 90 % confidence to be ± 20 %'.

If the method of quantified uncertainty is used, the Authority is also to take into account that the acceptable level of uncertainty required in energy savings calculations is a function of the level of savings and the cost effectiveness of decreasing uncertainty.

[1] A model for establishing a level of quantifiable uncertainty based on these three errors is given in Appendix B in the International Performance Measurement & Verification Protocol (IPMVP).

4. Harmonised lifetimes of energy efficiency improvement measures in bottom-up calculations

Some energy efficiency improvement measures last for decades while other measures last for a shorter period of time. The list below gives some examples of the average lifetime of energy efficiency improvement measures:

Loft insulation of private dwellings	30 years
Cavity wall insulation of private dwellings	40 years
Glazing E to C rated (in m2)	20 years
Boilers B to A rated 15 years	
Heating controls — upgrade with boiler replacement	15 years
CFLs — retail	16 years

5. How to deal with multiplier effects of energy savings and how to avoid double counting in mixed top down and bottom-up calculation methods

The implementation of one energy efficiency improvement measure, e.g. hot water tank and pipe insulation in a building, or another measure with equivalent effect, may have future multiplier effects in the market, meaning that the market will implement a measure automatically without any further involvement from the Authority or any private-sector energy services provider. A measure with multiplier potential would in most cases be more cost-effective than measures that need to be repeated on a regular basis.

The Authority shall estimate the energy savings potential of such measures including their multiplier effects and verify the total effects in an *ex-post* evaluation using indicators when appropriate.

With regard to the evaluation of horizontal measures, energy efficiency indicators may be used, provided that the way in which they would have developed without the horizontal measures can be determined. However, it must be possible to rule out, as far as possible, double counting with savings achieved through targeted energy efficiency programmes, energy services and other policy instruments. This applies particularly to energy or CO_2 taxes and information campaigns. Corrections shall be made for double counting of energy savings. The use of matrices that enable the summation of impacts of measures is encouraged.

Potential energy savings resulting after the target period shall not be taken into account when the Authority reports on the overall target set out in regulation 4. Measures that promote long-term market effects should in any case be encouraged and measures that have already resulted in multiplier energy savings effects should be taken into account when reporting on the targets set out in regulation 4, provided they can be measured and verified using the guidance given in this Schedule.

6. How to verify energy savings

If deemed cost-effective and necessary, the energy savings obtained through a specific energy service or other energy efficiency improvement measure shall be verified by a

third party. This may be done by independent consultants, ESCOs or other market actors. The Authority may provide further instructions on this matter.

Fifth Schedule

Regulation 13

Indicative list of energy conversion markets and sub-markets for which benchmarks can be worked out:

1. The market for household appliances/information technology and lighting:

1.1. Kitchen appliances (white goods);

1.2. Entertainment/information technology;

1.3. Lighting.

2. The market for domestic heating technology:

2.1. Heating;

2.2. Hot-water provision;

2.3. Air conditioning;

2.4. Ventilation;

2.5. Heat insulation;

2.6. Windows.

3. The market for industrial ovens.

4. The market for motorised power in industry.

5. The market for public-sector institutions:

5.1. Schools/public administration;

5.2. Hospitals;

5.3. Swimming pools;

5.4. Street lighting.

6. The market for transport services.

Sixth Schedule

Regulations 5 and 11

List of eligible energy efficient public procurement measures

Without prejudice to national and Community public procurement legislation, the public sector shall apply at least two requirements from the following list in the context of the exemplary role of the public sector as referred to in regulation 5:

(a) requirements concerning the use of financial instruments for energy savings, including energy performance contracting, that stipulate the delivery of measurable and pre-determined energy savings (including whenever public administrations have outsourced responsibilities);

(b) requirements to purchase equipment and vehicles based on lists of energy-efficient product specifications of different categories of equipment and vehicles to be drawn up by the Authority using, where applicable, minimised life-cycle cost analysis or comparable methods to ensure cost effectiveness;

(c) requirements to purchase equipment that has efficient energy consumption in all modes, including in standby mode, using, where applicable, minimised life-cycle cost analysis or comparable methods to ensure cost effectiveness;

(d) requirements to replace or retrofit existing equipment and vehicles with the equipment listed in points (b) and(c);

(e) requirements to use energy audits and implement the resulting cost-effective recommendations;

(f) requirements to purchase or rent energy-efficient buildings or parts thereof, or requirements to replace or retrofit purchased or rented buildings or parts thereof in order to render them more energy-efficient.

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