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**COMMISSION STAFF WORKING DOCUMENT**

**on the review of the Measuring Instruments Directive 2004/22/EC**

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#### A. Introduction

##### 1. Purpose of this document

The purpose of this document is to give an overview of the evaluation of the Measuring Instruments Directive, of any issues at hand which result from the evaluation and of any proposal for changes, be it to the provisions of the current directive or adding new sectors. The aim of the consultation is to take in responses from all interested parties notably on impacts, costs and benefits.

Making this document available is in the interest of transparency and the public exchange of views and is in line with the requirements of the Commission's better regulation policy.

**In no way is the Commission or its services bound by any statement or proposal in this document, its annexes or the background documents.**

##### 2. Measuring Instruments Directive (MID)

The Measuring Instruments Directive (Directive 2004/22/EC<sup>1</sup>) has been in operation since 30 October 2006<sup>2</sup>. Instruments that conform to the Directive are CE and M marked and profit from free circulation on the EU internal market. Member States may only require that instruments conforming with the Directive be used for tasks requiring legal metrological control in their territory<sup>3</sup>.

It applies to the following instruments defined in the Annexes to the directive:

- water meters;
- gas meters and volume conversion devices;
- active electrical energy meters;
- heat meters;
- measuring systems for continuous and dynamic measurement of quantities of liquids other than water;
- automatic weighing instruments;
- taximeters;
- material measures;
- dimensional measuring instruments;
- exhaust gas analysers.

The main policy objective of the Directive is to facilitate and enhance the internal market for instruments required for measuring tasks for reasons of public interest, public health, public

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<sup>1</sup> OJ L 135, 30.4.2004, p. 1:

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:2004L0022:20091201:en:PDF>

<sup>2</sup> The directive also contains a transition period of 10 years (until 29 October 2016) during which instruments conforming to old rules are allowed to continue to be marketed (Article 23 of Directive 2004/22/EC)

<sup>3</sup> See for more information:

[http://ec.europa.eu/enterprise/sectors/legal-metrology-and-prepack/measuring-instruments/index\\_en.htm](http://ec.europa.eu/enterprise/sectors/legal-metrology-and-prepack/measuring-instruments/index_en.htm)

safety, public order, protection of the environment, protection of consumers, levying of taxes and duties and fair trading, where Member States consider it justified..

MID guarantees a high level of confidence through essential requirements which are applicable in all Member States and is expressed by means of CE and M marking. It defines performance criteria, while giving manufacturers technological flexibility on ways of meeting them. MID offers a wide choice of conformity assessment procedures that cater for the needs of small and large producers alike.

The legislation does not define for which activities the measuring instruments need to be used. That remains a matter for national governments. For instance, practices differ between Member States on whether meters are required for water consumption or common heating systems. Similarly, factories may use many different types of meters for internal production purposes which do not need to be regulated.

However, where a formal legal measurement is required by a Member State, as in the vast majority of consumer transactions, then only items which comply with the Directive can be used. The Directive distinguishes categories to take account of the huge disparity of temperatures in Europe where measuring instruments placed outside need to remain accurate at - 40 degrees in a Scandinavian winter and + 70 degrees in a Mediterranean summer.

The Directive allows to reference international standards that may be used alongside European ones to demonstrate compliance with the legislative requirements. Relying on the work of the 60-country strong Organisation Internationale de la Métrologie Légale (OIML), for instance, helps European industry to be more competitive and penetrate global markets.

The unit responsible for the MID is DG enterprise and Industry, Unit I/5.

### 3. Reasons for the review

In Article 25 of the Measuring Instruments Directive<sup>4</sup> the Commission is invited to report on the implementation of the Directive as follows: “The European Parliament and the Council invite the Commission to report, before 30 April 2011, on the implementation of this Directive, inter alia, on the basis of reports provided by the Member States, and, where appropriate, to submit a proposal for amendments. The European Parliament and Council invite the Commission to evaluate whether conformity assessment procedures for industrial products are properly applied and, where appropriate, to propose amendments in order to ensure consistent certification.”

The revision clause was proposed by European Parliament and was motivated according to its second reading report<sup>5</sup> by its profound concerns about:

- technological innovation being hampered by requirements in the Directive which according to one piece of advice received by Parliament would already become apparent within a period of 5 years;
- optionality of the Directive leading to a dual (two-tier) market with unmarked instruments unfairly competing on the internal market with those that are properly marked and conform with the high-level requirements of Directive (recital 6);

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<sup>4</sup> OJ L 135/1, 30.4.2004

<sup>5</sup> G.B. Chichester: ITRE Recommendation for second reading on the Council common position adopting a directive on measuring instruments, 2000/0233 (COD), A5-0458/2003 of 3 December 2003: <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML+REPORT+A5-2003-0458+0+DOC+PDF+V0//EN>

- unequal treatment of consumers/users in different Member States because of optionality, which should be seen as a temporary measure and ideally should be phased out 5 years after the start of implementation. Therefore Member States are required to report why they deviate from the general rule of requiring legal metrological control (second para of Article 2);
- non-Member State stakeholders not being able to fully participate in comitology decision making in the measurement instruments committee (recital 23);
- conformity assessment procedures differing considerably from the 1993 Decision formats for conformity assessment modules which Council had requested to actualise in 2003 (second paragraph of Article 25).

Council and Commission<sup>6</sup> accepted the 5 year revision clause without endorsing notably the first three above-mentioned motivations expressed by the European Parliament and agreed in a tri-partite declaration on updating conformity assessment procedures once these had been agreed, as has happened in the new 2008 Decision on the New Legal Framework<sup>7</sup>.

For the Commission services the first priority for the report on the implementation of the Directive is assessing whether any of the above-expressed fears have materialised.

Given the Competitiveness and Innovation Framework programme and with the aim of achieving a more SME-friendly regulatory environment, the second priority is analysing the views of small and medium size enterprises (SME). To this end the Commission services have solicited opinions from SMEs via the Enterprise Europe Network.

The third priority is the implementation of the Directive on other points, taking due account of the fact that the Directive has been applicable for less than 4 years, namely since 30 October 2006. A related question is whether the 10 year transition period up till 2016 may have retarded application of the Directive in the market place because there was no need to produce according to the Directive.

Fourth priority is to assess whether any other categories could benefit from being included in the scope of the Measuring Instruments Directive. Of prime importance is to indicate reasons such as trade barriers that hamper the internal market. This request also applies to the instruments for which the Commission has proposed to repeal existing harmonisation under Old Approach Directives in its proposal COM(2008)801<sup>8</sup>.

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<sup>6</sup> Opinion of the Commission on EUROPEAN PARLIAMENT amendments to the Council's common position on the directive on measuring instruments, 200/0233(COD), COM(2004)40 of 26.01.2004:  
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2004:0040:FIN:FR:PDF>

<sup>7</sup> Decision N° 768/2008/EC, OJ L218/82 of 13.08.2008

<sup>8</sup> [OJ C/2010/76/ 8](http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2010:76:8) and [http://ec.europa.eu/prelex/detail\\_dossier\\_real.cfm?CL=en&DosId=197702](http://ec.europa.eu/prelex/detail_dossier_real.cfm?CL=en&DosId=197702)

See for supporting documents:

[http://ec.europa.eu/enterprise/sectors/legal-metrology-and-prepack/documents/framework-directive/index\\_en.htm](http://ec.europa.eu/enterprise/sectors/legal-metrology-and-prepack/documents/framework-directive/index_en.htm)

## **B. Evaluation**

### **1. Evaluation study by CSES<sup>9</sup>**

#### **1.1. Objectives and methodology**

The objectives of the interim evaluation of the Measuring Instruments Directive (MID), conducted by CSES during the period 11/2009-06/2010, were to provide ballpark market estimates for each sector covered by MID, to review the effectiveness of the Directive and to make recommendations. The evaluation findings are based on a review of relevant documents, analysis of market data from public and private sources, interviews with a total of 91 stakeholders and two surveys of notified bodies and SMEs.

#### **1.2. Market of legal metrology instruments covered by the MID**

It is estimated that the MID applies to around 345 million units of MIs sold annually in the European market with a total sales value of around €3.25 billion. There are around 900 manufacturers active in the 10 sectors covered by the MID not including the large number of SMEs operating as distributors, importers or providers of repair services. The total number of employees occupied in the sector is estimated at 175,000- 205,000.

#### **1.3. Main conclusions**

- The MID has helped improve the operation of the internal market with the use of a single conformity assessment certificate and represents a significant improvement in relation to the pre-MID period. Still, problems are present mainly due to the poor quality of market surveillance in most MSs, national requirements concerning functionality and specific issues related to the use of the subassembly approach for automatic weighing instruments and fuel dispensers.
- As a result of the use of a single certificate the cost savings from the introduction of the MID exceed the moderate increase of certification and other administrative fees reported. These savings help firms with presence in multiple markets. Firms focused on national market may face slightly higher administrative costs.
- There appear to be inconsistencies among the notified bodies in the interpretation of essential requirements and WELMEC<sup>10</sup> guidance documents and, more general, the 140 bodies have varying levels of capacity. This leads to important variation in the experience of manufacturers during the certification process.
- There is no evidence that the implementation of the MID has generally put SMEs in disadvantaged position against larger companies. However, in the case of weighing instruments and fuel dispensers the industry representatives suggest that the absence of a subassembly approach can disadvantage SMEs that produce MIs' components.
- The MID is in general a technologically neutral directive that allows for a level playing field. The main issue is the rather restrictive use by notified bodies of the guidelines of WELMEC posing constraints in using alternative approaches to conform to the essential requirements.
- There is also no evidence that the Directive has had a negative impact to the level of consumer protection either due to the essential requirements or due to the use of optionality.

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<sup>9</sup> CSES are external contractors, in full "Centre for Strategic & Evaluation Services"

<sup>10</sup> WELMEC, is the organisation of national authorities in legal metrology at which meetings some stakeholders participate.

- The optionality clause in Article 2 of the MID has been used by a total of 17 countries for at least one MI although still 90% of instruments are regulated. There is no evidence linking optionality with unfair competition or development of two tier markets. Two tier markets do exist, although they are not due to optionality, but to the fact the MIs are used for both legal metrology purposes, and other uses such as process control not covered by the Directive.
- The MID decision-making procedures have been open to all interested stakeholders and there is no evidence of interested parties being excluded or not having the opportunity to raise relevant issues.

#### 1.4. Recommendations

The utility and effectiveness of the Directive could be improved by the following actions:

- Development and implementation of market surveillance plans by MSs in accordance to the New Legislative Framework. The Commission can help in the sharing of the results and of experience among the relevant bodies through the organisation of targeted discussion groups
- Strengthen quality of notified bodies and enhance consistency by information sharing and training support concerning the application of conformity tests, the interpretation of the essential requirements and the use of WELMEC guidance documents.
- Enhance information exchange among competent authorities concerning instruments certified or rejected through the extension of existing national databases of type certificates
- Organise information campaign to increase the level of awareness of the Directive by manufactures and importers
- Use existing representation bodies, including WELMEC, to identify and promote solution to specific technical issues identified by stakeholders including the combination of old and new components for liquid dispensers other than water (MI-005).

See for the full CSES report, background document 1.

## 2. Views by Small and Micro enterprises

A survey was carried out by the Commission services using the SME panel consultation tool of the Enterprise Europe Network. The survey was opened on 30 September 2009 and closed on 5 December 2009. It attracted a total of 286 responses, 55% being manufacturer, installer, importer or distributor and 45% being user. The respondents of the survey were primarily small enterprises of less than 50 employees (over 80%) with over 50% being micro enterprises of less than 10 employees. In terms of sales the majority (63%) stated total turnover of less than €10million although 34% did not provide any data. In terms of the country of origin, the sample provided a wide coverage of EU countries but there is a notable absence of Netherlands and the United Kingdom. In terms of the types of measuring instruments covered, all sectors of MIs were represented and for the great majority of the companies in the sample (around 78%), the measuring instrument they traded had a CE+M marking which indicates that the instrument is in conformity with the MID. The responding SMEs traded in all 27 EU member states with France, Germany and Spain stated by more than 20% of the respondents. Around 19% stated presence in more than 5 EU countries while, in contrast, 23% sold in only one – usually the domestic - market. In terms of exports outside EU, around 40% stated that they sold their products outside the EU market (against 42% not), primarily in other countries of South and Eastern Europe (56%) but also around 35% to non-EU Mediterranean countries, Africa, Asia and North America.

Main findings by the survey as interpreted by CSES were:

- Concerning conformity assessment, all modules were used by the 80 SMEs that responded, modules B and D are the most common (44% and 52% respectively) while modules A, G, F, and H were less often stated.
- Over 80% of the 118 manufactures and importers were positive or very positive concerning the adequacy of the conformity assessment modules.
- When asked for specific comments and suggestions for improving the conformity assessment SMEs referred to the need to relax the assessment procedures for the very inexpensive MIs and suggestions in connection with sub-assemblies not recognised as such in the Directive.
- a small number of companies made reference to barriers posed by national authorities that do not allow them to enter other markets. The complaints concerned mainly – but not exclusively - new member states but there was no specific category of MI identified. The consultation should make such issues clear.
- The survey also asked SMEs users of MIs to assess whether the current legal metrology regime provides sufficient protection. The majority of the responses were positive (60%) with only a small share (20%) suggesting problems in terms of consumer protection. This again is unclear and should be clarified in the public consultation
- On the question whether there are unmarked products competing with CE and M marked instruments, the answers suggest that there is indeed a significant presence of MI instruments circulating without CE+M marking as close to 60% of the total respondents made such reference and one third did not consider that the products created unfair competition whilst two-thirds thought otherwise. The public consultation should clarify whether this concerns products that are not under the transition and in what way they compete with MID products. The differences between the responses of users and manufactures were rather small although a greater share of users thought that the non-CE+M marked products were competing unfairly.

See for further details the CSES report, background document 1, pp 35-40.

### **C. Suggestions for changes to the Directive**

Member States and stakeholders participating in the Working Group on Measuring Instruments which advises the Commission services on the questions concerning the MID were asked for suggestions for possible changes to the MID. A fairly large number of suggestions were made and they were prioritised by working groups of WELMEC, the organisation of national authorities in legal metrology at meetings in which some stakeholders also participate.

A majority of Member States (or a substantial minority) and some of the involved stakeholders is in favour to discuss each of the suggested changes with a view to effectuating a change in the current wording of the Directive. The suggested texts are still under discussion and wordings are not definite. The 26 suggestions for text changes are listed in [Annex 3](#) and details are available in Background Document 2.

By referring to these suggestions in this document, the Commission services do not endorse any of the suggested changes nor does their publication in any way commit the Commission or its services. The Commission reserves its position on the outcome of the Public Consultation and the impact assessment process. Given the support registered for each of the suggested changes they are bound to come up in discussions. Therefore the Public Consultation is the opportunity to get the full range of views from all interested parties, notably those who may have not participated fully in the preparation of the text changes.

On the other hand, however, Commission is sensitive to the risk of changing the MID after less than 4 years of functioning. The possibilities of standardisation and guidance have not been fully used during the short period of the full application of the directive. Changing the directive at such an early stage could lead to regulatory drift and to uncertainty in the market place. For these reasons, the Commission and its services will need to comply fully with impact assessment as required by the Commission's Smart Regulation Policy. Given the technicality of many of the changes, the Commission can only consider those for which the Public Consultation gives sufficient information upon which to base impact assessment, notably also the existence of identifiable barriers to trade (see [Annex 2](#) on mutual recognition). Until now no procedures under the Mutual Recognition Regulation have been opened for any of the issues mentioned in annex 3.

Stakeholders are requested to very clearly make the case whether they are in favour or against proposals and to carefully motivate their considerations with due attention to impacts.

See as an example the [Annex 1](#): Standardisation in the case of smart metering.

The suggestions for changes in detail are available in [background document 2](#).

#### **D. Adding new sectors to MID?**

There have been a number of suggestions by Member States and some stakeholders to include new sectors as annexes in the MID. There is also some interest among Commission services in 2 cases<sup>11</sup>. In all, 18 candidates have been suggested for inclusion in MID and they are listed in Annex 4 from where references are made to further information in Background documents 3 and 4.

##### **1. Options for adding new sectors to MID:**

Broadly three options for analysis can be distinguished:

- Option 1: Do nothing (baseline)
- Option 2: Co-Regulation (via standards or guidance)
- Option 3: Harmonisation

##### **a) Option 1: Baseline**

The baseline option encompasses three possible sub-options:

- **Option 1a:** no regulation or national standards;
- **Option 1b:** national regulation/standards; and
- **Option 1c:** international/European standards.

It is, of course, quite possible for the baseline (for individual instrument sectors) to vary from Member State to Member State and this will need to be accounted for in the analysis. Since 2009 the Mutual Recognition Regulation has been in force and it offers significant improvements notably as regards the procedures to follow in the case of a product not being given automatic entry. These procedures allow establishing the occurrence of trade barriers in the internal market in an objective way, see for details Annex 2. This means that the number of procedures that have been opened against products in a sector give an indication of the severity of trade barriers on the internal market. Corollary is that if there are no procedures, trade barriers cannot be assumed. Until now no procedures under the Mutual Recognition Regulation have been opened for any of the sectors mentioned in annex 4.

##### **b) Option 2: Co-Regulation (via standards or guidance)**

The co-regulation option encompasses two possible sub-options:

- **Option 2a: EU Standardisation:** European standardisation based on international standards by means of mandates to European Standardisation Organisations.
- **Option 2b: Extending guidance:** Extending guidance (through actions by Member States, possibly with Commission support) on existing requirements based on commonly agreed interpretations (such as international standards).

Under both these options Member States must base national laws on international standards (WTO/TBT obligations) and apply the principles of mutual recognition – as outlined above under Option 1.

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<sup>11</sup> Electrical vehicle chargers and Energy measurement system for use on board railway vehicles

### c) Option 3: Harmonisation

The harmonisation option encompasses three possible sub-options:

- **Option 3a:** adding the technical annex to the MID defining sector specific essential requirements based upon international standards (WTO/TBT obligation);
- **Option 3b:** in the absence of international standards, adding the technical annex to the MID defining sector specific essential requirements based upon European standards; and
- **Option 3c:** in the absence of both European and international standards, adding the technical annex to the MID defining sector specific essential requirements.

### 3. Views by Small and Micro enterprises

A second survey was carried out by the Commission services using the SME panel consultation tool of the Enterprise Europe Network. The survey was held from 21 May 2010 to 30 June 2010.

Across the EU 298 companies replied to the survey. The majority of respondents (more than 60%) are users of measuring instruments, manufacturers represent less than 25% and the remainder are distributors, installers or importers.

None of the respondents had their products withdrawn from the market due to a decision by a Member State under the Mutual Recognition Regulation.

Approximately half of the respondents did not experience any barriers to trade. For those who experienced barriers, the associated costs rarely exceeded 25% of the company's turnover and for many companies amounted to less than 10%.

Over half of the users (55%) identified a need for more legal metrological control.

Most of the respondents were in favour of a manufacturer declaration and half of them identified the need for involvement of the notified body.

Further details per sector as interpreted by RPA<sup>12</sup> are available in Background document 5.

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<sup>12</sup> RPA are external consultants : "Risk and Policy Analysis"

**E. Request to all interested parties for their reactions**

Based on the analysis presented in this report and its annexes, stakeholders are invited to answer the following questions:

**1. Are there any issues not flagged in the evaluation report which should nonetheless be included?**

**2. Do you have comments on the evaluation report and the CSES recommendations? Please mention examples of real cases where possible.**

**3. Which of the changes listed in Annex 3 should be made to the MID and why?**

**Please identify in particular:**

**a) Any barriers to trade experienced (see also Annex 2 on the Mutual Recognition Regulation)**

**b) Any need to adapt to technological development and/or risk that harmonisation would hinder it**

**c) The EU policies to be supported**

**d) Other reasons supporting the need for the change**

**e) The expected costs and benefits of the change, e.g. compliance costs will be raised by x% of turnover and there are resulting benefits of y% of turnover as compared with the costs incurred under a 'no change' option.**

**f) Why standards and/or guidance are not sufficient as alternatives to harmonisation?**

**4. Which of the 26 suggestions identified in Annex 3 for changes to the MID do you oppose and why? In relevant cases, why do you consider standardisation and/or guidance as better alternatives to harmonisation?**

**5. Which of the sectors identified in Annex 4 should be added to the MID and why?**

**Please identify in particular:**

**a) Any barriers to trade experienced (see also Annex 2 on the Mutual Recognition Regulation)**

**b) Any need to adapt to technological development and/or risk that harmonisation would hinder it**

**c) The Union policies to be supported**

**d) Other reasons supporting the inclusion of a sector**

e) The expected costs and benefits of the change, e.g. compliance costs will be raised by x% of turnover and there are resulting benefits of y% of turnover as compared with the costs incurred under a 'no change' option.

f) Why standards and/or guidance are not sufficient as alternatives to harmonisation?

**6. Which of the sectors identified in Annex 4 should not be added to the MID and why? In relevant cases, why do you consider standardisation and/or guidance as better alternatives to harmonisation?**

The Public Consultation is open to all interested parties in the broadest sense: manufacturers, distributors, importers, consumers, users, federations, authorities, potential notified bodies.

The public consultation will be open from 6 September 2010 to 1 November 2010.

Received contributions, together with the identity of the contributor, will be published on the Internet, unless the contributor objects to the publication of his/her personal data on the grounds that such publication would harm his/her legitimate interests. In this case the contribution may be published in anonymous form. Otherwise the contribution will not be published nor will, in principle, its content be taken into account."

Respondents are invited to clearly identify themselves, e.g. sector, type of activity, size, turnover, and to send their answers to the above mentioned questions by 1 November 2010 to:

[entr-metrology@ec.europa.eu](mailto:entr-metrology@ec.europa.eu)

**Annexes:**

1. Smart metering and the Measuring Instruments Directive
2. The Mutual Recognition Regulation
3. List of changes to MID suggested by WELMEC (Member States and some stakeholders)
4. List of sectors suggested as candidates for inclusion in MID

**Background documents:**

1. Evaluation report by CSES (101p)
2. Details of changes to MID suggested by Member States and some stakeholders (81p)
3. Details of proposals for new sectors (63p)
4. Details relevant for impact assessment of 13 new sectors (by RPA) (75p)
5. Survey of SMEs on possible sectors for inclusion in the MID (17p)

## Annex 1

### **Smart metering and the Measuring Instruments Directive**

#### 1. Legal context

Utility meters for residential, commercial and light industrial use fall under Directive 2004/22/EEC on measuring instruments.<sup>13</sup> Article 2 (1) of this Directive provides that Member States may prescribe the use of such measuring instruments. If they do so, Article 8 (2) of this Directive requires that Member States shall take all necessary steps to ensure that measuring instruments be placed on the market and/or put into service only if they satisfy the requirements of this Directive. According to Article 4 of the same Directive, a measuring instrument must meet the essential requirements set out in Annex I and the relevant instrument-specific MI-Annex. The assessment of the conformity of a measuring instrument to those essential requirements is subject to a Notified Body (Articles 9, 11 and 12 of Directive 2004/22/EC).

Additional requirements by Member States risk interfering with Directive 2004/22/EC, which limits product related requirements to the "essential requirements" needed to perform tasks requiring legal metrological control, and refrains from specifying detailed product characteristics or other functionalities.

Instead, Directive 2004/22/EC – like all New Approach Directives – opted for the complementation of the legal requirements by voluntary harmonised standards (see Article 13 thereof). Compliance with a harmonised standard provides the presumption of conformity with the relevant essential requirements. Member States must not make the specifications of harmonised standards mandatory since a manufacturer must keep the option to prove compliance with the legal essential requirements by other means.

By laying down specific national requirements for measuring instruments, a Member State would infringe Article 8(1) of Directive 2004/22/EC, which states that "*Member States shall not impede for reasons covered by this Directive the placing on the market and/or putting into use of any measuring instrument that carries the 'CE' marking and supplementary metrology marking in accordance with Article 7.*".

As regards smart metering, essential requirements are included in Directive 2004/22/EC (notably Annex I points 7.6, 8.1-8.5 and 10.5). Directive 2004/22/EC on measuring instruments being a full harmonisation of utility meters as regards metrological requirements allows all functionalities that do not interfere with the metrological characteristics of the instrument. These are not subject to any other limitations, i.e. the Directive allows any specification to be put into use.

By means of Mandate M/374 of 20 October 2005 for Standardisation in the field of measuring instruments, CEN and CENELEC were invited to develop standards for utility meters.

Directive 2006/32/EC on energy end-use efficiency and energy services<sup>14</sup> addresses framework conditions for achieving national energy savings targets. The Directive sets also an obligation for each Member States to adopt National Energy Efficiency Action Plans (NEEAPs). The Plans are meant to integrate all national measures addressing energy efficiency including these related to metering and billing of energy consumption.

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<sup>13</sup> OJ L 135, 30.4.2004, p. 1.

<sup>14</sup> OJ L 114/64 of 27.04.2006

Article 13 of Directive 2006/32/EC mentions the need for providing final consumers with competitively priced individual utility meters that accurately reflect the final customer's actual energy consumption and that provide information on actual time of use, in so far as it is technically possible, financially reasonable and proportionate in relation to potential energy savings.

Article 13 of Directive 2006/32/EC is a performance-related requirement to Member States which must be satisfied as fully as possible by means of measures taking into account Directives 2006/32/EC and 2004/22/EC in order to ensure a coherent and comprehensive implementation of both directives. In this context, national measures intending to satisfy Article 13 of Directive 2006/32/EC should not prescribe any specific technical solutions for measuring instruments which are already addressed by Directive 2004/22/EC. The latter establishes the requirements that a measuring instrument has to satisfy in order to be placed on the EU market and put into use. Directive 2004/22/EC leaves the manufacturer the choice to use any technical solution that ensures compliance of the instrument with the essential requirements. This ensures the widest competition on the EU market.

In order to satisfy both Directive 2004/22/EC and Directive 2006/32/EC, Mandate M/441 of 12 March 2009 invited CEN, CENELEC and ETSI to develop standards in the field of measuring instruments for the development of an open architecture for utility meters involving communication protocols enabling interoperability.

The Third Package Liberalisation Directive 2009/72/EC for electricity (Article 3.11 and Annex 1, point 2)<sup>15</sup> and Directive 2009/73/EC for gas (Article 3.8 and Annex 1, point 2)<sup>16</sup> are similarly performance-related requirement to Member States, the aims of which must be achieved within the context of Directive 2004/22/EC where applicable. This is reinforced by the revised objectives and duties of national regulatory authorities in these Directives, who are responsible for promoting a competitive, secure and environmentally sustainable internal market in electricity/gas within the European Union taking into account long-term objectives (Article 36(a) of the Electricity Directive, Article 40(a) of the Gas Directive). Relevant long-term objectives are European targets for the share of energy from renewable sources in final energy consumption, energy efficiency improvements and greenhouse gas emission reductions.

When considering issues relating to the implementation of Smart Grids, Member States should have due regard to the confidentiality of consumer information as provided for in Article 16 of the Treaty of the Functioning of the European Union.

## 2. The expected impacts of smart metering

### a) Energy efficiency

There are conceivably four major technical elements to energy efficiency: investment in insulation and more efficient machinery, smart plugs and smart machines that can change behaviour in relation to tariffs or other steering inputs, smart grids that can send signals to consumers and optimize load management and smart meters which can handle complex information in order to give correct information for billing and influence consumer behaviour.

Each has its separate costs and benefits scheme and these must be disentangled to properly assess each alternative.

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<sup>15</sup> OJ L 211/55 of 14.8.2009

<sup>16</sup> OJ L 211/94 of 14.8.2009

As regards the latter, the ERGEG<sup>17</sup>, offers a description of a Smart Meters that makes the point: “Meters could be equipped with a gateway that enables home automation and which allows for future customisation as demand response and other technologies come online.”

In other words the meter should be seen as the enabler for home controlling systems, and not as a controller itself. The market rationale is that while the meter is unavoidably linked to the contract with the utility because its relation to billing, home energy management systems should remain open market, on which the utilities should compete, if they want to, on equal open basis<sup>18</sup>.

Therefore, a decoupling is needed of both systems. Additionally, there are technical reasons to keep them conceptually separate. It is not conceivable that a home device that could be controlled directly from the meter only based on energy costs without some further additional information, like presence or temperature; hardly the washing machine. There are reports about "boxes" doing both things at the same time, but this is the exception and not the rule.

#### b) Consumer choice and behaviour

Another element relevant for smart meters could be that of consumer choice for one or the other energy supplier. For the moment this is rather unclear. Should meters be able to take tariffs from various suppliers and offer consumers a close to real time comparison of costs by competing suppliers? Would it be conceivable that in a not too distant future consumers could take energy by the minute from the most competitive whereby the meter takes the decisions? In the end the consumer wants to buy where it is cheapest.

An intermediary step could be that there exist fixed tariffs at fixed hours (whereby higher tariffs coincide with peak hours) which could reduce what would be technically possible by means of digital management in favour of consumers.

In order to influence consumers' behaviour through smart meters, e.g. to create a basis for sustained demand reduction, it may be necessary to provide the consumers with an instantaneous direct feedback in combination with frequent and accurate billing. Direct displays in combination with improved billing would seem to result in early energy savings at a relatively low cost.

#### c) Smart grid and smart metering

Smart grid and smart metering can each function and give benefits together and independently. Smart Grids encompass a much wider area than the smart metering. However, smart metering brings intelligence to the "last mile" between the grid and the final customer. Both may use very similar information and therefore the two are inextricably linked.

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<sup>17</sup> ERGEG Public consultation Paper on Draft Guidelines of Good Practice on Regulatory Aspects of Smart Metering for Electricity and Gas, Page 39:

[http://www.energy-regulators.eu/portal/page/portal/EER\\_HOME/EER\\_CONSULT/OPEN%20PUBLIC%20CONSULTATIONS/Smart%20metering/CD/E10-RMF-23-03\\_GGP-SmartMetering\\_PC\\_10-Jun-2010.pdf](http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_CONSULT/OPEN%20PUBLIC%20CONSULTATIONS/Smart%20metering/CD/E10-RMF-23-03_GGP-SmartMetering_PC_10-Jun-2010.pdf)

on

[http://www.energy-regulators.eu/portal/page/portal/EER\\_HOME](http://www.energy-regulators.eu/portal/page/portal/EER_HOME)

<sup>18</sup> CableLabs: Creating a Robust Market for Residential Energy Management through an Open Energy Management Architecture: [http://www.cablelabs.com/downloads/pubs/residential\\_energy\\_management.pdf](http://www.cablelabs.com/downloads/pubs/residential_energy_management.pdf)

#### d) Some Benefits and Costs

Several studies have already looked into the costs and benefits of smart metering and further assessments on costs and benefits from electricity and gas smart metering are to be conducted by EU Member States by 2012 in accordance with Directives 2009/72/EC and 2009/73/EC<sup>19</sup>.

Based on a selection of recent studies, costs and benefits from smart energy use and distribution include:

**Smart residential investment:** Energy use in the building sector (residential and commercial) is responsible for the lion's share – 40% – of EU total final energy consumption and of EU total CO<sub>2</sub> emissions – 36%. There is significant potential for energy savings. Projected greenhouse gas emissions worldwide in the buildings sector can be with net economic benefit by 2030. At the level of EU-27 this could mean 500Mt CO<sub>2</sub> emission reduction by 2020.<sup>20</sup>

For new buildings, there is a drive towards nearly-zero energy consumption by design based on the orientation of the buildings, improved insulation, heat recovery, building energy management systems, etc. In such buildings, it has been claimed<sup>21</sup> that operational costs can be reduced by up to 80%. For existing buildings, energy savings of 10-20% are readily accessible through taking steps to reduce energy consumption – with typical payback periods of 5-10 years<sup>22</sup>.

**Smart plugs and home controlling systems:** 'smart plugs' reduce consumption by switching off unused appliances and can cost from under €10 with a claimed payback period of one year. More 'intelligent' plugs can also monitor usage, incorporate automatic timing of use, etc. They can also be networked to provide an overall picture of electricity consumption outlet by outlet<sup>23</sup>

**Smart grids:** Recent studies show that Smart Grids technologies can enable emissions reductions. The Smart 2020<sup>24</sup> study has estimated that Smart Technology could reduce global emissions by 15%. The EPRI 2008<sup>25</sup> expects smart grids to reduce nearly 9% of the total domestic carbon emissions generated by the U.S. power sector in 2006. For Europe, the Bio Intelligence Study<sup>26</sup> supported by the Commission in 2008 concludes that Smart Grids could reduce almost 9% of the EU annual primary energy consumption of the energy sector in 2020 which equals to 37.2 Mtoe or 148 TWh of electricity. Based on average prices for electricity in 2010, this amounts almost €7.5 billion/year of saving.

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<sup>19</sup> Commission services guidance on the roll-out of smart meters :  
[http://ec.europa.eu/energy/gas\\_electricity/index\\_en.htm](http://ec.europa.eu/energy/gas_electricity/index_en.htm)

<sup>20</sup> SEC(2008) 2864 volume 5, Brussels, 13.11.2008

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=SEC:2008:2864:FIN:EN:PDF>

<sup>21</sup> [http://ec.europa.eu/energy/efficiency/doc/buildings/info\\_note.pdf](http://ec.europa.eu/energy/efficiency/doc/buildings/info_note.pdf)

<sup>22</sup> [http://ec.europa.eu/enterprise/sectors/electrical/files/electrereport\\_en.pdf](http://ec.europa.eu/enterprise/sectors/electrical/files/electrereport_en.pdf)

<sup>23</sup> See, for example, [http://news.cnet.com/8301-11128\\_3-10391736-54.html](http://news.cnet.com/8301-11128_3-10391736-54.html)

<sup>24</sup> GeSI and the climate Group. SMART 2020. <http://www.gesi.org/LinkClick.aspx?fileticket=tbp5WRTHUoY%3D&tabid>

<sup>25</sup> EPRI 2008. Electric Power Research Institute (EPRI). *The green grid: Energy savings and carbon emissions reductions enabled by a smart grid*. Palo Alto, California, United States: EPRI, accessed November 2009.  
[http://www.smartgridnews.com/artman/uploads/1/SGNR\\_2009\\_EPRI\\_Green\\_Grid\\_June\\_2008.pdf](http://www.smartgridnews.com/artman/uploads/1/SGNR_2009_EPRI_Green_Grid_June_2008.pdf)

<sup>26</sup> Bio Intelligence Service. Impacts of Information and Communication Technologies on Energy Efficiency, Final Report September 2008. Supported by the European Commission DG INFSO,  
[ftp://ftp.cordis.europa.eu/pub/fp7/ict/docs/sustainable-growth/ict4ee-final-report\\_en.pdf](ftp://ftp.cordis.europa.eu/pub/fp7/ict/docs/sustainable-growth/ict4ee-final-report_en.pdf)

According to the IEA, 1000 b€ will be invested to deploy power networks in the EU by 2030. 50% will be spent on generation and another 50% on transmission and distribution. According to the final High-Level Advisory Group on ICT for Smart Electricity Distribution Networks report <sup>27</sup> published in July 2009, investing Smart Grids deployment will by 2030 require additional investment of €176 billion on the IT, including about €50 billion investments in smart metering.

**Smart meters** changing behaviour by consumers: a user-friendly energy display (e-wizard) show energy reduction of 14% equal to €200 per year, due to turning off of household appliances and turning down heating and lighting<sup>28</sup>. The same source indicates that replacement with energy efficient appliances can reduce another 20%, however, this saving should not be attributed to smart metering but to smart investment. Similarly even part of the first 14% could be rather due to home area network efficiency if automated.

Some Member States have started or are planning the roll-out of smart metering as the first step towards the implementation of Smart Grids in Europe. For example, almost 100% of the customers have been equipped already with smart metering systems in Italy and Sweden. Pilot projects are being developed by utilities in the Netherlands, Scandinavia, France, Spain, Germany and the UK. Central Europe is also catching onto the potential savings that digital meters can bring and trials are expected within the next year/s.

In general, cost benefit analysis in Member States shows clear overall smart metering benefits, but benefits accrue to different parties in the chain, no single party can afford to bare all the costs<sup>29</sup>. For example, Italy's ENEL<sup>30</sup> has calculated €2.1 billion investments, against cost saving of €500 million p/a. In the UK<sup>31</sup> the government estimated that fitting 26 million homes with smart meters by 2020 would cost over £8 billion; but the cost would be more than compensated for by £14.5bn of savings in the operational costs of power companies and lower bills for customers. In Spain<sup>32</sup>, where the government has introduced an obligation to roll out smart meters by 2018, the industry says consumers will contribute around 70% of the required €1bn investment through the rental price of meters. The rest will be investment in managing the system.

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<sup>27</sup> Findings by the High-Level Advisory Group on ICT for Smart Electricity Distribution Networks. ICT for a low carbon Economy- Smart Electricity Distribution Networks, July 2009. Supported by the European Commission, DG for Information Society and Media. [http://ec.europa.eu/information\\_society/activities/sustainable\\_growth/docs/sb\\_publications/pub\\_smart\\_edn\\_web.pdf](http://ec.europa.eu/information_society/activities/sustainable_growth/docs/sb_publications/pub_smart_edn_web.pdf)

<sup>28</sup> <http://www.nuon.com/press/press-releases/20090713/index.jsp>

<sup>29</sup> Senter 2006. Smart Meters for Dumb Markets. The global experience. Sentec Presentation. 2006. Smart Meters for Dumb Markets: The Global Experience. <http://www.sentec.co.uk/pdfs/ceftalkv1.pdf>.

<sup>30</sup> ENEL: National Energy Technology Laboratory (2007-08) (pdf). *NETL Modern Grid Initiative — Powering Our 21st-Century Economy*. United States Department of Energy Office of Electricity Delivery and Energy Reliability. p. 15. [http://www.netl.doe.gov/smartgrid/referenceshelf/whitepapers/Modern%20Grid%20Benefits\\_Final\\_v1\\_0.pdf](http://www.netl.doe.gov/smartgrid/referenceshelf/whitepapers/Modern%20Grid%20Benefits_Final_v1_0.pdf). Retrieved 2008-12-06

<sup>31</sup> EuuActiv 30/11/2009. <http://www.euractiv.com/en/energy/power-firms-want-funding-model-smart-grids/article-187773>

<sup>32</sup> Spain (ORDEN ITC/3860/2007):

<http://www.greenunivers.com/wp-content/uploads/2009/05/capgemini-smart-metering.pdf>

<http://www.iea.org/textbase/pm/?mode=pm&id=4463&action=detail>

<http://www.euractiv.com/en/energy-efficiency/smart-meters-controlling-your-energy-bill>

Average annual consumption reductions are expected to range from 5% to 15%<sup>33</sup>. For example, in France the French regulator CRE<sup>34</sup> has estimated that with the implementation of smart metering the supplier switch capability will increase by a factor of 10 (50% instead of 5% without smart metering), decrease residential consumption by 5% and decrease CO2 emissions by 5%. In Finland, installation of smart metering encouraged consumer to increase energy efficiency by 7%. In the US, demonstration project in the Olympic Peninsula, users reduced the power used by 15% during key peak hours and consumers saved on average approximately 10% on their electricity bills.

In Europe the price per meter has dropped in the last ten years from more than €150 each to less than €50 for a basic unit. Simultaneously, Italy's ENEL experience shows that the quality of service has increased from 128 min. interruption /year in 2001 to 49 min. in 2009<sup>35</sup>

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<sup>33</sup> Findings by the High-Level Advisory Group on ICT for Smart Electricity Distribution Networks. ICT for a low carbon Economy- Smart Electricity Distribution Networks, July 2009. Supported by the European Commission, DG for Information Society and Media.  
[http://ec.europa.eu/information\\_society/activities/sustainable\\_growth/docs/sb\\_publications/pub\\_smart\\_edn\\_web.pdf](http://ec.europa.eu/information_society/activities/sustainable_growth/docs/sb_publications/pub_smart_edn_web.pdf)

<sup>34</sup> <http://www.cre.fr>

<sup>35</sup> Dario Gerofalo, ENEL Spa. Smart Metering and Smart Grids: the ENEL experience, Brussels, 8 March 2010.  
[http://www.ceps.eu/system/files/events/2010/02/Garofalo\\_ENEL.pdf](http://www.ceps.eu/system/files/events/2010/02/Garofalo_ENEL.pdf).

## Annex 2

### **Mutual Recognition Regulation (EC) No 764/2008**

In order to assess the need for harmonisation it is particularly important to be aware of the existence of barriers to trade. Given that the Mutual Recognition Directive has entered into force on 13 May 2010, evidence of trade barriers can now be given quite objectively by manufacturers who have experienced their products not being mutually recognised.

Regulation (EC) No 764/2008<sup>36</sup> (the “Mutual Recognition Regulation”) applies to administrative decisions addressed to economic operators, whether taken or intended, on the basis of a technical rule. National authorities must apply it if the administrative decision to be taken: (1) concerns a product lawfully marketed in another Member State, (2) concerns a product which is not subject to harmonised EC law, (3) is addressed to economic operators, (4) is based on a technical rule and (5) has the direct or indirect effect that the product is: (a) prohibited from being placed on the market, (b) modified or subject to additional testing before it can be placed or kept on the market or (c) withdrawn from the market.

1. In the case of a product which has been granted a type-approval in one Member State, and is also effectively lawfully marketed there, then the product would fully be covered by the Regulation. Should the national authorities in a second Member State feel that there are grounds for not applying the principle of mutual recognition as set out in the Regulation, they must specify the technical rules on which their decision will be based and set out technical and scientific evidence to the effect that:

- (a) the intended decision is justified on one of the grounds of public interest set out in Article 34 TFEU or by reference to other overriding reasons of public interest; and
- (b) the intended decision is appropriate for the purpose of achieving the objective pursued and does not go beyond what is necessary in order to attain that objective (Article 6(1) of the Regulation).

Any such decision must be notified to the economic operator, as well as to the Commission (Article 6(2) of the Regulation). The Commission services will examine the notification in relation to the Mutual Recognition Regulation and the general principle of free movement of goods (Articles 34-36 TFEU).

2. On the other hand, if only a type-approval has been granted, but no actual marketing has taken place in any Member State, the Mutual Recognition Regulation is not of application. However, even in such a case, according to the general principle of mutual recognition which derives from the case-law of the Court of Justice of the European Union, certificates and tests reports issued by authorities from other Member States should be taken into account by the national authorities when deciding whether or not a particular product can be marketed. This would equally concern the type-approval.

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<sup>36</sup> Regulation (EC) No 764/2008 of the European Parliament and of the Council of 9 July 2008 laying down procedures relating to the application of certain national technical rules to products lawfully marketed in another Member State and repealing Decision No 3052/95/EC (Text with EEA relevance); OJ L 218 of 13.8.2008, pp. 21-29.

### Annex 3

#### List of changes to MID suggested by WELMEC (Member States and some stakeholders)

N°	Authoring WELMEC-wg <sup>37</sup>	Place in MID	Subject	Details of Proposal in Background Document 2	Decisions notified under MRR <sup>38</sup> (= trade barriers)
1	WG-11	Art. 1	Define « functions » in specific annexes	2	0
2	WG-8	Art. 5	Modification of the subassemblies and the complete measuring instrument	3	0
3	WG-10	Art. 23	Mix-and-match of new SSD's with old dispensers	4-8	0
4	WG-8	Annex I	Metrological Data Processing Unit (MDPU)	9-10	0
5	WG-11	Annex I	Real time clock	11-12	0
6	WG-8	Annex I 1.1	No exploiting the MPE	13	0
7	WG-2	Annex I 1.3.1	Temperature limits	14-15	0
8	WG-8	Annex I 8	Sealing	16	0
9	WG-2	Annex I 10.1&3	Meaning of hard copy	17-18	0
10	WG-11	Annex I 10.5	Display of legally important results	19-20	0
11	WG-11	MI-001	Changes to MI-001 (water meters)	21-24	0
12	WG-11	MI-002	Changes to MI-002 (gas meters)	25-32	0
13	WG-11	MI-002	MPE of gas meters	33-37	0
14	WG-11	MI-002	Gas energy measurement	38-43	0
15	WG-11	MI-003	Instrument transformers	44-47	0
16	WG-11	MI-003	Changes to MI-003 (electricity meters)	48-56	0

<sup>37</sup> WELMEC, is the organisation of national authorities in legal metrology at which meetings some stakeholders participate. Suggestions for the text changes are from the following WELMEC working groups:  
 WG-2 : weighing instruments (MID, Annex MI-006)  
 WG-8 : horizontal MID issues and Annex MI-007, Annex MI-008, Annex MI-009 and Annex MI-010  
 WG-10 : measuring systems fro continuous and dynamic measurement of other liquids than water (MID, Annex MI-005)  
 WG-11 : utility meters (MID, Annex MI-001, Annex MI-002, Annex MI-003 and Annex MI-004)

<sup>38</sup> Regulation (EC) No 764/2008; OJ L 218 of 13.8.2008, pp. 21-29 – See Annex 2 above for details

17	WG-11	MI-004	Changes to MI-004 (heat meters)	57-66	0
18	WG-10	MI-005	Fuel Dispenser Totalisers for Tax purposes	67	0
19	WG-10	MI-005 5.3	Solve unclarity regarding gas elimination devices	68	0
20	WG-10	MI-005 5.6	Self Service Devices as sub-assemblies	69	0
21	WG-2	MI-006 CH I	Subassemblies	70-72	0
22	WG-2	MI-006 CH II Tab.4 1.2	Verification scale intervals for single or multi-interval instruments	73-74	0
23	WG-2	MI-006- CH II 2.1	Category X instruments	75-76	0
24	WG-2	MI-006 CH II 5	High precision weighing instruments	77-78	0
25	WG-2	MI-006 CH II 6.2	Dynamic setting	79-80	0
26	WG-8	MI-007	Improvement of annex MI-007 (taximeters)	81	0

## Annex 4

### Sectors suggested as candidates for inclusion in MID (short descriptions on next page)

N°	Authoring WELMEC-wg <sup>39</sup> or DG	Place in MID	Subject	Details of Proposal in Background Document 3	Decisions notified under MRR <sup>40</sup> (= trade barriers)
27	WG-11	MI-003	Reactive electrical energy meters* <sup>oo</sup> and precision electricity meters	2-9	0
28	WG-8	MI-009	New length measuring instruments	10-12	0
29	WG-8	New Annex	Equipment for the measurement of the speed of vehicles* <sup>oo</sup>	13-16	0
30	WG-8	New Annex	Alcohol breath analysers* <sup>oo</sup>	17-20	0
31	ENTR	New Annex	Electrical vehicle chargers* <sup>oo</sup>	21-25	0
32	MOVE	New Annex	Energy measurement system for use on board railway vehicles* <sup>oo</sup>	26-27	0
33	WG-2	New Annex	Automatic weighing of road vehicles* <sup>oo</sup>	28-32	0
34	WG-8	MI-010	Enlarge scope of exhaust gas analyser* <sup>oo</sup>	33	0
35	WG-10	New Annex	Measuring systems for compressed natural gas (CNG)	34	0
36	WG-10	New Annex	Level gauge on tank trucks and fixed storage tanks	35-42	0
37	WG-8	MI-001	Irrigation water meters* <sup>oo</sup>	43-46	0

<sup>39</sup> WELMEC, is the organisation of national authorities in legal metrology at which meetings some stakeholders participate. Suggestions for the text changes are from the following WELMEC working groups:  
 WG-2 : weighing instruments (MID, Annex MI-006)  
 WG-8 : horizontal MID issues and Annex MI-007, Annex MI-008, Annex MI-009 and Annex MI-010  
 WG-10 : measuring systems fro continuous and dynamic measurement of other liquids than water (MID, Annex MI-005)  
 WG-11 : utility meters (MID, Annex MI-001, Annex MI-002, Annex MI-003 and Annex MI-004)

<sup>40</sup> Regulation (EC) No 764/2008; OJ L 218 of 13.8.2008, pp. 21-29 – See Annex 2 above for details

<b>38</b>	WG-8	MI-001	Waste water meters* °°	43-46	0
<b>39</b>	WG-8	MI-001	Large scale water meters* °°	43-46	0
<b>40</b>	WG-8	New Annex	Alcoholmeters, alcohol hydrometers and associated thermometers* °°	47-50	0
<b>41</b>	WG-2	New Annex	Weights* °°	51-54	0
<b>42</b>	WG-8	New Annex	Tyre pressure meters* °°	55-58	0
<b>43</b>	WG-8	New Annex	EC standard mass per storage volume of grain* °°	59-61	0
<b>44</b>	WG-8	New Annex	Ships' tanks*	62-63	0

*\* For the 13 sectors marked with an asterix, Appraisal Summary Tables (AST) concerning the impact assessment of the sector are available in Background Document 4.*

*\*\* For views by SMEs on these sectors, see Background Document 5.*

#### Short description of the sectors in Annex 4

<p><b>27. Reactive electrical energy meters:</b> Meters to measure the reactive electrical energy utilised by an electricity user (<i>note that standard electricity meters measure 'active electrical energy'</i>).</p>
<p><b>28. New length measuring instruments:</b> length instruments which move while the object remains, e.g. electronic measuring instruments used in real estate and road measuring wheels.</p>
<p><b>29. Equipment for the measurement of the speed of vehicles:</b> Equipment (usually radar) which may be fixed or mobile used for the measurement of traffic speed on roads.</p>
<p><b>30. Alcohol breath analysers:</b> Devices which measure the alcohol content of a breath sample. Various different technologies are available depending on the particular purpose of the instrument.</p>
<p><b>31. Electrical vehicle chargers:</b> Plug-in electric (including hybrid) vehicles necessitate an external source of electricity and a charger in order to recharge the vehicle's batteries in exchange for payment. The scope of this work also includes chargers used in electrically power assisted cycles.</p>
<p><b>32. Energy measurement system for use on board railway vehicles:</b> An on-board device to measure the electricity consumed (and generated) by electric railway vehicles, supplied from the external traction system, along with other parameters such as train position recording, data transmission for analytical and billing purposes.</p>
<p><b>33. Automatic weighing of road vehicles:</b> Allows the fully unattended dynamic weigh-in-motion of vehicles at high and low speeds in situations including but not exclusive to the following: fare and toll systems, traffic detection and monitoring, road safety and guidance, and the screening of vehicles for weight compliance.</p>
<p><b>34. Exhaust gas analysers for motorbikes/diesel engines:</b> Exhaust gas analysers are used to detect concentrations of combustion products emitted from a vehicle's exhaust. They can be used to test for compliance with emission standards, diagnose engine faults and measure combustion efficiency.</p>
<p><b>35. Measuring systems for compressed natural gas (CNG):</b> Measuring systems intended for the continuous measurement of flowing quantities (volumes or masses) of compressed (high pressure) natural gas, an engine fuel for cars and trucks that is more environmentally friendly than conventional fuels.</p>
<p><b>36. Level gauge on tank trucks and fixed storage tanks:</b> Measuring systems intended for the discontinuous measurement of quantities (volumes or masses) of liquids other than water in fixed or mobile storage tanks, i.e. rail and road tankers.</p>
<p><b>37. Irrigation water meters:</b> Water meters intended for the measurement of the flow of water used for irrigation purposes (which are not covered by the existing Measuring Instruments Directive).</p>
<p><b>38. Waste water meters:</b> Water meters intended for the measurement of the flow of waste water (which are not covered by the existing Measuring Instruments Directive).</p>
<p><b>39. Large scale water meters:</b> Water meters intended for the measurement of the large-scale flow of clean cold water in distribution networks (which are not covered by the existing Measuring Instruments Directive).</p>
<p><b>40. Alcoholmeters and alcohol hydrometers:</b> These are instruments for measuring (directly or indirectly) the alcoholic strength of water/ethanol mixtures (including beers, wines and spirits).</p>
<p><b>41. Medium and above-medium accuracy weights:</b> Weights are used as counter mass on mechanical weighing instruments in trade and commerce. Weights are also used as reference for the verification of weighing instruments.</p>
<p><b>42. Tyre pressure gauges for motor vehicles:</b> Instruments found in commercial garages, petrol stations and tyre fitting shops which display the pressure when inflating pneumatic tyres.</p>
<p><b>43. Standard mass of grain:</b> Instrument used to measure the standard mass of grain per storage</p>

volume (also known as bulk density and specific weight).

**44. Ships' tanks:** The tank of an inland waterway vessel or a national/international coaster, which is used for carrying goods. Liquid fuel bunkers are included.