



**OPEN meter**

Open Public Extended Network metering



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**Title: D2.2 A** Requirements and Assessment

**Version: 1.0**

Page: 1 / 29

## D 2.2 AMENDMENT

# ASSESSMENT OF POTENTIALLY ADEQUATE TELECOMMUNICATIONS TECHNOLOGIES -

# GENERAL REQUIREMENTS AND ASSESSMENT OF TECHNOLOGIES

**DUE DELIVERY DATE: -**

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## Document History

Vers.	Issue Date	Content and changes
0.1	21.06.2010	First draft – protocol
0.2	24.06.2010	First draft – PLC
0.3	25.06.2010	Editorial changes
0.4	22.07.2010	Insertion of G3 upper layers assessment
0.5	02.08.2010	Changes/improvements according to comments
0.6	01.09.2010	Final changes after TB comments
1.0	10.12.2010	Final document

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Page: 3 / 29

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## TABLE OF CONTENTS

<b>1</b>	<b>PURPOSE</b>	<b>4</b>
<b>2</b>	<b>AMENDMENTS TO THE CORE DOCUMENT</b>	<b>5</b>
2.1	AMENDMENT TO CHAPTER “2 EXECUTIVE SUMMARY”	5
2.2	AMENDMENT TO PARAGRAPH “5.1 PLC/WIRED TECHNOLOGIES”	7
2.3	AMENDMENT TO PARAGRAPH “5.3 PROTOCOLS”	11
<b>3</b>	<b>COPYRIGHT</b>	<b>21</b>
	<b>ASSESSMENT TABLES</b>	<b>22</b>

### LIST OF TABLES

Table 2-1	Overview of suggested candidate PLC technologies for all relevant interfaces. ...	6
Table 2-2	Amendments to D2.2 Chapt. 2 – Executive Summary .....	6
Table 2-3	Amendments to D2.2 par. 5.1 – PLC technologies.....	11
Table 2-4	Amendments to D2.2 par. 5.3 – Protocols.....	20

### LIST OF FIGURES

Figure 2-1	Assessment result for Prime technology .....	8
Figure 2-2	Assessment result for Meters and More technology .....	8
Figure 2-3	Assessment result for PLC G3 technology .....	9
Figure 2-4	Total scoring of all relevant PLC technologies for the MI1-CI1 Interface.....	10
Figure 2-5	Assessment result for “Meters and More” protocol on interface MI3.....	13
Figure 2-6	Total scoring of all relevant protocols for the MI3 interface. ....	14
Figure 2-7	Assessment result for “Meters and More” protocol on MI1-CI1 interface .....	15
Figure 2-8	Assessment result for “Meters and More” protocol on CI2-SI1 interface.....	18
Figure 2-9	Total scoring of all relevant protocols for the CI2-SI1 Interface.....	19

## 1 Purpose

This document is an Amendment of deliverable D2.2 taking into account two additional technologies, “Meters and More” and “PLC G3”. Furthermore the assessment of already analyzed technologies has been updated using the latest available specifications.

The main objective of the assessment in deliverable D2.2 is to discard from the set of technologies and protocols described in D2.1 those that are clearly not suitable and that therefore will not be treated in the subsequent phases of the OPEN Meter project. The ranking presented in this document does not necessarily imply that one technology or protocol is better than another in all cases.



This assessment will be completed with the results of the tests in the field to be performed within WP4 (Testing) of the OPEN Meter project and should also be validated by the performance of the real operation in smart metering mass deployments.

## 2 Amendments to the core document

### 2.1 Amendment to Chapter “2 Executive Summary”

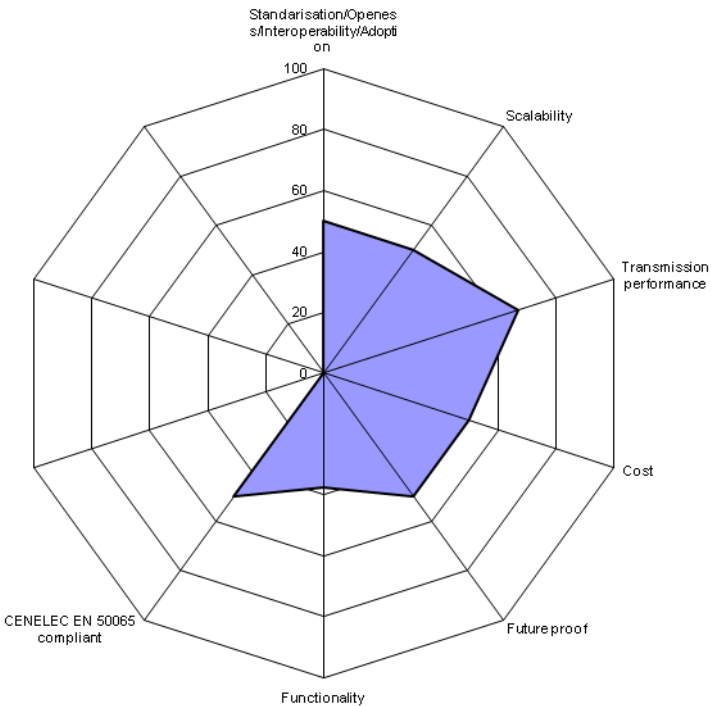


page	paragraph	action	Amendment																	
17	2.1	Replace	<p>Replace Table 2-1 by:</p> <table border="1"> <thead> <tr> <th>Interface</th> <th>MI1-CI1</th> <th>MI4 – MUMI1</th> <th>CI2-SI1</th> </tr> </thead> <tbody> <tr> <td rowspan="3"><b>Technologies</b></td> <td>IEC 61334-5-1</td> <td></td> <td></td> </tr> <tr> <td>PRIME</td> <td>IEC 61334-5-1</td> <td rowspan="2">Broadband PLC over MV</td> </tr> <tr> <td>Meters and More</td> <td>KNX-PL</td> </tr> <tr> <td>PLC G3</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>Table 2-1 Overview of suggested candidate PLC technologies for all relevant interfaces.</p>	Interface	MI1-CI1	MI4 – MUMI1	CI2-SI1	<b>Technologies</b>	IEC 61334-5-1			PRIME	IEC 61334-5-1	Broadband PLC over MV	Meters and More	KNX-PL	PLC G3			
Interface	MI1-CI1	MI4 – MUMI1	CI2-SI1																	
<b>Technologies</b>	IEC 61334-5-1																			
	PRIME	IEC 61334-5-1	Broadband PLC over MV																	
	Meters and More	KNX-PL																		
PLC G3																				
17	2.1	Add	<p>Add this sentence after Table 2-1:</p> <p>"It is worth underlining that the above table considers explicitly only 3 interfaces in the OPEN Meter architecture. In fact, because at the present time there are still on-going activities about PLC technologies for other interfaces (MI5 especially), they are not taken into account during the current phase of the Project.</p> <p>New solutions might also be taken into consideration during the project timeframe, as long as these new developments are open and public and they do not interfere in the objectives of the project."</p>																	
20	2.4	Add	<p>Add in first row, third column in Table 2-4:</p> <p>"Meters and More PLC G3"</p>																	
<p>NOTE: Figure captions, table captions and the table of content have to be updated in order to take into account the previously described amendments</p>																				

Table 2-2 Amendments to D2.2 Chapt. 2 – Executive Summary

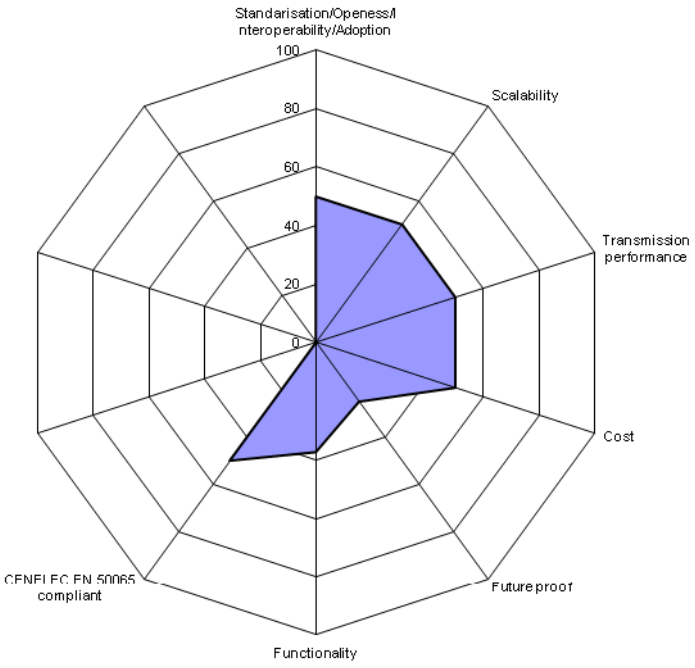


## 2.2 Amendment to paragraph “5.1 PLC/Wired technologies”

page	paragraph	action	Amendment
59	5.1	Add	Add two additional rows in second column of Table 6:  “Meters and More”  “PLC G3”
61	5.1.1	Add	Add three lines in the listing: <ul style="list-style-type: none"> <li>• PRIME <sup>1</sup></li> <li>• Meters and More</li> <li>• PLC G3</li> </ul>
69	5.1.1.7	Replace	Replace <i>Figure 15</i> :  

<sup>1</sup> PRIME PLC assessment was already present in D2.2 (par. 5.1.1.7) but just not mentioned in the list.



page	paragraph	action	Amendment
			Figure 2-1 Assessment result for Prime technology <sup>2</sup>
71	5.1.1.8	Replace	Replace reference “5.1.1.8 Evaluated candidate technology for Interface MI1-CI1” by “5.1.1.10 Evaluated candidate technology for Interface MI1-CI1”
71	5.1.1.8	Add	<p>Add a new 5.1.1.8 paragraph:</p> <p><b>5.1.1.8 Assessment results for technology Meters and More</b></p>  <p>Figure 2-2 Assessment result for Meters and More technology</p> <p>Meters and More is a single carrier technology using B-PSK. However the uncoded data rate is 9600 bps (coded 4800 bps) and therefore is much higher than other single carrier technologies like IEC 61334-5-1 and IEC 61334-5-2 evaluated in clause 5.1.2.4 and 5.1.2.5. For increasing robustness interleaving and convolutional encoding is used. Also multicast messages are supported.</p>

<sup>2</sup> Score for requirement OM-CR7 revised: it was wrongly set equal to 0 in the initial document - see the Assessment table provided at the end of this document





page	paragraph	action	Amendment
71	5.1.1.9	Add	<p>Add a new 5.1.1.9 paragraph:</p> <p><b>5.1.1.9 Assessment results for technology PLC G3</b></p> <p>Figure 2-3 Assessment result for PLC G3 technology</p> <p>G3 uses OFDM with 36 carriers spread between 35 kHz and 90 kHz within CENELEC A-band. Each carrier can dynamically be modulated with D-2-PSK or D-4-PSK. Reed-Solomon encoding is used besides interleaving and convolutional encoding. Additionally a so-called robust mode is available allowing communication in very harsh environment by symbol repetition. Therefore data rate is reduced accordingly. In normal mode (D-4-PSK) data rate exceeds 20 kbps. Advanced routing techniques are available and multicast messages are supported. Overall G3 is capable to fulfil possible future requirements.</p>
71	5.1.1.8	Replace	Replace clause 5.1.18 by:



page	paragraph	action	Amendment																				
			<table border="1"> <caption>Data for Figure 2-4: Total scoring of all relevant PLC technologies for the MI1-CI1 Interface</caption> <thead> <tr> <th>Technology</th> <th>Score</th> </tr> </thead> <tbody> <tr> <td>OPERA/JUPA DHS</td> <td>19</td> </tr> <tr> <td>Panasonic Solution</td> <td>18.5</td> </tr> <tr> <td>HomePlug AV</td> <td>18.5</td> </tr> <tr> <td>IEC 61334-5-1 (standard)</td> <td>20.5</td> </tr> <tr> <td>IEC 61334-5-2 (technical specification)</td> <td>14.5</td> </tr> <tr> <td>IEC 61334-5-4 (technical specification)</td> <td>20</td> </tr> <tr> <td>PRIME</td> <td>26</td> </tr> <tr> <td>PLC MORE</td> <td>23</td> </tr> <tr> <td>PLC G3</td> <td>26</td> </tr> </tbody> </table> <p>Figure 2-4 Total scoring of all relevant PLC technologies for the MI1-CI1 Interface</p> <p>Based on the results of the assessment four technologies are suggested as candidate technologies for MI1 – C11 interface. These are IEC 61334-5-1, PRIME, PLC G3 and MORE. All these seem to provide a good basis for implementing the use cases described in D1.1.</p> <p>IEC 61334-5-1 is expected to be robust against PLC channel conditions. Another advantage is that it is already standardized and implemented in commercial systems. Its biggest disadvantage, however, is the limited data rate which will only admit low data rates of a maximum of 2.4 kbit/s. The second suggested single carrier solution</p>	Technology	Score	OPERA/JUPA DHS	19	Panasonic Solution	18.5	HomePlug AV	18.5	IEC 61334-5-1 (standard)	20.5	IEC 61334-5-2 (technical specification)	14.5	IEC 61334-5-4 (technical specification)	20	PRIME	26	PLC MORE	23	PLC G3	26
Technology	Score																						
OPERA/JUPA DHS	19																						
Panasonic Solution	18.5																						
HomePlug AV	18.5																						
IEC 61334-5-1 (standard)	20.5																						
IEC 61334-5-2 (technical specification)	14.5																						
IEC 61334-5-4 (technical specification)	20																						
PRIME	26																						
PLC MORE	23																						
PLC G3	26																						



page	paragraph	action	Amendment
			<p>MORE overcomes this issue by using shorter symbol duration and thus provides a data rate of up to 9.6 kbit/s.</p> <p>The OFDM solutions PRIME and G3 provide PHY data rates above 10 kbit/s while being compliant with CENELEC EN 50065. Data rate could become important with respect to latency issues, even more so if the data that needs to be exchanged on the MAC layer and application layer is taken into account for larger numbers of devices within a network. Yet, the actual performance of both systems under real PLC channel conditions has to be scrutinized.</p> <p>Regarding future applications that may require tight latency limits, higher data rates may be desirable. Currently, OFDM-based solutions seem to be the only solutions that may serve as a basis for future systems that may possibly provide higher data rates.</p>
184	Ass. Tables	Add	PLC Assessment tables (MORE and PLC G3) for interface MI1-CI1
NOTE: Figure captions, table captions and the table of content have to be updated in order to take into account the previously described amendments			

Table 2-3 Amendments to D2.2 par. 5.1 – PLC technologies

## 2.3 Amendment to paragraph “5.3 Protocols”

page	paragraph	action	Amendment
19	2.3	Replace	<p>Replace:</p> <p>“SITRED is not included into the assessment because at this moment it is a proprietary solution. This protocol will be considered in the next revision of the documents (D2.1, D2.2) together with other protocols which specification become openly available in due time for that revision.”</p> <p>with this sentence:</p> <p>“Meters and More” is an open protocol managed by a nonprofit organization that was constituted with this purpose. It is based on SITRED protocol, a proprietary</p>



page	paragraph	action	Amendment
			solution developed by ENEL and adopted in more than 30 million of meter in Italy and abroad. The main characteristic of this new version of SITRED protocol is the adaptation of the BPSK modulation on physical layer.
19	2.3	Add	In table 2-3 "Overview of suggested candidate protocols for all relevant interfaces", add "Meters and More" to the following interfaces: <ul style="list-style-type: none"> <li>• MI1-CI1</li> <li>• MI3</li> <li>• CI2-SI1</li> </ul>
19	2.3	Add	In table 2-3 "Overview of suggested candidate protocols for all relevant interfaces", add "DLMS/COSEM over G3 PLC" to MI1-CI1 interface.
147	5.3	Add	Add this sentence after Table 5-16:  It's worth underlining that concentrator itself is out of scope of "Meters and More" specification; then requirements strictly regarding the concentrator are considered not applicable for the protocol assessment.
148	5.3	Add	Add a new row in Table 18:  Meters and More
148	5.3	Add	Add two new rows in Table 19:  Meters and More  DLMS/COSEM over G3 PLC
148	5.3	Add	Add a new row in Table 21:  Meters and More
148	5.3	Add	Add a new row in Table 22:  Meters and More
159	5.3.2	Add	Add this sentence to the list of assessed protocols.  * Meters and More (MI3 interface, CI3 is out of scope).



page	paragraph	action	Amendment
162	5.3.2	Add	<p>Add a paragraph after 5.3.2.3</p> <p><b>Assessment results for technology Meters and More</b></p> <p>Figure 2-5 Assessment result for “Meters and More” protocol on interface MI3</p> <p>“Meters and More” protocol gets a good overall score in all categories; the main advantage is an high transmission performance. The only requirement not fully satisfied is concerning retrieval of stored information (OM FR196), because this feature is supported but the total handling time <math>n</math> is not configurable. In any case, this is an <i>optional</i> requirement for operation and Maintenance with presence of Distributed Generation.</p> <p>Please note that maximum acceptable score for all categories but transmission performance is 50% (see assessment tables in appendix for further information).</p>
163	5.3.2.4	Replace	Replace <i>Figure 89</i> :

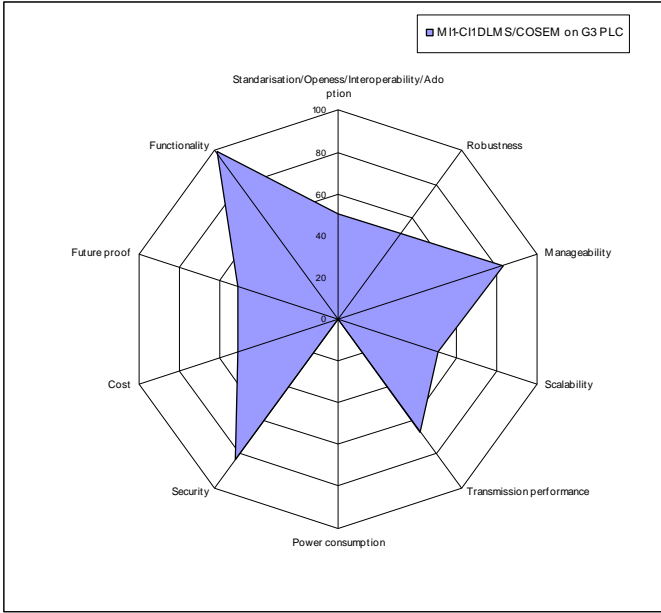
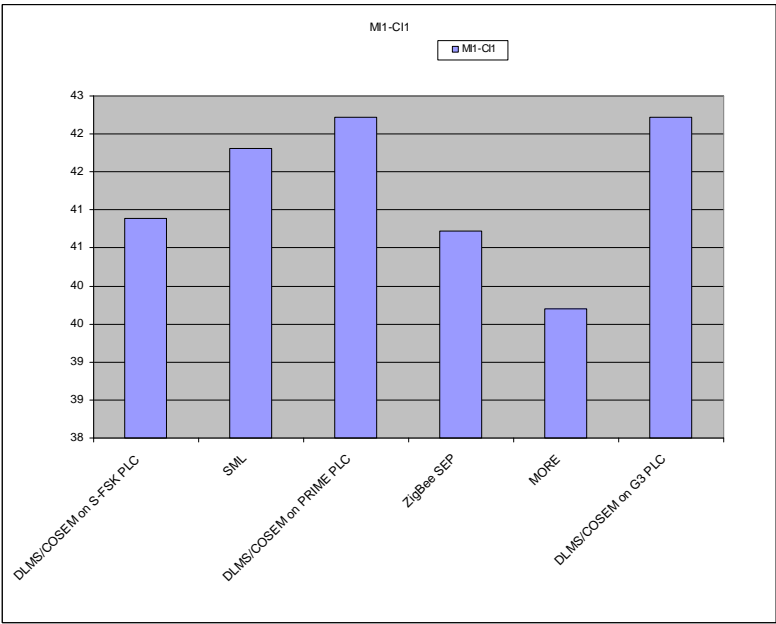


page	paragraph	action	Amendment										
			<table border="1"> <caption>Data for Figure 2-6: Total scoring of all relevant protocols for the MI3 interface</caption> <thead> <tr> <th>Protocol</th> <th>Score</th> </tr> </thead> <tbody> <tr> <td>DLMS Euridis</td> <td>34</td> </tr> <tr> <td>DLMS/COSEM on optical port IEC 62056-21 Mode C or Mode E</td> <td>31</td> </tr> <tr> <td>SML</td> <td>33</td> </tr> <tr> <td>MORE</td> <td>34</td> </tr> </tbody> </table> <p>Figure 2-6 Total scoring of all relevant protocols for the MI3 interface.</p>	Protocol	Score	DLMS Euridis	34	DLMS/COSEM on optical port IEC 62056-21 Mode C or Mode E	31	SML	33	MORE	34
Protocol	Score												
DLMS Euridis	34												
DLMS/COSEM on optical port IEC 62056-21 Mode C or Mode E	31												
SML	33												
MORE	34												
163	5.3.2.4	Add	Add this sentence to the paragraph:  “Meters and More” protocol on a local port gets a very interesting ranking.										
163	5.3.3	Add	Add this sentences to the list of assessed protocols. <ul style="list-style-type: none"> <li>• Meters and More</li> <li>• DLMS/COSEM over G3 PLC.</li> </ul>										
167	5.3.3	Add	Add a paragraph after 5.3.3.4  <b>Assessment results for technology “Meters and More”</b>										



page	paragraph	action	Amendment
			<p>Figure 2-7 Assessment result for “Meters and More” protocol on MI1-CI1 interface</p> <p>“Meters and More” gets a full score in all categories; a lower mark in the “functionality” category is present because the current release of this technology doesn’t support the “Prepayment” function (OM-SR20).</p>
167	5.3.3	Add	<p>Add a paragraph after 5.3.3.4</p> <p><b><i>Assessment results for technology DLMS/COSEM over G3 PLC</i></b></p>



page	paragraph	action	Amendment
			 <p>Figure 4-8 Assessment result for DLMS/COSEM over G3 PLC on MI1-CI1 interface</p> <p>DLMS/COSEM over G3 PLC gets a full score (as in §5.3.3.4).</p>
168	5.3.3.5	Replace	<p>Replace <i>Figure 94</i>:</p> 



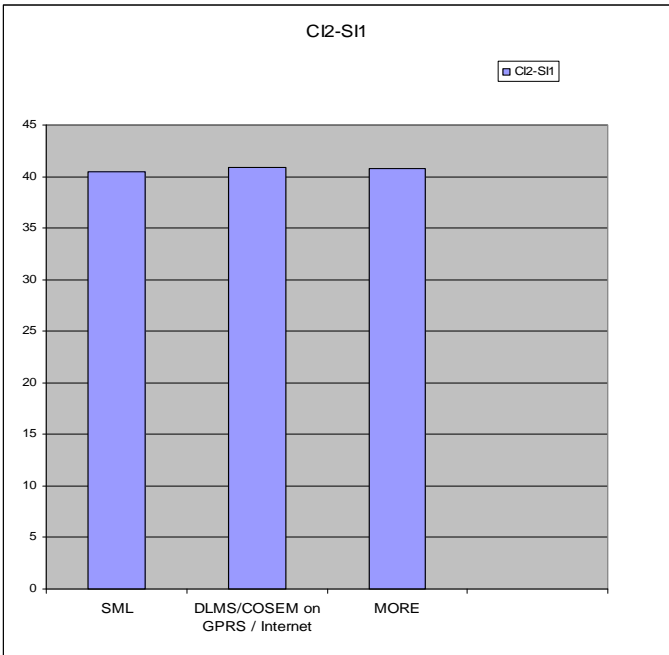


page	paragraph	action	Amendment
			Figure 4-3 Total scoring of all relevant protocols for the MI1-CI1 Interface.
168	5.3.3.5	Replace	<p>Replace:</p> <p>“As specified in the paragraph §2.3, SITRED is a proprietary protocol and cannot be considered relevant in this first phase of the OPEN meter project (if the specification of SITRED become openly available in due time for the next revision it will be considered”</p> <p>with this sentence:</p> <p>“Meters and More” gets an interesting score; this protocol is now an open protocol managed by a non profit organisation. “Meters and More” is based on SITRED protocol, adopted in the ENEL’s Telegestestore system with more than 32 million meters installed in Italy and abroad.</p>
168	5.3.3.5	Replace	<p>Replace:</p> <p>“DSML/COSEM over PRIME PLC gains the highest result, thanks to its standardization features.”</p> <p>with this sentence:</p> <p>“DSML/COSEM gains highest results over PRIME PLC and G3 PLC, thanks to its standardization features.”</p>
173	5.3.5	Add	<p>Add this sentence to the list of assessed protocols.</p> <p>* Meters and More.</p>
175	5.3.5	Add	<p>Add a paragraph after 5.3.5.2:</p> <p><b>Assessment results for technology “Meters and More”</b></p>



page	paragraph	action	Amendment
			<p>Figure 2-8 Assessment result for “Meters and More” protocol on CI2-SI1 interface</p> <p>“Meters and More” protocol shows an interesting score in all categories. It’s worth underlining that requirements concerning the whole system instead of this specific interface are considered not applicable from a protocol point-of-view (see §5.3).</p>
176	5.3.5.3	Replace	Replace <i>Figure 100</i> :



page	paragraph	action	Amendment
			 <p>Figure 2-9 Total scoring of all relevant protocols for the CI2-S11 Interface</p>
176	5.3.5.3	Replace	<p>Replace this sentence:</p> <p>“All considered protocols gain a remarkable score. Other protocols exist (even widely adopted), but at this moment they are proprietary solutions and therefore they could not be considered in this document.”</p> <p>With:</p> <p>“All considered protocols gain a remarkable score. All these seem to provide a good basis for implementing the use cases described in D1.1.”</p>
177	5.3.6	Add	<p>Add this sentence to the list of assessed protocols:</p> <ul style="list-style-type: none"> <li>• Meters and More.</li> </ul>
239	Ass. Tables	Add	Add the “Meters and More” protocol assessment table in Appendix for interface MI1-CI1.
239	Ass. Tables	Add	Add the DLMS/COSEM over G3 PLC protocol assessment table in Appendix for interface MI1-CI1.



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Page: 20 / 29

page	paragraph	action	Amendment
242	Ass. Tables	Add	Add the “Meters and More” protocol assessment table provided in Appendix for interface MI3.
253	Ass. Tables	Add	Add the “Meters and More” protocol assessment table provided in Appendix for interface CI2-SI1.
NOTE: Figure captions and the table of content have to be updated in order to take into account the previously described amendments			

Table 2-4 Amendments to D2.2 par. 5.3 – Protocols



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Page: 21 / 29

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## ASSESSMENT TABLES

### PLC assessment for interface MI1-CI1

Index	Interface	Technology	General Assessment Categories																				Total Score				
			100%				80%				100%				75%				100%					100%			
			Standardisation/Openness/Interoperability/Adoption				Scalability				Transmission performance				Cost				Future proof					Functionality			
Total	Min	Adv	Opt	Total	Min	Adv	Opt	Total	Min	Adv	Opt	Total	Min	Adv	Opt	Total	Min	Adv	Opt	Total	Min	Adv	Opt				
1	MI1-CI1	OPERA/UPA DHS	50%	100%	0%	0%	50%	100%	0%	0%	67%	100%	0%	100%	50%	100%	0%	0%	25%	50%	0%	0%	25%	50%	0%	0%	19%
2	MI1-CI1	Panasonic Solution	50%	100%	0%	0%	50%	100%	0%	0%	67%	100%	0%	100%	50%	100%	0%	0%	25%	50%	0%	0%	19%	38%	0%	0%	19%
3	MI1-CI1	HomePlug AV	50%	100%	0%	0%	50%	100%	0%	0%	67%	100%	0%	100%	50%	100%	0%	0%	25%	50%	0%	0%	19%	38%	0%	0%	19%
4	MI1-CI1	IEC 61334-5-1 (standard)	50%	100%	0%	0%	50%	100%	0%	0%	25%	50%	0%	0%	50%	100%	0%	0%	25%	50%	0%	0%	38%	75%	0%	0%	21%
5	MI1-CI1	IEC 61334-5-2 (technical specification)	38%	75%	0%	0%	50%	100%	0%	0%	0%	0%	0%	0%	50%	100%	0%	0%	0%	0%	0%	0%	16%	31%	0%	0%	14%
6	MI1-CI1	IEC 61334-5-4 (technical specification)	25%	50%	0%	0%	50%	100%	0%	0%	67%	100%	0%	100%	50%	100%	0%	0%	25%	50%	0%	0%	16%	31%	0%	0%	20%
7	MI1-CI1	PRIME	50%	100%	0%	0%	50%	100%	0%	0%	67%	100%	0%	100%	50%	100%	0%	0%	50%	100%	0%	0%	38%	75%	0%	0%	26%
8	MI1-CI1	Meters and More	50%	100%	0%	0%	50%	100%	0%	0%	50%	100%	0%	0%	50%	100%	0%	0%	25%	50%	0%	0%	38%	75%	0%	0%	23%
9	MI1-CI1	PLC GS	50%	100%	0%	0%	50%	100%	0%	0%	67%	100%	0%	100%	50%	100%	0%	0%	50%	100%	0%	0%	38%	75%	0%	0%	26%

Assessment of Technology		PRIME for Interface MI1-CI1		Chapter	Fit Criteria	Category	Level of fulfillment
Index	ID	Description					
30	OM-GR18	System must be interoperable		3.2.1.3	Use of standards, or at least open	Minimum	100%
31	OM-GR19	System must be robust		3.2.1.4	For each component (or group of	Minimum	
32	OM-GR20	System must be scalable		3.2.1.5	Maximum capacity of treatment fr	Minimum	
33	OM-GR21	All the possible steps to ease maintenance (corrective, preventive or as a continuous pr		3.2.1.6	Description of the mechanisms im	Minimum	
34	OM-GR22	The design and implementation of AMI systems shall aim at obtaining the best possible		3.2.1.7	Description of the mechanisms in	Minimum	
35	OM-ER1	Use of standard components		3.3.1.1	Bill of material composed of > 50	Minimum	
36	OM-ER2	Strictly adjust specs. to business needs		3.3.1.1	Cost estimates to be checked by	Minimum	
37	OM-ER3	Reduced bill of materials		3.3.1.1	Bill of materials to be checked by	Minimum	
38	OM-ER4	Maximise life time of equipments		3.3.1.1	-	Minimum	
39	OM-ER5	Flexible technology to fulfill possible future requirements		3.3.1.1	-	Minimum	100%
40	OM-ER6	Easy installable equipments without the need of changing the existing customer installat		3.3.1.2	-	Minimum	
41	OM-ER7	Minimization of cost of installation		3.3.1.2	-	Minimum	
42	OM-ER8	Minimization of external elements		3.3.1.2	-	Minimum	
43	OM-ER9	Maximum automation of the roll-out process supported by technology abd protocols		3.3.1.2	-	Minimum	
44	OM-ER10	Minimization of the need of customer presence on the installation process		3.3.1.2	-	Minimum	
45	OM-ER12	System must interface with existing utilities legacy systems		3.3.1.3	-	Minimum	
46	OM-ER13	Full automation of reading (electricity, gas, water and heat) operations.		3.3.2.1	-	Minimum	
47	OM-ER14	Full automation of disconnection and reconnection operations.		3.3.2.1	-	Minimum	
48	OM-ER15	Should allow remote reprogramming		3.3.2.1	Fulfillment of process "remote pro	Minimum	
49	OM-ER16	Should allow remote contract management.		3.3.2.1	Fulfillment of process "remote cor	Minimum	
50	OM-ER17	System should not interfere with existing operations.		3.3.2.1	-	Minimum	
51	OM-ER18	System should permit to automate the processes wherever possible (automatic detecto		3.3.2.1	-	Minimum	
52	OM-ER19	Optimization of Communication costs		3.3.2.1	-	Minimum	100%
125	OM-CR2	The PLC technology must be able to handle addressing for at least 3000 end points		5.1	The length of the MAC address m	Minimum	100%
126	OM-CR3	When PLC is used, the minimum speed must be 2.4 kbps for a reliable communication		5.1	PLC supports at least 2.4 kbps (P	Minimum	100%
127	OM-CR4	A reliable faster PLC interface should be possible.		5.1	Bandwidth: Reliable data speed: >	Optional	100%
128	OM-CR5	Unicast, multicast and broadcast transmission mode must be supported		5.1	The PLC technology has to suppo	Minimum	75%
129	OM-CR6	Automatic meter detection must be supported		5.1	Automatic meter detection proced	Minimum	
130	OM-CR7	A phase detection mechanism must be supported		5.1	Existence of the phase detection	Minimum	100%
131	OM-CR8	Adaption to topology changes must be supported		5.1	Routing function with automatic ac	Minimum	
132	OM-CR9	The electricity meter/communication-hub must have the ability to work as a repeater		5.1	Each electricity meter/communica	Minimum	75%
133	OM-CR10	Alternative routes to reach a node		5.1	Storing alternative routepaths to r	Optional	
134	OM-CR11	In case of having several PLC signals,due to crosstalk, it should not make communicati		5.1	PLC technology has to work prop	Minimum	
135	OM-CR12	New PLC technologies defined in this project and PLC technologies compliant to standa		5.1	Multiple physical layers supported	Minimum	
136	OM-CR13	Information about the line-quality must be provided		5.1	Availability of line quality indicato	Minimum	50%
137	OM-PLC1	The PLC technology complies with CENELEC EN 50065		5.1	The technology complies with EI	Minimum	100%

**Note:** this table replaces the corresponding table of the original document (pag.187) – see requirement OM-CR7.



Assessment of Technology		Meters and More	for	Interface	MI1-C11			
Index	ID	Description		Chapter	Fit Criteria	Category	Level of fulfillment	
30	OM-GR18	System must be interoperable		3.2.1.3	Use of standards, or at least open	Minimum	100%	
31	OM-GR19	System must be robust		3.2.1.4	For each component (or group of	Minimum		
32	OM-GR20	System must be scalable		3.2.1.5	Maximum capacity of treatment fr	Minimum		
33	OM-GR21	All the possible steps to ease maintenance (corrective, preventive or as a continuous pr		3.2.1.6	Description of the mechanisms im	Minimum		
34	OM-GR22	The design and implementation of AMI systems shall aim at obtaining the best possible		3.2.1.7	Description of the mechanisms in	Minimum		
35	OM-ER1	Use of standard components		3.3.1.1	Bill of material composed of > 50	Minimum		
36	OM-ER2	Strictly adjust specs. to business needs		3.3.1.1	Cost estimates to be checked by	Minimum		
37	OM-ER3	Reduced bill of materials		3.3.1.1	Bill of materials to be checked by	Minimum		
38	OM-ER4	Maximise life time of equipments		3.3.1.1	-	Minimum		
39	OM-ER5	Flexible technology to fulfill possible future requirements		3.3.1.1	-	Minimum	50%	
40	OM-ER6	Easy installable equipments without the need of changing the existing customer installat		3.3.1.2	-	Minimum		
41	OM-ER7	Minimization of cost of installation		3.3.1.2	-	Minimum		
42	OM-ER8	Minimization of external elements		3.3.1.2	-	Minimum		
43	OM-ER9	Maximum automation of the roll-out process supported by technology abd protocols		3.3.1.2	-	Minimum		
44	OM-ER10	Minimization of the need of customer presence on the installation process		3.3.1.2	-	Minimum		
45	OM-ER12	System must interface with existing utilities legacy systems		3.3.1.3	-	Minimum		
46	OM-ER13	Full automation of reading (electricity, gas, water and heat) operations.		3.3.2.1	-	Minimum		
47	OM-ER14	Full automation of disconnection and reconnection operations.		3.3.2.1	-	Minimum		
48	OM-ER15	Should allow remote reprogramming		3.3.2.1	Fulfillment of process "remote pro	Minimum		
49	OM-ER16	Should allow remote contract management.		3.3.2.1	Fulfillment of process "remote cor	Minimum		
50	OM-ER17	System should not interfere with existing operations.		3.3.2.1	-	Minimum		
51	OM-ER18	System should permit to automate the processes wherever possible (automatic detectio		3.3.2.1	-	Minimum		
52	OM-ER19	Optimization of Communication costs		3.3.2.1	-	Minimum	100%	
125	OM-CR2	The PLC technology must be able to handle addressing for at least 3000 end points		5.1	The length of the MAC address m	Minimum	100%	
126	OM-CR3	When PLC is used, the minimum speed must be 2.4 kbps for a reliable communication		5.1	PLC supports at least 2.4 kbps (P	Minimum	100%	
127	OM-CR4	A reliable faster PLC interface should be possible.		5.1	Bandwidth: Reliable data speed: >	Optional	0%	
128	OM-CR5	Unicast, multicast and broadcast transmission mode must be supported		5.1	The PLC technology has to suppo	Minimum	75%	
129	OM-CR6	Automatic meter detection must be supported		5.1	Automatic meter detection proced	Minimum		
130	OM-CR7	A phase detection mechanism must be supported		5.1	Existence of the phase detection	Minimum	100%	
131	OM-CR8	Adaption to topology changes must be supported		5.1	Routing function with automatic ac	Minimum		
132	OM-CR9	The electricity meter/communication-hub must have the ability to work as a repeater		5.1	Each electricity meter/communica	Minimum	75%	
133	OM-CR10	Alternative routes to reach a node		5.1	Storing alternative routepaths to r	Optional		
134	OM-CR11	In case of having several PLC signals,due to crosstalk, it should not make communicati		5.1	PLC technology has to work propo	Minimum		
135	OM-CR12	New PLC technologies defined in this project and PLC technologies compliant to standa		5.1	Multiple physical layers supported	Minimum		
136	OM-CR13	Information about the line-quality must be provided		5.1	Availability of line quality indicator	Minimum	50%	
137	OM-PLC1	The PLC technology complies with CENELEC EN 50065		0	The technologicly complies with EI	Minimum	100%	

Assessment of Technology		PLC G3	for	Interface	MI1-C11			
Index	ID	Description		Chapter	Fit Criteria	Category	Level of fulfillment	
32	OM-GR20	System must be scalable		3.2.1.5	Maximum capacity of treatment fr	Minimum		
33	OM-GR21	All the possible steps to ease maintenance (corrective, preventive or as a continuous pr		3.2.1.6	Description of the mechanisms im	Minimum		
34	OM-GR22	The design and implementation of AMI systems shall aim at obtaining the best possible		3.2.1.7	Description of the mechanisms in	Minimum		
35	OM-ER1	Use of standard components		3.3.1.1	Bill of material composed of > 50	Minimum		
36	OM-ER2	Strictly adjust specs. to business needs		3.3.1.1	Cost estimates to be checked by	Minimum		
37	OM-ER3	Reduced bill of materials		3.3.1.1	Bill of materials to be checked by	Minimum		
38	OM-ER4	Maximise life time of equipments		3.3.1.1	-	Minimum		
39	OM-ER5	Flexible technology to fulfill possible future requirements		3.3.1.1	-	Minimum	100%	
40	OM-ER6	Easy installable equipments without the need of changing the existing customer installat		3.3.1.2	-	Minimum		
41	OM-ER7	Minimization of cost of installation		3.3.1.2	-	Minimum		
42	OM-ER8	Minimization of external elements		3.3.1.2	-	Minimum		
43	OM-ER9	Maximum automation of the roll-out process supported by technology abd protocols		3.3.1.2	-	Minimum		
44	OM-ER10	Minimization of the need of customer presence on the installation process		3.3.1.2	-	Minimum		
45	OM-ER12	System must interface with existing utilities legacy systems		3.3.1.3	-	Minimum		
46	OM-ER13	Full automation of reading (electricity, gas, water and heat) operations.		3.3.2.1	-	Minimum		
47	OM-ER14	Full automation of disconnection and reconnection operations.		3.3.2.1	-	Minimum		
48	OM-ER15	Should allow remote reprogramming		3.3.2.1	Fulfillment of process "remote pro	Minimum		
49	OM-ER16	Should allow remote contract management.		3.3.2.1	Fulfillment of process "remote cor	Minimum		
50	OM-ER17	System should not interfere with existing operations.		3.3.2.1	-	Minimum		
51	OM-ER18	System should permit to automate the processes wherever possible (automatic detectio		3.3.2.1	-	Minimum		
52	OM-ER19	Optimization of Communication costs		3.3.2.1	-	Minimum	100%	
125	OM-CR2	The PLC technology must be able to handle addressing for at least 3000 end points		5.1	The length of the MAC address m	Minimum	100%	
126	OM-CR3	When PLC is used, the minimum speed must be 2.4 kbps for a reliable communication		5.1	PLC supports at least 2.4 kbps (P	Minimum	100%	
127	OM-CR4	A reliable faster PLC interface should be possible.		5.1	Bandwidth: Reliable data speed: >	Optional	100%	
128	OM-CR5	Unicast, multicast and broadcast transmission mode must be supported		5.1	The PLC technology has to suppo	Minimum	75%	
129	OM-CR6	Automatic meter detection must be supported		5.1	Automatic meter detection proced	Minimum		
130	OM-CR7	A phase detection mechanism must be supported		5.1	Existence of the phase detection	Minimum	100%	
131	OM-CR8	Adaption to topology changes must be supported		5.1	Routing function with automatic ac	Minimum		
132	OM-CR9	The electricity meter/communication-hub must have the ability to work as a repeater		5.1	Each electricity meter/communica	Minimum	75%	
133	OM-CR10	Alternative routes to reach a node		5.1	Storing alternative routepaths to r	Optional		
134	OM-CR11	In case of having several PLC signals,due to crosstalk, it should not make communicati		5.1	PLC technology has to work propo	Minimum		
135	OM-CR12	New PLC technologies defined in this project and PLC technologies compliant to standa		5.1	Multiple physical layers supported	Minimum		
136	OM-CR13	Information about the line-quality must be provided		5.1	Availability of line quality indicator	Minimum	50%	
137	OM-PLC1	The PLC technology complies with CENELEC EN 50065		0	The technologicly complies with EI	Minimum	100%	



**Energy Theme; Grant Agreement No 226369**

**Title: 2.2 A Requirements and Assessment**

**Version: 1.0**

**Page: 24 / 29**

Protocol assessment for interface MI1-C11

Index	Interface	Technology	Weighting of Assessment Category												Total Score																								
			100%			100%			80%			80%				100%			50%			100%			75%			100%			100%								
			Total	Min	Adv	Occ	Total	Min	Adv	Occ	Total	Min	Adv	Occ		Total	Min	Adv	Occ	Total	Min	Adv	Occ	Total	Min	Adv	Occ	Total	Min	Adv	Occ	Total	Min	Adv	Occ				
1	MI1-C11	DLMS/COSEM on S-FSK PLC	50%	100%	0%	0%	50%	100%	0%	0%	83%	100%	100%	0%	50%	100%	0%	0%	50%	100%	0%	0%	6%	0%	0%	0%	83%	100%	100%	0%	50%	100%	0%	0%	50%	100%	0%	0%	41%
2	MI1-C11	SML	48%	100%	0%	0%	50%	100%	0%	0%	83%	100%	100%	0%	50%	100%	0%	0%	67%	100%	0%	0%	0%	0%	0%	0%	83%	100%	100%	0%	50%	100%	0%	0%	99%	100%	100%	0%	42%
3	MI1-C11	DLMS/COSEM on PRIME PLC	50%	100%	0%	0%	50%	100%	0%	0%	83%	100%	100%	0%	50%	100%	0%	0%	67%	100%	0%	0%	0%	0%	0%	0%	83%	100%	100%	0%	50%	100%	0%	0%	99%	100%	100%	0%	42%
4	MI1-C11	ZigBee SEP	48%	100%	0%	0%	50%	100%	0%	0%	83%	100%	100%	0%	50%	100%	0%	0%	42%	83%	0%	0%	25%	0%	0%	0%	83%	100%	100%	0%	44%	87%	0%	0%	100%	100%	100%	0%	41%
5	MI1-C11	MODB	50%	100%	0%	0%	50%	100%	0%	0%	75%	100%	100%	0%	50%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	83%	100%	100%	0%	50%	100%	0%	0%	72%	100%	100%	0%	40%
6	MI1-C11	DLMS/COSEM on G3 PLC	50%	100%	0%	0%	50%	100%	0%	0%	83%	100%	100%	0%	50%	100%	0%	0%	67%	100%	0%	0%	0%	0%	0%	0%	83%	100%	100%	0%	50%	100%	0%	0%	99%	100%	100%	0%	42%





**Work Package:** WP2  
**Type of document:** Deliverable  
**Date:** 10.12.2010

**Open Public Extended Network metering**

**Energy Theme; Grant Agreement No 226369**

**Title: 2.2 A Requirements and Assessment** **Version: 1.0** **Page: 25 / 29**

Index	Assessment of Technology	MORE	for	Interface	M1-G1	5	Chapter	Fit Criteria	Category	Level of fulfillment
1	OM-SR1	System must permit meter registration					3.1.2.1	Fulfillment of process "meter registration"	Minimum	100%
2	OM-SR2	System must permit remote tariff programming					3.1.2.2	Fulfillment of process "remote tariff programming"	Minimum	100%
3	OM-SR3	System must permit on demand meter reading					3.1.2.3	Fulfillment of process "on demand meter reading"	Minimum	100%
4	OM-SR4	System must permit remote meter reading					3.1.2.4	Fulfillment of process "remote meter reading for billing"	Minimum	100%
5	OM-SR5	System must permit remote disconnection and reconnection					3.1.2.5	Fulfillment of process "remote disconnection and reconnection"	Minimum	100%
6	OM-SR6	System must permit power control					3.1.2.6	Fulfillment of process "power control"	Minimum	100%
7	OM-SR7	System must permit clock synchronization					3.1.2.7	Fulfillment of process "clock synchronization"	Minimum	100%
8	OM-SR8	System must permit remote firmware updates					3.1.2.8	Fulfillment of process "remote firmware updates"	Minimum	100%
9	OM-SR9	System must permit alarm and event management					3.1.2.9	Fulfillment of process "alarm and event management"	Minimum	100%
10	OM-SR10	System must permit interruption information					3.1.2.10	Fulfillment of process "outage information"	Minimum	100%
11	OM-SR11	System must permit fraud detection					3.1.2.11	Fulfillment of process "fraud detection"	Minimum	100%
12	OM-SR12	System must permit remote concentrator access for registration, programming, reading and firmware updates					3.1.2.12	Fulfillment of process "remote concentrator access"	Minimum	100%
13	OM-SR13	System must permit load profile management					3.1.2.13	Fulfillment of process "load profile management"	Minimum	100%
14	OM-SR14	System must permit automatic adaptation to grid changes					3.1.3.1	Fulfillment of process "automatic adaptation to grid changes"	Advanced	100%
15	OM-SR15	System must permit meter availability control					3.1.3.2	Fulfillment of process "meter availability control"	Advanced	100%
16	OM-SR16	System must permit energy balances					3.1.4.1	Fulfillment of process "energy balances"	Optional	100%
17	OM-SR17	System must permit load management					3.1.4.2	Fulfillment of process "load management"	Optional	100%
18	OM-SR18	System must permit customer device management					3.1.4.3	Fulfillment of process "customer device management"	Optional	100%
19	OM-SR19	System must permit power quality management					3.1.4.4	Fulfillment of process "power quality management"	Optional	100%
20	OM-SR20	System must permit remote meter reading					3.1.4.5	Fulfillment of process "remote meter reading"	Optional	100%
21	OM-GR1	System must permit operation, administration and provisioning through access methods and management					3.2.1.1	Presence of tools and information bases accessible to the user	Minimum	0%
22	OM-GR2	The system must be capable of authenticating entities					3.2.1.2	Origin of message and identification should be proved to the user	Minimum	100%
23	OM-GR3	The system must be capable of managing access rights for any of its components, with an adequate level of security					3.2.1.2	The access control will be offered through classical means	Minimum	100%
24	OM-GR4	The system must be capable of guaranteeing the integrity of data exchanged at all times					3.2.1.2	Implementation of hash mechanisms or usage of symmetric encryption	Minimum	100%
25	OM-GR7	The system and devices should provide functionality to prevent eavesdropping					3.2.1.2	Implementation of encryption mechanisms is necessary	Minimum	100%
26	OM-GR11	The equipment shall provide functionality for management of encryption keys					3.2.1.2	Kinematics for management of encryption keys should be provided	Minimum	100%
27	OM-GR12	Physical access to devices should be made difficult					3.2.1.2	The system must be capable of automatically generating physical access control	Minimum	100%
28	OM-GR13	All user devices (physical gateway, data concentrator, meter) will be disabled by default					3.2.1.2	Mechanisms will be proposed for automatically disabling user devices	Advanced	100%
29	OM-GR14	Attempting to access to local maintenance port of device will be logged					3.2.1.2	Mechanisms will be proposed for automatically disabling local maintenance port	Advanced	100%
30	OM-GR18	System must be interoperable					3.2.1.3	Use of standards, or at least open and public specifications	Minimum	100%
31	OM-GR19	System must be robust					3.2.1.4	For each component (or group of components) of the A, the system must be able to recover from a functional point of view	Minimum	100%
32	OM-GR20	System must be scalable					3.2.1.5	Maximum capacity of the system from a functional point of view	Minimum	100%
33	OM-GR21	All the possible steps to ease maintenance (corrective, preventive or as a continuous process) of the system must be provided					3.2.1.6	Description of the mechanisms implemented for maintenance	Minimum	100%
34	OM-GR22	The design and implementation of AMI systems shall aim at obtaining the best possible performance					3.2.1.7	Description of the mechanisms in place that allow performance optimization	Minimum	100%
35	OM-ER1	Use of standard components					3.3.1.1	Bill of material composed of > 50% of off-the-shelf components	Minimum	100%
36	OM-ER2	Strictly adjust prices to business needs					3.3.1.1	Cost estimates to be checked by Technical Committee	Minimum	100%
37	OM-ER3	Reduced bill of materials					3.3.1.1	Bill of materials to be checked by Technical Committee	Minimum	100%
38	OM-ER4	Maximise life time of equipments					3.3.1.1	-	Minimum	100%
39	OM-ER5	Flexible technology to fulfill possible future requirements					3.3.1.1	-	Minimum	100%
40	OM-ER6	Easy installation of equipments without the need of changing the existing customer installations					3.3.1.2	The adjusted threshold value will be applied at the time of installation	Minimum	100%
41	OM-ER7	Minimization of cost of installation					3.3.1.2	-	Minimum	100%
42	OM-ER8	Minimization of external elements					3.3.1.2	-	Minimum	100%
43	OM-ER9	Maximum automation of the roll-out process supported by technology aided protocols					3.3.1.2	-	Minimum	100%
44	OM-ER10	Minimization of the need of customer presence on the installation process					3.3.1.2	-	Minimum	100%
45	OM-ER12	System must interface with existing utilities legacy systems					3.3.1.3	-	Minimum	100%
46	OM-ER13	Full automation of reading (electricity, gas, water and heat) operations.					3.3.2.1	-	Minimum	100%
47	OM-ER14	Full automation of disconnection and reconnection operations.					3.3.2.1	-	Minimum	100%
48	OM-ER15	Should allow remote programming					3.3.2.1	Fulfillment of process "remote programming"	Minimum	100%
49	OM-ER16	Should allow remote contract management.					3.3.2.1	Fulfillment of process "remote contract management"	Minimum	100%
50	OM-ER17	System should not interfere with existing operations.					3.3.2.1	-	Minimum	100%
51	OM-ER18	System should permit to automate the processes wherever possible (automatic detection of meters, automatic detection of communication costs)					3.3.2.1	-	Minimum	100%
52	OM-ER19	Optimization of communication costs					3.3.2.1	-	Minimum	100%
53	OM-ER20	Reduction of communication points					3.3.2.1	-	Minimum	100%
54	OM-ER21	Systems should be designed to minimise maintenance costs.					3.3.2.1	-	Minimum	100%
55	OM-ER23	System should provide alarms					3.3.2.1	-	Minimum	100%
56	OM-ER25	System should permit energy balance of a transformer station					3.3.2.2	0	Optional	100%
57	OM-ER27	Minimise internal power consumption of field components.					3.3.2.2	-	Minimum	100%
58	OM-ER28	Minimise communication activity.					3.3.2.2	-	Minimum	100%
59	OM-FR55	The Electricity equipment shall issue a normal error for time adjustments larger than (S) that occur in the field					4.1.2.20	If the time adjustment is more than (S), a logical error is issued	Minimum	100%
60	OM-FR59	The equipment shall provide functionality to upload new firmware to the equipment					4.1.3.1	The new version of the firmware shall be stored by the equipment	Minimum	100%
61	OM-FR59	The equipment shall issue a logical error in case the new firmware is incomplete or inconsistent.					4.1.3.1	The logical error issued for incomplete or inconsistent firmware	Minimum	100%
62	OM-FR64	The equipment shall provide functionality to invoke a self-check and retrieve the results remotely					4.1.3.1	The self-check that is executed as part of the firmware	Minimum	100%
63	OM-FR67	The E meter shall have a standardized local port for installation and maintenance purposes (MIS).					4.1.3.2	By the time the meter is deployed the time and date of the MIS	Minimum	100%
64	OM-FR70	The electricity meter shall provide functionality to set the standard messages in the meter at the manufacturing site					4.1.3.2	The adjusted standard messages will be applied at the time of installation	Minimum	100%
65	OM-FR70	The electricity meter shall provide functionality to set the breaker at the manufacturing site and at the field					4.1.3.2	The adjusted breaker position will be applied at the time of installation	Minimum	100%
66	OM-FR72	The electricity meter shall provide functionality to set the periods for different tariffs for electricity at the field					4.1.3.2	The adjusted tariff periods will be applied at the time of installation	Minimum	100%
67	OM-FR73	The electricity meter shall provide functionality to set the table for special days at the manufacturing site					4.1.3.2	The table for special days shall cover a minimum period of 30 days	Minimum	100%
68	OM-FR74	The electricity meter shall provide functionality to set the standard messages in the meter at the manufacturing site					4.1.3.2	The adjusted standard messages will be applied at the time of installation	Advanced	100%
69	OM-FR75	The electricity meter shall provide functionality to set location information in the meter after the manufacturing site					4.1.3.2	Fit criterion may differ per DSO	Optional	100%
70	OM-FR77	The meter shall provide functionality to set the disconnectable flag at the manufacturing site and at the field					4.1.3.2	By the time the meter is deployed the disconnectable flag	Minimum	100%
71	OM-FR78	The electricity meter shall provide functionality to invoke "Use case: Adjust equipment" remotely or at the field					4.1.3.2	Adjustment of the electricity meter shall comply with the requirements	Minimum	100%
72	OM-FR79	The electricity meter shall provide functionality to invoke "Use case: Perform self-check electricity meter"					4.1.3.2	The result of the self-check that is executed as part of the firmware	Minimum	100%
73	OM-FR80	After the electricity meter is physically installed and functions correctly, communication shall be established					4.1.3.2	The meter shall provide functionality to automatically initiate communication	Minimum	100%
74	OM-FR82	The electricity meter shall provide functionality to invoke "Use case: Retrieve electricity meter/communication parameters"					4.1.3.2	Retrieval of the state of the equipment that is executed	Minimum	100%
75	OM-FR83	Meters of other installations that use the equipment to be uninstalled for communication, shall not be able to communicate					4.1.3.2	Communication for any other electricity meter/communication hub	Optional	100%
76	OM-FR86	The electricity meter shall provide functionality to set the actual meter reading					4.1.3.2	The actual meter readings gathered shall be in accordance with the requirements	Minimum	100%
77	OM-FR86	The electricity meter shall provide functionality to send the electricity configuration to the central system					4.1.3.2	The information retrieved as the electricity configuration	Minimum	100%
78	OM-FR87	The electricity meter shall provide functionality to retrieve the electricity operational parameters					4.1.3.2	The operational parameters retrieved for the electricity meter	Minimum	100%
79	OM-FR88	If the M14 interface is present, the electricity meter shall provide functionality to retrieve the multi-utility information					4.1.3.2	The configuration information retrieved shall be at least the M14 interface	Minimum	100%
80	OM-FR89	If the M14 interface is present, the electricity meter shall provide functionality to retrieve the multi-utility information					4.1.3.2	The operational parameters retrieved for the multi-utility	Minimum	100%
81	OM-FR91	The electricity meter shall provide logging information and errors of the electricity equipment and, if it is available, the communication hub					4.1.3.2	The electricity meter shall provide on request of an external system	Minimum	100%
82	OM-FR92	The electricity meter shall provide the actual meter readings and the complete state and logging information					4.1.3.2	State and logging information	Minimum	100%
83	OM-FR95	The equipment shall issue a normal error if it detects an inconsistent state of the memory					4.1.3.2	The error for inconsistent memory shall contain the generic error code	Minimum	100%
84	OM-FR96	The equipment shall issue a normal error if it detects an inconsistent state of the memory					4.1.3.2	The error for battery lifetime shall contain the generic error code	Optional	100%
85	OM-FR99	The electricity meter shall issue a normal error if the meter is not correctly connected to the grid, i.e. if the meter is not connected to the grid					4.1.3.2	The error for phase inversion shall be at least contain the generic error code	Optional	100%
86	OM-FR100	The electricity meter shall issue a normal error if not all phases of a poly-phase meter are connected					4.1.3.2	The error for incorrect connection of phases shall be at least contain the generic error code	Optional	100%
87	OM-FR104	The electricity meter shall indicate if the self-check failed for electricity and, if M14 is present, the multi-utility information					4.1.3.2	If any of the verifications of the self-check failed, the self-check shall be considered as failed	Optional	100%
88	OM-FR107	The concentrator equipment shall issue a logical error if it detects an inconsistent state of the memory					4.1.3.3	The logical error for inconsistent state of the memory	Minimum	100%
89	OM-FR130	The concentrator equipment shall verify that the communication channels that it is connected to are available					4.1.3.3	The concentrator shall determine if carriers are available	Minimum	100%
90	OM-FR135	The Electricity meter shall provide functionality to automatically issue a request for a host.					4.1.3.4	In case there was no communication between Electricity meter and host	Minimum	100%
91	OM-FR138	The concentrator shall provide functionality to inform electricity meter/communication hub that it is a concentrator					4.1.3.4	The concentrator shall inform the electricity meter/communication hub	Minimum	100%
92	OM-FR140	The concentrator shall provide functionality to respond to a communication test initiated by the central system					4.1.3.4	Communication test is done by asking the status or the concentrator	Minimum	100%
93	OM-FR143	The electricity meter shall provide functionality to respond to a communication test initiated by the central system					4.1.3.4	Communication check is done by asking the status or the concentrator	Minimum	100%
94	OM-FR146	The equipment shall support a uniform description for errors exchanged through all interfaces.					4.1.3.5	The equipment shall support a uniform description for errors	Minimum	100%
95	OM-FR147	The error code used in errors shall have a value from a pre-defined range.					4.1.3.5	The value of error codes shall be in a pre-defined range	Minimum	100%
96	OM-FR149	The equipment shall include an error report as integrated part of all data exchanged with external parties					4.1.3.5	The equipment shall include an error report as integrated part of all data	Minimum	100%
97	OM-FR153	The electricity meter shall have load profile available on S12/M12/C1-M11 soon after the request was received					4.1.4.4	Total time of retrieving the internal data (both electricity and gas)	Minimum	100%
98	OM-FR155	The electricity meter shall have the power quality information available on M12 or M11 soon after the request was received					4.1.4.6	Total handling time of retrieving power quality information	Optional	100%
99	OM-FR167	The electricity meter shall have the logging information on large time shifts available for both electricity and gas					4.1.4.14	The retrieval of the stored information and publication of the information	Minimum	100%
100	OM-FR176	The activity of checking the communication state of the concentrator shall be completed in a limited time					4.1.4.25	The completion time of checking the communication at the concentrator	Minimum	100%
101	OM-FR179	The activity of retrieving daily information from the meters by the concentrator shall be completed in a limited time					4.1.4.26	The completion time needed to retrieve the daily information	Minimum	100%
102	OM-FR180	The concentrator shall provide functionality to retrieve the daily information of all Electricity and multi-utility meters					4.1.5.2	The concentrator shall provide functionality to retrieve the daily information	Minimum	100%
103	OM-FR181	The concentrator shall check if all required data is available after a daily information retrieval and multi-utility information					4.1.5.2	The concentrator shall check if all required data is available	Minimum	100%
104	OM-FR184	The concentrator shall provide functionality to retrieve and/or supply the daily meter information of one or more meters					4.1.5.2	The concentrator is able to send the daily meter information	Minimum	100%
105	OM-FR186	The concentrator shall provide functionality to forward a request, which was sent by the central system					4.1.5.3	The concentrator shall provide functionality to forward a request	Minimum	100%
106	OM-FR187	The concentrator shall provide functionality to forward a broadcast or multicast request, which was sent by the central system					4.1.5.3	A broadcast request, which was sent by the central system	Minimum	100%
107	OM-FR188	The concentrator shall provide functionality to bi-directionally communicate with the Electricity meter					4.1.5.3	The concentrator is able to forward information received from the Electricity meter	Minimum	100%
108	OM-FR189	If the request return information of the Electricity and multi-utility meter is not received within a specified time					4.1.5.3	The concentrator shall be able to retrieve the required data if the request is not received	Minimum	100%
109	OM-FR193	The concentrator shall provide functionality to synchronise the time of the electricity equipment.					4.1.5.4	After the clock of the concentrator is adjusted during commissioning	Minimum	100%
110	OM-FR196	The electricity meter shall have the result on (dis)connection available soon after the request was received					4.1.6.2	Total handling time of retrieving the stored logging information	Optional	75%
111	OM-FR197	The electricity meter shall send the information on generation (current, voltage, active and reactive) energy					4.1.6.3	The information is provided on time and it is accurate as the information is available on port M4	Optional	100%
112	OM-FR199	The electricity meter shall receive set points for generation (active and reactive) energy								



# OPEN meter

Open Public Extended Network metering



Work Package: WP2  
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Title: 2.2 A Requirements and Assessment

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Assessment of Technology Index	DLMS/COSEM on G3 PLC for Interface M1-C1	Description	Chapter	Cat col off	Fit Criteria	Category	Level of fulfillment
1	OM-SR1	System must permit meter registration	3.1.2.1	-	Fulfillment of process "meter registration"	Minimum	100%
2	OM-SR2	System must permit remote tariff programming	3.1.2.2	-	Fulfillment of process "remote tariff programming"	Minimum	100%
3	OM-SR3	System must permit on demand meter reading	3.1.2.3	-	Fulfillment of process "on demand meter reading"	Minimum	100%
4	OM-SR4	System must permit meter reading for billing	3.1.2.4	-	Fulfillment of process "meter reading for billing"	Minimum	100%
5	OM-SR5	System must permit remote disconnection and reconnection	3.1.2.5	-	Fulfillment of process "remote disconnection and reconnection"	Minimum	100%
6	OM-SR6	System must permit power control	3.1.2.6	-	Fulfillment of process "power control"	Minimum	100%
7	OM-SR7	System must permit clock synchronization	3.1.2.7	-	Fulfillment of process "clock synchronization"	Minimum	100%
8	OM-SR8	System must permit remote firmware update	3.1.2.8	-	Fulfillment of process "remote firmware update"	Minimum	100%
9	OM-SR9	System must permit alarm and event management	3.1.2.9	-	Fulfillment of process "alarm and event management"	Minimum	100%
10	OM-SR10	System must permit intervention information	3.1.2.10	-	Fulfillment of process "outage information"	Minimum	100%
11	OM-SR11	System must permit fraud detection	3.1.2.11	-	Origin of message and identification should be proved and command message will be	Minimum	100%
12	OM-SR12	System must permit remote concentrator access for registration, programming, reading and firmware up	3.1.2.12	-	Fulfillment of process "remote concentrator access"	Minimum	100%
13	OM-SR13	System must permit load profile management	3.1.2.13	-	Fulfillment of process "load profile management"	Minimum	100%
14	OM-SR14	System must permit automatic adaptation to grid changes	3.1.3.1	-	Fulfillment of process "automatic adaptation to grid changes"	Advanced	100%
15	OM-SR15	System must permit meter availability control	3.1.3.2	-	Fulfillment of process "meter availability control"	Minimum	100%
16	OM-SR16	System must permit energy balances	3.1.4.1	-	Fulfillment of process "energy balances"	Optional	100%
17	OM-SR17	System must permit load management	3.1.4.2	-	Fulfillment of process "load management"	Optional	100%
18	OM-SR18	System must permit customer device management	3.1.4.3	-	Fulfillment of process "customer device management"	Optional	100%
19	OM-SR19	System must permit power quality management	3.1.4.4	-	Fulfillment of process "power quality management"	Optional	100%
20	OM-SR20	System must permit prepayment	3.1.4.5	-	Fulfillment of process "prepayment"	Optional	50%
21	OM-GR1	System must permit operation, administration and provisioning through access methods and manage	3.2.1.1	-	Presence of tools and information bases accessible to control applications and control	Minimum	100%
22	OM-GR2	The system must be capable of authenticating entities	3.2.1.2	-	Origin of message and identification should be proved and command message will be	Minimum	100%
23	OM-GR3	The system must be capable of managing access rights for any of its components, with an adequate gr	3.2.1.2	-	The access control will be offered through classical mechanisms (such as access con	Minimum	100%
24	OM-GR4	The system must be capable of guaranteeing the integrity of data exchanged at all times	3.2.1.2	-	Implementation of hash mechanisms or usage of symmetric or asymmetric algorithms	Minimum	100%
25	OM-GR7	The system and devices should provide functionality to prevent eavesdropping	3.2.1.2	-	Implementation of encryption mechanisms is necessary on appropriate layers of the c	Minimum	100%
26	OM-GR11	The system shall provide functionality for management of encryption keys	3.2.1.2	-	Key schedule for management of encryption keys should be exposed, in any case the ge	Minimum	100%
27	OM-GR12	Physical access to devices should be made difficult	3.2.1.2	-	The system must be capable of automatically generating alarms reporting security r	Minimum	100%
28	OM-GR13	All unused device physical interface (about gateway, data concentrator, meter) will be disabled by defau	3.2.1.2	-	Mechanisms will be proposed for the management to enabling or disabling these inter	Advanced	100%
29	OM-GR18	System must permit remote power quality management	3.1.4.4	-	Mechanisms will be proposed to automatically disabling or locking interface device	Advanced	100%
30	OM-GR18	System must be interoperable	3.2.1.3	-	Use of standards, or at least open and public specifications, wherever interoperability	Minimum	100%
31	OM-GR19	System must be robust	3.2.1.4	-	For each component (or group of components) of the AMI system criteria along which	Minimum	100%
32	OM-GR20	System must be scalable	3.2.1.5	-	Maximum capacity of treatment from a functional point of view (such as number of m	Minimum	100%
33	OM-GR25	All electricity equipment must be maintained (corrective, preventive or as a continuous process) of the AM	3.2.1.5	-	Bit of the meter must be implemented for maintenance. Each time it is possible	Minimum	100%
34	OM-GR22	The design and implementation of AMI systems shall aim at obtaining the best possible performances	3.2.1.7	-	Description of the mechanisms in place that allow performance in AMI systems, and c	Minimum	100%
35	OM-ER1	Use of standard components	3.3.1.1	-	Bill of material composed of > 50% of off-the-shelf components	Minimum	100%
36	OM-ER2	Strictly adjust specs. to business needs	3.3.1.1	-	Cost estimates to be checked by Technical Committee	Minimum	100%
37	OM-ER3	Reduce bill of materials	3.3.1.1	-	Bill of materials to be checked by Technical Committee	Minimum	100%
38	OM-ER4	Maximize life time of equipments	3.3.1.1	-	-	Minimum	100%
39	OM-ER5	Flexible technology to fulfil possible future requirements	3.3.1.1	-	-	Minimum	100%
40	OM-ER6	Easy installable equipments without the need of changing the existing customer installations	3.3.1.1	-	-	Minimum	100%
41	OM-ER7	Minimization of cost of installation	3.3.1.2	-	-	Minimum	100%
42	OM-ER8	Minimization of external elements	3.3.1.2	-	-	Minimum	100%
43	OM-ER9	Maximum automation of the roll-out process supported by technology and protocols	3.3.1.2	-	-	Minimum	100%
44	OM-ER10	Minimization of the time of customer presence at the installation process	3.3.1.2	-	-	Minimum	100%
45	OM-ER12	System must interface with existing utilities legacy systems	3.3.1.3	-	-	Minimum	100%
46	OM-ER13	Full automation of reading (electricity, gas, water and heat) operations.	3.3.2.1	-	-	Minimum	100%
47	OM-ER14	Full automation of disconnection and reconnection operations.	3.3.2.1	-	-	Minimum	100%
48	OM-ER15	Should allow remote programming	3.3.2.1	-	Fulfillment of process "remote programming"	Minimum	100%
49	OM-ER16	Should allow remote contract management.	3.3.2.1	-	Fulfillment of process "remote contract management"	Minimum	100%
50	OM-ER17	System should not interfere with existing operations.	3.3.2.1	-	-	Minimum	100%
51	OM-ER19	System should permit to automate the processes wherever possible (automatic detection of meters, rec	3.3.2.1	-	-	Minimum	100%
52	OM-ER20	Optimization of Communication costs	3.3.2.1	-	-	Minimum	100%
53	OM-ER20	Reduction of communication points	3.3.2.1	-	-	Minimum	100%
54	OM-ER21	Systems should be designed to minimise maintenance costs.	3.3.2.1	-	-	Minimum	100%
55	OM-ER22	Reduce false alarms	3.3.2.1	-	-	Minimum	100%
56	OM-ER25	System should permit Energy balance of a transformer station	3.3.2.2	0	-	Optional	100%
57	OM-ER27	Minimize internal power consumption of field components.	3.3.2.2	-	-	Minimum	100%
58	OM-ER28	Minimize communication activity.	3.3.2.2	-	-	Minimum	100%
59	OM-FR5	The Electricity meter shall issue a normal error for time adjustments larger than (S) that occur in th	4.1.3.1	-	If the time adjustment is more than (S), a logical error is issued that contains the gen	Minimum	100%
60	OM-FR57	The equipment shall provide functionality to upload new firmware to the equipment.	4.1.3.1	-	The new version of the firmware shall be stored by the equipment until its deployment.	Minimum	100%
61	OM-FR59	The equipment shall issue a logical error in case the new firmware is incomplete or inconsistent.	4.1.3.1	-	The logical error issued for incomplete or inconsistent firmware (invalid identification o	Minimum	100%
62	OM-FR61	The equipment shall provide functionality to invoke Use case: Retrieve electricity meter/communi	4.1.3.2	-	The equipment shall be checked that is executed as part of the installation process	Minimum	100%
63	OM-FR67	The E meter shall have a standardized local port for installation and maintenance purposes (M13).	4.1.3.2	-	By the time the meter is deployed the time and date of the internal clock will deviate le	Minimum	100%
64	OM-FR69	The electricity meter shall provide functionality to set the threshold electricity at the manufacturing site	4.1.3.2	-	The adjusted threshold value will be applied at the time the electricity meter is deploye	Minimum	100%
65	OM-FR70	The electricity meter shall provide functionality to set the breaker at the manufacturing site and after it is	4.1.3.2	-	The adjusted breaker position will be applied at the time the electricity meter is deploye	Minimum	100%
66	OM-FR72	The electricity meter shall provide functionality to set the table for special days at the manufacturing site	4.1.3.2	-	The value of error codes shall be in a pre-defined range of error codes	Minimum	100%
67	OM-FR73	The electricity meter shall provide functionality to set the table for special days at the manufacturing site	4.1.3.2	-	The table for special days shall cover a minimum period of at least n months, where n	Minimum	100%
68	OM-FR74	The electricity meter shall provide functionality to set the standard messages in the meter at the manufa	4.1.3.2	-	The adjusted standard messages will be applied at the time the meter is deployed	Advanced	100%
69	OM-FR75	The electricity meter should provide functionality to set location information in the meter after the meter	4.1.3.2	-	Fit criterion may differ per DSO	Optional	100%
70	OM-FR76	The meter shall provide functionality to set the disconnectable flag at the manufacturing site and after it	4.1.3.2	-	By the time the meter is deployed the disconnectable flag is set to the correct value	Minimum	100%
71	OM-FR78	The electricity meter shall provide functionality to invoke Use case: Adjust equipment remotely or local	4.1.3.2	-	Adjustment of the electricity meter shall comply with the description of use case "Use c	Minimum	100%
72	OM-FR79	The electricity meter shall provide functionality to invoke Use case: Perform self-check electricity meter	4.1.3.2	-	The result of the self-check that is executed as part of the installation process shall co	Minimum	100%
73	OM-FR80	After the electricity meter is physically installed and functions correctly, communication shall be establish	4.1.3.2	-	The meter shall provide functionality to automatically invoke Use case: Set up commu	Minimum	100%
74	OM-FR82	The electricity meter shall provide functionality to invoke Use case: Retrieve electricity meter/communi	4.1.3.2	-	Retrieval of the state of the equipment that is executed as part of the installation pr	Minimum	100%
75	OM-FR83	Meters of other installations that use the equipment to be uninstalled for communication, shall not be eff	4.1.3.2	-	Communication for any other electricity meter/communication hub in other homes sha	Optional	100%
76	OM-FR85	The electricity meter or the concentrator shall automatically invoke use case: Provide actual meter reads	4.1.3.2	-	The actual meter readings gathered shall be in accordance with the description of use	Minimum	100%
77	OM-FR86	The electricity meter shall provide functionality to send the electricity configuration to the central syst	4.1.3.2	-	The configuration check is done by asking the status on an demand read of a value f	Minimum	100%
78	OM-FR87	The electricity meter shall provide functionality to retrieve the electricity operational parameters.	4.1.3.2	-	The operational parameters retrieved for the electricity equipment shall at least contain	Minimum	100%
79	OM-FR88	If the M14 interface is present, the electricity meter shall provide functionality to retrieve the multi-utility	4.1.3.2	-	The configuration information retrieved shall at least contain the information specified	Minimum	100%
80	OM-FR89	If the M14 interface is present, the electricity meter shall provide functionality to retrieve the operational p	4.1.3.2	-	The operational parameters retrieved for the multi-utility meter shall at least contain th	Minimum	100%
81	OM-FR91	The electricity meter shall provide logging information and errors of the electricity equipment and, if the	4.1.3.2	-	The electricity meter shall provide on request of an external entity the log items for the	Minimum	100%
82	OM-FR92	The electricity meter shall provide the actual meter readings and the complete state and logging inform	4.1.3.2	-	State and logging information	Minimum	100%
83	OM-FR95	The equipment shall issue a normal error if it detects an inconsistent state of the memory	4.1.3.2	-	The error for inconsistent memory shall contain the generic attributes for errors	Minimum	100%
84	OM-FR96	The electricity meter shall issue a normal error if it detects an inconsistent state of the memory.	4.1.3.2	-	The error for battery lifetime shall contain the generic attributes for errors.	Optional	100%
85	OM-FR99	The electricity meter shall issue a normal error if the meter is not correctly connected to the grid, i.e. the	4.1.3.2	-	The error for phase inversion shall contain the generic attributes for errors. Th	Optional	100%
86	OM-FR100	The electricity meter shall issue a normal error if not all phases of a poly-phase meter are connected co	4.1.3.2	-	The error for incorrect connection of phases shall at least contain the generic attrib	Optional	100%
87	OM-FR104	The electricity meter shall indicate if the self-check failed for electricity and, if M14 is present, the multi-	4.1.3.2	-	If any of the verifications of the self-check failed, the self-check shall fail. If all verifi	Minimum	100%
88	OM-FR105	The electricity meter shall provide functionality to verify that the communication channels that it is connecte	4.1.3.3	-	The length of the MAC address must support 3000 end points	Minimum	100%
89	OM-FR130	The concentrator equipment shall verify that the communication channels that it is connected to are ava	4.1.3.3	-	The concentrator shall determine if carriers are available for the channels it is connect	Minimum	100%
90	OM-FR135	The electricity meter shall provide functionality to automatically issue a request for a host.	4.1.3.4	-	In case there was no communication between Electricity meter/communication hubs a	Minimum	100%
91	OM-FR138	The concentrator shall provide functionality to inform electricity meter/communication hub that it is auth	4.1.3.4	-	The concentrator shall inform the electricity meter/communication hub, by sending the	Minimum	100%
92	OM-FR143	The electricity meter shall provide functionality to respond to a communication test initiated by the centr	4.1.3.4	-	Communication check is done by asking the status on an demand read of a value f	Minimum	100%
93	OM-FR143	The electricity meter shall provide functionality to respond to a communication test initiated by the centr	4.1.3.4	-	Communication check is done by asking the status on an demand read of a value f	Minimum	100%
94	OM-FR146	The equipment shall support a uniform description for errors exchanged through all interfaces.	4.1.3.5	-	The equipment shall support a uniform description for errors exchanged through all int	Minimum	100%
95	OM-FR147	The error codes used in errors shall have a value from a pre-defined range.	4.1.3.5	-	The value of error codes shall be in a pre-defined range of error codes	Minimum	100%
96	OM-FR149	The equipment shall include an error report as integrated part of all data exchanged with external partie	4.1.3.5	-	The equipment shall include an error report as integrated part of all data exchanged w	Minimum	100%
97	OM-FR153	The electricity meter shall have load profile available on SI2-M12/C11-M1 soon after the request was rec	4.1.4.4	-	Total time of retrieving the interval data (both electricity and Multi-utility meter) and put	Minimum	100%
98	OM-FR155	The electricity meter shall have the power quality information available on M12 or M11 soon after the requ	4.1.4.6	-	Total handling time of retrieving power quality information and publishing all informatio	Optional	100%
99	OM-FR167	The electricity meter shall have the logging information on large time shifts available for both electricity	4.1.4.14	-	The retrieval of the stored information and publication on M11/M12/M13 shall take no m	Minimum	100%
100	OM-FR178	The activity of checking the communication state of the concentrator shall be completed in a limited per	4.1.4.25	-	The completion time of checking the communication state of the C1/C12 interfaces us	Minimum	100%
101	OM-FR179	The activity of retrieving daily information from the meters by the concentrator shall be completed in a li	4.1.4.26	-	The completion time needed to retrieve the daily information by the concentrator from	Minimum	100%
102	OM-FR180	The concentrator shall provide functionality to retrieve the daily information of all Electricity and multi-ut	4.1.5.2	-	The concentrator shall provide functionality to retrieve the daily information of all Elect	Minimum	100%
103	OM-FR183	The concentrator shall check if all required data is available after a daily information retrieval and shall i	4.1.5.2	-	The concentrator shall check if all required data is available after a daily informatio	Minimum	100%
104	OM-FR184	The concentrator shall provide functionality to retrieve and/or supply the daily meter information of one s	4.1.5.2	-	The concentrator is able to send the daily meter information of one specific Electri	Minimum	100%
105	OM-FR186	The concentrator shall provide functionality to forward a request, which was sent by the central system,	4.1.5.3	-	The concentrator shall provide functionality to forward a request, which was sent by th	Minimum	100%
106	OM-FR187	The concentrator shall provide functionality to forward a broadcast or multicast request, which was sent	4.1.5.3	-	A broadcast request, which was sent by the central system, will be forwarded by the c	Minimum	100%
107	OM-FR188	The concentrator shall provide functionality to bi-directionally communicate with the Electricity meters ho	4.1.5.3	-	The concentrator is able to forward information received from the electricity meters ho	Minimum	100%
108	OM-FR189	If the request return information of the Electricity and multi-utility meter is not received within a specifi	4.1.5.3	-	The concentrator will retry to retrieve the required data if this data has not been receiv	Minimum	100%
109	OM-FR193	The concentrator shall provide functionality to synchronise the time of the electricity equipment.	4.1.5.4	-	After the clock of the concentrator is adjusted during clock synchronization, use case 1	Minimum	100%
110	OM-FR196	The electricity meter shall have the result on (dis)connection available soon after the request was rec	4.1.6.2	-	Total handling time of retrieving the stored logging information on (dis)connection of e	Optional	100%
111	OM-FR197	The electricity meter shall send the information on generation (current, voltage, active and reactive) and	4.1.6.3	-	The information is provided on time and it is accurate according to the programmed p	Optional	100%
112	OM-FR199	The electricity meter shall receive set points for generation (active and reactive)	4.1.6.3	-	The information is available on port M14	Optional	50%
113	OM-FR200	The electricity meter shall send signal prices and consumption set point to M14. At the same time the ek	4.1.6.4	-	The information is available on involved ports	Optional	50%
114	OM-TR19	The equipment shall provide functionality for unique identification of the source of all data communicat	4.2.1.7	-	The identification shall be provided by a unique identifier for each source that may con	Minimum	100%
115	OM-TR20	The equipment shall provide functionality for the authorisation (ability of a given person to make a conn	4.2.1.7	-	Authorisation functionality shall be provided by access control mechanisms.	Minimum	100%
116	OM-TR21	All communications interfaces shall disable protocols that are not required for communications with oth	4.2.1.7	-	All communications interfaces shall support only the protocols required for communic	Minimum	100%
117	OM-TR22	All communications interfaces shall have all unauthorised communications without adversely affecting	4.2.1.7	-	All communications interfaces shall handle all unauthorised communications without a	Minimum	100%
118	OM-TR25	Changing a device connected to one of the physical Concentrator interfaces must be detected, logged,	4.2.1.7	-	Changing a device connected to one of the physical Concentrator interfaces must be	Minimum	100%
119	OM-TR26	All unused physical Concentrator interfaces are disabled by default, except for the local Concentrator	4.2.1.7	-	All unused physical Concentrator interfaces are disabled by default, except for the loc	Optional	100%
120	OM-TR27	If the local port is disabled, unused physical Concentrator interfaces which are disabled by default can b	4.2.1.7	-	Unused physical Concentrator interfaces which are disabled by default can be enable	Minimum	100%
121	OM-TR28	If the device is password protected then the password for access to the Concentrator Interface must b	4.2.1.7	-	If the device is password protected then the password for access to the Concentrator	Minimum	100%
122	OM-TR29	If the device is password protected then the password for access to the Concentrator Interfaces must b	4.2.1.7	-	If the device is password protected then the password for access to the Concentrator	Minimum	100%
123	OM-TR30	Physical Concentrator interfaces which were successfully enabled locally must be automatically disable	4.2.1.7	-	Physical Concentrator interfaces which were successfully enabled locally must be aut	Minimum	100%
124	OM-CR1	The electricity meter/communication-hub must have either a PLC or a wireless interface	5.1	-	Existence of a CENELEC 50065-1 Band A compliant PLC or a wireless interface.	Minimum	100%
125	OM-CR2	The PLC technology must be able to handle addresses for at least 3000 end points	5.1	-	The length of the MAC address must support 3000 end points	Minimum	100%
126	OM-CR3	When PLC is used, the communication speed must be 2.4 kbps for a reliable communication	5.1	-	PLC supports at least 2.4 kbps (PHY). Signal level CENELEC 50065-1 Band A compl	Minimum	100%
127	OM-CR4	A reliable faster PLC interface should be possible.	5.1	-	Bandwidth. Reliable data speed: >= 20 kbps (PHY). Signal level CENELEC 50065-1	Optional	100%
128	OM-CR5	Unicast, multicast and broadcast transmission mode must be supported	5.1	-	The length of the MAC address must support 3000 end points	Minimum	100%
129	OM-CR6	Automatic meter detection must be supported	5.1	-	Automatic meter detection procedure without input information	Minimum	100%
130	OM-CR7	A phase detection mechanism must be supported	5.1	-	Existence of the phase detection mechanism	Minimum	100%
131	OM-CR8	Adaptation to topology changes must be supported	5.1	-	Routing function with automatic adaptation to the grid topology changes	Minimum	100%
132	OM-CR9	The electricity meter/communication-hub must have the ability to work as a repeater	5.1	-	Each electricity meter/communication hub is able to work as a repeater in an automati	Minimum	100%
133	OM-CR10	Alternative routes to reach a node	5.1	-	Storing alternative routings to reach to each node. Automatic mechanism to switch	Optional	100%
134	OM-CR11	In case of having several PLC signals, due to crosstalk, it should not make communication impossible	5.1	-	PLC technology has to work properly when the PLC signal of other concentrators are i	Minimum	100%
135	OM-CR12	New PLC technologies defined in this project and PLC technologies compliant to standards used within	5.1	-	Multiple physical layers supported and consistent use of frequencies	Minimum	100%
136	OM-CR13	Information about the line-quality must be provided	5.1	-	Availability of line quality indicators	Minimum	100%





# Open Meter

Open Public Extended Network metering



Work Package: WP2

Type of document: Deliverable

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## Energy Theme; Grant Agreement No 226369

### Title: 2.2 A Requirements and Assessment

Version: 1.0

Page: 28 / 29

Assessment of Technology Index	Index for Interface Description	Chapter	Fit Criteria	Category	Level of fulfillment
1	OM-SR1 System must permit meter registration	3.1.2.1	Fulfillment of process "meter registration"	Minimum	100%
2	OM-SR2 System must permit remote tariff programming	3.1.2.2	Fulfillment of process "remote tariff programming"	Minimum	100%
3	OM-SR3 System must permit on demand meter reading	3.1.2.3	Fulfillment of process "on demand meter reading"	Minimum	100%
4	OM-SR4 System must permit meter reading for billing	3.1.2.4	Fulfillment of process "meter reading for billing"	Minimum	100%
5	OM-SR5 System must permit remote disconnection and reconnection	3.1.2.5	Fulfillment of process "remote disconnection and reconnection"	Minimum	100%
6	OM-SR6 System must permit power control	3.1.2.6	Fulfillment of process "power control"	Minimum	100%
7	OM-SR7 System must permit clock synchronization	3.1.2.7	Fulfillment of process "clock synchronization"	Minimum	100%
8	OM-SR8 System must permit remote firmware update	3.1.2.8	Fulfillment of process "remote firmware update"	Minimum	100%
9	OM-SR9 System must permit alarm and event management	3.1.2.9	Fulfillment of process "alarm and event management"	Minimum	100%
10	OM-SR10 System must permit tamper information	3.1.2.10	Fulfillment of process "tamper information"	Minimum	100%
11	OM-SR11 System must permit fraud detection	3.1.2.11	Fulfillment of process "fraud detection"	Minimum	100%
12	OM-SR12 System must permit remote concentrator access for registration, programming, reading and firmware	3.1.2.12	Fulfillment of process "remote concentrator access"	Minimum	100%
13	OM-SR13 System must permit energy balances	3.1.4.1	Fulfillment of process "load profile balances"	Optional	100%
14	OM-SR14 System must permit automatic adaptation to grid changes	3.1.3	Fulfillment of process "automatic adaptation to grid changes"	Advanced	100%
15	OM-SR15 System must permit meter availability control	3.1.3.2	Fulfillment of process "meter availability control"	Advanced	100%
16	OM-SR16 System must permit energy management	3.1.4.2	Fulfillment of process "load management"	Optional	100%
17	OM-SR17 System must permit customer device management	3.1.4.3	Fulfillment of process "customer device management"	Optional	100%
18	OM-SR18 System must permit power quality management	3.1.4.4	Fulfillment of process "power quality management"	Optional	100%
19	OM-SR19 System must permit payment	3.1.4.5	Fulfillment of process "prepayment"	Optional	70%
20	OM-SR20 System must permit operation, administration and provisioning through access methods and manage	3.2.1.1	Precedence of test and information bases accessible to control applications and cor	Minimum	100%
21	OM-GR1 The system must be capable of authenticating entities	3.2.1.2	Origin of message and identification should be proved and command message wit	Minimum	100%
22	OM-GR2 The system must be capable of managing access rights for any of its components, with an adequat	3.2.1.2	The access control will be offered through classical mechanisms (such as access	Minimum	100%
23	OM-GR3 The system must be capable of performing a secure exchange of data exchanged at all times	3.2.1.2	Implementation of hash mechanisms or usage of symmetric or asymmetric algori	Minimum	100%
24	OM-GR4 The system and devices should provide functionality to prevent eavesdropping	3.2.1.2	Implementation of encryption mechanisms is necessary on appropriate layers of th	Minimum	100%
25	OM-GR5 The equipment shall provide functionality for management of encryption keys	3.2.1.2	Kerberos for management of encryption keys should be exposed, in any case th	Minimum	100%
26	OM-GR6 Physical access to devices should be made difficult	3.2.1.2	The system must be capable of automatically generating alarms reporting securi	Minimum	100%
27	OM-GR7 All unused device physical interface (above gateway, data concentrator, meter) will be disabled by	3.2.1.2	Mechanisms will be proposed for the management to enabling or disabling these i	Advanced	100%
28	OM-GR8 All unused device physical interface (above gateway, data concentrator, meter) will be disabled by	3.2.1.2	Mechanisms will be proposed for automatically disabling or locking interfaces de	Advanced	100%
29	OM-GR9 System must be interoperable	3.2.1.3	Use of standards, or at least open and public specifications, wherever interoperab	Minimum	100%
30	OM-GR10 System must be robust	3.2.1.4	For each component (or group of components) of the AMI system criteria along wh	Minimum	100%
31	OM-GR11 System must be scalable	3.2.1.4	Point of view of treatment from a maximum number of meters	Minimum	100%
32	OM-GR12 All the possible steps to ease maintenance (corrective, preventive or as a continuous process) of the	3.2.1.6	Description of the mechanisms implemented for maintenance. Each time it is poss	Minimum	100%
33	OM-GR13 The design and implementation of AMI systems shall aim at obtaining the best possible performanc	3.2.1.7	Description of the mechanisms in place that allow performance in AMI systems, a	Minimum	100%
34	OM-ER1 Use of standard components	3.3.1.1	Bill of material composed of > 50% of off-the-shelf components	Minimum	100%
35	OM-ER2 Strictly adjust specs. to business needs	3.3.1.1	Cost estimates to be checked by Technical Committee	Minimum	100%
36	OM-ER3 Reduced bill of material	3.3.1.1	Bill of materials to be checked by Technical Committee	Minimum	100%
37	OM-ER4 Maximize life time of equipments	3.3.1.1		Minimum	100%
38	OM-ER5 Flexible technology to fulfil possible future requirements	3.3.1.1		Minimum	100%
39	OM-ER6 Easy installable equipment without the need of changing the existing customer installations	3.3.1.2		Minimum	100%
40	OM-ER7 Minimization of cost of installation	3.3.1.2		Minimum	100%
41	OM-ER8 Minimization of external elements	3.3.1.2		Minimum	100%
42	OM-ER9 Maximum automation of the roll-out process supported by technology and protocols	3.3.1.2		Minimum	100%
43	OM-ER10 System must interface with existing utilities legacy systems	3.3.1.3		Minimum	100%
44	OM-ER11 Full automation of installation and field operations	3.3.1.3		Minimum	100%
45	OM-ER12 Full automation of disconnection and reconnection operations	3.3.1.3		Minimum	100%
46	OM-ER13 Should allow remote contract management	3.3.2.1	Fulfillment of process "remote programming"	Minimum	100%
47	OM-ER14 System should not interfere with existing operations	3.3.2.1	Fulfillment of process "remote contract management"	Minimum	100%
48	OM-ER15 System should permit to automate the processes wherever possible (automatic detection of meters,	3.3.2.1		Minimum	100%
49	OM-ER16 Optimization of communication cost	3.3.2.1		Minimum	100%
50	OM-ER17 Reduction of communication points	3.3.2.1		Minimum	100%
51	OM-ER18 Systems should be designed to minimize maintenance costs	3.3.2.1		Minimum	100%
52	OM-ER19 System should provide alarms	3.3.2.1		Minimum	100%
53	OM-ER20 System should permit Energy balance of a transformer station	3.3.2.2	0	Optional	100%
54	OM-ER21 Minimize internal power consumption of field components	3.3.2.2		Minimum	100%
55	OM-ER22 Minimize communication activity	3.3.2.2		Minimum	100%
56	OM-FR1 The electricity meter shall provide the n most recent billing period meter readings for electricity, where	4.1.2.6	The electricity meter shall have available meter readings electricity for each first da	Minimum	100%
57	OM-FR2 The electricity meter shall provide a fraud attempt as fraud attempt was registered by the	4.1.2.6	The meter shall provide a fraud attempt as fraud attempt was registered by the	Minimum	100%
58	OM-FR3 The electricity meter shall be able to provide the current values of the registers of the electricity and	4.1.2.6	The electricity meter shall provide a meter reading electricity and gas-water-heat to	Minimum	100%
59	OM-FR4 The electricity meter shall be able to provide the current values of the registers of the electricity and	4.1.2.6	The electricity meter shall provide a meter reading electricity and gas-water-heat to	Minimum	100%
60	OM-FR5 The electricity meter shall provide on request internal data for the n most recent days, where	4.1.2.6	The bad profile for the designated period shall at least contain the following param	Minimum	100%
61	OM-FR6 The electricity meter shall provide on request internal data for the n most recent days, where	4.1.2.6	The electricity meter shall provide a minimum of n days of internal data electri	Minimum	100%
62	OM-FR7 The electricity meter shall provide on request internal data Gas-Water-Heat for the n most recent da	4.1.2.6	The electricity meter shall provide a minimum of n days of internal data gas, water	Minimum	100%
63	OM-FR8 The electricity meter shall provide on request internal data Gas-Water-Heat for the n most recent da	4.1.2.6	The electricity meter shall provide a minimum of n days of internal data gas, water	Minimum	100%
64	OM-FR9 The electricity meter shall provide the number of short (s) power interruptions. T must be configur	4.1.2.10	The adjusted threshold value will be applied at the time the electricity meter is dep	Optional	100%
65	OM-FR10 The electricity meter shall provide the number of short (s) power interruptions. T must be configur	4.1.2.10	The adjusted threshold value will be applied at the time the electricity meter is dep	Optional	100%
66	OM-FR11 The electricity meter shall provide the long (h) power interruptions. T must be configur	4.1.2.11	The electricity meter shall provide the following information on long interruptions: E	Minimum	100%
67	OM-FR12 The electricity meter shall provide the long (h) power interruptions. T must be configur	4.1.2.11	The electricity meter shall provide the following information on long interruptions: E	Minimum	100%
68	OM-FR13 In the case of a 3-phase metering installation, a record is also kept in case there is an interruption o	4.1.2.11	The electricity meter shall provide the power interruption information for each phase	Minimum	100%
69	OM-FR14 Metering equipment shall provide a configurable number of detected tamper attempts	4.1.2.12	The metering equipment shall be able to store the following numbers of tamper at	Minimum	100%
70	OM-FR15 Metering equipment shall provide a configurable number of detected tamper attempts	4.1.2.12	The metering equipment shall be able to store the following numbers of tamper at	Minimum	100%
71	OM-FR16 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
72	OM-FR17 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
73	OM-FR18 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
74	OM-FR19 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
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76	OM-FR21 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
77	OM-FR22 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
78	OM-FR23 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
79	OM-FR24 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
80	OM-FR25 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
81	OM-FR26 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
82	OM-FR27 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
83	OM-FR28 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
84	OM-FR29 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
85	OM-FR30 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
86	OM-FR31 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
87	OM-FR32 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
88	OM-FR33 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
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90	OM-FR35 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
91	OM-FR36 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
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119	OM-FR64 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
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121	OM-FR66 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
122	OM-FR67 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
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124	OM-FR69 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
125	OM-FR70 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
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132	OM-FR77 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
133	OM-FR78 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
134	OM-FR79 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
135	OM-FR80 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
136	OM-FR81 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
137	OM-FR82 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
138	OM-FR83 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
139	OM-FR84 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
140	OM-FR85 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
141	OM-FR86 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
142	OM-FR87 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
143	OM-FR88 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
144	OM-FR89 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
145	OM-FR90 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
146	OM-FR91 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
147	OM-FR92 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
148	OM-FR93 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
149	OM-FR94 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
150	OM-FR95 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
151	OM-FR96 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default tariff upon loss of synchronizat	Optional	100%
152	OM-FR97 The electricity meter shall provide logging information for a configurable amount of (dis)connect	4.1.2.13	The correct application of the configurable default		



# OPEN meter

Open Public Extended Network metering



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Page: 29 / 29

## Protocol assessment for interface MI3

Index	Interface	Technology	Weighting of Assessment Category												Total Score																								
			100%			100%			80%			80%				100%			100%			75%			100%			100%											
			Standardisation/ openness in implementation/ interoperability												Management												Fit criteria												
			Total			Min			Max			Total			Min			Max			Total			Min			Max			Total			Min			Max			
1	MI3	DLMS-EASys	50%	100%	0%	0%	50%	100%	0%	0%	50%	100%	0%	0%	50%	100%	0%	0%	67%	100%	0%	0%	50%	100%	0%	0%	50%	100%	0%	0%	50%	100%	0%	0%	50%	100%	0%	0%	31%
2	MI3	DLMS/COSEM on optical port	50%	100%	0%	0%	50%	100%	0%	0%	50%	100%	0%	0%	50%	100%	0%	0%	67%	100%	0%	0%	50%	100%	0%	0%	50%	100%	0%	0%	50%	100%	0%	0%	50%	100%	0%	0%	31%
3	MI3	DLMS	50%	100%	0%	0%	50%	100%	0%	0%	50%	100%	0%	0%	50%	100%	0%	0%	67%	100%	0%	0%	50%	100%	0%	0%	50%	100%	0%	0%	50%	100%	0%	0%	50%	100%	0%	0%	31%
4	MI3	DLMS	50%	100%	0%	0%	50%	100%	0%	0%	50%	100%	0%	0%	50%	100%	0%	0%	67%	100%	0%	0%	50%	100%	0%	0%	50%	100%	0%	0%	50%	100%	0%	0%	50%	100%	0%	0%	31%

Index	ID	Assessment of Technology	MORE	for	Interface MI3	4	Cat col off	10	Fit Criteria	Category	Level of fulfillment	
												Description
1	OM-GR1	System must permit operation, administration and provisioning through access methods and manage							3.2.1.1	Presence of tools and information bases accessible to control applications and cor	Minimum	100%
2	OM-GR2	The system must be capable of authenticating entities							3.2.1.2	Origin of message and identification should be proved and command message will	Minimum	100%
3	OM-GR3	The system must be capable of managing access rights for any of its components, with an adequat							3.2.1.2	The access control will be offered through classical mechanisms (such as access	Minimum	100%
4	OM-GR4	The system must be capable of guaranteeing the integrity of data exchanged at all times							3.2.1.2	Implementation of hash mechanisms or usage of symmetric or asymmetric algorith	Minimum	100%
5	OM-GR7	The system and devices should provide functionality to prevent eavesdropping							3.2.1.2	Implementation of encryption mechanisms is necessary on appropriate layers of th	Minimum	100%
6	OM-GR11	The equipment shall provide functionality for management of encryption keys							3.2.1.2	Kinematics for management of encryption keys should be exposed, in any case th	Minimum	100%
7	OM-GR18	System must be interoperable							3.2.1.3	Use of standards, or at least open and public specifications, wherever interoperabil	Minimum	100%
8	OM-GR19	System must be robust							3.2.1.4	For each component (or group of components) of the AMI system criteria along whi	Minimum	100%
9	OM-GR20	System must be scalable							3.2.1.5	Maximum capacity of treatment from a functional point of view (such as number of	Minimum	100%
10	OM-GR21	All the possible steps to ease maintenance (corrective, preventive or as a continuous process) of the							3.2.1.6	Description of the mechanisms implemented for maintenance. Each time it is poss	Minimum	100%
11	OM-GR22	The design and implementation of AMI systems shall aim at obtaining the best possible performanc							3.2.1.7	Description of the mechanisms in place that allow performance in AMI systems, a	Minimum	100%
12	OM-ER1	Use of standard components							3.3.1.1	Bill of material composed of > 50% of off-the-shelf components	Minimum	100%
13	OM-ER2	Strictly adjust specs. to business needs							3.3.1.1	Cost estimates to be checked by Technical Committee	Minimum	100%
14	OM-ER3	Reduced bill of materials							3.3.1.1	Bill of materials to be checked by Technical Committee	Minimum	100%
15	OM-ER4	Maximize life time of equipments							3.3.1.1	-	Minimum	100%
16	OM-ER6	Flexible technology to fulfill possible future requirements							3.3.1.1	-	Minimum	100%
17	OM-ER6	Easy installable equipments without the need of changing the existing customer installations							3.3.1.2	-	Minimum	100%
18	OM-ER7	Minimization of costs of installation							3.3.1.2	-	Minimum	100%
19	OM-ER8	Minimization of external elements							3.3.1.2	-	Minimum	100%
20	OM-ER9	Maximum automation of the roll-out process supported by technology aided protocols							3.3.1.2	-	Minimum	100%
21	OM-ER10	Minimization of the need of customer presence on the installation process							3.3.1.2	-	Minimum	100%
22	OM-ER12	System must interface with existing utilities legacy systems							3.3.1.3	-	Minimum	100%
23	OM-ER13	Full automation of reading (electricity, gas, water and heat) operations.							3.3.2.1	-	Minimum	100%
24	OM-ER14	Full automation of disconnection and reconnection operations.							3.3.2.1	-	Minimum	100%
25	OM-ER17	System should not interfere with existing operations.							3.3.2.1	-	Minimum	100%
26	OM-ER18	System should permit to automate the processes wherever possible (automatic detection of meters,							3.3.2.1	-	Minimum	100%
27	OM-ER19	Optimization of Communication costs							3.3.2.1	-	Minimum	100%
28	OM-ER20	Reduction of communication points							3.3.2.1	-	Minimum	100%
29	OM-ER21	Systems should be designed to minimise maintenance costs.							3.3.2.1	-	Minimum	100%
30	OM-ER23	System should provide alarms							3.3.2.1	-	Minimum	100%
31	OM-ER27	Minimise internal power consumption of field components.							3.3.2.2	-	Minimum	100%
32	OM-ER28	Minimise communication activity.							3.3.2.2	-	Minimum	100%
33	OM-FR28	The electricity meter shall provide functionality to remotely (dis)connect the supply of electrical pow							4.1.2.13	The customer does not receive any electrical power after a disconnect. The supply	Minimum	100%
34	OM-FR57	The equipment shall provide functionality to upload new firmware to the equipment.							4.1.3.1	The new version of the firmware shall be stored by the equipment until its deploye	Minimum	100%
35	OM-FR59	The equipment shall issue a logical error case the new firmware is incomplete or inconsistent.							4.1.3.1	The logical error issued for incomplete or inconsistent firmware (invalid identifier)	Minimum	100%
36	OM-FR66	The equipment shall provide functionality to invoke a self-check and retrieve the results from the loca							4.1.3.1	The self-check that is executed as part of the planned maintenance process shall c	Minimum	100%
37	OM-FR67	The E meter shall have a standardized local port for installation and maintenance purposes (MI3).							4.1.3.2	By the time the meter is deployed the time and date of the internal clock will deval	Minimum	100%
38	OM-FR69	The electricity meter shall provide functionality to set the threshold electricity at the manufacturing site							4.1.3.2	The adjusted threshold value will be applied at the time the electricity meter is deplo	Minimum	100%
39	OM-FR70	The electricity meter shall provide functionality to set the breaker at the manufacturing site and after							4.1.3.2	The adjusted breaker position will be applied at the time the electricity meter is dep	Minimum	100%
40	OM-FR71	The multi-utility meter shall provide functionality to set the valve, if existing, at the manufacturing site							4.1.3.2	The adjusted valve position will be applied at the time the multi-utility meter is deplo	Minimum	100%
41	OM-FR72	The electricity meter shall provide functionality to set the periods for different tariffs for electricity at t							4.1.3.2	The adjusted tariff periods will be applied at the time the electricity meter is deplo	Minimum	100%
42	OM-FR73	The electricity meter shall provide functionality to set the table for special days at the manufacturing							4.1.3.2	The table for special days shall cover a minimum period of at least n months, wher	Minimum	100%
43	OM-FR74	The electricity meter shall provide functionality to set the standard messages in the meter at the ma							4.1.3.2	The adjusted standard messages will be applied at the time the meter is deployed	Advanced	100%
44	OM-FR75	The electricity meter should provide functionality to set location information in the meter after the me							4.1.3.2	Fit criterion may differ per DSO	Optional	75%
45	OM-FR76	If the MI4 interface is present, the electricity meter shall provide functionality to identify electricity m							4.1.3.2	The electricity meter shall store the necessary information to enable communication	Minimum	100%
46	OM-FR77	The meter shall provide functionality to set the disconnectable flag at the manufacturing site and afte							4.1.3.2	By the time the meter is deployed the disconnectable flag is set to the correct val	Minimum	100%
47	OM-FR78	The electricity meter shall provide functionality to invoke Use case: Adjust equipment (remotely or lo							4.1.3.2	Adjustment of the electricity meter shall comply with the description of use case U	Minimum	100%
48	OM-FR78	The electricity meter shall provide functionality to invoke Use case: Perform self-check electricity m							4.1.3.2	The result of the self-check that is executed as part of the installation process sha	Minimum	100%
49	OM-FR80	After the electricity meter is physically installed and functions correctly, communication shall be est							4.1.3.2	The meter shall provide functionality to automatically invoke Use case: Set up com	Minimum	100%
50	OM-FR82	The electricity meter shall provide functionality to invoke Use case: Retrieve electricity meter/commu							4.1.3.2	Retrieval of the state of the equipment that is executed as part of the un-installat	Minimum	100%
51	OM-FR83	Meters of other installations that use the equipment to be uninstalled for communication, shall not be							4.1.3.2	Communication for any other electricity meter/communication hub in other homes	Optional	100%
52	OM-FR84	The electricity meter/communication hub shall provide functionality to reset its state after the equip							4.1.3.2	The electricity meter shall provide functionality to reset its state.	Optional	100%
53	OM-FR85	The electricity meter or the concentrator shall automatically invoke use case Provide actual meter re							4.1.3.2	The actual meter readings gathered shall be in accordance with the description of u	Minimum	100%
54	OM-FR86	The electricity meter shall provide the functionality to send the electricity configuration to the central							4.1.3.2	The information retrieved as the electricity configuration shall at least contain the in	Minimum	100%
55	OM-FR87	The electricity meter shall provide functionality to retrieve the electricity operational parameters.							4.1.3.2	The operational parameters retrieved for the electricity equipment shall at least cor	Minimum	100%
56	OM-FR88	If the MI4 interface is present, the electricity meter shall provide functionality to retrieve the multi-uti							4.1.3.2	The configuration information retrieved shall at least contain the information specifi	Minimum	100%
57	OM-FR89	If the MI4 interface is present, the electricity meter shall provide functionality to retrieve the operatio							4.1.3.2	The operational parameters retrieved for the multi-utility meter shall at least contain	Minimum	100%
58	OM-FR91	The electricity meter shall provide logging information and errors of the electricity equipment and, if							4.1.3.2	The electricity meter shall provide on request of an external entity the log items fo	Minimum	100%
59	OM-FR92	The electricity meter shall provide the actual meter readings and the complete state and logging info							4.1.3.2	State and logging information	Minimum	100%
60	OM-FR104	The electricity meter shall indicate if the self-check failed for electricity and, if MI4 is present, the m							4.1.3.2	If any of the verifications of the self-check failed, the self-check shall fail. If all verif	Minimum	100%
61	OM-FR105	The electricity meter shall provide functionality to invoke Use case: Retrieve electricity meter/comm							4.1.3.2	Retrieval of the state of the equipment that is executed as part of the maintenance	Minimum	100%
62	OM-FR106	The electricity meter shall provide functionality to invoke Use case: Perform self-check and send th							4.1.3.2	The result of the self-check that is executed as part of the maintenance process af	Minimum	100%
63	OM-FR149	The equipment shall include an error report as integrated part of all data exchanged with external pa							4.1.3.5	The equipment shall include an error report as integrated part of all data exchanged	Minimum	100%
64	OM-FR158	The electricity meter shall (dis)connect the supply of energy soon after the request was received by							4.1.4.9	Total handling time after receiving the request should be less than 30 seconds.	Minimum	100%
65	OM-FR167	The electricity meter shall have the logging information on large time shifts available for both electric							4.1.4.14	The retrieval of the stored information and publication on MI1/MI2/MI3 shall take no	Minimum	100%
66	OM-FR168	The equipment shall execute a change to a new firmware within a limited period of time.							4.1.4.15	The completion rates and times for execution of the change of the firmware within t	Minimum	100%
67	OM-FR169	The activities for the process of configuring electricity meter/communication hub (excluding register							4.1.4.16	The completion time of the adjustment via MI3 shall be less than 1 minute.	Minimum	100%
68	OM-FR170	The activities for the process of locally setting up communication for the electricity meter/communi							4.1.4.17	The completion time for the local setup of all communication parameters and config	Minimum	100%
69	OM-FR171	The activity of retrieving the equipment state shall be completed in a limited period of time.							4.1.4.18	The completion time for the retrieval of the equipment state via MI3/MI4 shall be	Optional	100%
70	OM-FR196	The electricity meter shall have the result on (dis)connection available soon after the request was re							4.1.6.2	Total handling time of retrieving the stored logging information on (dis)connection of	Optional	75%
71	OM-FR197	The electricity meter shall send the information on generation (current, voltage, active and reactive) e							4.1.6.3	The information is provided on time and it is accurate according to the programmed	Optional	100%
72	OM-TR19	The equipment shall provide functionality for unique identification of the source of all data communic							4.2.1.7	The identification shall be provided by a unique identifier for each source that may c	Minimum	100%
73	OM-TR20	The equipment shall provide functionality for the authorisation (ability of a given person to make a co							4.2.1.7	Authorisation functionality shall be provided by access control mechanisms	Minimum	100%
74	OM-TR21	All communications interfaces shall disable protocols that are not required for communications with							4.2.1.7	All communications interfaces shall support only the protocols required for commu	Minimum	100%
75	OM-TR22	All communications interfaces shall handle all unauthorised communications without adversely affect							4.2.1.7	All communications interfaces shall handle all unauthorised communications witho	Minimum	100%
76	OM-CR15	The electricity meter/communication hub must have a local bidirectional interface							5.3	Existence of a local interface	Minimum	100%
77	OM-CR16	Use of PLC modem of a meter device to communicate with other near meters							5.3	The meter has to support that a Local O&M device is connected to optical port and	Optional	100%