REPORT

ON

STANDARDIZATION OF METER PARAMETERS

APRIL 2009

CENTRAL POWER RESEARCH INSTITUTE

Prof. Sir C.V. Raman Road, Sadashivanagar Sub Post Office
P.B.No: 8066, Bangalore – 560 080
http://www.cpri.in

CONTENTS

GLOSSARY

ABT	Availability Based Tariff
AMI	Advanced Metering Infrastructure
AMM	Advanced Meter Management
AMR	Automatic Meter Reading
AMRA	Automatic Meter Readers Association
ANSI	American National Standards Institute
API	Application Program Interface
BIS	Bureau of Indian Standards
CBIP	Central Board of Irrigation & Power
CDF	Common Data Format
CEA	Central Electricity Authority
CMRI	Common Meter Reading Instrument
COSEM	COmpanion Specification for Energy Metering
CPRI	Central Power Research Institute
CTT	Conformance Test Tool
DISCOM	DIStribution COMpany
DLMS	Device Language Message Specification
DLMS-UA	DLMS User Association
DTC	Distribution Transformer Centre
GO&D	Grid Operations & Distribution
ET-13	Electro-Technical Committee - 13 on Metering
HHU	Hand Held unit
HLC	High Level committee
HT	High Tension
IPP	Independent Power Producers
IEC	International Electrotechnical Commission
IEEMA	Indian Electrical and Electronics Manufacturers Association
IT	Information Technology
LT	Low tension
MBC	Metering, Billing & Collection
MIOS	Meter Inter Operable Solution
MOP	Ministry Of Power
NC	National Committee
OBIS	OBject Identification System
PSTN	Public Switched Telephone Network
R-APDRP	Restructured APDRP
SC	Sectional Committee
TC	Technical Committee

EXECUTIVE SUMMARY

1. A meeting was held on 29th Jan 2008 at CEA on the interoperability issue of reading meters i.e adopting a single protocol (OPEN) or MIOS proposed by IEEMA. The discussions considered both open protocol and MIOS. BIS took in its purview the study of protocol and held a few meetings. Later Joint Secretary (dist) took a meeting on 30-9-2008 at MOP for finalization of metering protocol. The participants favored open protocol. This was followed by a BIS meeting on 23rd Dec. 2008 for adoption of IEC 62056 series of standards and creation of companion standard for Indian utilities. The ET-13, P1 committee of BIS recommended adoption of IEC 62056 and initiated work on Companion Standard for Indian requirements. Simultaneously a HLC under Chairmanship of Member (GO&D), CEA was formed by MOP, to study and recommend suitable open protocol.

2. The recommendations of the HLC are as under:

   2.1 Energy Meters supplied in future shall conform to IEC 62056 standard.
   2.2 The legacy meters shall be provided with a Converter to standard protocol. Alternatively MIOS may be chosen or meters replaced.
   2.3 Standardization of parameters for various meters including tamper list.
   2.4 Compilation of OBIS codes as per IEC 62056 for above parameters
   2.5 Development of CMRI for IEC 62056 for standardized parameters.
   2.6 Creation / augmentation of test facility for IEC 62056 at CPRI.

3. MoP constituted a committee under the Chairmanship of Director General, CPRI with the members from CEA, Manufacturers Association and utilities to make recommendations taking 2.3, 2.4 and 2.5 as Terms of reference.

   3.1 This committee resolved that

   - There shall be three types of meters as follows.

     a) Energy accounting / Audit Meters - For feeder and DTC
     b) Interface Meters - For Boundary / Bank / ABT/ IPPs
     c) Consumer Meters - For HT as well as LT

   - The above meters shall provide the electrical and non-electrical parameters identified and Classified under following groups:

     i) Instantaneous Parameters
     ii) Profile generic or Load Survey Parameters.
     iii) Accounting/ billing Parameters.
     iv) Abstract Parameters
       - Name Plate Details.
       - Programmable Parameters
     v) Event conditions (including tampers).

   3.2 The number of identified parameters for each of the above listed groups and meters types is summarized in TABLE –A.

TABLE – A

S.No	CLASSIFIED PARAMETERS	METER TYPES		
		ENERGY ACCOUNTING AND AUDIT METERS	INTERFACE METERS	CONSUMER METERS
1	INSTANTANEOUS	28	24	22
2	PROFILE OR LOAD SURVEY	13	11	13
3	ACCOUNTING/ BILLING.	TO BE DERIVED FROM S.No 1 & 2	11	40
4	NAME PLATE DETAILS.	6	6	6
5	PROGRAMMABLE	6	6	6
6	EVENTS / TAMPER	40	40	40

3.3 The individual parameter with OBIS codes are listed under table 1 to table 12 in Section – 5. The OBIS codes identified are generally in accordance with IEC 62056, PART – 61 and Bluebook edition – 9 of DLMS UA.

3.4 The committee gathered that there are a few Indian manufacturers for development of CMRI and that technology is available. These manufacturers are reported to have exhibited IEC 62056 compatible CMRI in various forums.

3.5 This report is being sent to BIS as input for formulation of Companion Standard for IEC 62056 to suit the country specific requirements.

3.6 This maiden list of identified parameters shall be considered and approved as “Indian Electrical Energy Parameters for Communication form Meter – VERSION1”. This list shall be uploaded on the website of CEA/CPRI/IEEMA.

3.7 It is recommended that a separate committee be constituted by MOP for maintenance of parameter list, its OBIS codes and regulate the future requirements from any utilities. This committee shall exist on permanent basis and financial provision shall be made for its recurring expenses.

3.8 The committee is of the view that compliance of meters to Companion Standard is to be made mandatory and hence has recommended provision of funds for upgrading the test facility at CPRI as national and third party certification laboratory.

REPORT ON STANDARDIZATION OF METER PARAMETERS

1. PREAMBLE

The present day electronic meter goes beyond metering and provides relevant meaningful data. The range of data covers billing quantities, electrical parameters, tamper details and historical data. There are also high end meters capable of meeting the needs of Import/Export category, ABT and power quality measurements. Most of the distribution setups have resorted to electronic meters, thanks to the sufficient production base in the country which has been rising to the needs of quality meters, by their clients with support of country wide Test houses like CPRI, ET&DC, ERDA and other laboratories.

The industry is also supporting the reading of meter data through HHUs or remotely. The distribution companies in their quest for improving the MBC process started adopting various degree of automation which centered on IT systems for delivering the desired outputs. Under this scenario the retrieval of meter data was found to be challenging due to plethora of proprietary protocols, with which data are structured by each of the manufacturers. The irony was that in a cosmopolitan type of network, information about those structures is reported to be not freely available there by choking the process of automation. This misery was traced to the lack of a common (open) meter data reading protocol not only in India but in other countries as well and the issue was deliberated at various national forums.

The IT empowerment of power distribution is round the corner through PART-A of the R-APDRP program which aims at establishment of base line data creation for ultimate objective of 15% AT&C loss level. Some of the activities are Consumer Indexing, Asset Mapping, GIS Mapping, Integrated MBC, Energy accounting & auditing and AMR on DT & Feeders. In other words a modern metering system capable of interfacing with IT infrastructure to facilitate communication directly with the AMR/AMM systems and transforming in to an AMI is needed. The common open metering protocol forms an important ingredient for realizing the full capabilities of an AMI system.

The discussion on Common (Open) protocol was debated at many forums. A meeting was held on 29th Jan 2008 at CEA on the topic of interoperability. The discussions considered both open protocol and MIOS. BIS took in its purview the study of protocol and held a few meetings. The deliberations could not resolve the issues. Later Joint Secretary (dist) took a meeting on 30-9-2008 at MOP for finalization of metering protocol. The participants favored open protocol. This was followed by the constitution of HLC under Chairmanship of Member (GO&D), CEA by MOP. The gist of report of HLC on standardization of meter protocol is given at Annexure-1. Simultaneously BIS held a meeting on 23rd Dec. 2009 for adoption of IEC 62056 series of standards and creation of companion standard for Indian utilities. The ET-13, P1 committee of BIS recommended adoption of IEC 62056 and initiated work on companion standard for Indian requirements.

The common protocol often referred to as OPEN PROTOCOL exists in the form of standards. The various parts of IEC 62056 standards addressing all aspects of protocol including OBIS codes is given in Annexure-2. The standard was evolved by DLMS UA and subsequently adopted by IEC in 2002. This standard enables a structured approach for exchange of meter data. The syntax and semantics for this

open protocol are well documented. Most of the meter parameters are defined as objects. The standard prescribes the OBIS - a unique method for addressing the parameters. Provision exists for adding new objects. This protocol is independent of communication medium and supports interoperability. This open protocol is having a CTT. This recommendation of adopting the open protocol IEC 62056 by HLC can be expected to bring in the homogeneity needed for automation.

The HLC desired that as part of standardization the parameters to be read from all the meters and the tamper conditions be consolidated and frozen as on date. The committee formed under the chairmanship of Director General, CPRI to standardize the parameters and to identify the OBIS codes. This committee is now submitting its findings in the following sections.

2. CONSTITUTION OF THE COMMITTEE

A committee was constituted by MOP (vide lr.No.6/8/2008-EC/APDRP dt. 7-1-2009 (copy enclosed in Annexure -3). With the nominations received from the members the full committee was as under:

1. Shri P. K. Kognolkar, Director General, CPRI …… Chairman
2. Shri Alok Gupta, Chief Engineer (DP &D), CEA
3. Dr. A. B. Pandey, Managing Director, MSEDCL

   (Alternate - Shri. U.S. Mane, GMIT, MSEDCL)
4. Shri Vijender Kumar, Managing Director, UHBVN
5. Shri R. C. Dhup, G.M (APDRP), NTPC
6. Bureau of Indian Standard (BIS) represented by

   Shri. Prakash Bachani, Scientist E & Head ETD

   Smt. Manju Gupta, Scientist D, ETD
7. Shri S. C. Sarkar, President Metering Division, IEEMA
8. IEEMA Represented by

   Shri. Surendra Jhalora, Secure Meters Ltd.

   Shri. Sanjay Ahuja, L & T

   Shri. C.P Jain, HPL Socmec Ltd.

   Smt. Manushri Shah, Elster Metering Pvt. Ltd.

The committee invited Shri. Prashanth Gopalkrishnan, CEO, Shri. Vinoo Warrior, VP and Shri. Balagopal of M/s Kalki Communication Technologies, Bangalore dealing with software development and implementation of IEC 62056 (DLMS) protocol issues.

3. TERMS OF REFERENCE

The Committee was given the following mandate to look into standardization of application wise meter parameters and tamper list along with OBIS codes and submit its report within three months of formation.

The committee was constituted to

(i) Operationalise the implementation of IEC 62056

(ii) Approve and Channelise the India specific requirements in the IEC 62056as may be necessary at future date as under:-
   - Application wise standardization of parameters including tamper list.
   - Circulation of standard parameters to utilities for their comments.
   - Compilation / Creation of OBIS codes as per IEC 62056 for standardized parameters by CPRI.
   - Development of CMRI having IEC 62056 compatibility.

4. METHODOLOGY ADOPTED FOR IDENTIFICATION OF PARAMETERS

The meter is often looked upon as the cash box of a distribution company. So any distribution company would look for billing related data as per local tariff regulations. Nevertheless the meters as of now are advanced and offer additional data and features. Any distribution company would for in the IT empowered scenario, data for planning, dispute resolving, and system studies besides billing data.

Therefore the general guideline adopted is that the data required for the envisaged applications like energy accounting, billing, energy auditing, system analysis etc, shall have prime importance and other data considered useful in the IT empowered scenario shall also be included in the list. The meters shall be able to provide identified data for designated usage at the host computer.

In line with these considerations, CPRI prepared the first version, a base document, of all electrical and non electrical parameters keeping the category of consumers as the basis. This document proposed four types of meters namely Energy Accounting Meter, Interface Meter, HT Meter and LT Meter. The list of parameters was classified in to six groups. This list borrowed inputs from SRS document of R-APDRP, CBIP technical report published in July 2008 and specification of a typical energy meter.

During the discussion among CEA, CPRI, a few manufacturers and System Integrators the four types of meter were brought down to three types and aligned with the existing CEA regulation on meters. This revised version became the base document and was circulated by CEA to all the distribution companies. The response received had suggestions and comments. During the run up to the finalization three meetings were held at CPRI covering all the state utilities. The list of invitees and participants during the meetings is given in Annexure-4. These meetings helped to understand the practices of various states and field problems.

The list of various parameters was consolidated based on the comments and suggestions received from utilities during the meeting held on 4th Feb, 3rd and 4th Mar, 2009. This consolidated list was deliberated up on by the designated committee during its meeting on 19th March 2009 at CPRI. Committee observed that large number of parameters have been listed based on practices adopted by various utilities. In order to reduce the time required for communication of large data to host computer it was resolved that bare essential data be recorded by the meter. This minimum data can be communicated in the least possible time and other parameters could be easily computed at host computer rather than computing in the meter. Based on these considerations the list of parameters was revised for each type of meter. The revised list was sent to committee members and feedback received subsequent which the list was finalized. The OBIS codes for these finalized parameters were identified. The Section-5 elaborates on the finalized parameters with OBIS codes.

EXCLUSIONS - It was noted during the discussions that different practices are adopted by the various utilities and felt that the following aspects shall be considered by utilities as per their present practices.

[A] The measurement and computation of each of the parameters.

[B] Demand computation method.

[C] Harmonics and Distortion - The parameters associated with measurement of harmonics energy/ distortions have not been considered for the present. In case any utility proposes to measure the harmonics separately they may consult the proposed committee for identification of the future parameters with Object Identification System Code (OBIS).

5. IDENTIFIED PARAMETERS WITH OBIS CODES.

As on date many manufacturers have been supplying electronic energy meters having capability to make available varieties of data / information covering electrical parameters, abstract parameters and Tamper / Event conditions. Different utilities call for different set of parameters from the manufacturer.

All those data / information are measured or computed by the meter, stored, displayed and made available at the meter communication terminals. The enormous data / information are downloaded by an automatic reading system or a common meter reading instrument (CMRI). These reading systems are more or less custom designed and downloading time is reported to be time consuming.

Now for the future energy meters to be procured by electric utilities the list of electrical parameters, abstract parameters and event / tamper conditions along with the communication protocol are proposed to be standardized so that utilities across the country follow a uniform approach in preparing tender documents for procurement of meter/ meter reading software. Hence forth a typical meter specification would encompass Electrical, Mechanical and Parameter List.

This approach is expected to bring uniformity across the country thus avoiding frequent changes in the specification. The minimal data / information can be scheduled for a time bound communication over a channel to the data center thereby all the identified applications like energy accounting, energy auditing, billing data generation etc are possible with corresponding application programs. This of course is to be supported by robust Information Technology (IT) system which is well within the current technological capabilities.

The following energy meters are envisaged in line with CEA regulations on installation of operation of meters.

(i) ***Energy accounting and Audit Meters -*** The Energy Accounting and Audit meters are identified for use at sub-station feeders and Distribution Transformer Centers. These meters would record energy flow in one direction.

(ii) ***Interface Meters -*** The interface meters are identified for use at Meter Banks, network boundaries, for ABT based metering and wherever consumer is drawing / injecting from/to the grid

(iii) ***Consumer Meters –*** The consumer meter are identified for HT PT and CT operated and LT – CT operated consumer meters who import energy.

In line with the above notion the parameters have been identified and classified into:

a) Instantaneous Parameters
b) Block Profile / Load Survey data for 15 or 30 minute capture time block.
c) Accounting / billing Parameters (Daily profile).
d) Abstract Quantities

- Name Plate Details.
- Programmable parameters

e) Event / Tamper Conditions

The measurement and computation of each of these parameters shall be based on methods specified by the utilities as per their prudent practices or as directed by respective Regulatory Commission as different utilities are adopting different practices and there is no common consensus especially with reference to calculation of energies (fundamental energy / total energy including harmonics / lag reactive power or lag lead reactive power) and demand integration (fixed or sliding window for Maximum Demand(MD)).

In this report the parameters associated with measurement of harmonics energy/ distortion have not been considered. In case any utility proposes to measure the harmonics separately they may consult CEA / CPRI for identification of the parameters with Object Identification System Code (OBIS).

The parameters have been finalized in such a way so that there is minimum type of meters and minimum parameters. The identified parameters are considered adequate to derive application specific quantities at the host computer end.

Each of the parameters as given in the following Tables are assigned OBIS code in line with IEC 62056-61 and Bluebook edition-9 released by DLMS UA. Details of applicable Table for each type of meters are given as below:

S.No	Meter Type	Data / Information	Applicable Tables
A	Energy Accounting and Audit Meters	Instantaneous Parameters Block Profile / Load Survey data. Accounting / billing Parameters (Daily profile). Name Plate Details. Programmable parameters Event / tamper conditions.	1 2 1, 2 10 11 12A, 12B
B	Interface Meters	Instantaneous Parameters Block Profile / Load Survey data. Accounting / billing Parameters (Daily profile). Name Plate Details. Programmable parameters Event / tamper conditions.	3 4 4,5 10 11 12A, 12B
C	Consumer Meters	Instantaneous Parameters Block Profile / Load Survey data. Accounting / billing Parameters (Daily profile). Name Plate Details. Programmable parameters Event / tamper conditions.	6 7 8,9 10 11 12A, 12B

5.1 ***Instantaneous Parameters***

The Instantaneous parameters are calculated at a particular instant of time and displayed on the meter. These values will be continuously updated by the meter hardware / software as per internal sampling and computation time. At any instant or on continuous basis a snap shot of all the instantaneous values shall be readable by the HOST computer or by a CMRI. There is a provision to read all the listed parameters or set of parameters based on selection. The energy values in the table are cumulative readings from the date of manufacturing or installation of meter as the case may be. These shall be continuously updated and last updated value available at the meter for downloading as and when required.

5.2 ***Profile Generic or load survey parameters (capture time block 15 or 30 minutes) – Block Profile***

Two load survey profiles are proposed with the capture times of 15 minutes and 30 minutes. The capture times are programmable by the utilities. The tables lists the parameters whose profile (survey) is captured and stored in the meter as per capture time period. However for interface meters the capture time shall be of 15 minutes duration. The data stored is the average value for the captured time block stored at the end of that block, except for energy values. The energy entries are the consumption during respective capture time block posted at the end of that block. All the data shall be stored in the form of an array. These shall be retained inside the meter memory for the last 22 days for a capture period of 15 minutes or for the 45 days for a capture period of 30 minutes... It is assumed that number of load survey parameters are 5 which are selectable from the respective tables by the utilities. If number of load survey parameters are more than 5 then number of storage days will get proportionately reduced for the chosen capture time. The profiles can be read at any time. All these data shall also be read by Hand Held Unit (HHU) or HOST.

5.3 ***Parameters for Accounting/ Billing Purpose – Daily Profile***

These are parameters identified for accounting / billing purposes. These shall be generated by the meter for each billing cycle and stored in the memory. The set of data for last 6 (six) cycles shall be stored in the memory. At the end of each cycle corresponding set of data shall be read by the host/ CMRI. In case of energy accounting and audit meters these values shall be computed from Table -1 and Table -2.

5.4 ***Name Plate Details***

These details are abstract parameters and are grouped as “Name Plate Details”. These are readable as a profile as and when required. Some of the pertinent information about the supplied meter is included in this table.

5.5 ***Programmable Parameters***

These details are abstract parameters and are grouped as “Programmable Parameters”. These are readable as and when required. The Programmable

parameters are required to be written by utility engineers with appropriate access rights.

5.6 ***Event Conditions:***

The event conditions are identified and listed in Table – 12A, the utility shall select the required events from this table. These details shall be stored based on number of counts to be decided by the utility. It is suggested that a total 200 tamper/ events counts could be stored in the memory.

For each type of event conditions the parameters to be captured are also listed in Table – 12B. It may be chosen as per utility need and practice.

The types of events to be recorded may be selected by the Utility out of the list provided in table 12A as per Utility need and practice. The parameters for which Snapshot is to be recorded at time of tamper / event can also be selected out of list of parameters provided in “Capture Parameters” in table 12B.

The event conditions are identified and listed in Table -12A. These details shall be stored in 4 compartments. No. of events in the first three compartment shall be 60 each and the 4th compartment shall be 20. Total events shall be 200. Tampers are grouped in four different compartments:

- Voltage related tampers : Total 60 events
- Current Related Tampers : Total 60 events
- Other Tampers : Total 60 events
- Power Failure : Total 20 events

The following sets of tables contain the names and the assigned OBIS codes of the electrical and non-electrical parameters. These tables shall be considered and approved as “Indian Electrical Energy Parameters for Communication form Meter – VERSION1”. The future maintenance of these tables shall be entrusted to a separate committee.

NOTE: The OBIS codes identified are in accordance with IEC 62056: Part-61:2002 and the latest edition (No-9) of the Bluebook released by DLMS UA. However these codes could be reviewed while finalizing the Companion Standard, by BIS.

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[A] ENERGY ACCOUNTING AND AUDIT METERS

A.1] INSTANTANEOUS PARAMETERS.

These meters are identified for Feeder metering and DTC metering where the power flow is unidirectional *****. The parameters identified are grouped under Instantaneous (Table-1) and Block load profile (Table -2). The tables include the name of the parameter and the details pertaining to OBIS codes. The parameters shall be considered with following points.

1. The values of parameters listed in Table -1 would be continuously updated internally by the meter.
2. The parameters at S No. 18 to 25 hold cumulative values at that instant from the date of manufacturing or installation of meter as the case may be.
3. All parameters can be read by the HOST/CMRI as and when required.
4. Snap shot of all or selected values could be read as a Profile.
5. Signed Power factor – (+ indicates lag) and (- indicates lead).
6. Parameters like Phase Sequence Reversal and any other item shall be **ONLY DISPLAYED** on the meter as per the respective utility practices.
7. The attributes of each of the IC (Interface Class) is to be identified while finalizing the Companion Standard.

Please see for Table -1 in the next page.

*** - In the event a meter, has to read bi-directional power flow then Interface meters, shall be used.**

TABLE- 1 – INSTANTANEOUS VALUES FOR ENERGY ACCOUNTING AND AUDIT METERS.

S.No	Parameter	OBIS CODES						IC	REMARKS
		A	B	C	D	E	F		
1.	Real Time Clock – Date and Time	0	0	1	0	0	255	8 (Clock)	
2.	Current - I_R	1	0	31	7	0	255	3 (Register)	
3.	Current - I_Y	1	0	51	7	0	255	3 (Register)	
4.	Current – I_B	1	0	71	7	0	255	3 (Register)	
5.	Voltage - V_{RN} for 3 Φ / 4W	1	0	32	7	0	255	3 (Register)	Code is same for 3 Φ / 4W or 3 Φ / 3W. The reference point is either Neutral or Y-phase.
6.	Voltage – V_{YN} for 3 Φ / 4W	1	0	52	7	0	255	3 (Register)	
7.	Voltage – V_{BN} for 3 Φ / 4W	1	0	72	7	0	255	3 (Register)	
8.	Voltage - V_{RY} for 3 Φ / 3W	1	0	32	7	0	255	3 (Register)	
9.	Voltage – V_{YB} for 3 Φ / 3W	1	0	52	7	0	255	3 (Register)	
10.	Signed Power Factor – R phase	1	0	33	7	0	255	3 (Register)	
11.	Signed Power Factor – Y phase	1	0	53	7	0	255	3 (Register)	
12.	Signed Power Factor – B phase	1	0	73	7	0	255	3 (Register)	
13.	System Power Factor – PF	1	0	13	7	0	255	3 (Register)	
14.	Frequency	1	0	14	7	0	255	3 (Register)	
15.	Apparent Power – kVA	1	0	9	7	0	255	3 (Register)	
16.	Signed Active Power – kW (+ Forward, - Reverse)	1	0	1	7	0	255	3 (Register)	Sign is reflected in the attribute of IC
17.	Signed Reactive Power – kVAr (+ Lag, - Lead)	1	0	3	7	0	255	3 (Register)	
18.	Cumulative Energy – kWh	1	0	1	8	0	255	3 (Register)	
19.	Cumulative Energy – kVArh – Lag	1	0	5	8	0	255	3 (Register)	
20.	Cumulative Energy – kVArh – Lead	1	0	8	8	0	255	3 (Register)	
21.	Cumulative Energy – kVAh	1	0	9	8	0	255	3 (Register)	
22.	Cumulative Power OFF duration	0	0	96	7	15	255	1 (Data)	
23.	Cumulative Tamper Count	1	0	94	91	1	255	1 (Data)	
24.	Cumulative MD resets count	0	0	0	1	0	255	1 (Data)	
25.	Cumulative programming count	0	0	96	2	0	255	1 (Data)	
26.	Date and Time of Last MD reset	0	0	0	1	2	255	1 (Data)	
27.	Maximum demand – kW	1	0	1	6	0	255	4(Ext.Reg)	
28.	Maximum demand – kVA	1	0	9	6	0	255	4(Ext.Reg)	

A.2] BLOCK LOAD PROFILE FOR ENERGY ACCOUNTING AND AUDIT METERS.

The parameters for this block load profile listed in Table -2 shall be considered with following points.

1. The parameters listed in this table are for load survey purpose and are logged as per the block period time.
2. The Block period of 15 min / 30 min is programmable by utility.
3. If the block period chosen is 30 minutes the storage will be for 45 days.
4. If the block period chosen is 15 minutes the storage will be for 22 days.
5. If the number of parameters chosen are less the storage will be for more days in both the above cases.
6. The parameters at S. No. 2 to 9 are the average values during the block period time and stored at the end of that time block.
7. The parameters at S. No. 10 to 13 are the actual energy consumption during that time block.
8. These parameters can be read at any instant by HOST/ CMRI for any of the parameters for any specified range and time.
9. Selected values can be read as profile.
10. The list of parameters in Table – 1 and Table – 2 shall be used for computing the daily accounting data at the HOST.
11. Capture objects for 3 Φ / 4W are items 1, 2,3,4,5,6,7,10,11,12,13.
12. Capture objects for 3 Φ / 3W are items 1, 2,4,8,9,10,11,12,13.
13. Load profile (Load survey) is modeled as Profile generic (IC: = 7) object with OBIS Code 1.0.99.1.1.255.
14. The capture objects of this load profile are as per Table-2.
15. The capture object values will be copied into buffer of this object automatically, at the interval specified in the capture period of the same profile object.
16. The attributes of each of the IC (Interface Class) is to be identified while finalizing the Companion Standard.

Please see for Table -2 in the next page.

TABLE- 2 – BLOCK LOAD PROFILE FOR ENERGY ACCOUNTING AND AUDIT METERS

S.No	Parameter	OBIS CODES						IC	REMARKS
		A	B	C	D	E	F		
	PROFILE CODE	**1**	**0**	**99**	**1**	**1**	**255**	**7 (profile generic)**	**Capture time = 15/30 min Capture Objects = 1 to 13**
1.	Real time clock	0	0	1	0	0	255	8 (Clock)	
2.	Current – I_R	1	0	31	27	0	255	3 (Register)	
3.	Current – I_Y	1	0	51	27	0	255	3 (Register)	
4.	Current – I_B	1	0	71	27	0	255	3 (Register)	
5.	Voltage - V_{RN} for 3 Φ / 4W	1	0	32	27	0	255	3 (Register)	Code is same for 3 Φ / 4W or 3 Φ / 3W. The reference point is either Neutral or Y-phase.
6.	Voltage – V_{YN} for 3 Φ / 4W	1	0	52	27	0	255	3 (Register)	
7.	Voltage – V_{BN} for 3 Φ / 4W	1	0	72	27	0	255	3 (Register)	
8.	Voltage - V_{RY} for 3 Φ / 3W	1	0	32	27	0	255	3 (Register)	
9.	Voltage – V_{YB} for 3 Φ / 3W	1	0	52	27	0	255	3 (Register)	
10.	Block Energy – kWh	1	0	1	29	0	255	3 (Register)	
11.	Block Energy – kVArh – lag	1	0	5	29	0	255	3 (Register)	
12.	Block Energy – kVArh – lead	1	0	8	29	0	255	3 (Register)	
13.	Block Energy – kVAh	1	0	9	29	0	255	3 (Register)	

[B] INTERFACE METERS

B.1] INSTANTANEOUS PARAMETERS

These meters are identified for Network Boundary / Open Access consumer / Feeder Bank / ABT. Hence, some additional parameters have been accommodated for taking care of bidirectional flow of power. The parameters identified are grouped under Instantaneous (Table-3), Block load profile (Table -4) and Daily load Profile (Table-5). The tables include the name of the parameter and the details pertaining to OBIS codes.

The parameters for this instantaneous value listed in Table -3 shall be considered with following points.

1. The values of parameters listed in Table -3 would be continuously updated internally by the meter.
2. The parameters at S No. 19 to 24 hold cumulative values at that instant from the date of manufacturing or installation of meter as the case may be.
3. All parameters can be read by the HOST/CMRI as and when required.
4. Snap shot of all or selected values could be read as a Profile.
5. Signed Power factor – (+ indicates lag) and (- indicates lead).
6. Parameters like Phase Sequence Reversal and any other item shall be **ONLY DISPLAYED** on the meter as per the respective utility practices.
7. The attributes of each of the IC (Interface Class) is to be identified while finalizing the Companion Standard.

Please see for Table – 3 in the next page.

TABLE – 3 - INSTANTANEOUS PARAMETERS FOR INTERFACE METERS

S.No	Parameter	OBIS CODES						IC	REMARKS
		A	B	C	D	E	F		
1.	Real Time Clock – Date and Time	0	0	1	0	0	255	8 (Clock)	
2.	Current - I_R	1	0	31	7	0	255	3 (Register)	
3.	Current - I_Y	1	0	51	7	0	255	3 (Register)	
4.	Current – I_B	1	0	71	7	0	255	3 (Register)	
5.	Voltage - V_{RN} for 3 Φ / 4W	1	0	32	7	0	255	3 (Register)	Code is same for 3 Φ / 4W or 3 Φ / 3W. The reference point is either Neutral or Y-phase.
6.	Voltage – V_{YN} for 3 Φ / 4W	1	0	52	7	0	255	3 (Register)	
7.	Voltage – V_{BN} for 3 Φ / 4W	1	0	72	7	0	255	3 (Register)	
8.	Voltage - V_{RY} for 3 Φ / 3W	1	0	32	7	0	255	3 (Register)	
9.	Voltage – V_{YB} for 3 Φ / 3W	1	0	52	7	0	255	3 (Register)	
10.	Signed Power Factor – R phase	1	0	33	7	0	255	3 (Register)	
11.	Signed Power Factor – Y phase	1	0	53	7	0	255	3 (Register)	
12.	Signed Power Factor – B phase	1	0	73	7	0	255	3 (Register)	
13.	System Power Factor – PF	1	0	13	7	0	255	3 (Register)	
14.	Frequency	1	0	14	7	0	255	3 (Register)	
15.	Apparent Power – kVA	1	0	9	7	0	255	3 (Register)	
16.	Signed Active Power – kW (+ is import, - is export)	1	0	1	7	0	255	3 (Register)	Sign is reflected in the attribute of IC
17.	Signed Reactive Power – kVAr (+ is import, - is export)	1	0	3	7	0	255	3 (Register)	
18.	Cumulative Energy Import – kWh	1	0	1	8	0	255	3 (Register)	
19.	Cumulative Energy Export – kWh	1	0	5	8	0	255	3 (Register)	
20.	Cumulative Power OFF duration	0	0	96	7	15	255	1 (Data)	
21.	Cumulative Tamper Count	1	0	94	91	1	255	1 (Data)	
22.	Cumulative MD resets count	0	0	0	1	0	255	1 (Data)	
23.	Cumulative programming count	0	0	96	2	0	255	1 (Data)	
24.	Date and Time of Last MD reset	0	0	0	1	2	255	1 (Data)	

B.2] BLOCK LOAD PROFILE

The parameters for this block load profile listed in Table -4 shall be considered with following points.

1. The parameters listed in this table are for load survey purpose and are logged as per the block period time.
2. The Block period time for Interface meters is fixed at 15 min for which the data storage will be for 22 days.
3. If the number of parameters chosen are less the storage will be for more days.
4. The parameters at S. No. 2 to 6 are the average values of 15 min block and stored at the end of that time block.
5. The parameters at S. No. 7 to 11 are the actual energy consumption during the 15 min time block.
6. These parameters can be read at any instant by HOST/ CMRI for any of the parameters for any specified range and time.
7. Selected values can be read as profile.
8. Load profile (Load survey) is modeled as Profile generic (IC: = 7) object with OBIS Code 1.1.99.1.1.255.
9. The capture objects of this load profile are as per Table-4.
10. The capture object values will be copied into buffer of this object automatically, at the interval specified in the capture period of the same profile object.

TABLE- 4 - BLOCK LOAD PROFILE FOR INTERFACE METERS

S.No	Parameter	OBIS CODES						IC	REMARKS
		A	B	C	D	E	F		
	PROFILE CODE	**1**	0	**99**	**1**	**1**	**255**	**7 (profile generic)**	**Capture time = 15/30 min Capture Objects = 1 to 11**
1.	Real time clock	0	0	1	0	0	255	8 (Clock)	
2.	Frequency	1	0	14	27	0	255	3 (Register)	Gives absolute average
3.	Voltage - V_{RN} for 3 Φ / 4W	1	0	32	27	0	255	3 (Register)	
4.	Voltage – V_{YN} for 3 Φ / 4W	1	0	52	27	0	255	3 (Register)	
5.	Voltage – V_{BN} for 3 Φ / 4W	1	0	72	27	0	255	3 (Register)	
6.	System Power Factor – PF	1	0	13	27	0	255	3 (Register)	
7.	Net Energy – kWh	1	0	16	29	0	255	3 (Register)	
8.	kVARh – Quadrant 1	1	0	5	29	0	255	3 (Register)	
9.	kVARh – Quadrant 2	1	0	6	29	0	255	3 (Register)	
10.	kVARh – Quadrant 3	1	0	7	29	0	255	3 (Register)	
11.	kVARh – Quadrant 4	1	0	8	29	0	255	3 (Register)	

B.3] DAILY LOAD PROFILE

The parameters for this daily load profile listed in Table -5 shall be considered with following points.

1. The parameters listed in this table are meant for billing purpose and are logged at midnight (00 Hrs).
2. The storage time for these parameters is 22 days.
3. The parameters are the actual energy consumption during the 24 Hrs time block.
4. These parameters can be read at any instant by HOST/ CMRI for any of the parameters for any specified range and time.
5. Selected values can be read as profile.
6. Load profile (Load survey) is modeled as Profile generic (IC: = 7) object with OBIS Code 1.1.99.1.1.255.
7. The capture objects of this load profile are as per Table-5.
8. The capture object values will be copied into buffer of this object automatically, at the interval specified in the capture period of the same profile object.
9. The capture period attribute will be statically fixed as 24 hours.
10. The attributes of each of the IC (Interface Class) is to be identified while finalizing the Companion Standard.

TABLE-5 – DAILY PROFILE FOR INTERFACE METERS:

S.No	Parameter	OBIS CODES						IC	REMARKS
		A	B	C	D	E	F		
	PROFILE CODE	**1**	**0**	**99**	**2**	**1**	**255**	**7 (profile generic)**	**Capture time = 24 hrs Capture Objects = 1 to 11**
1.	Real time clock	0	0	1	0	0	255	8 (Clock)	
2.	Cumulative Energy – kWh – Import	1	0	1	30	0	255	3 (Register)	For D=30 the daily energy consumption can be obtained. For D=8 cumulative meter reading at the end of the day can be obtained.
3.	Cumulative Energy – kWh – Export	1	0	2	30	0	255	3 (Register)	
4.	kVAh – while kWh import	1	0	9	30	0	255	3 (Register)	
5.	kVAh – while kWh export	1	0	1	30	0	255	3 (Register)	
6.	Reactive Energy High (V>103%)	1	0	94	91	1	255	3 (Register)	
7.	Reactive Energy Low (V<97%)	1	0	94	91	2	255	3 (Register)	
8.	Cumulative kVARh – Quadrant 1	1	0	5	30	0	255	3 (Register)	For D=30 the daily energy consumption can be obtained. For D=8 cumulative meter reading at the end of the day can be obtained.
9.	Cumulative kVARh – Quadrant 2	1	0	6	30	0	255	3 (Register)	
10	Cumulative kVARh – Quadrant 3	1	0	7	30	0	255	3 (Register)	
11	Cumulative kVARh – Quadrant 4	1	0	8	30	0	255	3 (Register)	

[C] CONSUMER METERS

C.1] INSTANTANEOUS PARAMETERS

These meters are identified for both HT and LT consumers with PT / CT connected loads. The load is considered unidirectional and Import only. The parameters identified are grouped under Instantaneous (Table-6), Block load profile (Table -7), Current Billing cycle parameters (table – 8) and Parameters for billing purposes (Table-9). The tables include the name of the parameter and the details pertaining to OBIS codes.
The parameters for this instantaneous value listed in Table -6 shall be considered with following points.

1. The values of parameters listed in Table -6 would be continuously updated internally by the meter.
2. The parameters at S No. 19 to 22 hold cumulative values at that instant from the date of manufacturing or installation of meter as the case may be.
3. All parameters can be read by the HOST/CMRI as and when required.
4. Snap shot of all or selected values could be read as a Profile.
5. Signed Power factor – (+ indicates lag) and (- indicates lead).
6. Parameters like Phase Sequence Reversal and any other item shall **ONLY DISPLAYED** on the meter as per the respective utility practices.
7. The attributes of each of the IC (Interface Class) is to be identified while finalizing the Companion Standard.

Please see for Table – 6 in the next page.

TABLE – 6 INSTANTANEOUS PARAMETERS FOR CUSTOMER METERS

S.No	Parameter	OBIS CODES						IC	REMARKS
		A	B	C	D	E	F		
1.	Real Time Clock – Date and Time	0	0	1	0	0	255	8 (Clock)	
2.	Current - I_R	1	0	31	7	0	255	3 (Register)	
3.	Current - I_Y	1	0	51	7	0	255	3 (Register)	
4.	Current – I_B	1	0	71	7	0	255	3 (Register)	
5.	Voltage - V_{RN} for 3 Φ / 4W	1	0	32	7	0	255	3 (Register)	Code is same for 3 Φ / 4W or 3 Φ / 3W. The reference point is either Neutral or Y-phase.
6.	Voltage – V_{YN} for 3 Φ / 4W	1	0	52	7	0	255	3 (Register)	
7.	Voltage – V_{BN} for 3 Φ / 4W	1	0	72	7	0	255	3 (Register)	
8.	Voltage - V_{RY} for 3 Φ / 3W	1	0	32	7	0	255	3 (Register)	
9.	Voltage – V_{YB} for 3 Φ / 3W	1	0	52	7	0	255	3 (Register)	
10.	Signed Power Factor – R phase	1	0	33	7	0	255	3 (Register)	
11.	Signed Power Factor – Y phase	1	0	53	7	0	255	3 (Register)	
12.	Signed Power Factor – B phase	1	0	73	7	0	255	3 (Register)	
13.	System Power Factor – PF	1	0	13	7	0	255	3 (Register)	
14.	Frequency	1	0	14	7	0	255	3 (Register)	
15.	Apparent Power – kVA	1	0	9	7	0	255	3 (Register)	
16.	Signed Active Power – kW (+ Forward, - Reverse)	1	0	1	7	0	255	3 (Register)	Sign is reflected in the attribute of IC
17.	Signed Reactive Power – kVAr (+ Lag, - Lead)	1	0	3	7	0	255	3 (Register)	
18.	Cumulative Power OFF duration	0	0	96	7	15	255	1 (Data)	
19.	Cumulative Tamper Count	1	0	94	91	1	255	1 (Data)	
20.	Cumulative MD resets count	0	0	0	1	0	255	1 (Data)	
21.	Cumulative programming count	0	0	96	2	0	255	1 (Data)	
22.	Date and Time of Last MD reset	0	0	0	1	2	255	1 (Data)	

C.2] BLOCK LOAD PROFILE

The parameters for this block load profile listed in Table -7 shall be considered with following points.

1. The parameters listed in this table are for load survey purpose and are logged as per the block period time.
2. The Block period of 15 min / 30 min is programmable by utility.
3. If the block period chosen is 30 minutes the storage will be for 45 days.
4. If the block period chosen is 15 minutes the storage will be for 22 days.
5. If the number of parameters chosen are less the storage will be for more days in both the above cases.
6. The parameters at S. No. 2 to 9 are the average values during the block period time and stored at the end of that time block.
7. The parameters at S. No. 10 to 13 are the actual energy consumption during that time block.
8. These parameters can be read at any instant by HOST/ CMRI for any of the parameters for any specified range and time.
9. Selected values can be read as profile.
10. Capture objects for 3 Φ / 4W are items 1, 2,3,4,5,6,7,10,11,12,13.
11. Capture objects for 3 Φ / 3W are items 1, 2, 4, 8,9,10,11,12,13.
12. Load profile (Load survey) is modeled as Profile generic (IC: = 7) object with OBIS Code 1.1.99.1.1.255.
13. The capture objects of this load profile are as per Table-7.
14. The capture object values will be copied into buffer of this object automatically, at the interval specified in the capture period of the same profile object.
15. The attributes of each of the IC (Interface Class) is to be identified while finalizing the Companion Standard.

Please see for Table – 7 in the next page.

TABLE-7 – BLOCK LOAD PROFILE FOR CUSTOMER METERS

S.No	Parameter	OBIS CODES						IC	REMARKS
		A	B	C	D	E	F		
	PROFILE CODE	**1**	**0**	**99**	**1**	**1**	**255**	**7 (profile generic)**	**Capture time = 15/30 min Capture Objects = 1 to 13**
1.	Real Time Clock	0	0	1	0	0	255		
2.	Current – I_R	1	0	31	27	0	255	8 (Clock)	
3.	Current – I_Y	1	0	51	27	0	255	3 (Register)	
4.	Current – I_B	1	0	71	27	0	255	3 (Register)	
5.	Voltage - V_{RN} for 3 Φ / 4W	1	0	32	27	0	255	3 (Register)	Code is same for 3 Φ / 4W or 3 Φ / 3W. The reference point is either Neutral or Y-phase.
6.	Voltage – V_{YN} for 3 Φ / 4W	1	0	52	27	0	255	3 (Register)	
7.	Voltage – V_{BN} for 3 Φ / 4W	1	0	72	27	0	255	3 (Register)	
8.	Voltage - V_{RY} for 3 Φ / 3W	1	0	32	27	0	255	3 (Register)	
9.	Voltage – V_{YB} for 3 Φ / 3W	1	0	52	27	0	255	3 (Register)	
10	Block Energy – kWh	1	0	1	29	0	255	3 (Register)	
11	Block Energy – kVArh – Lag	1	0	5	29	0	255	3 (Register)	
12	Block Energy – kVArh – Lead	1	0	8	29	0	255	3 (Register)	
13	Block Energy – kVAh	1	0	9	29	0	255	3 (Register)	

C.3] CURRENT CYCLE PARAMETERS FOR CUSTOMER METERS.

The parameters for this current cycle parameters listed in Table -8 shall be considered with following points.

1. The table-8 constitutes the full list. First 20 parameters in this page and next 18 parameters in next page.
2. This table contains the energy and demand values of the running billing cycle.
3. These parameters can also be read at any instant of time by the HOST/ CMRI.
4. Selected values can be read as profile.

TABLE-8 – CURRENT CYCLE PARAMETERS FOR CUSTOMER METERS.

S.No	Parameter	OBIS CODES						IC	REMARKS
		A	B	C	D	E	F		
1.	Cumulative Energy – kWh	1	0	1	8	0	255	3 (Register)	
2.	Cumulative Energy – kWh – TZ-1	1	0	1	8	1	255	3 (Register)	
3.	Cumulative Energy – kWh – TZ-2	1	0	1	8	2	255	3 (Register)	
4.	Cumulative Energy – kWh – TZ-3	1	0	1	8	3	255	3 (Register)	
5.	Cumulative Energy – kWh – TZ-4	1	0	1	8	4	255	3 (Register)	
6.	Cumulative Energy – kWh – TZ-5	1	0	1	8	5	255	3 (Register)	
7.	Cumulative Energy – kWh – TZ-6	1	0	1	8	6	255	3 (Register)	
8.	Cumulative Energy – kWh – TZ-7	1	0	1	8	7	255	3 (Register)	
9.	Cumulative Energy – kWh – TZ-8	1	0	1	8	8	255	3 (Register)	
10	Cumulative Energy – kVArh – Lag	1	0	5	8	0	255	3 (Register)	
11	Cumulative Energy – kVArh – Lead	1	0	8	8	0	255	3 (Register)	
12	Cumulative Energy – kVAh	1	0	9	8	0	255	3 (Register)	
13	Cumulative Energy – kVAh – TZ -1	1	0	9	8	1	255	3 (Register)	
14	Cumulative Energy – kVAh – TZ -2	1	0	9	8	2	255	3 (Register)	
15	Cumulative Energy – kVAh – TZ -3	1	0	9	8	3	255	3 (Register)	
16	Cumulative Energy – kVAh – TZ -4	1	0	9	8	4	255	3 (Register)	
17	Cumulative Energy – kVAh – TZ -5	1	0	9	8	5	255	3 (Register)	
18	Cumulative Energy – kVAh – TZ -6	1	0	9	8	6	255	3 (Register)	
19	Cumulative Energy – kVAh – TZ -7	1	0	9	8	7	255	3 (Register)	
20	Cumulative Energy – kVAh – TZ -8	1	0	9	8	8	255	3 (Register)	

Table-8 continued

S.No	Parameter	OBIS CODES						IC	REMARKS
		A	B	C		E	F		
21.	MD – kW	1	0	1	6	0	255	4(Extended Register)	
22.	MD – kW – TZ – 1	1	0	1	6	1	255	4(Extended Register)	
23.	MD – kW – TZ – 2	1	0	1	6	2	255	4(Extended Register)	
24.	MD – kW – TZ – 3	1	0	1	6	3	255	4(Extended Register)	
25.	MD – kW – TZ – 4	1	0	1	6	4	255	4(Extended Register)	
26.	MD – kW – TZ – 5	1	0	1	6	5	255	4(Extended Register)	
27.	MD – kW – TZ – 6	1	0	1	6	6	255	4(Extended Register)	
28.	MD – kW – TZ – 7	1	0	1	6	7	255	4(Extended Register)	
29.	MD – kW – TZ – 8	1	0	1	6	8	255	4(Extended Register)	
30.	MD – kVA	1	0	9	6	0	255	4(Extended Register)	
31.	MD – kVA – TZ – 1	1	0	9	6	1	255	4(Extended Register)	
32.	MD – kVA – TZ – 2	1	0	9	6	2	255	4(Extended Register)	
33.	MD – kVA – TZ – 3	1	0	9	6	3	255	4(Extended Register)	
34.	MD – kVA – TZ – 4	1	0	9	6	4	255	4(Extended Register)	
35.	MD – kVA – TZ – 5	1	0	9	6	5	255	4(Extended Register)	
36.	MD – kVA – TZ – 6	1	0	9	6	6	255	4(Extended Register)	
37.	MD – kVA – TZ – 7	1	0	9	6	7	255	4(Extended Register)	
38.	MD – kVA – TZ – 8	1	0	9	6	8	255	4(Extended Register)	

C.4 BILLING PROFILE

The parameters for this Billing Profile listed in Table -9 shall be considered with following points.

1. The parameters listed in this table are meant for billing purpose and are logged at the end of billing cycle.
2. The storage time for these parameters is 6 billing cycles.
3. The parameters are the actual energy consumption during the billing cycle.
4. These parameters can also be read at any instant of time by the HOST/ CMRI for the previous completed billing cycles.
5. Billing profile is modeled as Profile generic (IC: = 7) object with OBIS Code 1.1.99.1.1.255.
6. The capture objects of this load profile are as per Table-9.
7. The capture object values will be copied into buffer of this object either automatically or asynchronously.
8. The capture period attribute will be fixed as billing date.
9. The attributes of each of the IC (Interface Class) is to be identified while finalizing the Companion Standard.

Please see for Table – 9 spread in the next page.

TABLE-9 – PARAMETERS FOR BILLING PURPOSE FOR CUSTOMER METERS.

S.No	Parameter	OBIS CODES						IC	REMARKS
		A	B	C	D	E	F		
	PROFILE CODE	**1**	**0**	**98**	**1**	**0**	**255**	**7(Profile generic)**	**Capture time = billing date Capture Objects = 1 to 40**
1.	Real Time Clock – Date and Time	0	0	1	0	0	255	8 (Clock)	
2.	System Power Factor for billing period.	1	0	13	0	0	255	3 (Register)	
3.	Cumulative Energy – kWh	1	0	1	8	0	255	3 (Register)	
4.	Cumulative Energy – kWh – TZ-1	1	0	1	8	1	255	3 (Register)	
5.	Cumulative Energy – kWh – TZ-2	1	0	1	8	2	255	3 (Register)	
6.	Cumulative Energy – kWh – TZ-3	1	0	1	8	3	255	3 (Register)	
7.	Cumulative Energy – kWh – TZ-4	1	0	1	8	4	255	3 (Register)	
8.	Cumulative Energy – kWh – TZ-5	1	0	1	8	5	255	3 (Register)	
9.	Cumulative Energy – kWh – TZ-6	1	0	1	8	6	255	3 (Register)	
10	Cumulative Energy – kWh – TZ-7	1	0	1	8	7	255	3 (Register)	
11	Cumulative Energy – kWh – TZ-8	1	0	1	8	8	255	3 (Register)	
12	Cumulative Energy – kVArh – Lag	1	0	5	8	0	255	3 (Register)	
13	Cumulative Energy – kVArh – Lead	1	0	8	8	0	255	3 (Register)	
14	Cumulative Energy – kVAh	1	0	9	8	0	255	3 (Register)	
15	Cumulative Energy – kVAh – TZ -1	1	0	9	8	1	255	3 (Register)	
16	Cumulative Energy – kVAh – TZ -2	1	0	9	8	2	255	3 (Register)	
17	Cumulative Energy – kVAh – TZ -3	1	0	9	8	3	255	3 (Register)	
18	Cumulative Energy – kVAh – TZ -4	1	0	9	8	4	255	3 (Register)	
19	Cumulative Energy – kVAh – TZ -5	1	0	9	8	5	255	3 (Register)	
20	Cumulative Energy – kVAh – TZ -6	1	0	9	8	6	255	3 (Register)	
21	Cumulative Energy – kVAh – TZ -7	1	0	9	8	7	255	3 (Register)	
22	Cumulative Energy – kVAh – TZ -8	1	0	9	8	8	255	3 (Register)	

Table – 9 continued

S.No	PARAMETER	OBIS CODES						IC	REMARKS
		A	B	C	D	E	F		
23.	MD – kW	1	0	1	6	0	255	4(Extended Register)	
24.	MD – kW – TZ – 1	1	0	1	6	1	255	4(Extended Register)	
25.	MD – kW – TZ – 2	1	0	1	6	2	255	4(Extended Register)	
26.	MD – kW – TZ – 3	1	0	1	6	3	255	4(Extended Register)	
27.	MD – kW – TZ – 4	1	0	1	6	4	255	4(Extended Register)	
28.	MD – kW – TZ – 5	1	0	1	6	5	255	4(Extended Register)	
29.	MD – kW – TZ – 6	1	0	1	6	6	255	4(Extended Register)	
30.	MD – kW – TZ – 7	1	0	1	6	7	255	4(Extended Register)	
31.	MD – kW – TZ – 8	1	0	1	6	8	255	4(Extended Register)	
32.	MD – kVA	1	0	9	6	0	255	4(Extended Register)	
33.	MD – kVA – TZ – 1	1	0	9	6	1	255	4(Extended Register)	
34.	MD – kVA – TZ – 2	1	0	9	6	2	255	4(Extended Register)	
35.	MD – kVA – TZ – 3	1	0	9	6	3	255	4(Extended Register)	
36.	MD – kVA – TZ – 4	1	0	9	6	4	255	4(Extended Register)	
37.	MD – kVA – TZ – 5	1	0	9	6	5	255	4(Extended Register)	
38.	MD – kVA – TZ – 6	1	0	9	6	6	255	4(Extended Register)	
39.	MD – kVA – TZ – 7	1	0	9	6	7	255	4(Extended Register)	
40.	MD – kVA – TZ – 8	1	0	9	6	8	255	4(Extended Register)	

D] ABSTRACT PARAMETERS

D.1] NAME PLATE DETAILS

NOTE for Table – 10 and Table - 11:

1. The parameters listed in this table are for all applicable for all meter types.
2. These listed parameters are readable any time,
3. The parameters in Table – 11 are programmable by the utility engineers with required access rights.
4. Programming of any of the parameters in Table – 11 shall increment the “Cumulative programming count” value.

TABLE – 10 NAME PLATE DETAILS FOR ALL METERS

S.No	Information	OBIS CODES						IC	REMARKS
		A	B	C	D	E	F		
1	Manufacturer name	0	0	96	1	0	255	1 (Data)	
2	Meter Serial Number	0	0	96	1	1	255	1 (Data)	
3	Firmware Version for meter	0	0	96	1	2	255	1 (Data)	
4	Firmware Version of communication software	0	0	96	1	3	255	1 (Data)	
5	Internal CT ratio	1	0	0	4	2	255	1 (Data)	
6	Internal PT ratio	1	0	0	4	3	255	1 (Data)	

D.2] PROGRAMMABLE PARAMETERS

TABLE – 11 PROGRAMMABLE PARAMETERS FOR ALL METERS

S.No	Information	OBIS CODES						IC	Remarks
		A	B	C	D	E	F		
1.	Real Time Clock	0	0	1	0	0	255	8 (Clock)	
2.	Demand Integration Period	1	0	0	8	0	255	3 (Register)	
3.	Block Capture Time	Respective profile OBIS code						7 (Profile)	Attr-4 of respective profile object
4.	Billing Date	0	0	10	0	1	255	9 (Script table)	MDI reset / End of billing period
5.	Time Zones (1 to 8)	0	0	10	0	100	255	9 (Script table)	Script table for tariff time switches
6.	Schedule for Billing periods and tariffs	0	0	12	0	0	255	10 (Schedule)	For tariff time switch as well as end of billing period date

E] EVENT / TAMPER CONDITIONS

E.1] EVENTS

Any abnormal / fraud / tamper condition is considered as an Event and stored in an ***Event code*** object (OBIS: = 0.0.96.11.0.255 IC: = 1). The value (attr-2) of this object stores identifier corresponding to most recent event occurred in the meter. Unique identifier is assigned to occurrence and restoration of all possible events (identified so far) in the event reference table (Table-12A). Thus event code object will tell only about the most recent event and to get a picture of all events and associated information (at the time of event) and ***Event log*** object is used. An event log object is modeled as Profile generic (OBIS: = 0.0.99.98.0.255 IC: = 7). The buffer (attr-2) of this profile object will store (asynchronously) a new entry for every event(occurrence and restoration are considered as separate events). The capture objects for the event log object is defined below in Table-12B.

NOTE for Tables – 12 A and 12 B:

1. These are the event conditions generally recorded in consumer meters, utilities may select any the above event conditions based on their practice. The need and applicability of these events for other type of meters shall be considered by Utility.
2. Either Occurrence or Restoration is considered an event.
3. For each of the events a certain list of parameters will be captured.
4. The list capture parameters are given in Table-12B. The utility shall select the required parameters from the table 12B as per their practice.
5. For each of the event captured “Cumulative tamper count” value will be incremented.
6. Capture parameters mentioned in Table 12 B are captured when event occurrence and restoration (as per Table 12A) is logged.
7. For events “Power On-OFF” and “Cover Open” no parameters shall be captured.
8. The attributes of each of the IC (Interface Class) is to be identified while finalizing the Companion Standard.

Table – 12 - A – *Indian Event* Reference Table - for the purpose of OBIS code.

EVENT ID	Descriptions
1.	Meter Cover Opening – Occurrence
2.	Meter Cover Opening – Restoration
3.	R-Phase – PT link Missing (Missing Potential) – Occurrence
4.	R-Phase – PT link Missing (Missing Potential) – Restoration
5.	Y-Phase – PT link Missing (Missing Potential) – Occurrence
6.	Y-Phase – PT link Missing (Missing Potential) – Restoration
7.	B-Phase – PT link Missing (Missing Potential) – Occurrence
8.	B-Phase – PT link Missing (Missing Potential) – Restoration
9.	Over Voltage in any Phase - Occurrence
10.	Over Voltage in any Phase - Restoration
11.	Low Voltage in any Phase - Occurrence
12.	Low Voltage in any Phase - Restoration
13.	Voltage Unbalance - Occurrence
14.	Voltage Unbalance - Restoration
15.	Phase – R CT reverse – Occurrence
16.	Phase – R CT reverse – Restoration
17.	Phase – Y CT reverse – Occurrence
18.	Phase – Y CT reverse – Restoration
19.	Phase – B CT reverse – Occurrence
20.	Phase – B CT reverse – Restoration

Table – 12A continued

EVENT ID	Descriptions
21.	Phase – R CT Open - Occurrence
22.	Phase – R CT Open - Restoration
23.	Phase – Y CT Open - Occurrence
24.	Phase – Y CT Open - Restoration
25.	Phase – B CT Open - Occurrence
26.	Phase – B CT Open - Restoration
27.	Current Unbalance - Occurrence
28.	Current Unbalance - Restoration
29.	CT Bypass – Occurrence
30.	CT Bypass – Restoration
31.	Over Current in any Phase – Occurrence
32.	Over Current in any Phase – Restoration
33.	Influence of AC / DC or permanent magnet - Occurrence
34.	Influence of AC / DC or permanent magnet - Restoration
35.	Neutral Disturbance - HF & DC - Occurrence
36.	Neutral Disturbance - HF & DC - Restoration
37.	Very Low PF - Occurrence
38.	Very Low PF - Restoration
39.	Power failure – Occurrence
40.	Power failure – Restoration

Table- 12 - B – Capture parameters for event as applicable (Event Log Profile)

S.No	Parameter	A	B	C	D	E	F	IC	REMARKS
1.	Date and Time of event	0	0	1	0	0	255	8 (Clock)	
2.	Event Code	0	0	96	11	0	255	1 (Data)	
3.	Current - I_R	1	0	31	7	0	255	3 (Register)	
4.	Current - I_Y	1	0	51	7	0	255	3 (Register)	
5.	Current – I_B	1	0	71	7	0	255	3 (Register)	
6.	Voltage - V_{RN} for 3 Φ / 4W	1	0	32	7	0	255	3 (Register)	Code is same for 3 Φ / 4W or 3 Φ / 3W. The reference point is either Neutral or Y-phase.
7.	Voltage – V_{YN} for 3 Φ / 4W	1	0	52	7	0	255	3 (Register)	
8.	Voltage – V_{BN} for 3 Φ / 4W	1	0	72	7	0	255	3 (Register)	
9.	Voltage - V_{RY} for 3 Φ / 3W	1	0	32	7	0	255	3 (Register)	
10.	Voltage – V_{YB} for 3 Φ / 3W	1	0	52	7	0	255	3 (Register)	
11.	Power Factor – R phase	1	0	33	7	0	255	3 (Register)	
12.	Power Factor – Y phase	1	0	53	7	0	255	3 (Register)	
13.	Power Factor – B phase	1	0	73	7	0	255	3 (Register)	
14.	Cumulative Energy – kWh	1	0	1	8	0	255	3 (Register)	

6. Development of CMRI.

The CMRI is a hand held gadget used for downloading meter data from all makes of energy meters. At present this gadget is predominantly used by the Indian utilities for the billing activity. In the present form it works with the proprietary protocols of all makes of meters that are currently supplied to the Indian market. There are at least two Indian manufacturers who are supplying CMRIs to Indian markets. The technology for development is available. These two manufacturers have already demonstrated the IEC 62056 (dlms/COSEM) compatible CMRIs at various Conferences / exhibitions. It is understood that one of the manufacturer has even supplied a customized variant to a dlms meter manufacturer.

This brings to light the design and technological support for making available dlms compatible CMRIs. So it is inferred that design, development and supply of CMRI gadgets is achievable. However as part of ongoing standardization activities a guideline requirement / specification which shall include the standard parameter list, storage size, print formats etc. for dlms CMRI shall be made available for further customization and adoption, by utilities.

The CPRI and other test houses shall equip their laboratories with required facility to test and validate the CMRI for the standardized list of parameters.

7. Recommendations

1. The committee after detailed deliberations and consultation process with various stake holders resolved that the Meter types and Parameter list shall be as follows

Meter Types

a) Energy accounting and Audit Meters - For Feeder and DTC
b) Interface Meters - For Boundary / Bank / ABT / IPPs
c) Consumer Meters - For HT as well as LT-CT operated.

Classification of Parameters

i) Instantaneous Parameters
ii) Profile generic or Load Survey Parameters.
iii) Accounting/ billing Parameters.
iv) Abstract Parameters
- Name Plate Details.
- Programmable Parameters

v) Event conditions (including tampers).

S.No	Meter Type	Data / Information	Applicable Tables
A	Energy Accounting and Audit Meters	Instantaneous Parameters Block Profile / Load Survey data. Accounting / billing Parameters (Daily profile). Name Plate Details. Programmable parameters Event / tamper conditions.	1 2 1, 2 10 11 12A, 12B
B	Interface Meters	Instantaneous Parameters Block Profile / Load Survey data. Accounting / billing Parameters (Daily profile). Name Plate Details. Programmable parameters Event / tamper conditions.	3 4 4,5 10 11 12A, 12B
C	Consumer Meters	Instantaneous Parameters Block Profile / Load Survey data. Accounting / billing Parameters (Daily profile). Name Plate Details. Programmable parameters Event / tamper conditions.	6 7 8,9 10 11 12A, 12B

2. The identified parameters along with OBIS codes are tabulated in groups as per the above table. The tables numbers referred in column 4 are given as per Section – 5.

3. In the case of consumer meters, the HT & LT-CT operated category meters (import of energy) have been considered and parameters identified. These parameters are by and large applicable for LT whole current meters as well as single phase meters. However the suitability for later cases (domestic) shall be reviewed and refined if required by a separate group.

4. It is recommended that the above table shall be considered and approved as "Indian Electrical Energy Parameters for Communication from Meter – VERSION1 - APRIL 2009"

5. A committee shall be constituted by MOP for maintenance of parameter list, its OBIS codes and regulate the future requirements from any utilities. This committee shall exist on permanent basis and financial provision shall be made for its recurring expenses.

6. The present version of the list and any further changes approved by the committee shall be uploaded on the website of MOP/CEA/CPRI/IEEMA.

7. It shall be noted that some of the manufacturers have started manufacturing IEC 62056 compliant meters. A few manufacturers have already carried out Conformance testing at CPRI laboratory. However, finalization of Companion standard which comes under the purview of BIS is very much essential to accomplish the most important aspect 'THE INTEROPERABILITY'. BIS being and CPRI being a convener, a member of the committee a copy of this report is also forwarded to BIS.

8. The Companion standard to be finalized by BIS (including approved parameter list with OBIS codes) shall be made available to all the utilities.

9. It is understood that the technology and manufacturing for IEC 62056 compatible CMRI is available within the country. The manufacturers can customise the CMRI to suit the standardized list of parameters.

10. The Testing – Once the Companion Standard is released by BIS along with the main adopted version of IEC 62056 standards, the meter supplies would be expected to comply with those standards and as per the requirements of the Utilities. This calls for augmentation / creation of test facilities across the country. The committee recommends provision of funds for upgrading the test facility at CPRI as national and third party certification laboratory.

NOTE: The OBIS codes identified are in accordance with IEC 62056: Part-61:2002 and the latest edition (No-9) of the Bluebook released by DLMS UA. However these codes could be reviewed while finalizing the Companion Standard, by BIS.

8. REFERENCES

1. “Report of High Level Committee on Standardization of Meter Protocol” by CEA, New Delhi
2. CEA Notification – Regulations - No. 502/70/CEA/DP&D New Delhi, dated 17th March 2006. Part III, Section iv
3. Manuel on Standardization of AC Static Electrical Energy Meters, CBIP Publication No. 304, JULY – 2008.
4. Report on Open Protocols for Metering Purposes by CPRI, July 2008
5. IntelliGrid Consumer Portal Telecommunications Assessment and Specification – Technical report by EPRI, December 2005
6. Bluebook 9th Edition, published by DLMS UA.
7. Greenbook 6th Edition, published by DLMS UA.
8. Yellowbook 3rd Edition, published by DLMS UA.
9. Website of DLMS (www.dlms.com)
10. P3 Companion Standard - *Dutch Smart Meter Requirements* Version 2.2 (Final), April 2008, KEMA Consulting
11. Companion Standard for Communication interfaces - Spanish AMM T5 Meters Version 0.6.0 (Draft), December 2008, Iberdrola, Spain

ANNEXURE

Annexure - I

Gist of Report of high level committee on standardization of meter protocol

The High Level Committee under the Chairmanship of Member (Grid Operation & Distribution, CEA comprised members from Electricity Distribution Companies, IEEMA, NTPC, Director General, CPRI, for standardization of meter protocol to enforce interoperability of different makes of meters, both existing and to be installed in future in the power sector).

1. The process of integration of a modern electricity meter with the IT infrastructure attains complexity with numerous proprietary protocols available for each meter make/type. To ameliorate the difficulty in dealing with a number of proprietary protocols and to ensure inter-operability of different makes/types of meters, open protocols have been evolved and standardized by American National Standards Institute (ANSI) and International Electrotechnical Commission (IEC). A forum of nine Indian meter manufacturers under the aegis of IEEMA has also proposed Meter Inter-Operability Solution (MIOS). The adoption of an open protocol to enforce inter-operability of different makes of meters has been under consideration for past few years.

2. Taking note of the deliberations on the subject that have already taken place during the past few years, discussions on the issues framed during of the Committee Meetings and consultation process with the concerned stakeholders, a consensus emerged in regard to the adoption of the open protocol as per IEC 62056 series of standards for future meters. In regard to legacy meters, it was considered appropriate that utilities may depending upon their requirement opt for MIOS or APIs for AMR applications.

3. After detailed deliberations the Committee recommended as under.

3.1. The new meters to be procured in future may conform to the open protocol as per IEC 62056 series of standards.

3.2. For the legacy meters utilities may adopt any of the following options:

a) To use APIs / MIOS as developed by MIOS Forum.
b) Replacement of existing old meters with IEC 62056 compliant meters.
c) To make meter suitable for open protocol (IEC-62056) by incorporating protocol converter, if feasible.

3.3. In order to operationalise the implementation of IEC 62056 in respect of new meters, following issues need to be addressed on priority.

a) Application wise standardization of parameters for various meters including tamper list may be carried out by CEA along with CPRI and NTPC in consultation with utilities. The standard parameters may then be specified by all the utilities.
b) Compilation of OBIS codes as per IEC 62056 for above parameters and identification of the parameters for which OBIS codes are not available and evolving codes for the same. CPRI to take necessary action in this regard.

c) CMRI vendors may develop CMRI having IEC 62056 compatibility for standardized parameters.

3.4. Ministry of Power may consider constituting a committee under the Chairmanship of DG, CPRI with members from CEA, meter manufacturers and standardization body (BIS) to approve and channelise the incorporation of India specific requirement in the IEC 62056 as may be necessary at a future date.

3.5. Necessary action would be taken on the above points in a time bound manner to enable release of agreed common parameters at the earliest for procurement of IEC 62056 compliant meters.

3.6. Funds may be earmarked under R-APDRP for supporting implementation of open protocol and enhancing the facilities for testing of IEC 62056 compliant meters in the country.

Annexure - II

IEC 62056 – The standard for Electricity metering – Data exchange for meter reading, tariff and load control

DLMS was originally created as the Distribution Line Message Specification, an application layer protocol for communicating with distribution automation devices. It was standardized as IEC 61334-4-41. It gradually evolved and was renamed as the Device Language Message Specification, a generic protocol for accessing structured data models.

The Companion Specification for Energy Metering (COSEM) rests on DLMS and addresses a generic set communications services which is independent of lower layers, a detailed object model for metering, based on a naming convention called the Object Identification System (OBIS) and a transport specification based on HDLC for use over serial links, including optical port, local current loop, power line carrier, telephone lines, or GSM cellular, and TCP/IP. The DLMS protocol and COSEM are defined by the DLMS User Association in Blue book (9^{th} ed), Green book (6^{th} ed) and Yellow book (3^{rd} ed).

These documents were later converted into seven parts for standardization by the IEC in 2002 as IEC 62056. The seven parts are as below.

1. **IEC 62056-21** Ed.1.0:2002 – Part 21: Electricity metering – Data exchange for meter reading, tariff and load control **Direct local data exchange**

2. **IEC 62056-31** Ed. 1.0:1999 – Part 31: Electricity metering – Data exchange for meter reading, tariff and load control **Using local area networks on twisted pair with carrier signaling.**

3. **IEC 62056-46** Ed.1.1:2007 – Part 46: Electricity metering – Data exchange for meter reading, tariff and load control **Data link layer using HDLC protocol**

4. **IEC 62056-47** Ed. 1.0:2006 – Part 47: Electricity metering – Data exchange for meter reading, tariff and load control **COSEM transport layers for IPv4 networks**

5. **IEC 62056-53** Ed.2.0:2006 – Part 53: Electricity metering – Data exchange for meter reading, tariff and load control **COSEM Application layer**

6. **IEC 62056-61** Ed.2.0:2006 – Part 61: Electricity metering – Data exchange for meter reading, tariff and load control **Object identification system (OBIS)**

7. **IEC 62056-62** Ed.2.0:2006 – Part 62: Electricity metering – Data exchange for meter reading, tariff and load control **Interface classes**

The standard is supported by the DLMS User Association, which has 130 Members from 5 continents and 51 countries. It has issued - 102 dlms conformance certificates spread over 32 manufactures. Asia has 45 members and 3 independent test laboratories including CPRI. The DLMS UA provides technical support and training. It provides a forum for maintenance and development of the specification in

liaison with IEC TC 13 WG 14, the body responsible globally for electricity meter communication standards.

The protocol provides the methods to present both electrical and non electrical data that are made available by the meter. The protocol describes the three step approach of Modeling, Messaging and Transporting. By modeling the desired data is molded as a composite unit (interface class + attributes) and referred as an Object. The objects are uniquely identified through codes. The IEC 62056, part 61 also called “OBjects Identification System” (OBIS) lists all combinations of such objects. In the Messaging step the object gets transformed in to exchangeable packets. Under transportation the packets are sent or received over the chosen communication medium.

Through object oriented approach, this open standard enables integration and interoperability of the meter with metering systems. The complete specification for a meter would include besides electrical and mechanical requirements, the list of data. Each of the data in the list shall be identifiable by the standard OBIS code in the IEC 62056-61. However Off standard OBIS codes are permitted. These are called Country and Manufacture specific OBIS codes. The Off standard OBIS codes are formed as per the generic OBIS structure. This allows to uniquely identifying a very wide range of metering data, for all utility energy types, covering a wide range of metering functionality. Checking the validity of the OBIS codes is an important part of conformance testing. While the standard OBIS codes are testable, the formed codes are not testable by CTT. Nevertheless CTT would validate the implementation. The Off standard codes shall be verified through separate supplementary software. It is proposed to custom develop this software at CPRI as part of testing facility augmentation.

The COSEM server model

The meter is generally referred as COSEM server. The server is viewed as Physical device having one or more logical devices. The logical devices are group of objects which have unique identification. The logical device consists of Association object and Interface object. The former facilitates authenticated association for further communication. The later holds the metering data which are identifiable through OBIS codes.

The code is a string of up to six integers called *value groups* that identify exactly what the object represents. The six value groups are

Value Group	**Usage description**	**Range**
A = The type of metering	Electricity, Gas, water, heat etc.	1 – 15
B = Channel	Multiple input (eg-concentrator)	0 – 255
C = Physical quantity	Parameters (eg- Voltage, Current, Power etc)	0 – 255
D = Processing	Processing if any on parameters (eg-maximum, minimum, average etc.)	0 – 255
E = Metering rate	Processing for tariff / rate.	0 – 255
F = historical information	storage as per billing periods	0 – 255

Country and Vendor specific extensions are permitted.

If any value group C to F contains a value between 128 and 254, the whole code is considered as manufacturer specific.

The generic structure of OBIS

OBIS codes are a combination of above six value groups, which describe in a hierarchical way the exact meaning of each data item

A	B	C	D	E	F

EXAMPLE

Value group	A	B	C	D	E	F
CODE	1	0	1	8	0	255
Interpretation	Electrical	First channel	Import active power	Time integral of active power from start of measurement	Total energy	Present cycle

This standard is considered suitable for standard representation of metering data. It is an internationally recognized standard and has a strong user support outside of North America. The pre-defined OBIS hierarchy makes it easy to access metering information without a lengthy discovery process.

Annexure - III

The Copy of MoP letter on Parameter standardization Committee.

No. 6/8/2008-EC/APDRP
Government of India
Ministry of Power
::::::::::

Shram Shakti Bhavan, Rafi Marg,
New Delhi January 7, 2009

OFFICE MEMORANDUM

Subject: Constitution of a Committee for Standardisation of the Meter Protocol
::::::::::

Ministry of Power has constituted a "High Level Committee on Standardisation of Meter Protocol" to enforce the interoperability of different make of meters, both existing and in future in the Power sector. The Committee has submitted its Report. As per the recommendation of the Report, a Committee under the Chairmanship of the Director-General, Central Power Research Institute (CPRI) is being constituted to operationalise the implementation of IEC 62056 with the following members:-

(i) Shri Alok Gupta, Chief Engineer (DP&D), Central Electricity Authority
(ii) Dr. Ajay Bhushan Pandey, MD, Maharashtra State Electricity Distribution Co. Ltd
(iii) Shri Vijender Kumar, MD, Uttar Haryana Bidyut Vitran Nigam Ltd.
(iv) Shri R.C. Dhup, GM(APDRP), NTPC Ltd, NOIDA
(v) Bureau of Indian Standards (BIS) representative
(vi) Shri S.C. Sarkar, President Meters Division, IEEMA
(vii) IEEMA Representative

2. The Committee will approve and channelise the incorporation of India specific requirement in the IEC 62056 as may be necessary at a future date as under:-

- Application wise standardization of parameters including tamper list.
- Circulation of standard parameters to utilities for their comments.
- Compilation / creation of OBIS codes as per IEC 62056 for standardized parameters by CPRI.
- Development of CMRI having IEC 62056 compatibility.

3. The Committee shall be required to submit its report within three month of its constitution. The Committee should apprise the Ministry of Power of the development in the matter regularly.

(Ramesh Chand)
Under Secretary to the Government of India
Tel: 23705957

To
All Members of the Committee

Copy to:
PS to Joint Secretary (Dist)/ PA to Director (Distribution)
DGM (KS), APDRP Cell, Ministry of Power

Annexure – IV

CHRONOLOGY OF PREPARATIONS BY THE COMMITTEE

The first version of data list was prepared for four types of meters namely Energy accounting meters, Interface meters, HT consumer meters and LT consumer meters. A meeting was held at CPRI on 9th Jan. 2009 with participation form CEA, a few manufacturers, and a few system integrators. During this meeting the number meter type was made three aligning with CEA regulations on metering and the data list was also modified. This list was circulated to all Utilities by CEA. The Utilities responded with comments and suggestions. Based on this the parameter list was modified. Three meetings were held at CPRI on

4-2-2009 – WITH SOUTHERN / WESTERN REGION UTILITIES
3-3-2009 – WITH NORTHERN REGION UTILITIES
4-3-2009 – WITH EASTERN / NORTHEASTERN REGION UTILITIES

After the above preparatory meetings the parameter list was consolidated and discussed by the committee members on 19th March 2009 at Bengaluru.

LIST OF INVITEES

SOUTHERN INVITEES

1. Bangalore Electricity Supply Company Ltd (BESCOM)
2. Hubli Electricity Supply Company Ltd (HESCOM)
3. Mangalore Electricity Supply Company Ltd (MESCOM)
4. Gulbarga Electricity Supply Company Ltd (GESCOM)
5. Chamundeshwari Electricity Supply Company Ltd (CESCOM) Mysore
6. Eastern Power Distribution Company of AP Ltd
7. Central Power Distribution Company of AP Ltd
8. Northern Power Distribution Company of AP Ltd
9. Southern Power Distribution Company of AP Ltd
10. Kerala State Electricity Board
11. Tamil Nadu Electricity Board
12. (Head of Department) Electricity Department, Puducherry
13. Maharashtra State Electricity Distribution Company Ltd
14. Electricity Department (Panaji Goa)

15. North Eastern Electricity Supply Company of Orissa Ltd.
16. Western Electricity Supply Company of Orissa Ltd.
17. Central Electricity Supply Utility of Orissa (CESCO)
18. Southern Electricity Supply Company of Orissa Ltd
19. Electricity Department (Port Blair)
20. M.P. Paschim Kshetra Vidyut Vitran Company Ltd
21. M.P. Madhya Kshetra Vidyut Vitaran Company Ltd
22. M.P. Poorv Kshetra Vidyut Vitran Company Ltd
23. Electricity Division Office (Kavaratti – Lakshadweep.)

NORTHERN INVITEES

24. Madhya Gujarat Vij Company Ltd. (MGVCL)
25. Dakshin Gujarat Vij Company Ltd. (DGVCL)
26. Ajmer Vidyut Vitran Nigam Ltd. (AVVNL)
27. Jaipur Vidyut Vitran Nigam Ltd (JVVNL)
28. Jodhpur Vidyut Vitran Nigam Ltd. (JVVNL)
29. Paschim Gujarat Vij Company Ltd. (PGVCL)
30. Gujarat Urja Vikas Nigam Limited (GUVNL)
31. Uttar Gujarat Vij Company Ltd. (UGVCL)
32. Uttar Pradesh Power Corporation Ltd. (UPPCL)
33. Paschimanchal Vidyut Vitran Nigam Ltd
34. Poorvanchal Vidyut Vitran Nigam Ltd
35. Dakshinanchal Vidyut Vitran Nigam Ltd
36. Kanpur Electricity Supply Company Limited (KESCO)
37. Dakshin Haryana Bijli Vitran Nigam
38. Uttar Haryana Bijli Vitran Nigam
39. Himachal Pradesh State Electricity Board
40. Punjab State Electricity Board (PSEB)

EASTERN & NORTH EASTERN INVITEES

41. West Bengal State Electricity Distribution Company Ltd
42. Bihar State Electricity Board
43. Chattisgarh State Electricity Board
44. Jharkhand State Electricity Board
45. Uttarkhand Power Corporation Ltd
46. Sikkim Energy & Power Department
47. Arunachal Pradesh Electricity Department
48. Manipur Electricity Department
49. Meghalaya State Electricity Board
50. Department of Power, Nagaland
51. Tripura State Electricity Corporation.

LIST OF PARTICIPANTS

SOUTHERN PARTICPANT'S

1. O.P.Gupta, ACE (Elec) - NDMC, New Delhi, (om.pr.gupta@gmail.com)
2. R.Raviraj, Asst Engineer - Electricity Department, Puducherry, sr_raviraj@sancharnet.in
3. C.V.Karunakaran, JE - Electricity Department, Puducherry,
4. K.S.Dawn, Exe Engineer - KSEB Kerala (dawnchaithram@gmail.com)
5. Y.Venkata Narayana, GM - NDPCL Warangal (gmeanpdcl@yahoo.com)
6. K.Anil Kumar, Asst.Div. Engineer - NDPCL Warangal (anilkedala@gmail.com)
7. Satyanarayana, DE, M&P - SPDCL Tirupati (satyanarayanaindia@yahoo.co.in)
8. Lakshman Chavan, SEE MRT - GESCOM Gulbarga (eeldcgescom@gmail.com)
9. Subhash Bhosle, EEE MRT - GESCOM Gulbarga
10. B.B.Patil, EEE MRT - HESCOM,Belgaum
11. K.Selvam, EE / Meters - TNEB TamilNadu (eemeters@tneb.net.org)
12. T.Samapath Kumar, EE / MRT - TNEB TamilNadu (tsam_kumar@yahoo.com)
13. T. Siddaraju, AEE (Elec)Comm - BESCOM Bangalore, (gmcommercial_bescom@yahoo.in)
14. Mohammed Mustaq, AEE (Elec) - BESCOM Bangalore (aeehtl@yahoo.com)
15. R.P.Chouby, EE (MT) - MPMKVVCL Bhopal (ravi131965@rediffmail.com)
16. Rajkumar, DE (Purchase) - EPDCL,Vizag -
17. Laxmipathy, Exe. Engineer - CESC Mysore
18. N.R.Nagaraju, Exe. Engineer - CESC Mysore
19. R.Veeranna Seth, DT - CESC Mysore (dtcesc@rediffmail.com)

NORTHERN PARTICPANT'S

20. P.K. Monga – Software Manager - PSEB (pkmonga@gmail.com)
21. Sanjay Gandhi - Sr. EE - PSEB (eseemetering@yahoo.com)
22. S.P. Singh - Dy.Dir / SLDC - PSEB (spsingpatiala@yahoo.com)
23. S.K. Bhargav – Sptd. Engineer - Rajasthan (Jaipur Discom)(se_mnp@yahoo.co.in)
24. R.N. Bishnoi – Addl EE - Rajasthan (Jodhpur Discom) (rn_bishan@yahoo.co.in)
25. Prakash Narayan – EE - Uttar Pradesh (PVVNL, Meerut) (eeeutmbd@yahoo.co.in)
26. A.V.Lalchandani – Dy Engineer - UGVCL Gujarat (Uttar) (arun@ugvlmail.com)
27. M.A.Trivedi - Dy Engineer - UGVCL Gujarat (Uttar) (manishkumar.trvedi@ugvclmail.com)

EASTERN &NORTH EASTERN PARTICPANT'S

28. Subrata Das, Chief-Engineer - WBSEDCL (subrata_d50@rediffmail.com)
29. Dilip Kumar Das, Suptd.Engineer - WBSEDCL
30. Chandan Ghosh, DE - WBSEDCL (sjhitech@gmail.com)
31. S.J.Shukla – Dy-Engineer - Hi-tech Lab, MGVCL, Baroda (sjhitech@gmail.com)

COMMENTS / SUGGESTIONS IN THE FORM OF LETTERS / MAILS RECEIVED FROM

1. **M/s. Reliance Energy, Mumbai**
   E-mail: Dated: 22/11/2008 from Assistant Vice President, Operations

2. **M/s. Torrent Power**
   Email: Dated: 05/03/2009

3. **M/s. CESC LTD**
   Email: Dated: 13/02/2009 from Executive Director – Tech (T&D)

4. **M/s. Southern Electricity Supply Company of Orissa Ltd**
   Corporate Office: Courtpeta, Berhampurm, Dist: Ganjam
   Letter: Ref No: O&M/2009/2102 Dated: 10/02/2009 from Senior General Manger (O&M)

5. **M/s. Power & Electricity Department Mizoram: Aizawal**
   Letter: Ref No: T-21018/02/06-EC(P)/P/116 Dated: 16/02/2009 from
   Engineer-in-Chief, P&E

6. **M/s. Government of Pondicherry, Electricity Department**
   Letter: Ref No: EDP/EE-VII/AE-HTM/F.1/2008-09 Dated: 4/02/2009
   Assistant Engineer/HT Metering

7. **M/s. Southern Power Distribution Company of A.P Ltd, Tirupati**
   Letter: Ref No: CGM/SPDCL/TPT/F1/F.Doc/D.No.429 Dated: 20/01/2009

8. **M/s. West Bengal State Electricity Distribution Company Ltd**
   Letter: Ref No: DTD/Open Protocol (Meter) Dated: 27/01/2009
   Additional Chief Engineer, DTD

9. **M/s. The Tata Power Company Ltd**
   E-mail: Dated: 05/02/2009

10. **M/s. North Delhi Power Ltd**
    Letter: Ref No: NDPL/CCM/3 Dated: 21/01/2209
    Head of Department, Power Management & Corporate Commercial

11. **M/s. Elymer**
    E-mail: Dated: 02/02/2009

12. **M/s. BSES, New Delhi.**

Some of the above listed utilities also participated in the meetings held at CPRI.

Members, Invitees, Experts & CPRI Participants

1. P.K.Kognolkar, Director General (I/c) - CPRI, dgcpri@cpri.in
2. Alok Gupta, Chief Engineer - CEA New Delhi
3. R.C.Dhup, Gen Manager - NTPC New Delhi, rcdhup@ntpc
4. U.S. Mane, GMIT, MSEDCL
5. Surendra Jhalora - Secure Meters Ltd.
6. Sanjay Ahuja - Larson & Toubro Ltd
7. C.P Jain - HPL Socamec Ltd.
8. A. Raja Rao, Former Exec. Dir - BHEL, arajarao@yahoo.com
9. A.K. Rajput, Dy Director - CEA , rajputcea@yahoo.com
10. Vinoo S. Warrier, VP - Kalki Communication (vinoo@kalkitech.com)
11. Bala Gopal, - Technologies, Bangalore (balagopal@kalkitech.com)
12. R.K.Hegde, Additional Director - CPRI, rkhegde@cpri.in
13. B.H. Narayana, Additional Director - CPRI, bhn@cpri.in
14. K.B. Manjunath, Additional Director - CPRI, kbm@cpri.in
15. M.M. Babu Narayanan, Additional Director - CPRI, babu@cpri.in
16. V.Arunachalam, Joint Director - CPRI, varun@cpri.in
17. R.Gavirangappa, Joint Director - CPRI, rangappa@cpri.in
18. Madhusudan Kadloor, Joint Director - CPRI, mkadloor@cpri.in
19. V.Shivakumar, Engineering Officer - CPRI, shiva@cpri.in
20. M. Pradish, Engineering Officer - CPRI, pradish@cpri.in
21. Mridula Jain, Engineering Officer - CPRI, mridula@cpri.in