IEC 62055-32 Multi-Part Meters

July2009

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The Battlefield (are we winning?)

+ **Revenue Protection Dimensions**
  - **Technology…** **Engineers, Suppliers…** **Standards (62055-32)**
  - Communication… Sociologists… Forums
  - Legislation… Lawyers… Bylaws
  - Political Will… Politicians… Society
+ **Known limitations of Indoor Payment Meters**
  - Ease of **Consumer** tampering/bypassing of metrology functionality
    - BS5685: terminal re-wiring
    - Eskom base: terminal bridging
  - Higher probability of **Consumer** initiated damage
    - Sugar water/insects, Pool chlorine/corrosion, Pins, Magnets
    - Bridged plug/intentional switching on to large fault currents
  - Dependence on **home invasions** for auditing purposes

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Energy Theft mitigation strategies (at extra cost!)

+ **Two way token technologies (via IEC 62055-52 VTC port modems ?)**
  - Useful with **opportunistic** consumers. Must reward the consumer
  - Requires a **smarter STS** that is fully compatible with existing investments
+ **Service enhancement technologies (via STSA companion standards ?)**
  - Energy savings and consumption/profile awareness
  - Personal consumption management tools
  - Soft credit expiry and arrear collection alternatives
  - Avoid imposing utilities delivery problems
    - Avoid time of use, it penalizes the poor
    - Reward voluntary load curtailment in response to signals
  - Encourage integration of micro/self generation sources

+ **Multi-part implementations…for hostile communities (via 62055-32 ?)**
  - Going beyond making a market for ladders and loss of consumer liability
  - Need for robust enclosures and rapid response teams

Multi-Part STS Systems (via incremental investment)

Pilot wire

Single Part

Multi-Part Metering System

Origin of IEC 62055-32 (for developing countries!)

+ **1922**: First powerline communication systems (15-500kHz ripple control)
+ **1992**: Distribution line carrier systems (3-148kHz, **Cenelec EN 50065-1**)
+ **May 1996 - Eskom MC 710**: Requirements for a split pre-payment meter
  - BS 6839 PLC signaling in a Eskom SCSSCAAH3 pole mounting box
  - EMU to CIU signaling failed due to multiple proprietary alternatives
    - Pilot wires, narrowband PLC technologies and various RF
+ **May 1998 – IEC 61334-5-2:** Frequency shift keyed PLC **(FSK)**
+ **May 2001 – IEC 61334-5-1:** Spread frequency shift keyed **(S-FSK, PLAN)**
+ **Sep 2005 – IEC 62055-31**: Requirements for static payment meters
  - Split meters tested as a single part meter (for lack of a better solution)
+ **Dec 2008 – IEC 62055-32:** New work item proposed and accepted
  - Particular requirements for multi-part payment metering installations
  - Publication due by **September 2010** (may be aligned with EU standards)
+ **2010? – IEC 61334-5-x:** Orthogonal freq shift keying **(OFDM, PRIME)**

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Classification of Parts (proprietary, matched, interop)

+ **Metering Part**
  - **Must include:** Measuring element(s), register(s), storage and control, user display and push button(s), meter test output, diagnostics/service interface, auxiliaries (power supply), interface(s) to other part(s)
  - **May also include:** A virtual token carrier interface and decoder, load switch(s), supply interface, load interface, time-based or remote-operated functions such as a ripple control receiver or a radio receiver
+ **Customer Part**
  - **Must include:** User interface including any physical token carrier interface and user display and push buttons, auxiliaries (power supply)
+ **Communications Part**
  - **May communicate:** on a one-way or two-way basis with one or more other parts, using wired or wireless methods or some other method such as modulated HF induction from an adjacent part or infra-red link or direct mechanical control and feedback
+ **Switch (or valve) Part**
  - **UC2, UC3 or UC4:** according to Annex C of IEC 62055-31

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Dependability and Interoperability of Parts (eeish!)

+ **Metrology Parts**
  - Outdoor environment (**surge, temp range, tropical, solar, salt mist**)
+ **Load Switches**
  - Utilization classes for rural use (**intentional** fault currents, main & acc.)
+ Intra-part **Communication** is not specified. **Suggest**: Due to compliance and co-existence issues, only rely on **technologies that are adequately standardized and fully under utility control**, thus;
  - Proprietary RF technologies are **rejected** (e.g. unlicensed ISM bands)
  - Industry standard RF technologies are **rejected** (W-Mbus, Zigbee etc)
  - Broadband PLC & Cenelec B&C bands are **rejected**. Decabit is **OK**.
  - Cenelec A band PLC is **acceptable** (FSK, S-FSK & OFDM by 2011)
  - Optical FLAG port is **acceptable** (IEC 1107, IEC 61107, IEC 62056-21)
  - Proprietary pilot wire technologies are **acceptable** but safety is a concern
+ **Enclosures**
  - For pole-top and rail-mount products/installations to be **standardized**

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Typical Enclosures for Multi-Part Systems

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IEC TC13 Working Group Progress (WG15)

+ **8 October 2008, Poitiers, France**
  - A variety of terminal & mounting methods would be catered for
  - The variety of climatic conditions could be covered by **EN 50470**
  - **The intra-part communications will not be specified or tested**
  - Parallel work on IEC 62052-31 (**safety**) will be monitored & considered
  - Concern over who owns what parts and maintenance responsibilities
+ **27 May 2009, Input from South Africa**
  - Draft UML model according to syntax of TC57 common info model (**CIM**)
  - Parts may be interconnected by public or private WAN, LAN and/or PAN
+ **28/9 May 2009, Budapest, Hungary**
  - ZA report on global interoperable success of **STS** noted **IEC 62055-41**
  - Prepayment functions in EU smart meter roll-out to follow **IEC 62055-21**
  - **EU smart meters will also be multi-part. Synergies to be explored**
  - **DLMS/COSEM objects may be added for prepayment functionality**

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Issues still to be Resolved by WG15 (or a new WG?)

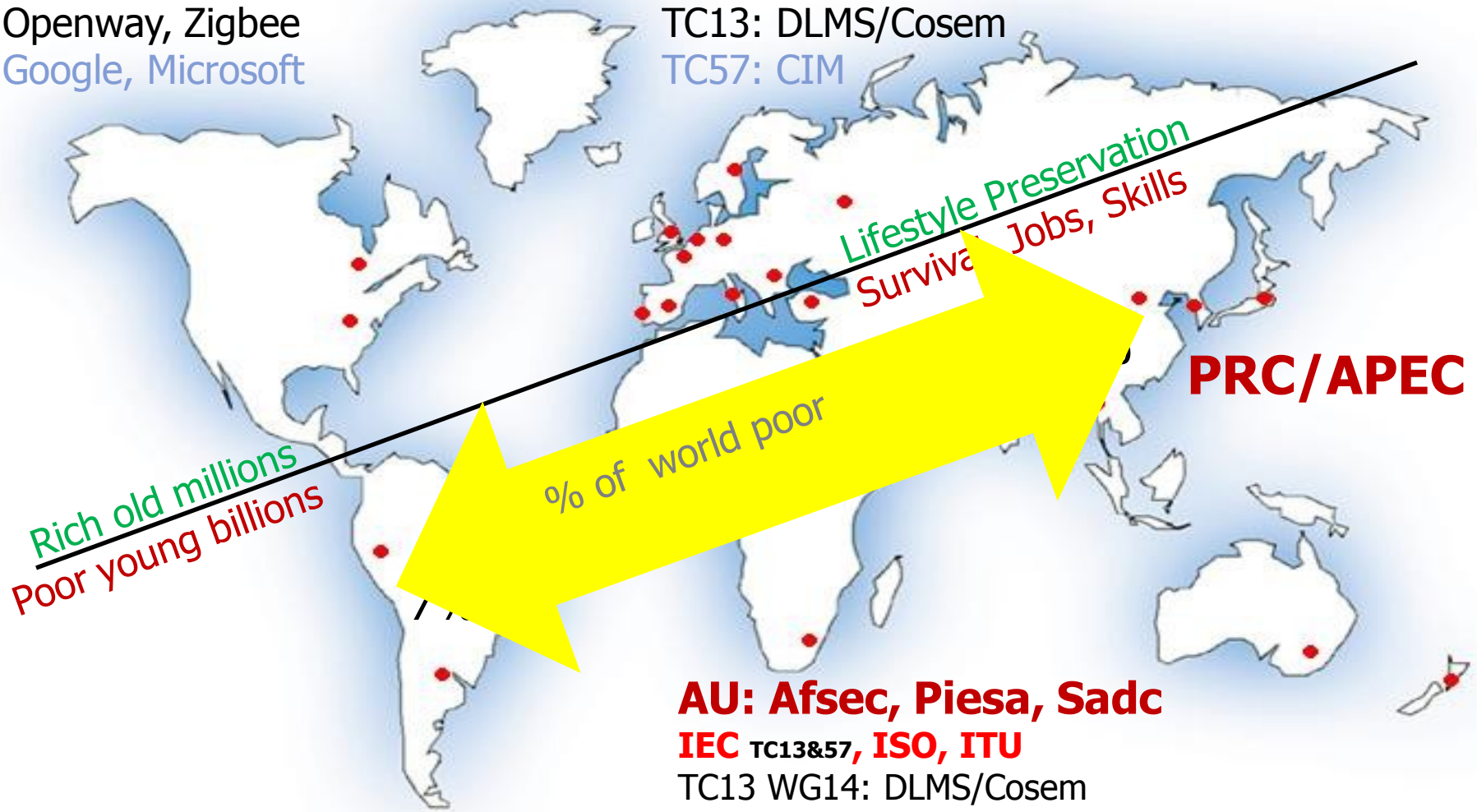
+ Expanded scope to include EU smart metering – TC13 meeting in July ?
+ Practicality of adding prepayment functionality as DLMS/Cosem objects ?
+ Categorization of equipment to aid interoperability and identification ?
+ Testing requirements for;
  - Wired & Wireless technologies (as they evolve)
  - Security aspects (spoofing, blocking, jamming, hi-jacking etc)
  - Commissioning processes, including addition and removal of parts
  - Regulatory requirements of communication parts (OFCOM, ICASA etc)
  - Interoperability (if claimed, and to what degree, certified by ?)
  - Testing of additional, non-metering functionality
+ Power supply requirements, before and/or after point of metering
+ Climatic requirements per part, with or without an enclosure ?
+ Acceptance and conformance testing per part or per installation ?

Progress will depend on Utility & Gvt Commitment !

Continental standards collaboration & influence

USA: EPRI, GridWise
ANSI c12, IEEE P19, ITU
Openway, Zigbee
Google, Microsoft

EU: mid, OPEN meter project
IEC TC13&57, ISO, CEN, IEA
TC13: DLMS/Cosem
TC57: CIM



AU: Afsec, Piesa, Sadc
IEC TC13&57, ISO, ITU
TC13 WG14: DLMS/Cosem
TC13 WG15: STS, STS Association
TC57: CIM

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Conclusions

+ **Multi-Part Metering Systems** are an important **weapon** to help win the revenue Protection War

+ **SARPA** should appoint Utility experts to harmonize South African Multi-Part Metering requirements, to ensure that our needs are incorporated into **IEC 62055-32**

+ **Simultaneous** consideration of the other mitigation strategies would provide additional benefits

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