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New Directions in Meter Standardisation

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I was asked to present my view on meter standardisation, which is by no means the official view of the DLMS User Association, nor of the diverse standard bodies, where I serve as working group convenor or member. This paper describes activities and tendencies of the most noted organisations and covers mainly electricity metering:

Hear the latest progress in terms of standardisation

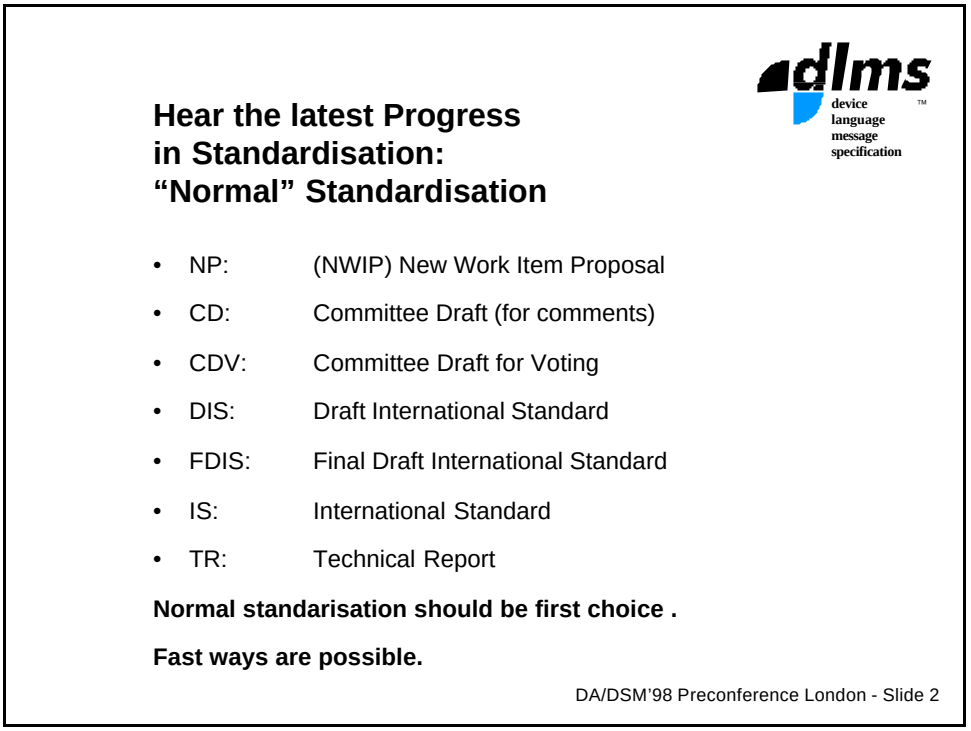
For many people, fast progress and standardisation is incompatible. This is not true any longer. Several fast track possibilities have been opened recently.

Following the path of normal standardisation, it is now possible to advance faster. A NP (new work item proposal) can be submitted with a complete draft, written in the form of a standard. The submitting National Committee can propose that the next step after acceptation of the NP would be a CDV (committee draft for vote). This new possibility encourages the introduction of already harmonised or principally agreed proposals into the standardising process.

"Normal" Standardisation (IEC TC13)

This Technical Committee is responsible for standardising electricity meters, data exchange included. There has been quite a few New Work Item Proposals which were accepted in the first half of 1998 by the National

Committees of IEC and which were given to WG 14 as work items in the meantime. Three of these work items consider channel aspects, and the fourth one is of the group of user requirements.



13/1146/NP Proposal of the German NC: Electricity metering - Data exchange for meter reading, tariff and load control - Using the public switched telephone network (PSTN)

This NWIP is to be IEC 62056-42 TR2 Ed.1 - Using wide area networks with HDLC protocol. The latter is a well defined protocol, since 1997 in a newly structured document of ISO/IEC, with amendments of JTC1, which suits well the asynchronous data transfer as used for meter data exchange. This NWIP is of first priority, as it goes together with 13/1144/NP. It is the clear aim to use the same protocol for PSTN and for the optical link.

13/1145/NP Proposal of the German NC: Electricity metering - Data exchange for meter reading, tariff and load control - EDIS - Energy Data Identification System

This NWIP is to be IEC 62056-61 TR2 Ed.1 - Data elements - Metering objects - EDIS Energy Data Identification System. It is already a well defined document, and it will probably be supplemented by an announced NWIP "COSEM Objects".

13/1144/NP Proposal of the Swiss NC: Electricity metering - Data exchange for meter reading, tariff and load control - Using direct local connection (new edition of IEC 61107)

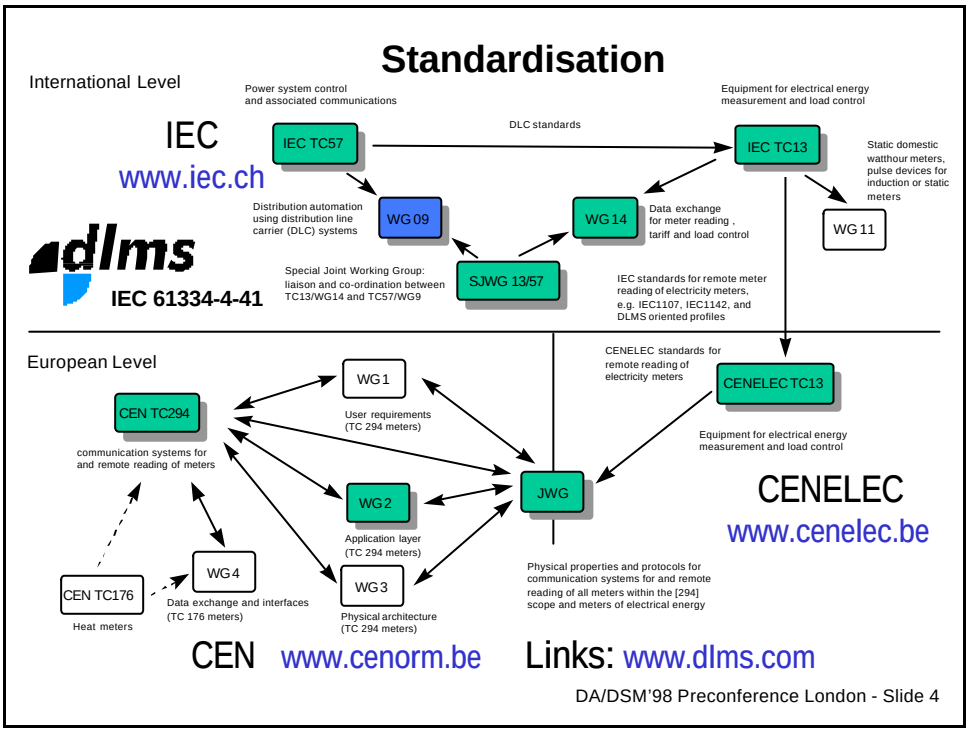
This NWIP is to be IEC 62056-21. It is supposed to add a new HDLC mode to the existing standard IEC 61107 2nd Ed. and to publish it under the new number. This NWIP shall be treated in first priority, together with 13/1146/NP.

13/1141/NP Proposal of the Swiss NC: Electricity metering - Data exchange for meter reading, tariff and load control - Using local area networks type 2 (Technical Report Type 2)

This NWIP is to be IEC 62056-32 TR2 Ed.1 - Using local area networks with baseband signalling. This NWIP bases on work done in the heat meter business.

It is the intention of Working Group 14 to make use of these building blocks as important elements of the house of standards.

There are of course many other Technical Committees and Working Groups working in the field of meter data exchange. Many of them base their work on DLMS:



Hear the latest Progress in Standardisation: ITA and PAS

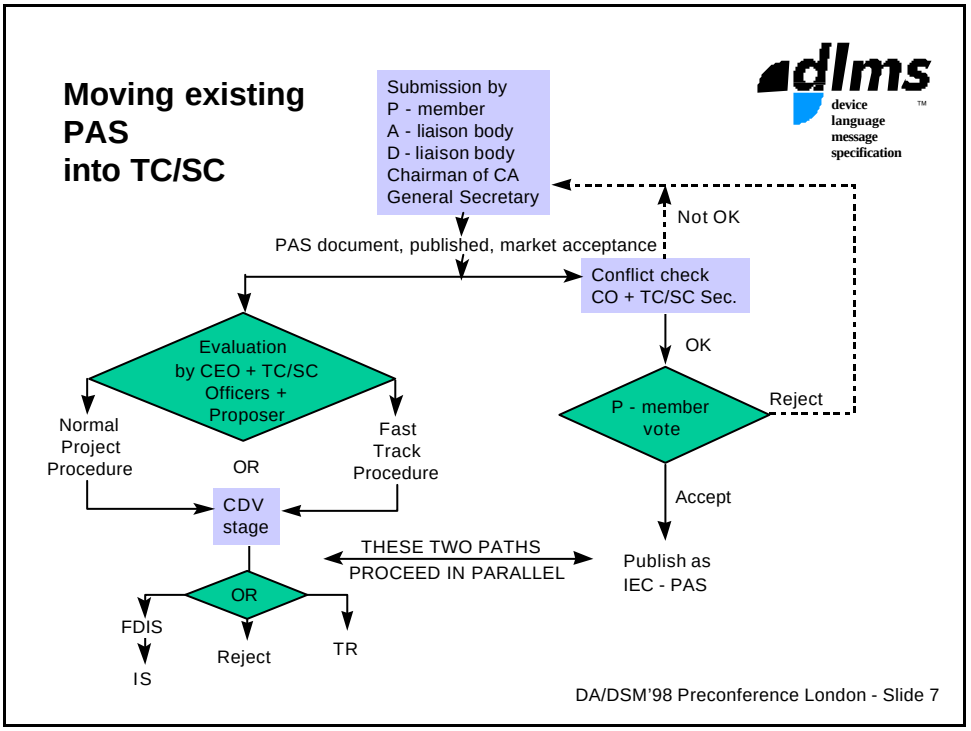
ISO and IEC have implemented PAS (Publicly Available Specifications) and ITA (Industry technical agreements). These new procedures take into account first the fast progress in technology and second the interest of the industry in marketing new developments before they are open to standardisation. This is done often by building up consortia, writing specifications fulfilling the actual market need. Once the products have become quasi standards, the consortia specifications can follow the path of standardisation. But remember, even following the path of normal standardisation, it is now possible to advance faster..

Industry technical agreements (ITAs)

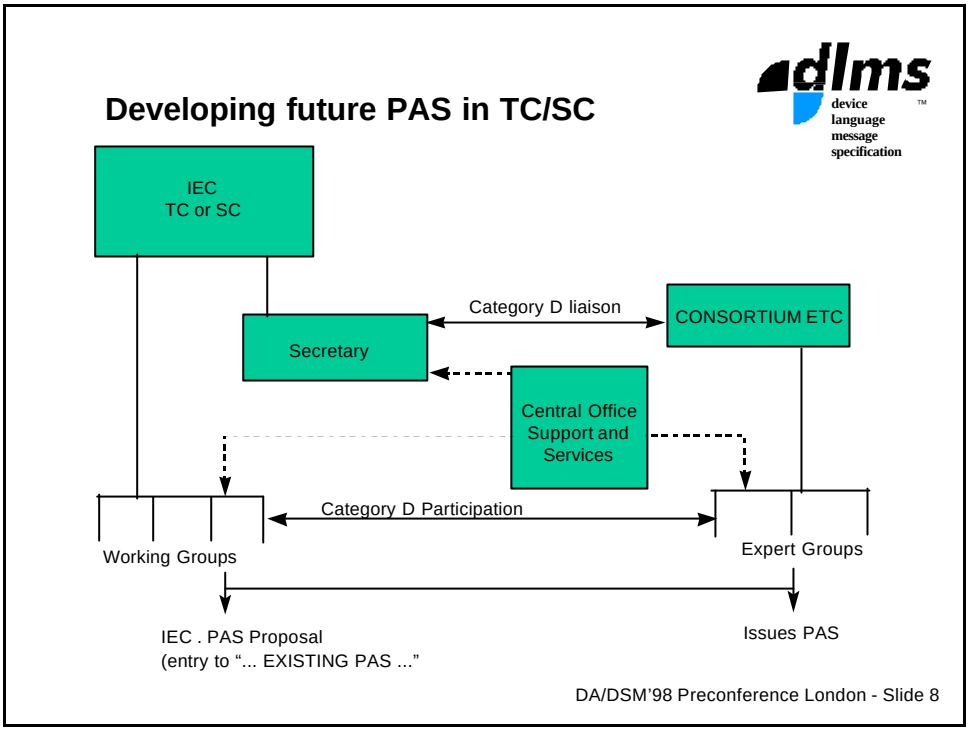
The IEC has recently introduced the concept of ITAs (Industry technical agreements) which offer a platform for reaching technical agreements among key industry players in time-critical market sectors. ITAs are intended for use by industry where business and trade in high-technology products and services do not need international consensus standards at market launch. They deliver a form of standardisation in months rather than years. Workshops comprising experts nominated by the industrial and user parties wishing to participate in the process and conclude the ITAs. ITAs will not be reached within the existing IEC technical committee structure. These agreements would progress to international standards or technical reports through the normal IEC TC/SC processes only if a market demand is foreseen. It must be said, that this method has not found its way into the practical life, so better do not consider it for the time being ...

Publicly Available Specifications (PAS)

Another IEC tool for meeting market demands in rapidly-developing technology are the IEC-PAS or publicly available specifications, which come from within the IEC technical committee structure. The objective of IEC-PAS is to speed up standardising in areas of rapidly-developing technology. This process gets information to market quickly (since PAS are de facto standards) and transforms PAS into de jure international standards when they are approved and accepted by the international community. PAS are usually created by large companies or consortia and rapidly gain wide acceptance in the global market. They are brought into the IEC technical committee processes primarily by a new liaison mechanism with such (big and established) consortia.



It can clearly be seen, that certain rules are necessary to start such a liaison. Consensus must be reached between existing standardising bodies and existing consortia. For normal cases, it is preferable to speed up the normal standardisation methods.



Find out the impact of communications standards on metering

IEC 61107, 2nd edition (Electricity metering - Data exchange for meter reading, tariff and load control - Using direct local connection)

The "classical" standard for meter reading is IEC 1107, also called the FLAG protocol. Most of the many millions of IEC 1107 meters are read out via the optical port by hand held units, which is one of the features defined in IEC 1107. The defined protocol is so simple, that even the simplest electronic meters or tariff devices can be built with this protocol. The standard is fully used and maintained. One of the New Work Item Proposals asks for the third edition of IEC 61107 (there was a renumbering lately).

Another field of standardisation is covering LANs using twisted pair busses mainly built for meter reading. In the early nineties, the need to read non-accessible meters became very strong. A bus system linking all meters in a building together, readable by one common access point, would solve the problem. Again, only standardisation could provide interoperability between different manufacturers' equipment. This case led to two standards: IEC 61142 (EURIDIS) for electricity meters and EN 1434-3 (M-Bus) for heat meters.

IEC 61142:1993 (Data exchange for meter reading, tariff and load control - Local bus data exchange)

The driver behind EURIDIS was a big utility in France, wanting to read electricity meters, which use to be installed inside the flats in France. Meter readers very often were not able to read the meter, as nowadays very often people are not at home the whole day. The idea was to have a common plug to allow a hand held unit to retrieve data from up to 100 meters branched to a twisted pair bus. This method became generally accepted in France, and about 2 Mio meters have been delivered in the meantime.

EN 1434-3, Publication:1997-04 (Heat meters - Part 3: Data exchange and interfaces)

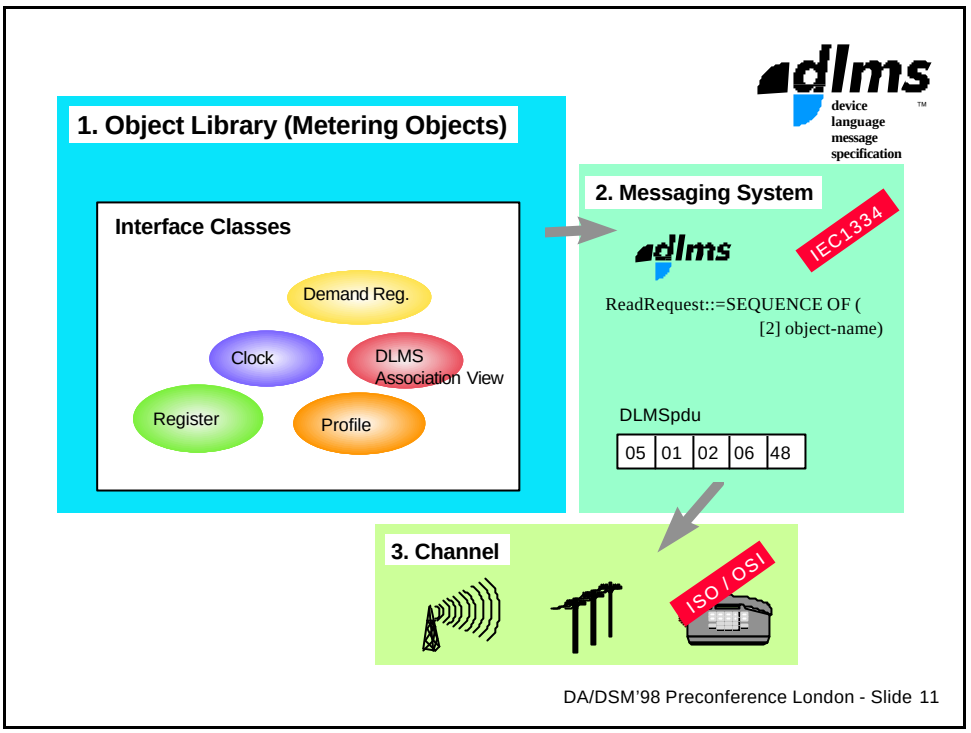
M-Bus however was driven by manufacturers, but only indirectly, as the real cause was the change in legislation for environment protection. Individual heat cost billing in flats became mandatory, and access to apartments to read the (evaporator) heat cost allocating devices which were situated on each radiator was hard to get. The first solution was to branch all (now electronic) heat cost allocators together with a serial connection. This hardware was the base for M-Bus, which used a protocol from IEC and an application definition, which was compiled by manufacturers and utilities and finally became a standard for heat meters. In the meantime a large number (about 500 000) of energy meters of all kinds have been equipped with a M-Bus interface.

Meter models.

The next step for a similar proliferation of standards on the "logical" side will be the definition of information models for energy meters There are two major approaches world-wide: The "Utility Industry Standard Tables" in USA and Canada, and the "Energy Data Information System" and the "Common Object Specification for Energy Metering" in Europe. As well as nobody doubts that a coexistence of Dollars and Euros is possible, as well can be accepted that different markets have different approaches to meter modelling.

ANSI C12.19-1997 - Utility Industry Standard Tables: A common initiative of US and Canadian utilities, standard bodies and manufacturers, the tables define the structure of data loggers and meters. Some tenders of US utilities make the use of these tables mandatory.

Common Object Specification for Energy Metering by DLMS User Association, using object names as defined in the EDIS document, a work item of IEC TC13 WG14:



Find out how standards can play a key role in streamlining metering processes in a deregulated environment

The deregulated environment goes far beyond of what was thought to be necessary for common system platforms of a single utility. Already there, it was difficult to manage the different models and generations of end devices. Moreover, the interest of the billing department and of the technical supervisory control department have not been the same.

The difficulties in managing a system in a deregulated environment is an order of magnitude more difficult. Of course, the job can be done as before, converting data every now and then as data flows through the process. But having the same communication language and the same functional models throughout the process brings the same advantages as being able e.g. to sell the same computer models throughout a continent using hot lines, catalogues and manuals all in English.

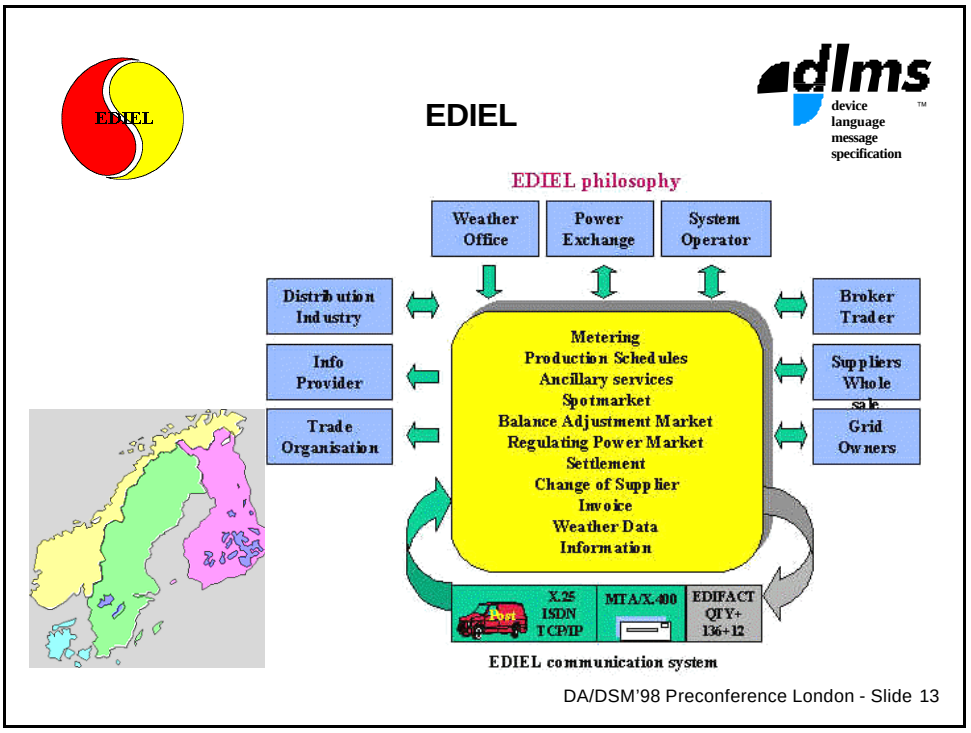
In short, if all end devices are following common rules, a much more coherent and future proof data collection is possible. In terms of the communication system, the end devices must follow common models, identify themselves in order to adapt quickly to market needs. They can easily be exchanged or remotely reprogrammed without manual adaptation of the system parameters. The meter is specified by its "behaviour" as seen from the utility's business processes. The formal specification of the behaviour is based on object modelling. The specification of these business objects forms a major part of COSEM (Common Object Specification for Energy Metering).

The COSEM server model represents only the externally visible elements of the meter. The client applications that support the business processes of the utilities, of the customers and of the meter manufacturers make use of this server model. The meter offers means to retrieve its structural model, the attributes of its elements and the measured data. The information can be obtained through read services to the elements of the model. In addition, specific configuration services are offered to configure the meter, to fine-tune its model and to specify the values of the attributes of the elements.

The second main impact is the exchange of management data, e.g. in order to manage the energy pool. This is another order of magnitude, it is comparable with the data exchange necessary for banking and trade organisations.

The United Nations Rules for Electronic Data Interchange for Administration, Commerce and Transport (UN/EDIFACT) comprise a set of internationally agreed-upon standards, directories and guidelines. Their purpose is to facilitate the electronic interchange of structured data that relates, in particular, to trade in goods and services between independent computerised information systems.

Trade facilitation deals with the requirements and procedures related to the flow of information needed for the international movement of goods. UN/EDIFACT activities are under the Working Party on Facilitation of International Trade Procedures which manages the development of the global EDIFACT standard, and deals with procedures and documentation.



One of the main deregulated energy market is to be found in Scandinavia. There a specialised subset of EDIFACT has been developed: EDIEL. It is used to trade electrical energy, using the same rules as EDIFACT. The

Nordic electrical power production and consumption is an industry with a turnover of about 350 billion kilowatt-hours valued to approximately 25 billion dollars.

The Nordic countries: Denmark, Finland, Norway and Sweden have deregulated the power industry. A common power exchange for Norway and Sweden was established in 1996. From 1998/99 both Denmark and Finland will be integrated as a part of the common power exchange. Nord Pool ASA is responsible for the administration of the power exchange. This includes distribution of market information to all participants and system operators in the Nordic countries.

One result of the deregulation is that a multinational company can purchase power from one supplier for all their installations in the Nordic countries. The grid and the power lines are still a monopoly. Free competition within production of power gives the users the freedom to choose supplier within each country.

The deregulation has increased the trade with electrical power and increased the need for metering. The settlement is based on hourly metering. This has further more given a focus on EDI (Electronic Data Interchange) as a tool for handling the increased needs for information and transport of data between the participants, the System Operator, and the Power Exchange.

To deal with the increased need for information, data and the interchange between different parties in the power industry, EDIEL Nordic-Forum was established. The forum was established in the autumn 1995. The scoop of the EDIEL Nordic-Forum is to standardise the use of EDI based on the UN/EDIFACT standard in the Nordic power industry. The standard EDIEL is supposed to cover all needs for interchanging of data, except on-line data between participants, System Operators and trade organisations in the power industry. Both domestic and interchange between the countries is to be handled by EDIEL. EDIEL Nordic-Forum will maintain and develop the standard and also handle topics in connected areas, as standards for communication, security and communication network, Internet.

Conclusion

Concluding can be said, that a deregulated environment is strongly demanding standards, as well standardising the "hard physical facts" of data exchange as also the "architectural questions" in structuring and modelling the data flow. Establishing such standards requires fast track methods, which allow to follow the fast changes of the deregulated environment. Preferably acceleration of the normal standardising procedures should be used (minimum risk), but if consensus of large consortia is already existing, new ways like ISO/IEC Publicly Available Standards are to be considered.

Acknowledgement:

The following Internet sites have been used as a source of information:

http://www.iec.ch, http://www.iso.ch, http://www.dlms.com, http://aseb.keb.or.kr, http://www.ediel.org