

ENARD:- INTERNATIONAL ACTION IN ELECTRICITY NETWORKS R&D

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ABSTRACT

The paper describes the development of the new International Energy Agency (IEA) Implementing Agreement on Electricity Networks Analysis, Research and Development (ENARD) from the time of its inception through to its present operational status. Specifically, it describes the essential role of the IEA's framework of Implementing Agreements and the development of ENARD within this context. Further information is then provided in relation to ENARD itself, including its current Annex I work programme activities and the anticipated forward development of the Agreement, via the initiation of a series of follow-on (R&D) Annexes. The paper concludes by summarising the range of benefits available through participation in the Implementing Agreement.

INTRODUCTION

The Electricity Industry worldwide is operating in a period of change, with it having to respond to a series of often quite disparate external drivers, whilst maintaining, if not improving, its overall service quality under ever more competitive market conditions. The successful development, design, configuration, operation and maintenance of its Transmission and Distribution (T&D) networks is an essential prerequisite of the Industry's ability to respond to and benefit from such changes in the external environment. The IEA provides an appropriate forum for international collaboration in relation to energy technologies and systems, via its framework of Implementing Agreements [1]. Whilst previous and ongoing Implementing Agreements have addressed and continue to address specific aspects of electricity networks, distributed generation, renewables, communications, network technologies and related, there has previously been no single Implementing Agreement addressing the subject of electricity networks at the integrated system level. The new Implementing Agreement on Electricity Networks Analysis, Research and Development (ENARD) has therefore been established in order to address the various issues involved in the development, design, operation and performance of electricity networks at the integrated system level.

The present paper describes the development of ENARD, as a major new international initiative in relation to electricity T&D networks, and reports on its work programme to date, together with its anticipated further development, over the 12 to 18 months ahead.

ENARD

ENARD represents a major new IEA Implementing Agreement, developed on a collaborative basis in conjunction with a wide range of interested parties and stakeholders, drawn from a cross-section of the IEA member countries, over a period of some 18 months, from early 2005 through to the formal establishment of the Agreement, July 2006. ENARD's vision is to facilitate the uptake of new operating procedures, architectures, methodologies and technologies in electricity T&D networks, such as to enhance their overall performance in relation to the developing challenges of network renewal, renewables integration and network resilience. Specifically, it is intended that ENARD will provide a major international forum for information exchange, in-depth research, analysis and collaborative research and development (R&D) [2].

It is intended that ENARD will develop as an authoritative, comprehensive and unbiased international source of information, data and advice, such as to inform Government officials, policy makers and key industry stakeholders of the pertinent issues relating to both current and anticipated future developments in electricity T&D networks.

ENARD specifically aims to address electricity T&D network related matters at the integrated system level. As such, it therefore complements and builds upon the work of a number of existing IEA Implementing Agreements which individually address discrete aspects of network related issues, including such facets as Distributed Generation, renewables, communications technologies and Demand Side Management. Likewise, it is fully intended that ENARD will proactively collaborate with other programme related activities, including those of the European Commission, US DOE, CIRED, CIGRE and Euroelectric.

ORGANISATIONAL AND MANAGEMENT STRUCTURE

ENARD has been developed from the outset with the organisational and management structure of a multiple Annex Implementing Agreement, as shown in figure 1 below.

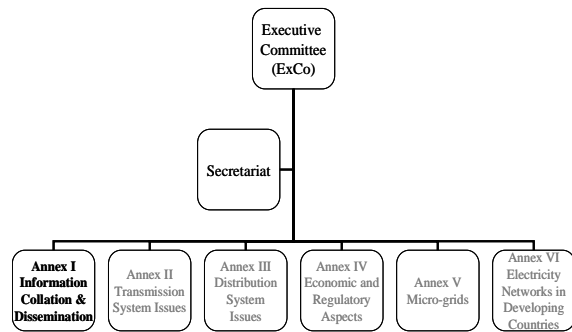


Figure 1:- Organisational and Management Structure

Overall management responsibility for the Implementing Agreement is vested in the ENARD Executive Committee (ExCo), which comprises nominated national Delegates from the signatory countries to the Implementing Agreement. The Executive Committee is responsible for overseeing the work within the individual operational Annexes and for the ongoing strategic development of the Implementing Agreement itself. The ExCo reports upwards within the IEA’s management structure, via the End Use Working Party (EUWP), to the Committee on Energy Research and Technology (CERT), with the latter two bodies helping to co-ordinate the activities of individual Implementing Agreements and also addressing a range of current energy technology collaboration issues.

Individual work programme activities within any given Implementing Agreement are performed in one or more operational Annexes (sometimes also referred to as Tasks). As a new Implementing Agreement, ENARD presently has just one operational Annex (Annex I), although with active consideration in relation to the development of selected follow-on Annexes, including those in relation to the performance of specific R&D activities[3].

Membership

At the time of writing (January 2007), ten countries have formally committed to participate in ENARD, namely Austria, Belgium, Denmark, Finland, Italy, Netherlands, Norway, Sweden, Switzerland and the UK. Additional countries are presently seeking to join the Implementing Agreement in the near future, with a number of other countries also considering the possibility of joining the Agreement.

Annex I (Information Collation and Dissemination)

Annex I serves as the central information collation Annex for the Implementing Agreement as a whole and has two central facets, namely:-

- it is principally led by the organisation and delivery of a series of topical experts’ meetings and workshops, which aim to draw out key issues of common interest and which may be further addressed, within the context of the Implementing Agreement as a whole;
- the experts’ meetings and workshops are complemented by an underlying programme of information and data collation, which aims to provide the requisite background material, to shape the context of the future development of the work programme.

Responsibility for the delivery of the Annex I work programme is vested in the Annex I Operating Agent (EA Technology), who works in close collaboration with individual National Co-ordinators, in each of the participating countries, as shown in figure 2 below.

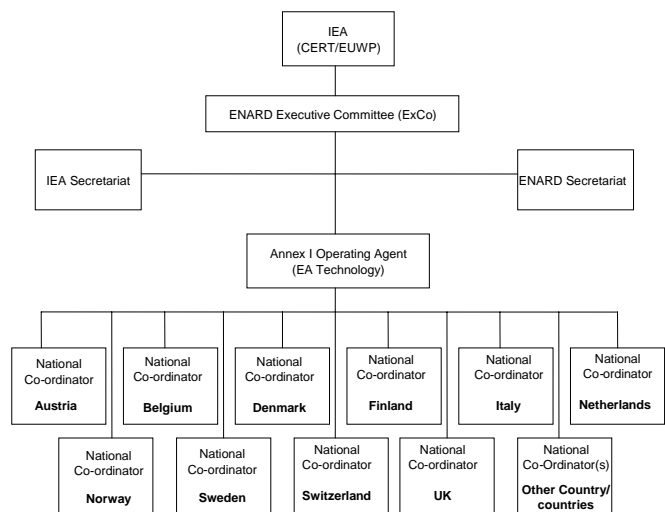


Figure 2:- Annex I Operational Structure

The National Co-ordinators are responsible for the co-ordination of their individual national activities in relation to ENARD, including the nomination of relevant national experts, to participate in the experts’ meetings and workshops, the supply of specific national information and data to the Operating Agent and the subsequent dissemination of the outputs from the Annex, within their own countries.

Annex I Experts’ Meetings and Workshops

Annex I aims to address a number of key areas of interest, with consensus having been reached within the ExCo in relation to the coverage of the following topics, via the initial series of experts’ meetings and workshops, during the first year of the Annex.

Date	Venue	Theme
Sept. 2006	Milan	Distribution Systems and End User Issues
March 2007	Vienna	Integration of Distributed Energy Sources and New Business Models
June 2007	Trondheim	Transmission System Issues
tbc	Belgium	Economic and Regulatory Issues

Further candidate workshops, already under consideration for the second year of the Annex I work programme, include such themes as intelligent distribution networks, quality and security of supply, network flexibility and control and road mapping and vision definition for future R&D.

In general terms, the experts' meetings tend to be smaller, tightly focussed meetings, between relevant nominated national experts, drawn from the participating countries. Workshops complement such experts' meetings and tend to have a more open participant base, including contributions from non-participating countries and organisations.

In both cases however, their fundamental aims relate to peer group information exchange and the identification of key challenges facing the T&D sector, together with associated opportunities for collaborative working relationships and R&D, to address such issues. It is anticipated that at least some of the issues identified may be addressed via appropriate future (R&D) Annexes, within ENARD, together with collaborative work programme activities, involving other framework initiatives and work programmes.

Supporting Information and Data Collation Priorities

The second principal aspect of the Annex I work programme, as noted above, relates to the structured collation and dissemination of supporting background information and data, in support of the Annex I work programme and the further development of the Implementing Agreement as a whole.

The information collation activity will run co-incidentally with the programme of experts' meetings and workshops and will gather and collate underlying information and data, in relation to developmental, design, operational, maintenance, investment and regulatory aspects of T&D networks, within the overall context of the developing challenges of network renewal, renewables integration and network resilience.

It is envisaged that the information and data gathering activities will take place in two phases, with the emphasis in the first year being on more readily available information,

with a subsequent review aiming to identify any significant "gaps", to be addressed via the second year's programme.

The information and data gathering activities are being co-ordinated by EA Technology, in its Operating Agent role, and performed in close co-operation with the individual National Co-ordinators. The process is facilitated by the preparation of a series of questionnaires, in a consistent format, each addressing a particular topic, which are forwarded on to the National Co-ordinators, for their completion, following appropriate dialogue with their respective power utility, power engineering, regulatory and governmental stakeholders.

The individual national returns will then be collated by EA Technology, such as to produce a comprehensive digest of the current status of T&D network developments in the participating countries. This digest will form a major initial deliverable from Annex I and will be produced at the end of the first 24 months of its activities, with an interim digest being produced after 12 months.

Associated Activities

Further activities associated with the Annex I work programme include a central information dissemination role, both within the context of the Annex and more generally, via the publication of overview reports and related material, in the public domain.

These two aspects are both facilitated by the development of the free standing ENARD web-site, which may be accessed at various levels by visiting www.iea-enard.org. The ENARD web-site both supports the Implementing Agreement and its individual operating Annex(es), whilst also providing links and details of various complementary industry initiatives, activities, events and programmes.

DEVELOPMENT OF FURTHER ANNEXES

As has been previously noted, ENARD has been developed from the outset with the organisational and management structure of a multiple Annex Implementing Agreement.

It is therefore very much anticipated that ENARD will develop on this basis, with selected follow-on (R&D) Annexes addressing specific work areas of interest to subsets of the overall ENARD membership. Already, active consideration is being given to the initiation of such R&D Annexes addressing a range of distribution, transmission and economic and regulatory issues, with these to be further developed into Annex specific proposals, as the Annex I work programme progresses.

Individual countries may then elect to participate in one or more of such follow-on Annexes, based upon their own

particular national interests and priorities. It is anticipated that the first of such follow-on Annexes will be initiated from mid-2007 on.

CURRENT STATUS

The Implementing Agreement was legally established July 2006, following on from its development from mid-2005 on. At time of writing (January 2007), the Annex I work programme is developing, with the first of its experts' meetings having been held in September 2006, coincidental with the inaugural ExCo meeting. Two further specific workshops are in preparation, with others in consideration, for further development and delivery later in the Annex I work programme.

These activities are supported by the underlying information collation activities, which are being pursued in collaboration with the network of National Co-ordinators.

The ENARD web-site is under development, to progressively "go live" from the end of January 2007 on.

BENEFITS

The development and initiation of the ENARD work programme provides its participants with a number of benefits, including:-

- highly timely and cost effective access on an international collaborative basis to detailed and in-depth knowledge in relation to electricity network T&D issues and developments;
- opportunities to participate in peer group information exchange forums;
- the provision of authoritative unbiased information and advice to Governmental officials, policy makers and key industry stakeholders;
- the identification and analysis of a range of key T&D issues and the consequential formulation of solution mechanisms and collaborative R&D activities;
- the complementary in-depth analysis of a range of associated strategic, economic and regulatory issues.

REFERENCES

[1] Energy Technologies at the Cutting Edge. International Energy Technology Collaboration. IEA Implementing Agreements. IEA, Paris, 2005.

[2] International Energy Agency Implementing Agreement on Electricity Networks Analysis, Research and Development (ENARD). Strategic Plan, Oct 2006-Sept 2011. Issue 1.0, 30th March 2006.

[3] International Energy Agency Implementing Agreement on Electricity Networks Analysis, Research and Development (ENARD). Programme of Work, October 2006-Sept 2007. Issue 1.0, 30th March 2006.

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