



# **ENARD:- the IEA Implementing Agreement on Electricity Networks Analysis, Research and Development**

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# Presentation Structure

- ENARD, context, mission, objectives, outputs, target audience and structure
- Participation
- Annex I
- Workshops
- Information and Data Collation
- Supporting Activities
- Current Status
- Annexes II, III and IV
- Complementarities and Linkages
- Ongoing developments
- Advantages and Benefits
- Further information
- ENARD web-site: [www.iea-enard.org](http://www.iea-enard.org)

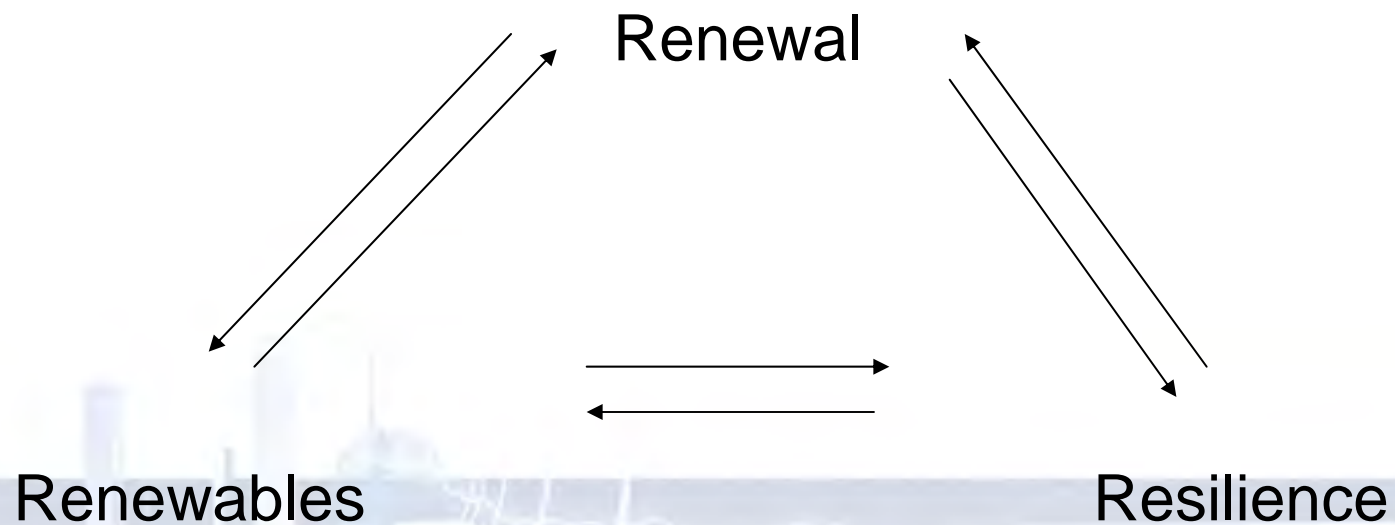


## The IEA Implementing Agreement on Electricity Networks Analysis, Research and Development (ENARD)

- ENARD:- an IEA Implementing Agreement addressing a variety of electricity T&D network issues
- Annex I work programme initiated September 2006



# Context: The Three Rs of Power Systems Development





## Mission:

“To provide a major international forum for information exchange, in-depth research and analysis and collaborative R&D in relation to electricity T&D networks”



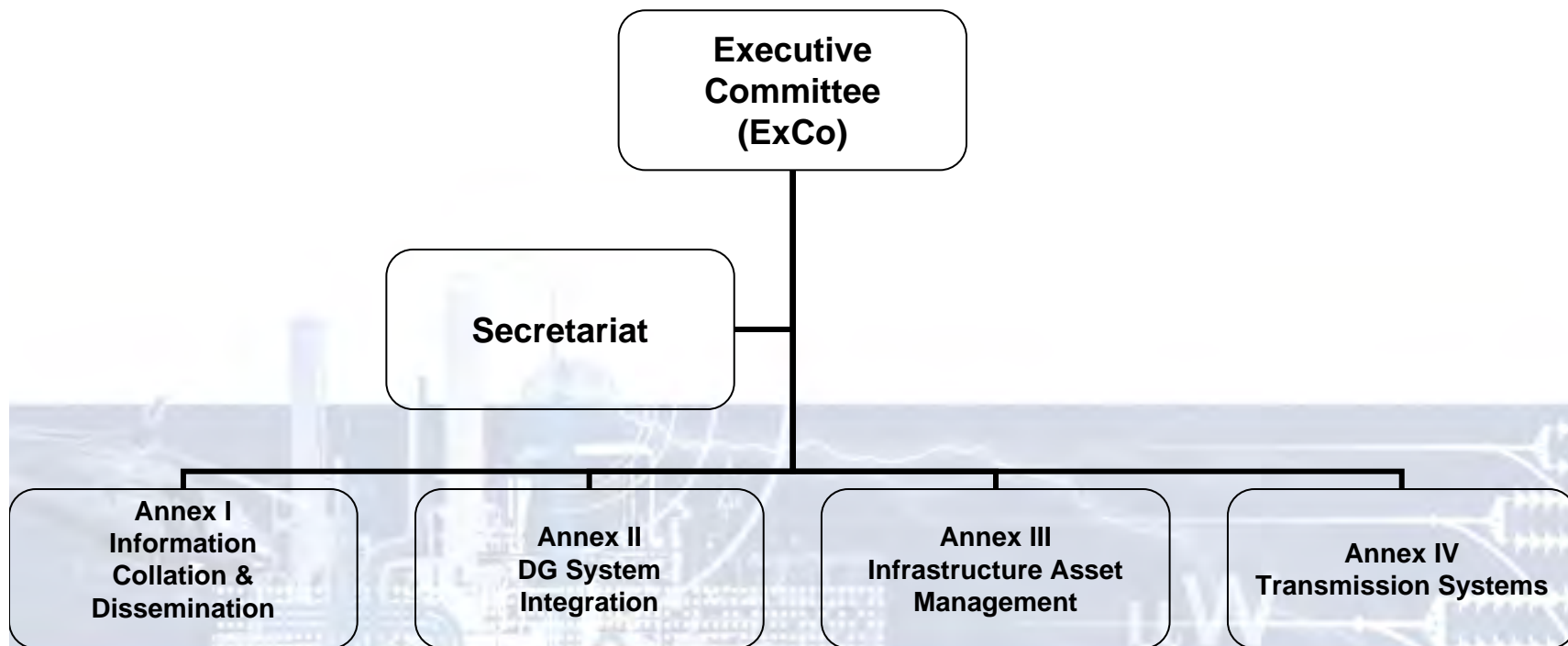
## Core Objectives

- The collation, exchange and dissemination of information and data
- The in-depth review and analysis of a range of key issues relating to the R&D, design, operation and management of T&D networks
- The complementary review and analysis of prevalent and anticipated regulatory frameworks and their impact on the economic evaluation and optimisation of network asset portfolios

## Outputs and Target Audience

- ENARD provides a range of authoritative and unbiased information and advice to key stakeholders in the governmental, policy, regulatory, utility and power engineering supply base sectors;
- Specifically, its outputs aim to identify matters in relation to the operation and future development of electricity T&D networks, in both developed and emerging economies, that should be addressed within the context of overall energy policy formulation;
- Its formal reporting relationship, to the IEA Secretariat, complements and supports the development of the IEA's advice to its 28 member governments.

# Organisational and Management Structure



## Participation



Austria



Belgium



Denmark



Finland



France



Italy



Netherlands



Norway



South Africa



Spain



Sweden



Switzerland



UK



USA

## Annex I (Information Collation and Dissemination)

- Combination of collation and dissemination of pertinent T&D network related information and data, complemented by organisation and delivery of series of topical workshops
- Operating Agent and national co-ordinator (expert) roles defined
- Further role as the springboard for the development of future (R&D) Annexes

# Annex I Workshops

<b>Date</b>	<b>Venue</b>	<b>Theme</b>
September 2006	Milan, Italy	Distribution Systems and Association End User Issues
March 2007	Vienna, Austria	Integration of Distributed Energy Sources and New Business Models
May 2007	CIREN, Vienna	Managing an Ageing Infra-structure
June 2007	Leuven, Belgium	Economic & Regulatory Issues
September 2007	Trondheim, Norway	Transmission Systems Issues
April 2008	Chester, UK	Intelligent Networks
May 2009	Gotland, Sweden	Communications & Control
October 2009	Fredericia, Denmark	Balancing the Variability in Renewable Electricity Supplies
September 2010	Madrid, Spain	Markets & Regulation – financing the Smart Grid

# Joint ENARD/IEA Grid Policy Workshop, “Electricity Grids – a key enabler in the delivery of a sustainable energy policy, held Paris, France, 28<sup>th</sup> April 2010



- Organised in conjunction with the Electricity Co-ordination Group and the IEA Secretariat
- featured:-
  - Series of high level regional perspectives
  - Presentations from each of ENARD's four operational Annexes
  - Complementary presentations from recognised sector leaders
  - Extensive dialogue and interaction via structured panel sessions
- Workshop represented the major public facing dissemination forum for the first 4 years of ENARD's operation
- Essential complementary role in helping shape the future development of ENARD's work programme
- Supported by 85 delegates from 19 countries
- Complementary Workshop publication available via ENARD web-site
- Workshop highlights reported in Newsletter No. 8

## Workshop Objectives

In general terms, workshops aim to identify:

- key challenges
- information requirements
- opportunities for future collaborative R&D
- complementarities with other initiatives and programmes
- associated opportunities to develop structured follow-on (R&D) Annexes

## Supporting Information and Data Collation Activities

- addressed on a collaborative basis with the network of National Co-ordinators
- Phase One (Sept 2006 to Sept 2008)
  - addressed via a series of detailed questionnaires
  - collation of national returns allowed for compilation of authoritative digest of T&D developments
  - digest delivered to National Participants, Sept 2008
- Phase Two (Oct 2008 on)
  - further specific topics being addressed via a small series of focussed studies

## Annex I Associated Activities

- Information Dissemination
  - Confidential information and data, within context of Annex I and further Annexes
  - Public dissemination via overview reports, outputs, proceedings and events
- Web-site development and maintenance

## Current Status

- Annex I: Operational and ongoing activities
- Annex II: “DG System Integration”; adopted by September 2007 ExCo Meeting and started work, May 2008
- Annex III: “Infrastructure Asset Management”; adopted by September 2007 ExCo Meeting
- Phase I completed November 2009
  - Phase 2 open for participation
- Annex IV: “Transmission Systems”; adopted by September 2008 ExCo Meeting and started work, April 2009
- Annex V: *“International Knowledge Exchange of Smart Grid Demonstration Projects”; under development, with Definition Workshop scheduled for October 2011*



## Annex II: “DG System Integration”



## Annex II: “DG System Integration”

- formally adopted by ENARD ExCo, September 2007
- Operating Agent: AIT, Austria
- Start-of-work, May 2008
- 11 countries participating
- Task 2 (Operation & Control of Active Distribution Networks), effectively concluded, December 2010
- Dissemination of outputs now being addressed on individual national bases

## Annex II – Overall Objectives

- to build up and **exchange knowledge** on DG system integration aspects and existing active network approaches **amongst the global players** in distribution networks
- to **promote implementation possibilities** for active distribution networks as an overall goal of Annex II
- to develop **guideline(s)** for network operators and political decision makers on how to manage and implement the **transition from passive to active distribution networks**

## Annex II: Deliverables and Outputs

The Annex II deliverables include:-

- Detailed in-country surveys of current state-of-the-art, lessons learnt, limitations, future developments
- Complementary foresighting activities and abstraction of visions/goals for the future (eg growth of future fully integrated active networks)
- Compilation of an international overview report drawing out key messages
- Identification of requirements and needs for future work



# Annex III: “Infrastructure Asset Management”



## Annex III: “Infrastructure Asset Management”

- formally adopted by ENARD ExCo, September 2007
- Operating Agent: EA Technology, United Kingdom
- 21 month Phase One work programme, addressing the distribution asset base, April 2008 to November 2009
- 6 countries participated



## Annex III “Infrastructure Asset Management”

**Aim:** To address the challenges associated with the management of increasingly ageing T&D asset bases within the participating countries and beyond, via the exchange of information and data in relation to the ageing, degradation, failure and end-of-life characteristics of the T&D asset base and the complementary development of new asset management techniques and methodologies



## Annex III “Infrastructure Asset Management”

### Objectives (Phase 1; related to the distribution asset base)

- development of a robust international information base
- development of detailed understanding of risk based definitions and methodologies
- to source, collate and analyse relevant case study material
- to cross-reference above with that for transmission systems
- to compile a comprehensive information base and digest

## **Annex III: Principal Deliverables and Outputs**

The principal deliverables and outputs associated with Annex III have included information/data bases, experts' meetings and reports addressing:-

- ageing, degradation, failure and EoL characteristics
- existing and proposed methods of quantifying asset related risk
- international case study experience
- lessons learnt and implications/recommendations for successful asset management



## Annex IV “Transmission Systems”



## Annex IV “Transmission Systems”

- formally adopted by ENARD ExCo, September 2008
- Operating Agent: SINTEF Energy Research (Norway) and ERSE SpA (Italy)
- 24 month initial work programme
- start-of-work, via Inaugural Experts meeting, Milano, Italy, 28<sup>th</sup>-29<sup>th</sup> April 2009
- 8 countries participating

## Annex IV “Transmission Systems”

### Aim:

- To develop a long term vision for transmission systems, beyond 2020

### Objectives:

- To address the main barriers towards the development of transmission capacity
- To identify the most promising solutions and challenges in terms of expansion planning and market analysis, and secure operation of transmission networks
- To identify the need for new transmission technologies

## Annex IV: “Principal Deliverables and Outputs”

The principal deliverables and outputs associated with Annex IV will comprise a small series of experts’ meetings and workshops and two detailed reports, addressing, respectively:

- Availability and application of planning tools, market and network models and the identification of the need for new tools
- Availability and application of advanced operational tools and on the need for new operational monitoring and control tools

## Complementarities and Linkages and Other Work Programmes

- current IEA framework addresses discrete aspects of electricity networks, DG, renewables, communications, DSM, network technologies
- ENARD actively pursuing the development of exchange mechanisms within the above framework and with other international programme activities, including:-
  - CIRED
  - CIGRE
  - Eurelectric
  - European Commission

## Ongoing Developments

- Proposed new Annex V “*International Knowledge Exchange of Smart Grid Demonstration Projects*” under development, to address the structured collation, exchange and dissemination of knowledge on Smart Grid demonstration projects, on an international basis
- Annex V Definition Workshop to be hosted in The Netherlands, October 2011
- ENARD ExCo presently exploring the most appropriate options for the alignment of ENARD with ISGAN, the International Smart Grids Action Network Implementing Agreement, as its preferred medium/long term alternative



## Key Advantages and Benefits of Participation in ENARD:-

- timely ability to address a series of inter-related technological and policy related issues
- highly cost effective platform for international collaboration and peer group information exchange
- provision of high level advice to Governments, G8 and associated policy makers
- essential role in stimulating new initiatives and actions
- common challenges/shared solution mechanisms!



## For further information...

Further information on ENARD, including participation in the Implementing Agreement and its activities, may be obtained from the ENARD website, at [www.iea-enard.org](http://www.iea-enard.org) or from the ENARD Secretariat at EA Technology:-

e:mail: [enquiries@iea-enard.org](mailto:enquiries@iea-enard.org)

Or

Tel. +44-(0) 151-347-2425



# ENARD Web-site

[www.iea-enard.org](http://www.iea-enard.org)



Innovators in Power Engineering