



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



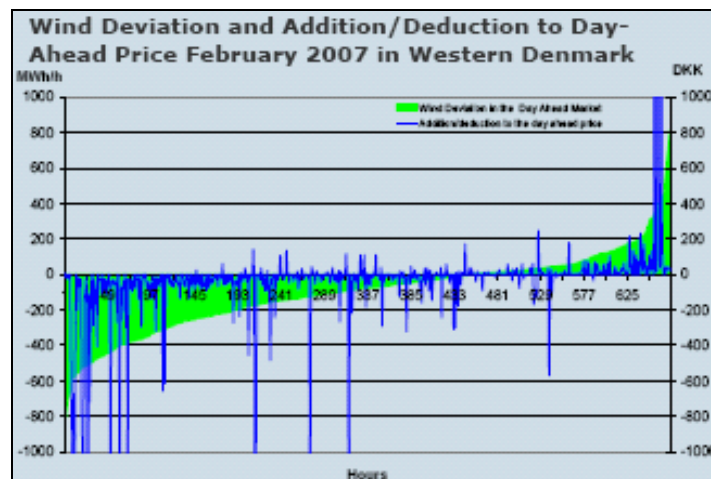
IEA Implementing Agreement on Renewable Energy Technology Deployment (RETD)

Annex I Workshop Profile

“Economic, Regulatory & Market Issues Associated with the Incorporation of Variable Generation”

Annex I: Information Collation and Dissemination

Annex I / RETD Workshop held KU-Leuven, Leuven, Belgium,
13th - 14th June 2007



[from the presentation given by Gitte Agersbæk, Energinet.dk]

Summary:

The workshop drew the support of 31 participants from 9 countries and comprised a series of keynote presentations, associated panel contributions and extensive complementary open discussion and dialogue.

This workshop forms one of a series of ENARD Annex I workshops organised and delivered by EA Technology in its capacity as ENARD Annex I Operating Agent



Workshop profile

1 Introduction

The workshop was organised jointly by the IEA (International Energy Agency) Implementing Agreements on Electricity Networks Analysis, Research and Development (ENARD) and Renewable Energy Technology Deployment (RETD). ENARD covers a wide range of issues associated with electricity transmission and distribution (T&D) systems. Annex I, which serves as the central information collation and dissemination Annex, is essentially led by a series of topical experts' meetings and workshops, each addressing particular areas of interest that act as the foundation for the development of future collaborative research and development (R&D) Annexes. RETD was established with a mandate to address cross-cutting issues influencing the deployment of renewable energy. RETD is intended to accelerate the market introduction and deployment of renewable energy technologies. Further details may be found on the ENARD and RETD web-sites at www.iea-enard.org and www.iea-retd.org or for ENARD e:mail enquiries@iea-enard.org.

2 Workshop Objectives

The workshop objectives were:

- to review the current state-of-the-art;
- to obtain a detailed insight into current economic, regulatory and market thinking;
- to identify the principal economic, regulatory and market mechanisms;
- to debate market and regulatory limitations;
- to assess the implications of all the above; and
- to identify the requirements for future collaborative work programmes.

3 Workshop Structure and Programme

The workshop comprised four principal sessions, each with a keynote address, one or more panel contributions and subsequent open discussion and dialogue. The latter was regarded as particularly important, as it aimed to elicit the key requirements for future work programmes within ENARD, RETD or other initiatives.

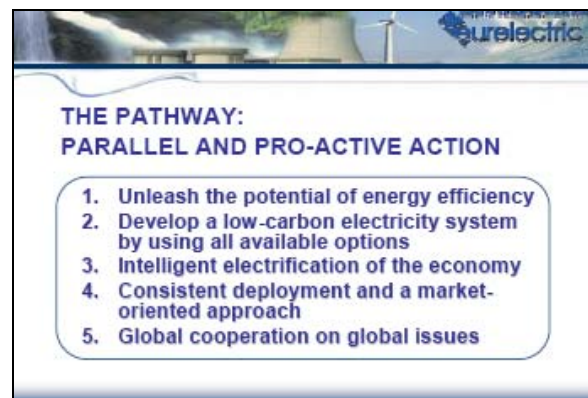
The workshop was opened by Professor Ronnie Belmans for KU-Leuven, with responses from Stig Goethe, Chair of ENARD's Implementing Agreement and Kaare Sandholt, Operating Agent of RETD's Implementing Agreement. RETD had just sanctioned a new project in relation to the creation of dynamic markets

for the large scale integration of renewables with this workshop forming a key input.

4 Keynote Address

The Role of Electricity: A New Path to Secure and Competitive Energy in a Carbon Constrained World (Paul Bulteel, Outgoing Secretary General, Eurelectric)

Mr Bulteel highlighted the role of Eurelectric as the collective voice of the European electricity industry and drew on the results of Eurelectric's research into the role of electricity in a carbon constrained world, where the key policy drivers were security-of-supply, economic competitiveness and climate change. The overall conclusions, which are to be followed in parallel, are summarised in the presentation slide below.



[from the presentation given by P Bulteel, Eurelectric]

5 Workshop Sessions

Session 1: The Influence of Major Incidents on Investment Planning

Keynote Address

Stig Goethe, Chair, ENARD Implementing Agreement

Stig Goethe focussed on three recent disturbances to the Swedish power system:

- 2003 network collapse: 2M customers; 5-6 hours;
- 2005 Gudrun storm: 400k customers; <40 days;
- 2007 major storm: 300k customers; <2 days.

Changes accepted by the power utilities sector were:

- no customers should be off supply for >24 hours;
- payments to customers off supply >12 hours.

Stig Goethe concluded that customer requirements in terms of quality and security of supply have re-opened a debate on the price that customers are willing to pay.

Panel Contribution

- **Learning from the blackouts** (Ulrik Stridbaek, IEA Office)

**Learning from the Blackouts:
Key Messages**

- Electricity reform creates more dynamic system operating conditions
- But changes to rules and operating practises have not kept pace
- A comprehensive, integrated policy response is required to avoid undue blackouts

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[from the presentation given by U Stridbaek, IEA Office]

Key Points from Session 1 Discussion and Dialogue

Key points to emerge included:

- development of security of supply as a market concept;
- potential degradation of regional security of supply as a consequence of greater inter-connection of national transmission systems;
- requirement for regional system risk curves;
- reduced knowledge of component parts of the electricity supply chain due to unbundling;
- development of the concept of locational marginal price;
- contribution of stand-by generation in mitigating the economic impact of supply disturbances;
- evaluate full cost and impact of blackouts.

Session 2: Regulatory and Permitting Aspects

Keynote Address

Emmanuel Cabau, DG TREN, European Commission

Emmanuel Cabau focussed on prospects for the internal gas and electricity markets in Europe. Issues to be addressed in relation to transmission régimes included:

- process of unbundling not fully complete;
- priority rights associated with existing contracts;
- regulated pricing régimes working against new market entrants;
- infringement cases.

The Commission's thoughts on outstanding issues were:

- enhanced EU co-ordination of national regulators;
- improved transparency;
- greater unbundling;
- the facilitation of investments;
- enhanced customer protection

Panel Contributions

- **Regulatory and permitting aspects - a UK perspective** (Robert Hull, Ofgem)
- **Economic, regulatory and market issues associated with the incorporation of variable generation** (Jésus Martin Giraldo, Union Fenosa)

Key Points from Session 2 Discussion and Dialogue

Key points to emerge included:

- transmission system infrastructure and development to reflect scenarios for renewables;
- systems balancing across European regions;
- uses for potential surplus of renewable outputs;
- pivotal role of Demand Side Management (DSM);
- develop IEA DSM Implementing Agreement links;
- need full transparency in systems costings;
- note technology's role in the regulatory process;
- rank regulatory policies by risk & system security.

Session 3: Financing Capacity

Keynote Address

Córne Meeuwis, TenneT, Netherlands

Córne Meeuwis focussed on the financing of transmission grids and interconnectors, with emphasis on investments made by the Dutch TSO, TenneT. The main topics addressed in the presentation were:

- Strategy for TenneT;
- Developing and financing interconnectors;
- Transmission grid reinforcement and construction;
- Interconnectors with Norway, Germany and UK.

TenneT's responsibilities cover 220kV and 380kV grids and, from 2008, the 110kV and 150kV grids. TenneT aims to establish a single market in north western Europe in which TSOs will solve congestions and market parties will not face restrictions. The market would have a common balancing system for supply and demand.

Initiatives that contribute to achieving these goals are:

- Acquisition and control of 50kV and 150kV grids;
- Large-scale projects such as the Randstad380;
- Interconnectors with other electricity markets;
- Market facilitation;
- Increases in energy efficiency.

Interconnectors are a core business concern, being key to developing the north western European market. TenneT has used two methodologies for financing interconnectors: socialization of costs and non-socialized financing.

Panel Contributions

- **Investing in transmission capacity for variable generation** (Goran Strbac, Imperial College London, UK)

- **Financing transmission capacity – a UK perspective** (Philip Baker, Dept. Trade & Industry, UK)

Key Points from Session 3 Discussion and Dialogue

Key points to emerge included:

- Interconnectors will lead to rising prices if there is approximation of prices across the connection;
- The Netherlands/Germany interconnector will result in coal-fired investment in the Netherlands;
- The difference between the energy-dimensioned Scandinavian market and the rest of Europe;
- The effects of having two different ways of financing interconnectors in the same system;
- Barriers for investments in transmission capacity;
- The role of commercial investors in extending the transmission network in Europe;
- Rights of incumbents in transmission financing.

Session 4: Market Integration of Renewable Energy

Keynote Address

Gitte Agersbæk, Energinet.dk, Denmark

Gitte Agersbæk focussed on Danish experiences with integrating wind generation into the market place:

- No reliable availability as power output is dependent on wind speed;
- Limited predictability due to variations in quality of wind prognosis;
- Unfavourable geographical location as attractive wind conditions are usually located in sparsely populated coastal areas without transmission infrastructure.

Wind generation in the electricity market has the following effects on the market:

- Day ahead market – more volatility
- Intraday market – more volume
- Balancing market – more market predictable, more volume
- Reserve market – higher need, less capacity

Future developments that will assist the integration of variable generation into electricity markets are:

- Better market coupling across Europe;
- Better co-operation between the reserve market, intraday market, balancing, congestion management, reinforcements within national networks and the development of new interconnection capacity.

Panel Contributions

- **Innovative electricity markets to incorporate variable production** (Gareth Swales, IPA Energy + Water Consulting, UK)
- **System integration** (Per Holmgaard, DONG Energy - Renewables, Denmark)
- **Market integration of RE** (Philip Baker, Dept. Trade & Industry, UK)

Key Points from Session 4 Discussion and Dialogue

Key points to emerge included:

- Need for an overview of current international activities in the field of market integration;
- Different market set-ups should be investigated as part of RETD, e.g. North American experiences;
- Interview major stakeholders: TSOs, regulators, producers, developers, power exchanges etc.

6 Future Activities

The workshop concluded by noting the considerable value of the various presentations, contributions and dialogue, in relation to the shaping and development of future ENARD, RETD and IEA initiatives in this area. In the short term, the outputs from the workshop will form an input to the RETD commissioned study described below. In the medium term, both the ENARD and RETD ExCos will consider how best to respond to some of the key outstanding issues raised.

Innovative Electricity Markets to Incorporate Variable Production

(Gareth Swales & Michael Wagner, IPA Energy + Water Consulting, UK)

A brief presentation was given on this project newly sanctioned by RETD. The project is intended to identify electricity market products and services required for the better integration of variable generation and to provide examples of how markets could effectively incorporate variable renewable energy sources. A structured approach to project delivery is anticipated, addressing:

- a review and assessment of market mechanisms in RETD and selected non-member countries;
- current best practice and potential improvements in cross border trading arrangements and in proactive grid planning

ENARD, the IEA Implementing Agreement on Electricity Networks Analysis, Research and Development, functions within a framework created by the International Energy Agency (IEA). The views, findings and publications of ENARD do not necessarily represent the views or policies of the IEA Secretariat or of all its individual member countries.

ENARD Participating Countries:

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