

# Harmonising Effective Regulation

**Einar Hope**

Professor

Norwegian School of Economics and Business Administration **NHH**

and

**Balbir Singh**

Senior Research Economist

Institute for Research in Economics and Business Administration **SNF**

Bergen, Norway

[www.snf.no](http://www.snf.no)

*Presentation at the EU SESSA conference “Implementing the internal market of electricity: Proposals and time tables”, Brussels , Friday, 9 September 2005*



Et selskap i NHH-miljøet

# EU Energy Policy Agenda

- **Security of Supply**
  - Reliability
  - Adequacy
  - Geopolitical robustness
- **Efficiency**
  - Market integration and workable competition
  - Networks: Effective regulation
- **Environmental sustainability**
  - Kyoto protocol

# What do we mean by harmonisation regulation?

- Harmonisation involves **removal of regulatory barriers** that restrict achievement of **secure, efficient and environmentally sustainable** supplies through integrated electricity markets
- Integrated markets do not happen. They are made
- Regulation is the visible hand that makes integrated markets
  - Market architecture – Market design
  - Market structure – Competition
  - Network governance
    - Economic incentives
    - Rules and protocols
- Harmonised regulation is the lubricant in construction and operations of integrated markets



# Four levels of harmonisation

- **Objectives**
  - National, regional and /or EU
- **Principles**
  - Independence
  - Transparency
- **Instruments and priorities**
  - Economic versus non economic
  - Mandatory versus voluntary
  - Efficiency versus equity
- **Metrics**

# Status and Challenges

**Objectives - National, Regional or EU:** Issue is far from being resolved.

To consolidate the emerging regional consensus

**Principles - Independence and transparency:** Lies in the eye of the beholder

To build on emerging general guidelines

Arms length relationship, stability of tenure, financial autonomy

**Instruments and priorities**

Economic versus non-economic - Many techniques and options

The issue is - How much regulatory discretion?

Formal versus voluntary: Preference for formal

The issue is - Realisation of the potential for voluntary agreements

**Metrics-** Many techniques and options

The issue is- Practical implementation and competence development



Status of harmonisation : An illustration  
We all have an idea about what ***security and reliability means***



An illustration:  
We have different views about *what to do about it*

Structure and regulation of service reliability of electricity Networks in the Nordic Market				
	Denmark	Finland	Norway	Sweden
<b>Regulation: Service Reliability</b>				
<i>Nature</i>	Voluntary		Ex-ante	Voluntary
<i>Reliability target variable</i>	None		Energy not supplied for interruptions > 3 minutes	None
<i>Benchmarking</i>	None		Historic values plus OLS extrapolation (for distn. net)	
<i>Economic Incentive</i>		Consumer compensation for interruptions exceeding 12 hours	Penalty / reward for deviation from reference	Voluntary compensation by networks
<i>Data reporting</i>	Voluntary	Obligatory	Obligatory	Obligatory
<i>Data registration</i>	Automatic (ELFAS)	Manual/Automatic (NIS/SCADA)	Automatic (FASIT)	Manual/Automatic (NIS/SCADA)
<i>Data values</i>		SAIFI, SAIDI	Energy not supplied	SAIDI, SAIFI, Planned/unplanned
<i>Reporting point</i>	Transformer	Transformer- Primary side	Transformer- Secondary side	End user
<i>Data availability</i>	Restricted	Public domain	Public domain	Public domain

# An illustration:

## Part of the problem is on deciding *where to begin*

- NORDEL
  - (Rekommendation om fastställande av definitioner, NORDEL, June 2000)
    - Energy security
    - Power security
    - Security of supply
- CEER
  - ("Second benchmarking report on quality of electric supply", Working group on quality of electric supply, CEER, AEEG Milan September 2003.)
    - Commercial quality of supply
    - Continuity of supply
- OTHER
  - Adequacy
  - Reliability of supply
    - (Oren, S. "Capacity Payments and Supply Adequacy in Competitive Electricity Markets." Proceedings from the symposium of specialists in electric operational and expansion planning, Curitiba, Brazil. May 21-26, 2000)
    - (Joskow, P. and J. Tirole "Reliability and competitive electricity markets.")
  - System robustness (Krafttrapport 2004, Statnett, Jan 2005)
  - System vulnerability (Sårbarhetsutvalget, 2000/ Vulnerability of the Nordic Power System, Report TR A5962, SINTEF)

# An illustration:

We have different views about *what to measure*

- **Quantity Indices**
  - **System average interruption frequency index**
    - $SAIFI = \text{Total number of customer Interruptions} / \text{Total number of customers served}$
  - **System average interruption duration index**
    - $SAIDI = \text{Sum (Interruptions * Customers affected)} / \text{Total number of customers served}$
  - **Customer average interruption duration index**
    - $CAIDI = \text{Sum (Interruption durations * Customers affected)} / \text{Total number of customer interruptions}$
    - $CAIDI = SAIDI / SAIFI$
- **Value Indices**
  - *Customer damage functions*
    - *Individual, Composite- Sectoral, Tariff group etc.*

## An illustration:

We have many techniques and options as to ***how to measure***

- Quantity indices
  - Census methods
- Value Indices
  - Stated preference methods/ contingent valuation of interruptions
    - Direct costs, Willingness to pay/ accept
  - Revealed preference methods
    - Averting behaviour methods
  - Normalisation
  - Estimation of energy not supplied
  - Estimation of damage functions
    - Non normal data problems

An illustration:  
 We have differences in *willingness to pay to get the job done*

Institutions and resource use in regulation of electricity Networks in the Nordic Market					
	Denmark	Finland	Norway	Sweden	Nordic Market
<b>Regulatory Costs</b>	Energitilsynet	Energimarknadsverket EMV	Norges vassdrags- og energidirektoratet NVE	Statens energimyndighet	
Labour inputs (Years)	20	16	50	30	116
Labour inputs/ utility	0,26	0,17	0,32	0,15	0,22
Network (1-110 kv) km /labour input	3384	9308	2101	7223	4641
Throughput / labour input (Gwh)	1746	3798	2509	5017	3204
Consumers 000/labour input	152	185	52	174	119
Energy not delivered Mwh /labour input	3	16	79	162	79

# What do we do next?

## Option 1-impose uniformity

- A text book “**designer package**” implemented through a third generation European directive
  - BETTA - UK, SMD-US etc.
  - **Not possible**
    - Lack of supranational authority
    - Political will varies across countries and regions
    - Costly and time consuming
  - **Neither desirable**
    - Cross-border regulation of electricity systems is technically and legally demanding
    - Regulation is not perfect and neither are regulators
    - Costs of failure may be significant as compared to potential benefits
    - Provides easy escape route for industry majors to write off responsibility
    - Lacks a successful prototype

## What do we do next?

### Option 2. Find uniformity in diversity

- A **“controlled process”** employing a judicious mix of mandatory and voluntary measures that can be implemented within the current regional frameworks
  - Ex. Nordic model: The only true cross-border model that so far has stood the test of time
    - Stage 1. Pre-liberalisation establishment of cross-border trades and establishment of short and long-term “interruptible power market” IPM and Nordel cooperation
    - Stage 2. A decade of establishment of the Nordic power market with roots in the IPM structure and formalisation of Nordel advisory role.
    - Stage 3. In 2004 the Nordic Council of Ministers issued the Akureyri declaration asking Nordic TSO to outline coordination of the system responsibility, joint organisation and financing of investments in the network and handling of peak load concretely can be managed in the Nordic market
- **Tradition, long history, favourable politics and good economics have been the important drivers**

# Road map for the future

- **Evaluate regional experience**
- **Identify regional clusters**
- **Identify the stakes – Benefits and costs**
  - Methodologically this means going beyond the simple two-dimensional models that are algebraically tractable and produce closed-form solutions
- **Successful implementation is the litmus test**
  - Devil lies in the detail
  - EU wide competence development and research cooperation is the keyword
- **Regulation is economic in content, political in implementation and social in consequence and so is harmonisation**
  - Its not just about efficiency
  - It takes time