5Th NARUC/CEER Energy Regulator's Roundtable Washington – February 12-13

Development of Regional Electricity Markets in EU

Still more rapid progress in of the Nordic Countries

Jan Moen

NORWAY

The Second EU directive on Electricity: A new momentum to establish effective, independent, EU wide regulation ?

More power to Regulators will it lead to harmonization or greater regulatory uncertainty and how will sector regulation co-exists with competition authorities?

Will the new member states and Germany create more slowdown and uncertainty ?

Will we see new investments in the power sector that can improve SoS and quality of supply ?

Will regional markets be created and will cross border trade and competition be improved ?

Transposition very slow in most countries, does it mean that national champions still have “support” and the “voice of Brussels” domestically still is low ?

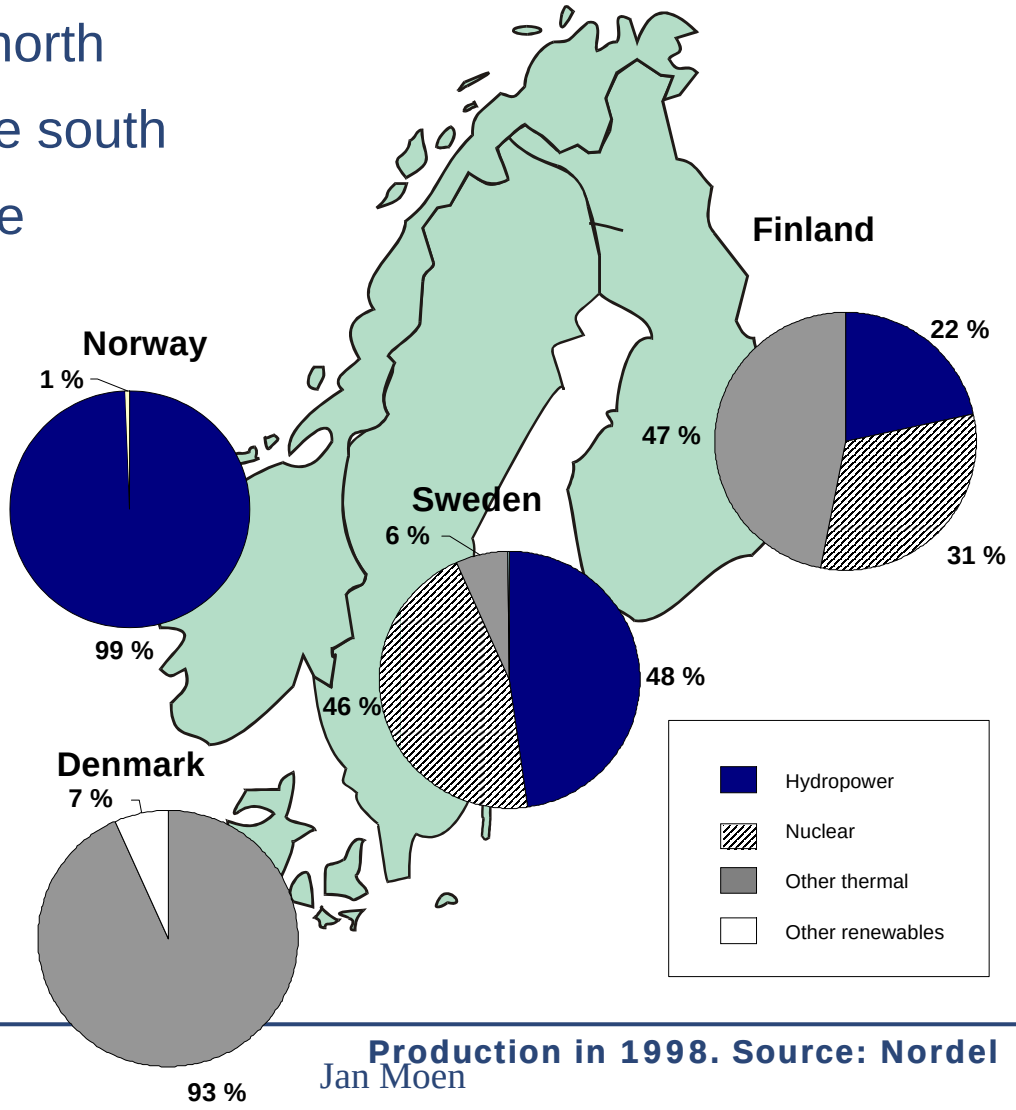
The Nordic countries still show progress “independent” of the second directive !

Rationale for trade in the Nordic countries

The Nordic countries have diversified generation capacity

- Hydro in the north
- Thermal in the south

➔basis for trade



Production in 1998. Source: Nordel

Some basic barriers

Export (oversupply) country : Consumer surplus down, producer surplus up!

- Lowest prices, marginal price **increase**

Import (excess demand) country : Consumer surplus up, producer surplus down

- Highest prices, marginal price **down**

Different marginal gains or losses for different segments of the market, but as a whole **net gains**!

Collective agreement will be necessary!

- **Who** will take the lead?

Organizing **"optimum" trade volumes** difficult

Incentives to limit trade and use "market power"- some volumes always create larger benefits than no trade

Basic Regulatory needs for Power Trade

A general political agreement directives and Regulations used in EU that enables regulators to implement regulations tools for Interconnectors and transmission lines on a common basis (degree on harmonization)

Tariffs/compensation for use of lines and/or host transit necessary for efficient power trade

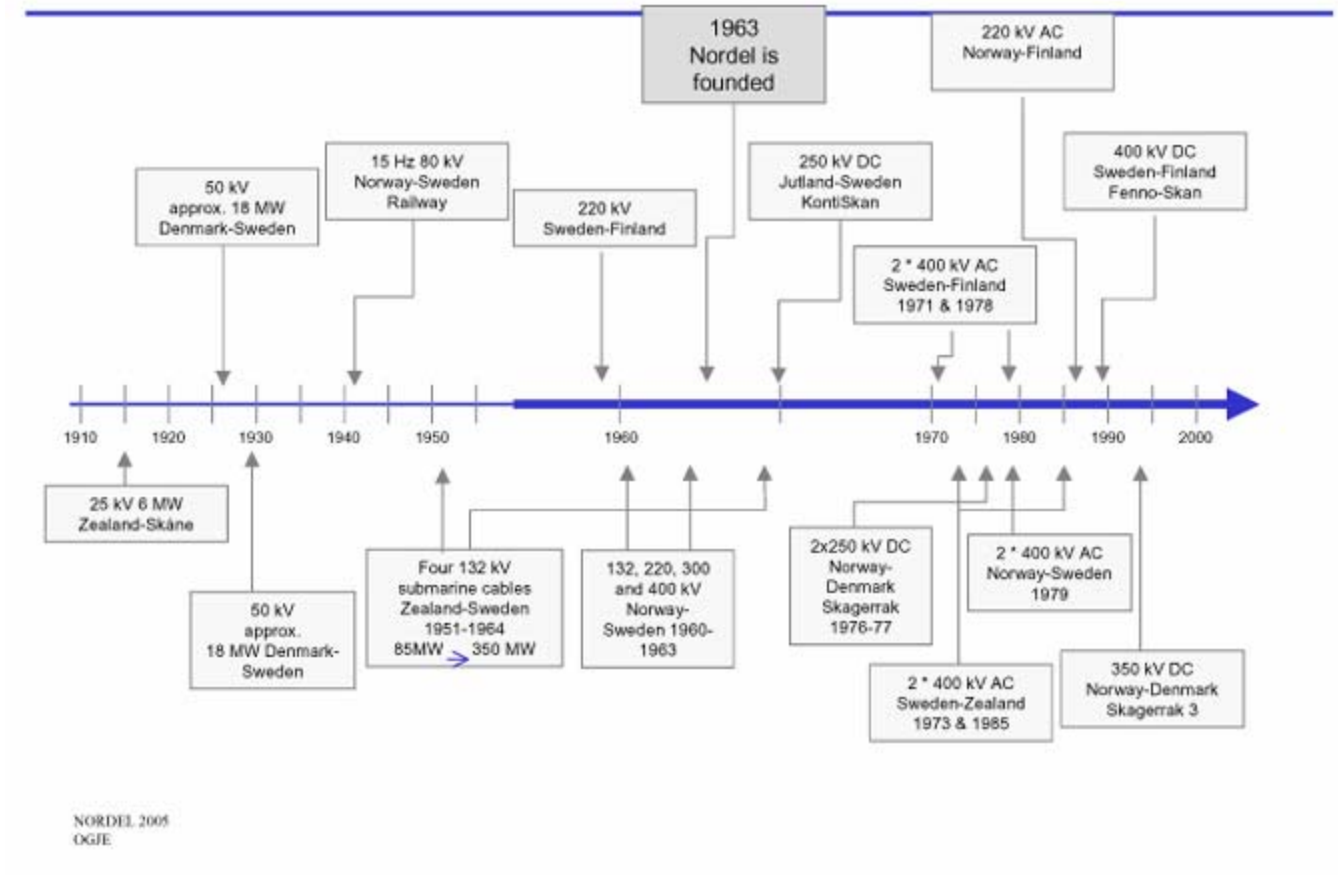
Congestion management on borders

Metering and settlements

Rules to handle **disputes**

Most of these tasks will be "operated" by TSOs and harmonizing regulation of TSOs will be important

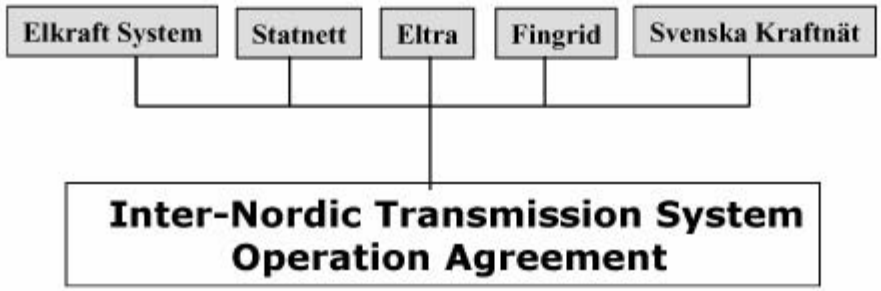
Development of Nordic co-operation



Forming of a Nordic power market

Requirements:
Co-operation between all five Nordic TSOs on issues required to form one common market.

Co-operation regulated in:
"The Inter-Nordic Transmission System Operation Agreement"



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NORDEL

- Nordel was founded in 1963 as an organisation for Nordic co-operation in the electricity sector.
- Members were from the beginning ”leading persons” in the sector in Denmark, Finland, Iceland, Norway and Sweden
- Nordel was established as an advisory and recommending body
- Goal to create and maintain the conditions for an efficient utalization of the Nordic electricity generation and transmission system

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Nordel objectives

NORDEL shall

Act as one Nordic TSO and be a basis for one uniform Nordic electricity market

- ***Solve grid investment problems***
- ***Solve congestion management problems***
- ***Apply uniform harmonised operational rules***
- ***Solve transit problems***

Be a leading developer in the Nordic market

Be a strong force in the European market development

Have capability to react promptly to challenges, make decisions and reach strong commitment

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Some conclusions

Introduction of energy trade can very often result in that the **full gains** are not realized. From a firm or country perspective use of market power also represent net gains, but as a whole the region can benefit more by limiting market abuse

National or general liberalization give **no guarantee** for the full benefit of power trade – **removing** of national monopolies will be a must

Nordic market developed fast because :

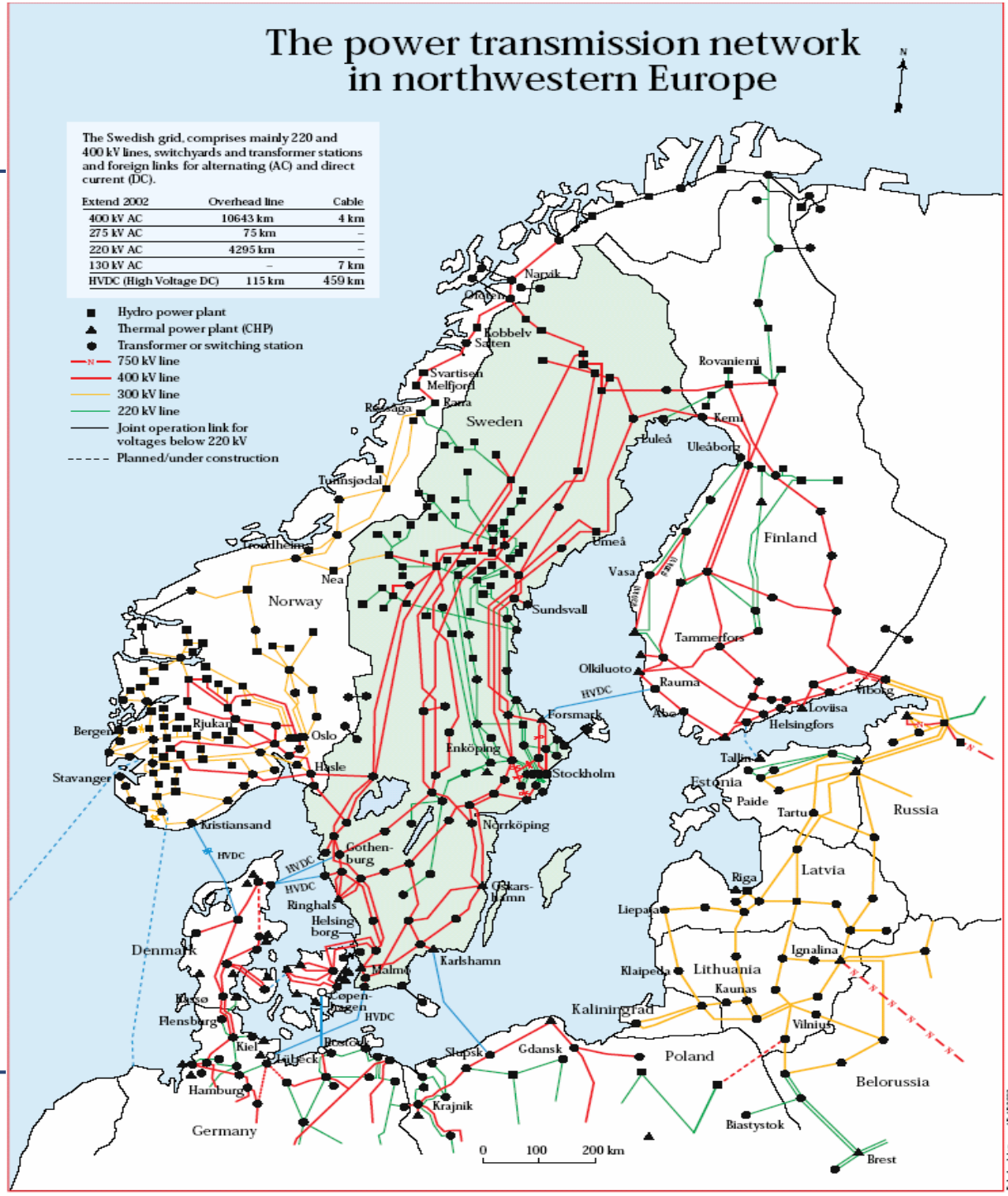
Strong governmental ownership

Nordel ”model” robust before and after sector reforms

Nordic **political consensus** in critical elements of energy policy

Institution building very strong - continues strong support to FNER and CEER

Competition authorities proactive and good cooperation with Regulators


The power transmission network in northwestern Europe
The Swedish grid, comprises mainly 220 and 400 kV lines, switchyards and transformer stations and foreign links for alternating (AC) and direct current (DC).
Extend 2002 | Overhead line | Cable
400 kV AC | 10643 km | 4 km
275 kV AC | 75 km | –
220 kV AC | 4295 km | –
130 kV AC | – | 7 km
HVDC (High Voltage DC) | 115 km | 459 km
Hydro power plant
Thermal power plant (CHP)
Transformer or switching station
750 kV line
400 kV line
300 kV line
220 kV line
Joint operation link for voltages below 220 kV
Planned/under construction
Sweden
Norway
Finland
Denmark
Germany
Poland
Russia
Estonia
Latvia
Lithuania
Belorussia
Kaliningrad
Narvik
Kobbelv
Svartisen
Melfjord
Rana
Rovaniemi
Kemi
Luleå
Uleåborg
Trondheim
Nea
Umeå
Vasa
Sundsvall
Tammerfors
Olkiluoto
Rauma
Forsmark
Abo
Loviisa
Helsingfors
Tallin
Paide
Tartu
Rjukan
Bergen
Oslo
Enköping
Stockholm
Hasle
Stavanger
Kristiansand
Norrköping
Gothen-burg
Oskars-hamn
Riga
Liepaja
Ringhals
Helsing-borg
Karlshamn
Malmö
Klaipeda
Kaunas
Ignalina
Vilnius
Kopen-hagen
Flensburg
Kiel
Lübeck
Hamburg
Rostock
Slupsk
Gdansk
Krajnik
Biastystok
Brest
0 100 200 km

The Nordic Power Exchange NORD POOL ASA

Nord Pool ASA

Financial Contracts
Hedging

1 day - 4 years ahead
- continuos trading -

Futures
Days Weeks

Months Quarters
Forwards
Seasons Years

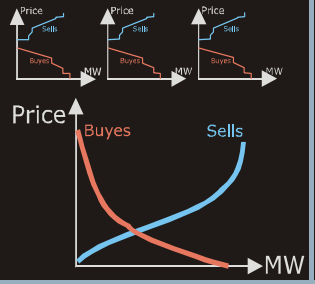
European
Options

Nord Pool Spot AS

Elspot

Physical Contracts
Marketequilibrium

one day ahead
- auction trade -



Elbas

hours ahead
- cont. trade -

114,25 (50)
114,00 (20)
113,75 (60)
113,50 (45)
113,00 (25)
112,75 (55)
112,50 (40)
112,25 (15)

Sweden & Finland

Nord Pool Clearing ASA

Derivatives, Elspot and Elbas:	Security - Margins - Business reports
Additional for Derivatives:	Mark-to-Market, Risk Management
Additional Services:	Bilateral Financial Contracts

The TSOs

Statnett, Svenska Kraftnät, Fingrid, Eltra, Elkraft System

Balancing Power

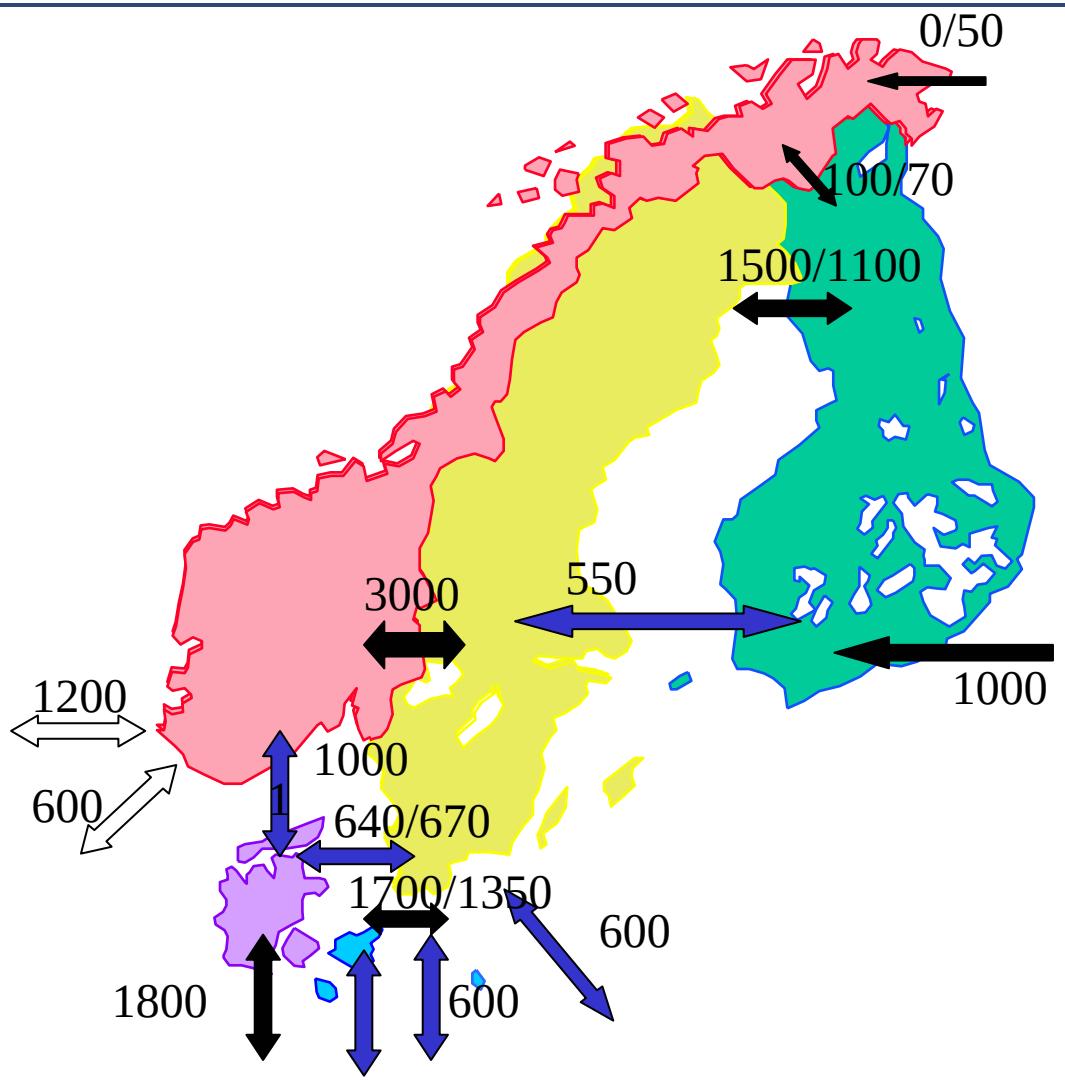
Real-Time-Operation

Balancing generation and consumption close to RT

System Operation

Services during the Real-Time-Operation: Controlling frequency and voltage etc.

The Nordic Power Market

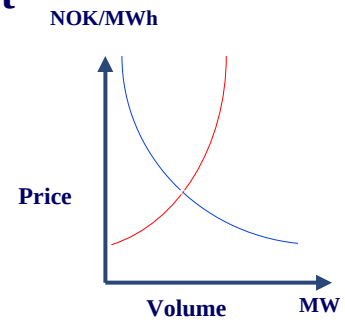


Two-market Concept

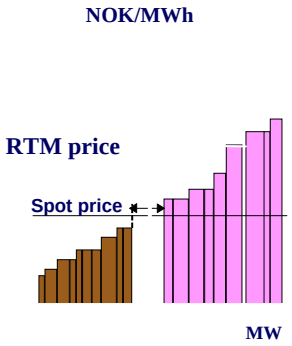
Day-ahead Spot Market

Bid form

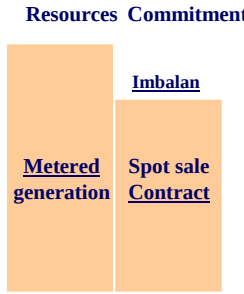
	Prices (NOK/MWh)				
Hour	0	200	201	300	5000
1-06					
07-18	300	300	150	150	150
18-24					



Real Time Market



Calculation of Imbalances



Day of Operation - 1

Price / volume bids
Price determination based on bids and transmission capacities
Binding contracts - de-centralised dispatch
Financial settlement based on contracted volume and price.

Price = energy price +/- transmission capacity fee.

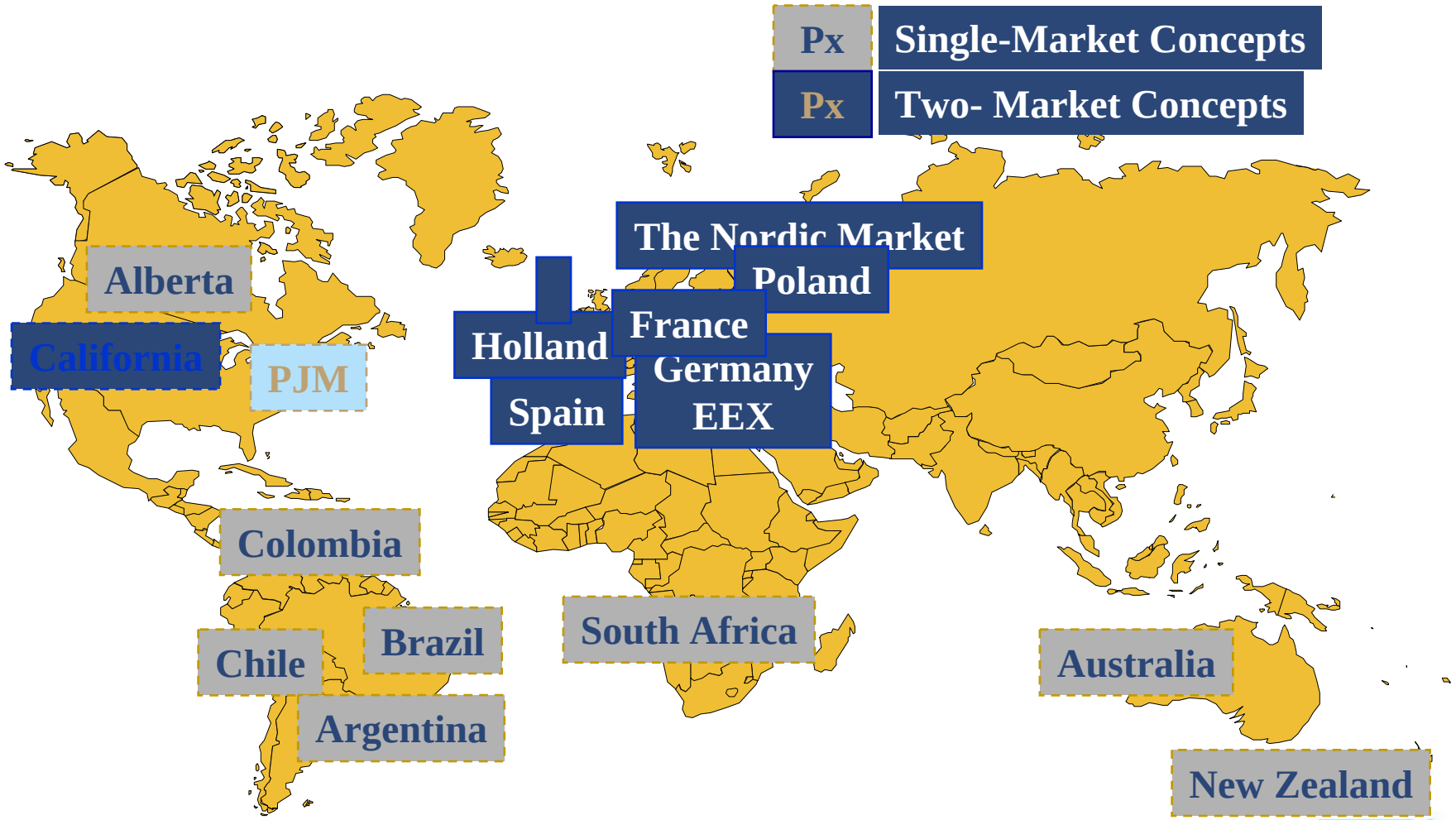
Day of Operation

Real Time Market based on bids of increments and decrements of generation and load.

Imbalance = contracted volumes - metered volumes.

Financial settlement based on imbalances volume and RTM-price.

Some established power exchanges



Nord Pool - markets

Elspot (Nord Pool Spot AS)

trade in physical-delivery contracts of 1-hour duration for next-day delivery

Regulating/Balance Markets

operated by national TSOs

Nordic Power Exchange (Nord Pool ASA)

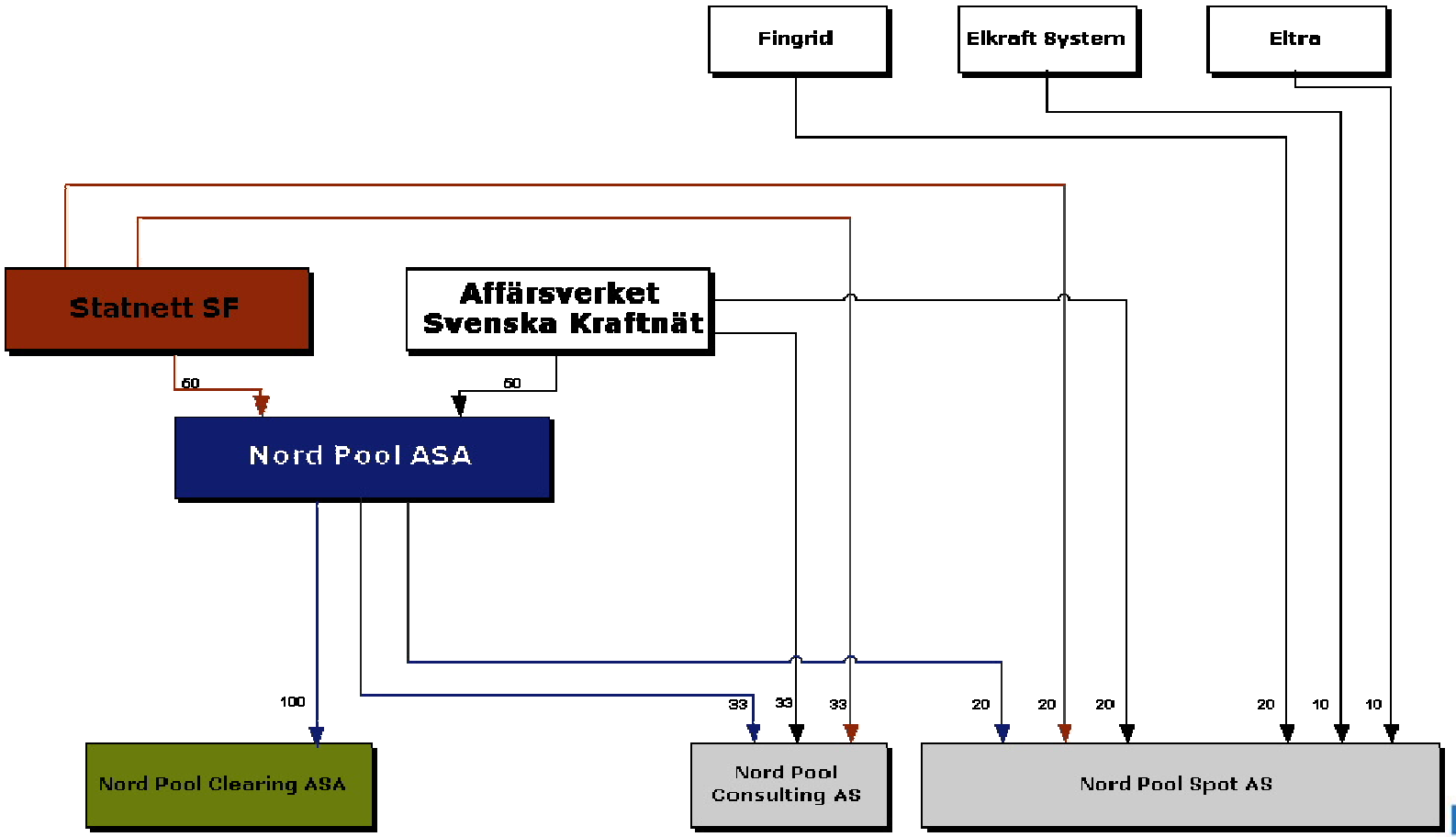
financial power contracts, time horizon of up to 4 years

Clearing

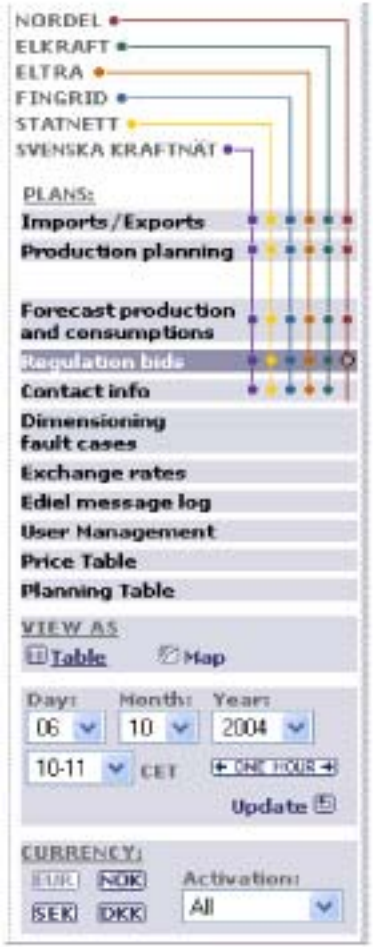
of Exchange & OTC/Bilateral trades

Nord Pool

corporate structure



Nordic Balancing Market



Regulation bids for Nordel, 2004.10.06 10-11

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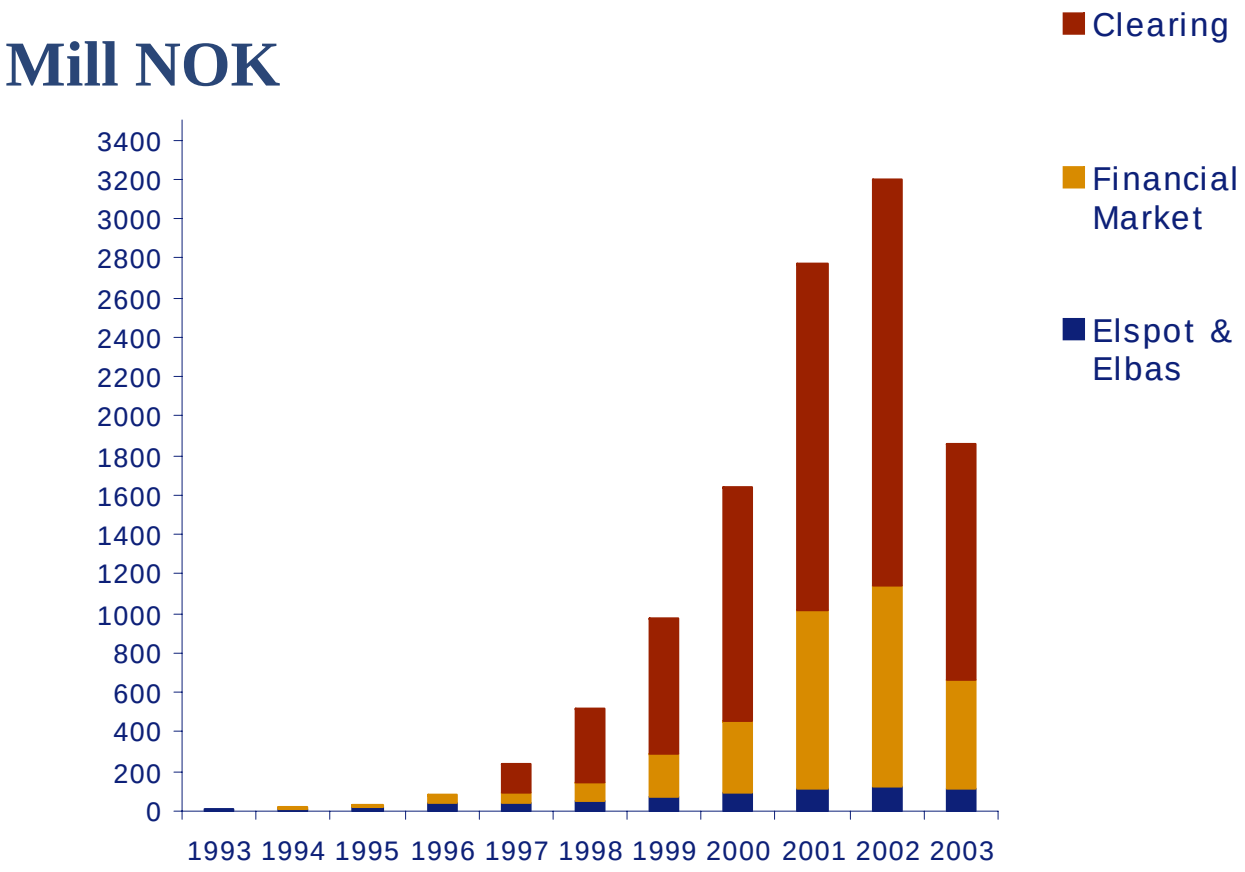
	Price /EUR	Price /SEK	Amount/MW	TSO	Area	Power station	Bid used	Type of activation Balance	Type of activation Special	Deactivated
	31.40	284	120	Statnett	NO1	Aurland				
	31.40	284	63	Statnett	NO2	Kolsvik				
	31.00	281	10	Fingrid						
	30.79	279	25	Statnett	NO1	BKK				
	30.79	279	48	Statnett	NO2	Helgeland				
	30.71	278	100	SvK	1					
	30.64	277	50	Eltra	DK1	Elsam				
	30.19	273	75	Statnett	NO1	Naddvik				
	30.19	273	25	Statnett	NO1	Rjukanverkene				
	29.83	270	50	Eltra	DK1	Elsam				
	29.71	269	100	SvK	1					
	29.58	268	25	Statnett	NO1	Hallingdal				
	29.27	265	12	SvK	2					
	29.03	263	50	Eltra	DK1	Elsam				
Up	28.98	262	10	Statnett	NO2	Sira				
Down	27.50	249	-12	SvK	2			•		
	27.50	249	-50	SvK	1			•		
	27.00	244	-50	Fingrid				•		
	26.57	241	-60	Statnett	NO1	BKK		•		
	25.96	235	-25	Statnett	NO1	Fortun		•		
	25.96	235	-12	SvK	2			•		
	25.40	230	-100	SvK	2					
	25.36	230	-70	Statnett	NO1	BKK				
	25.36	230	-55	Statnett	NO1	Florli				
	25.13	228	-50	Eltra	DK1	Elsam				
	25.00	226	-30	Fingrid						
	24.85	225	-50	SvK	1					
	24.85	225	-10	SvK	3					
	24.75	224	-70	Statnett	NO1	Ulla-Forre				
	24.75	224	-50	Statnett	NO1	Tokke				
	24.73	224	-50	Eltra	DK1	Elsam				
	24.41	221	-54	SvK	2					
	24.32	220	-50	Eltra	DK1	Elsam				

	Bids	----- Activated -----		---- Highest/Lowest Balance regulation price ----				
	Total	Balance	Special	Statnett	SvK	Fingrid	Elkraft	Eltra
Up	11141							
Down	-9586	-209		235	235	244		

Turnover in TWh 1993 - 2003



Conclusions 2

The Nordic Market **developed faster** than all other regions in Europe because:

Transition from pre 90`s to market opening was relatively easy because the structural “mandatory” **changes were quite easy to carry out** (NORDEL Development, NordPool etc)

A **monopolistic ownership** where government and municipalities **facilitated** this market development process – privatization was slow and a “goal” the ensure governments “control” own hydropower (limited number of players with same interests)

The Nordic council of minister who **participated fruitfully** in the pre 90`s with NORDEL managed still to be a facilitator for more efficient Nordic power market (one common TSO within NORDEL)

NordPool ownership split between the Nordic TSOs

Regulators **proactive** and cooperated through FNER

Net **effects were very positive** (lower prices) and accelerated further development

Quick summary of end use market in Norway

In principle all customers have **access** to the market and can change supplier when that want (3 weeks before new suppliers will connect you)

Challenge how to do the metering and **settlements at low cots** without costly new 2way communication

Adjusted low profiles worked very well and was easy to implement

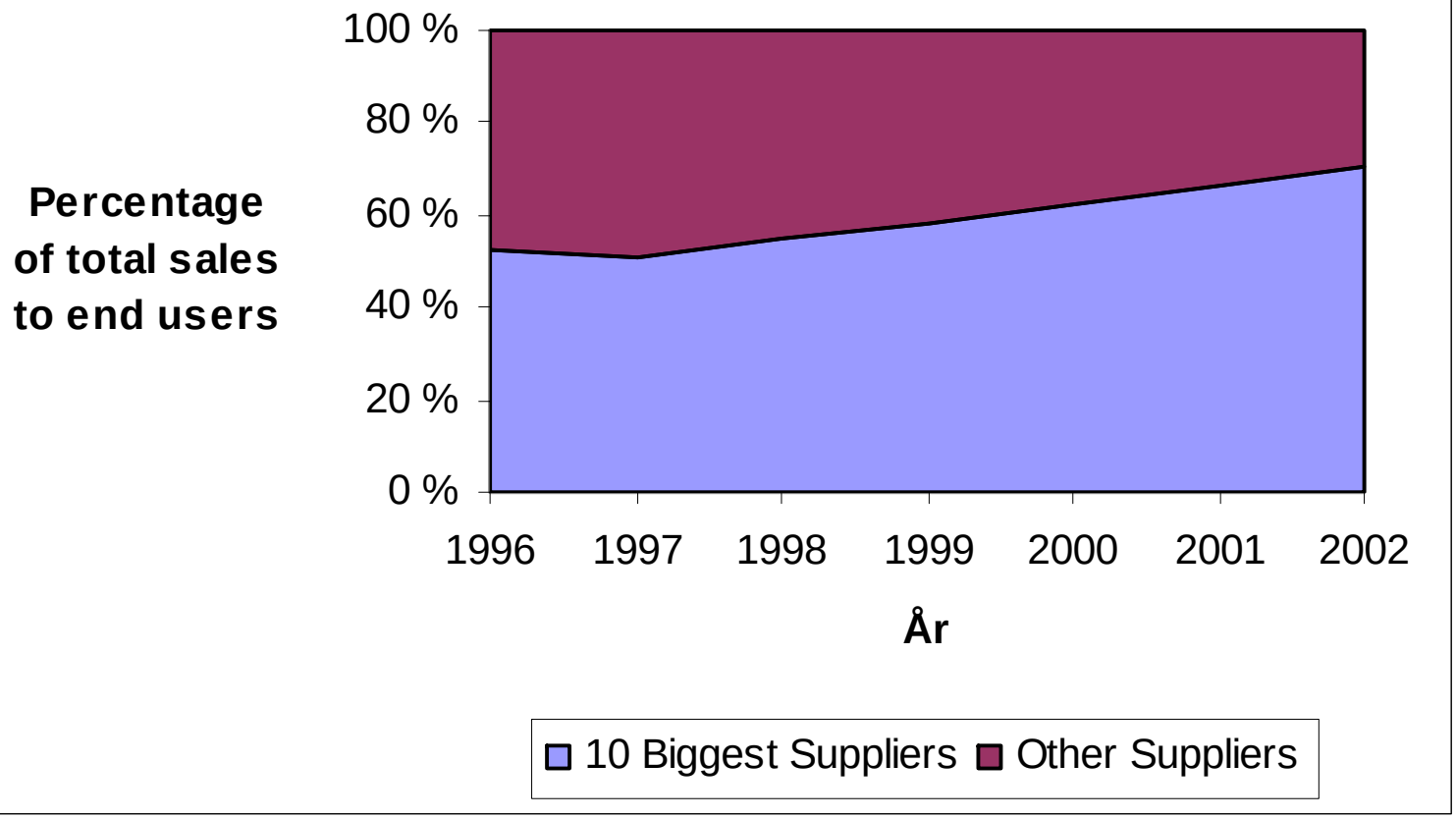
Fee to “cover” switching cost **gradually went down**

Competition authorities makes a list of supplier in each community at different volumes

Public debate on prices and how to choose the “best” offer

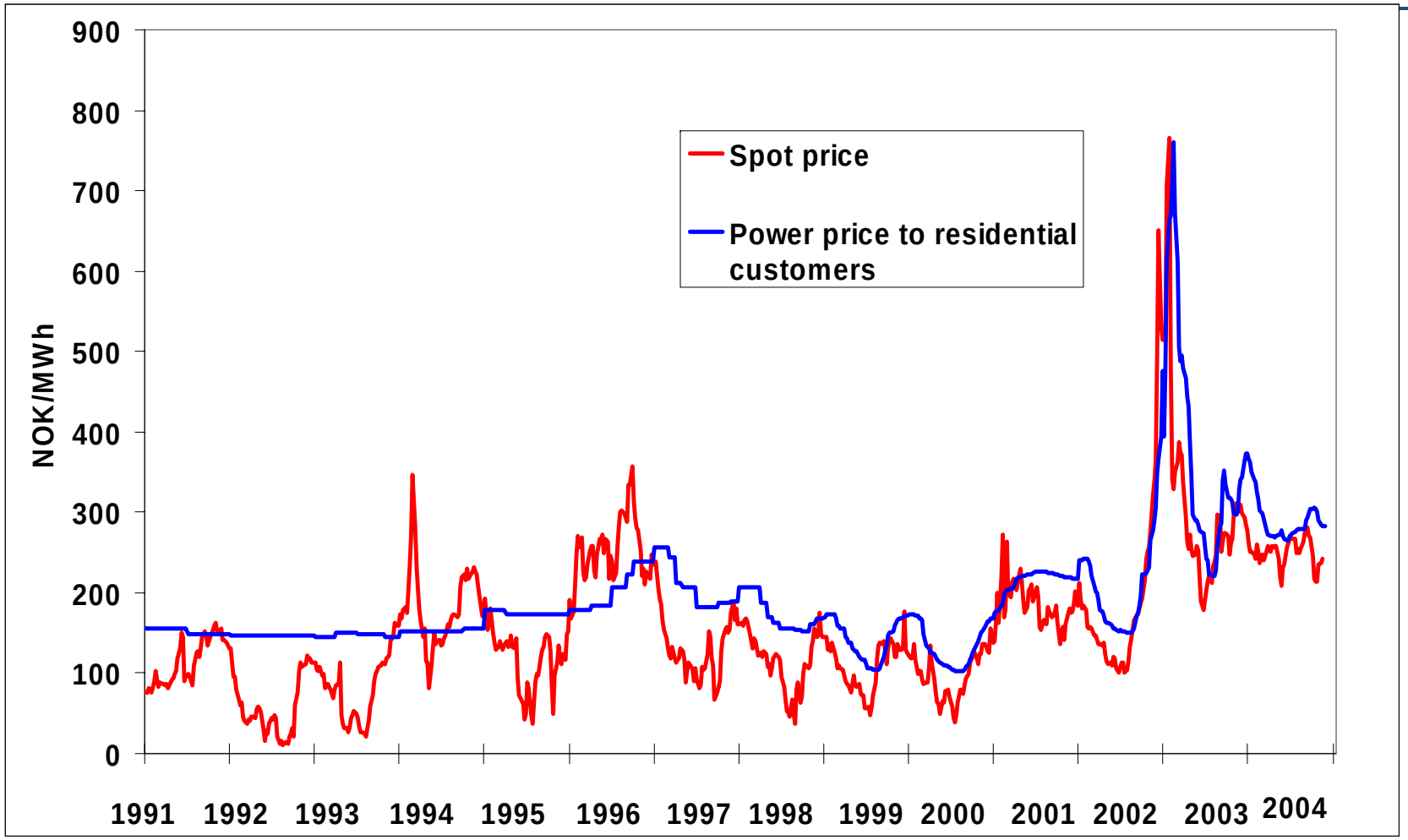
Norwegian Regulator proactive and **support from politicians** were important to speed up the process

Concentration in the end user market



Norwegian and Nordic import and spotprice, GWh og kr/MWh

Spot price and standard variable price to households



Conclusions end use market

Easy to switch suppliers and in most communities there are enough suppliers to ensure **efficient competition**

Over time a very good correlation between spot price and power element in end use tariff

Switching fee very fast down to **zero**

2way communication gradually introduced when cost effective

Norwegian system has an **impact** on other Nordic countries and hopefully CEER and ERGEG

Future “ENEL” solution will be considered

Political support to “simple” switching procedures and competition in the end-use market also for small customers