



Mobilising Demand Response into Wholesale/Retail market Lessons Learned

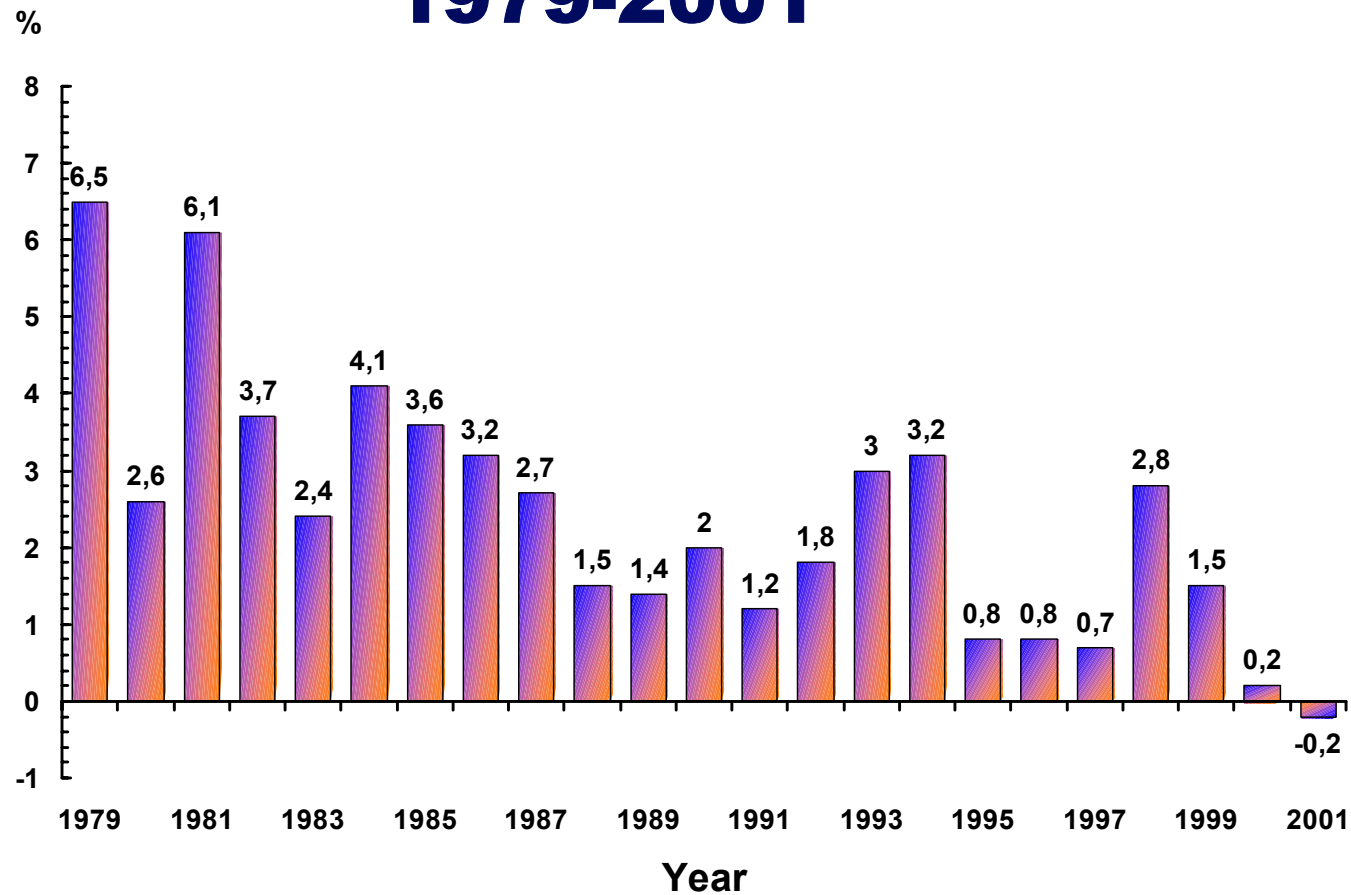
IEA Workshop Paris 24-25 February

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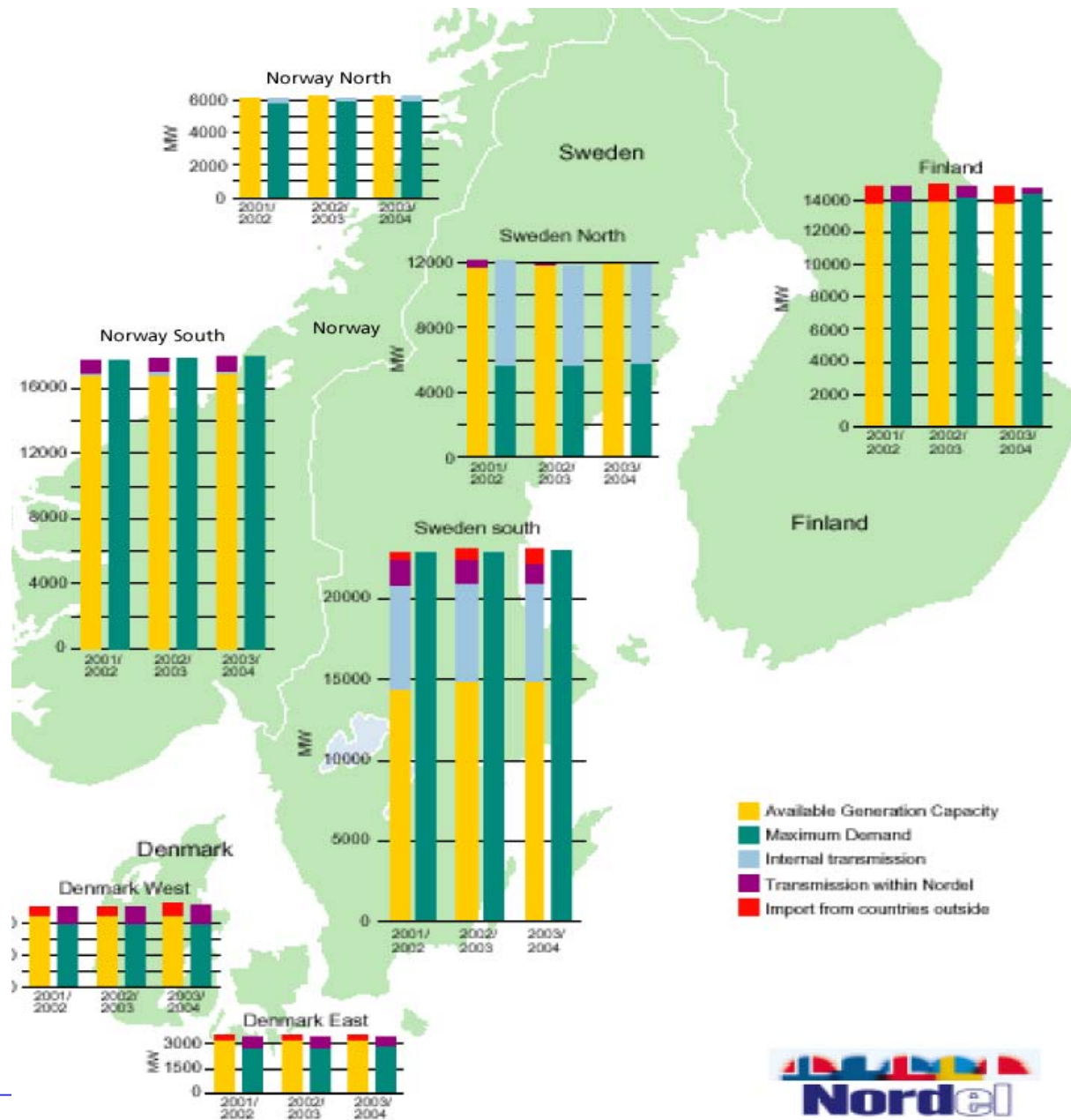
Norway

Growth Rates in General Consumption Temperature corrected 1979-2001

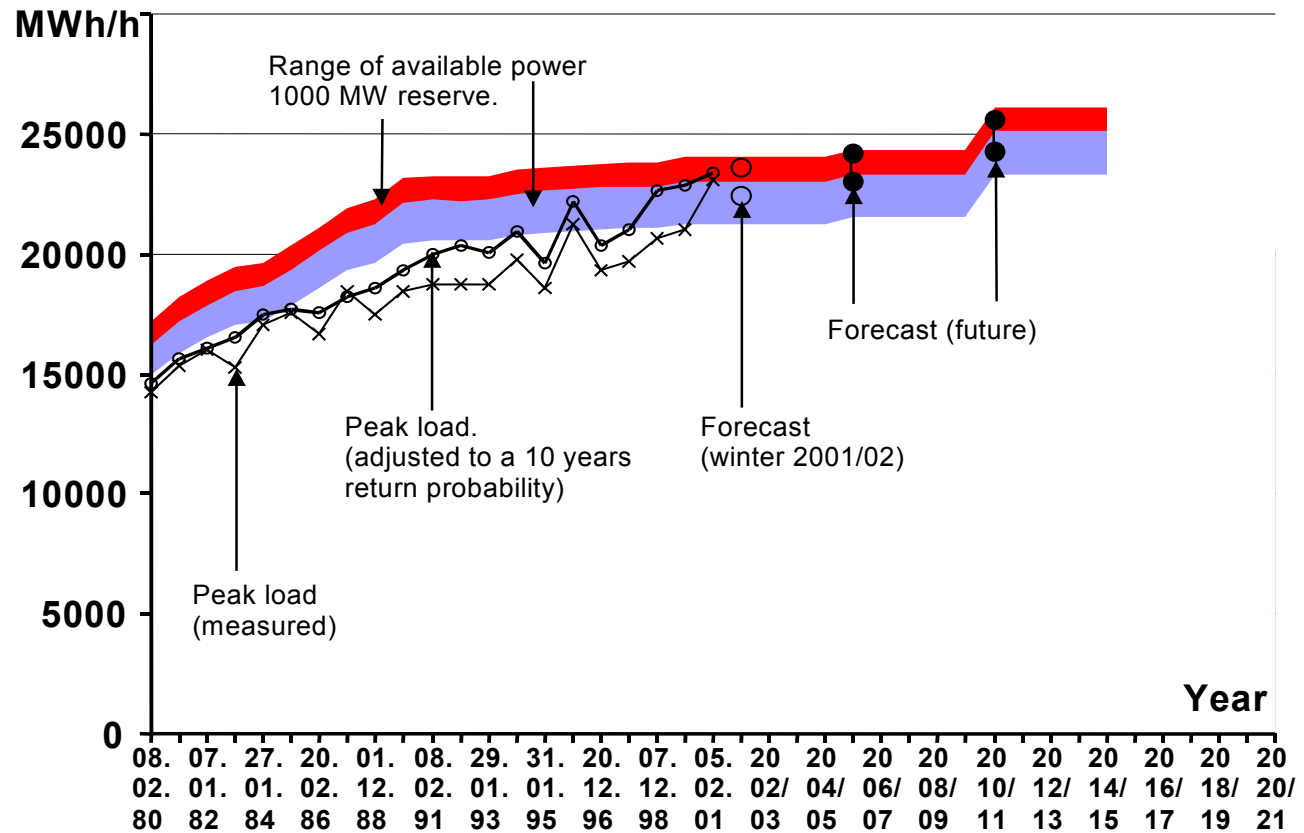


Capacity in Scandinavia

- The effects of the **NORDEL** co-operation : All generation and network resources have been better utilised !
- New capacity added is small, low prices and weak incentives to new investments !
- The overcapacity that existed for a long time has dried out !
- There is still a balance (?) for the **NORDEL** area as a whole but in “normal” years, Norway is a net importer
- **Challenges** : When is new capacity needed, optimum location and new inter-connectors are all hot topics or other solutions as **Demand Response** ?

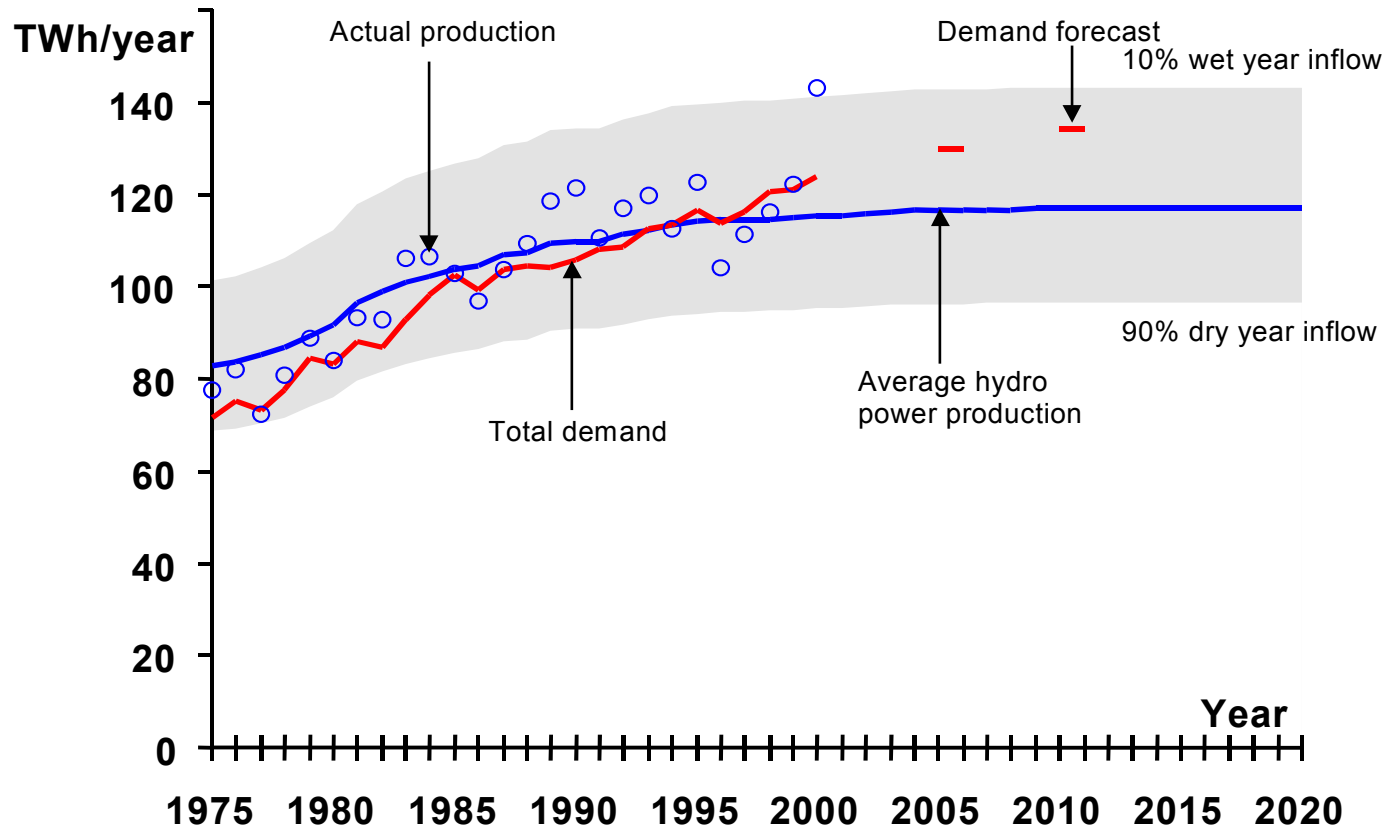


Background



Maximum load in relation to the available power.

Background



Annual consumption in relation to the average and actual production by the hydroelectric power plants.

How to manage the Balance 1

- New production and new inter-connectors are no alternative in the short and medium term perspective
- The government and the Regulator wanted market based solutions
- Demand Side Bidding - Norway participates in an IEA Group
- “Buy Back Contracts” was an issue during the cold and dry situation in 1996

How to manage the Balance 2

- Two way communication is on the agenda and new DSM options are discussed
- Simple to switch to a new supplier - customers awareness high
- New tariffs are introduced and some utilities try to sell the IT intelligent home
- The industry is well prepared for a power Reserve Market or Demand Side Bidding
- Household, when aggregated, is an interesting option

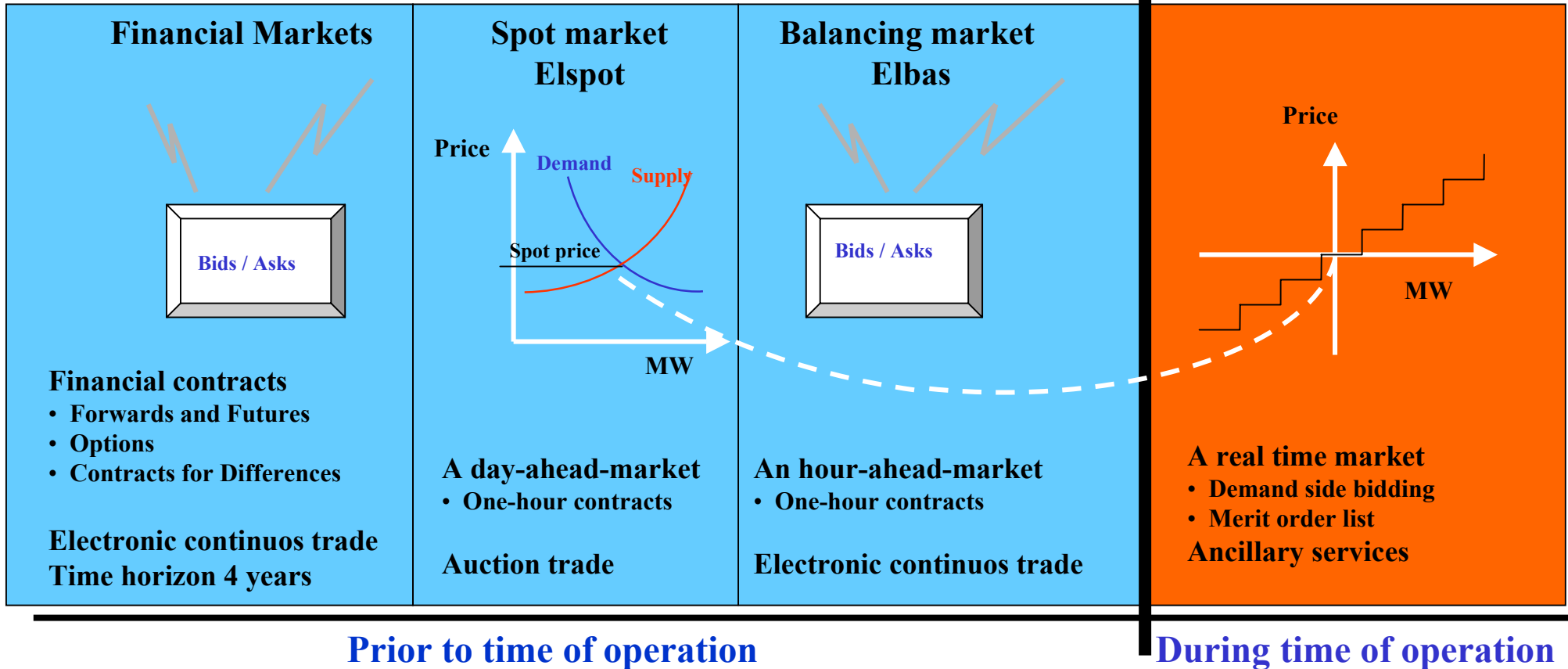
Stanett started a Market-based Power Reserves Acquisition project in 1999

- Elspot and RPM
- **Alternative solutions**
- **Product description**

The Power Exchange and the TSO

The Nordic Power Exchange

Nordic TSOs



The **physical** power markets

- **Elspot NordPool**
 - trading power contracts for physical delivery
- **RPM Statnett (TSO)**
 - collection of regulating objects to compensate for any imbalance

Alternative solutions

- Agreements with selected generators
- Purchasing power reserves on Elspot
- "Uplift", bid and offer prices different
- A general capacity market
- Long-term contracts with generators
- Investing in gas turbines
- Individual agreements with major consumption registered on RPM
- Agreements related to reduced tariffs
- Improving the systems for disconnecting and consumption by remote control

Principles

- Market-based
- Must operate in relation to the physical markets Elspot and RPM
- Disconnection of consumption

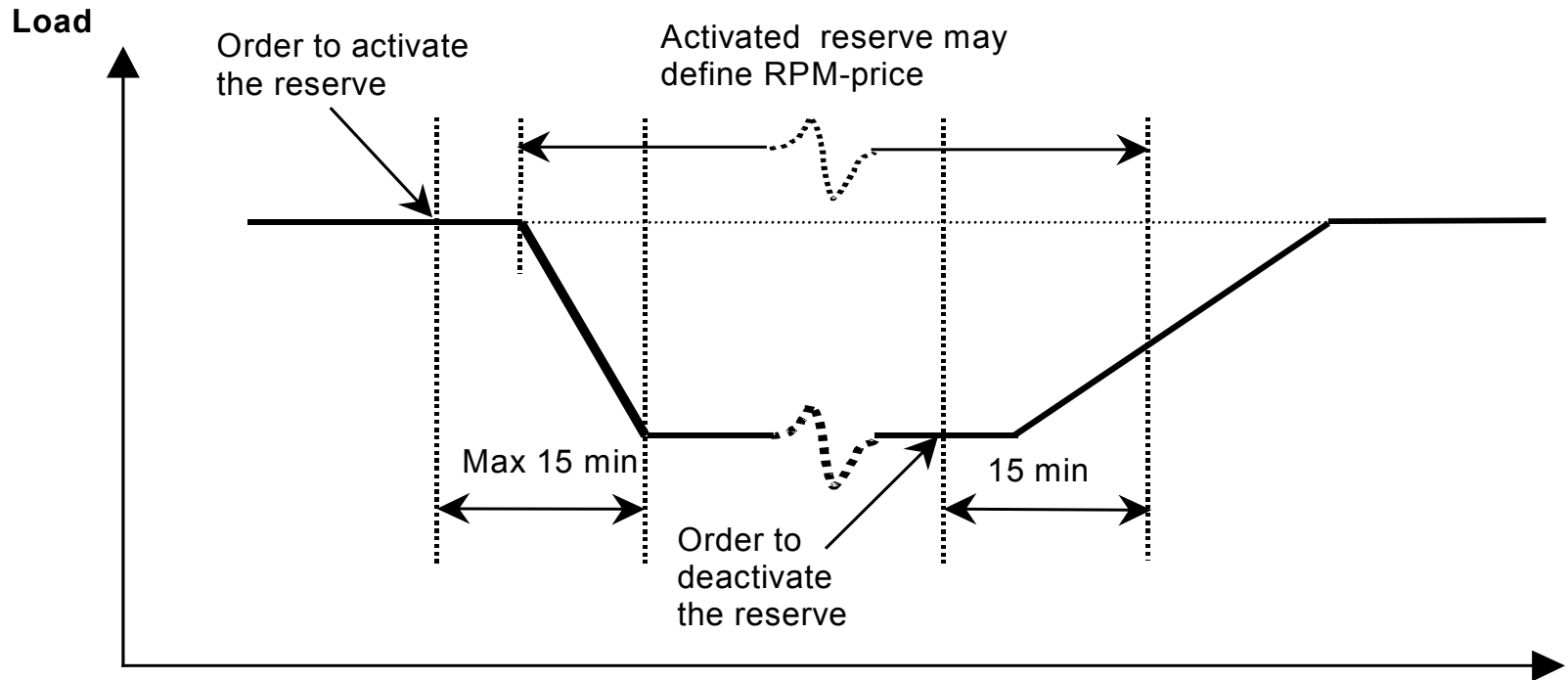
The solution chosen :An open market for power reserves

- An option market
- An instrument for attracting regulating objects to RPM
- Both consumption and production
- Remuneration for the commitment to register on RPM

Product description

- Available 6 a.m. to 10 p.m. Monday through Friday on business days.
- Minimum volume required: 25 MW
- Regulability
 - Must be possible to activate within 15 minutes.
 - Full activation for at least 1 hour without interruption.
 - Full activation for at least 10 hours per week.

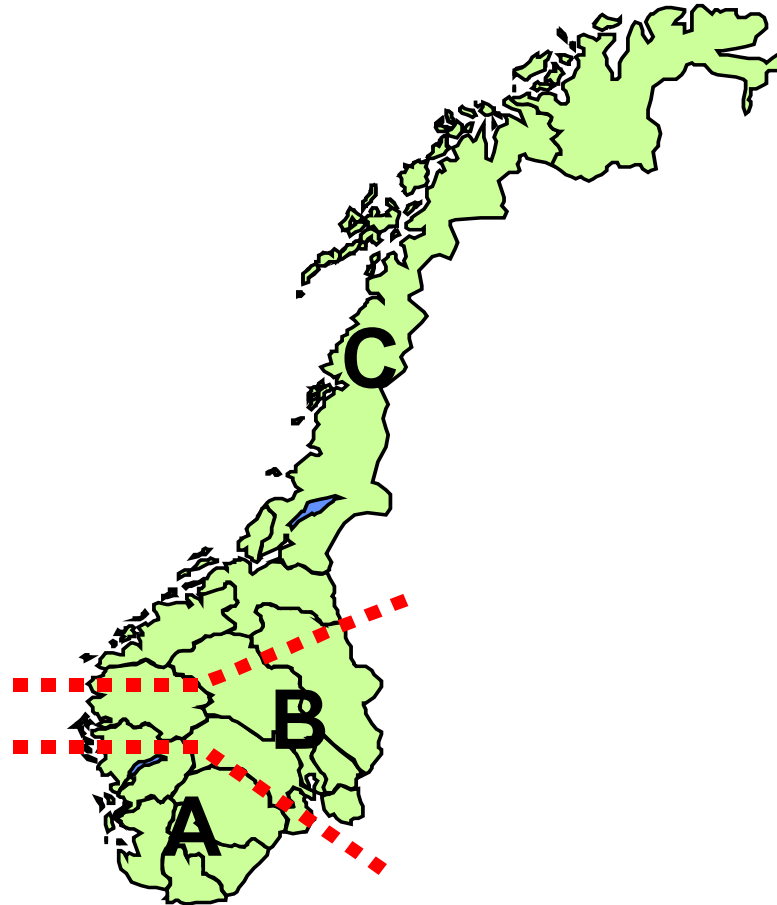
Consumption



Upwards regulation in the RPM, **consumption**.

Maximum **rest period** allowed is **8 hours**.

Possible grid limitations

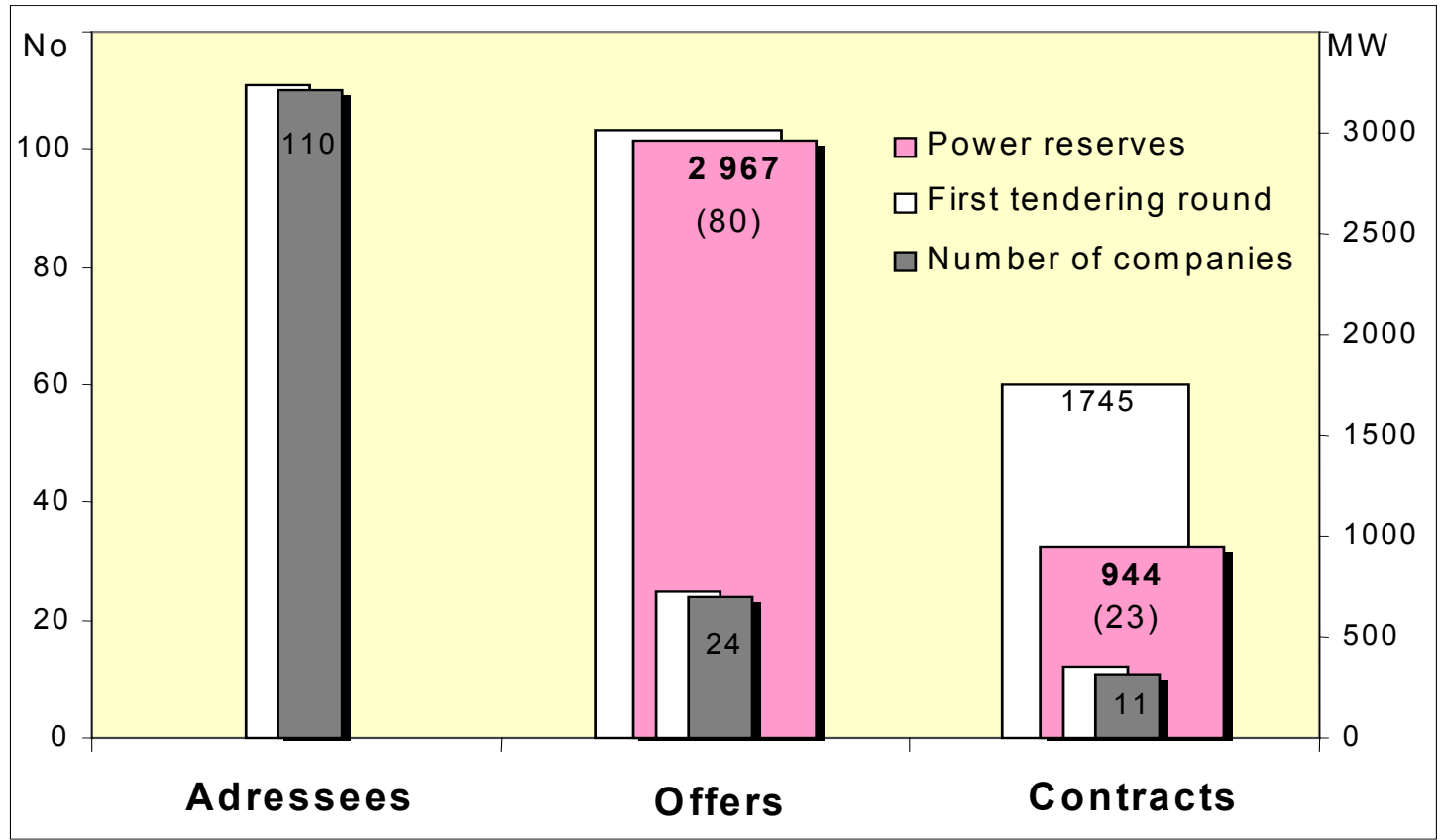


Grid/geographic regions for the placement of power reserves.

Accepted suppliers

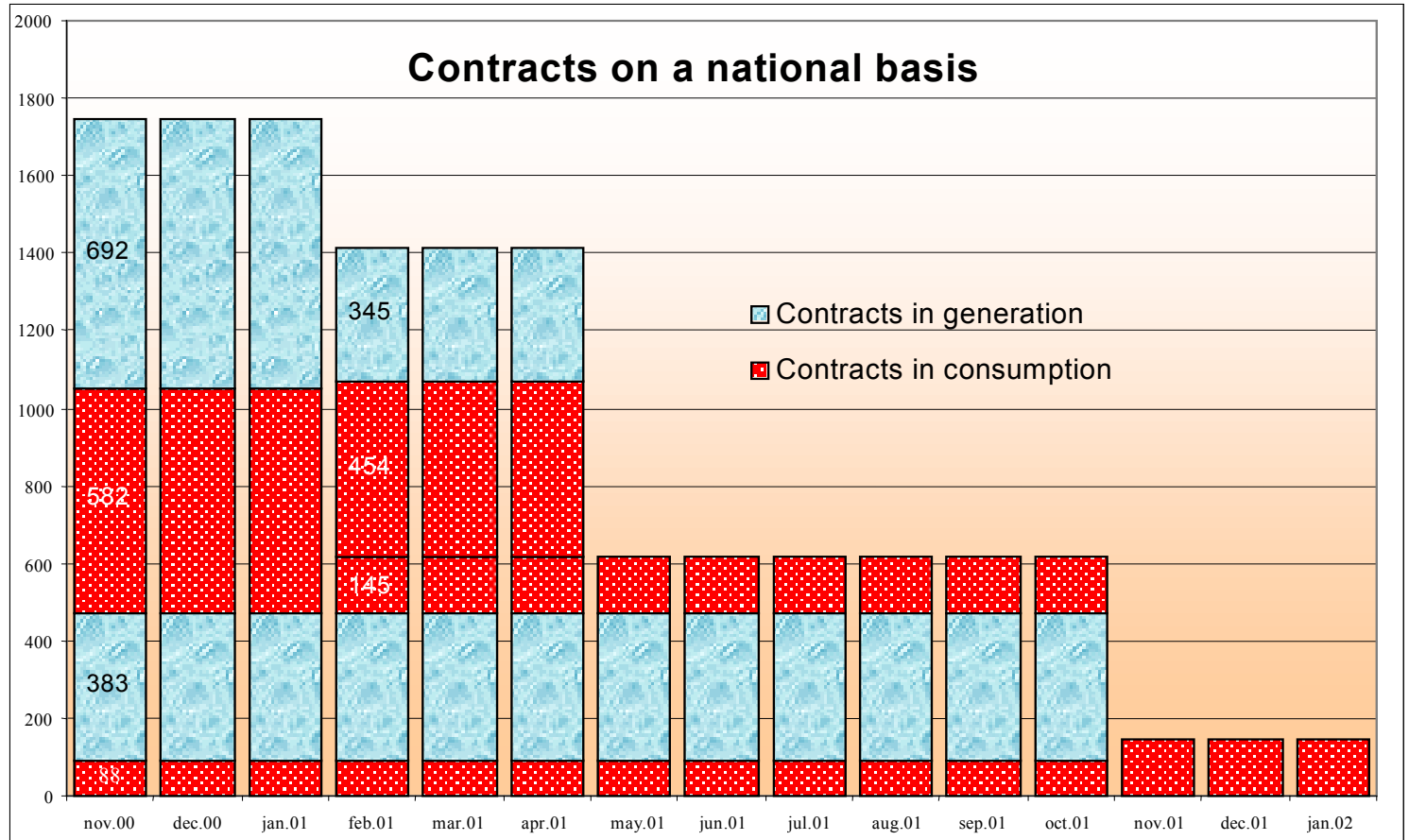
- Contract accordance to the offer
- Obligated to register with the RPM

Main results



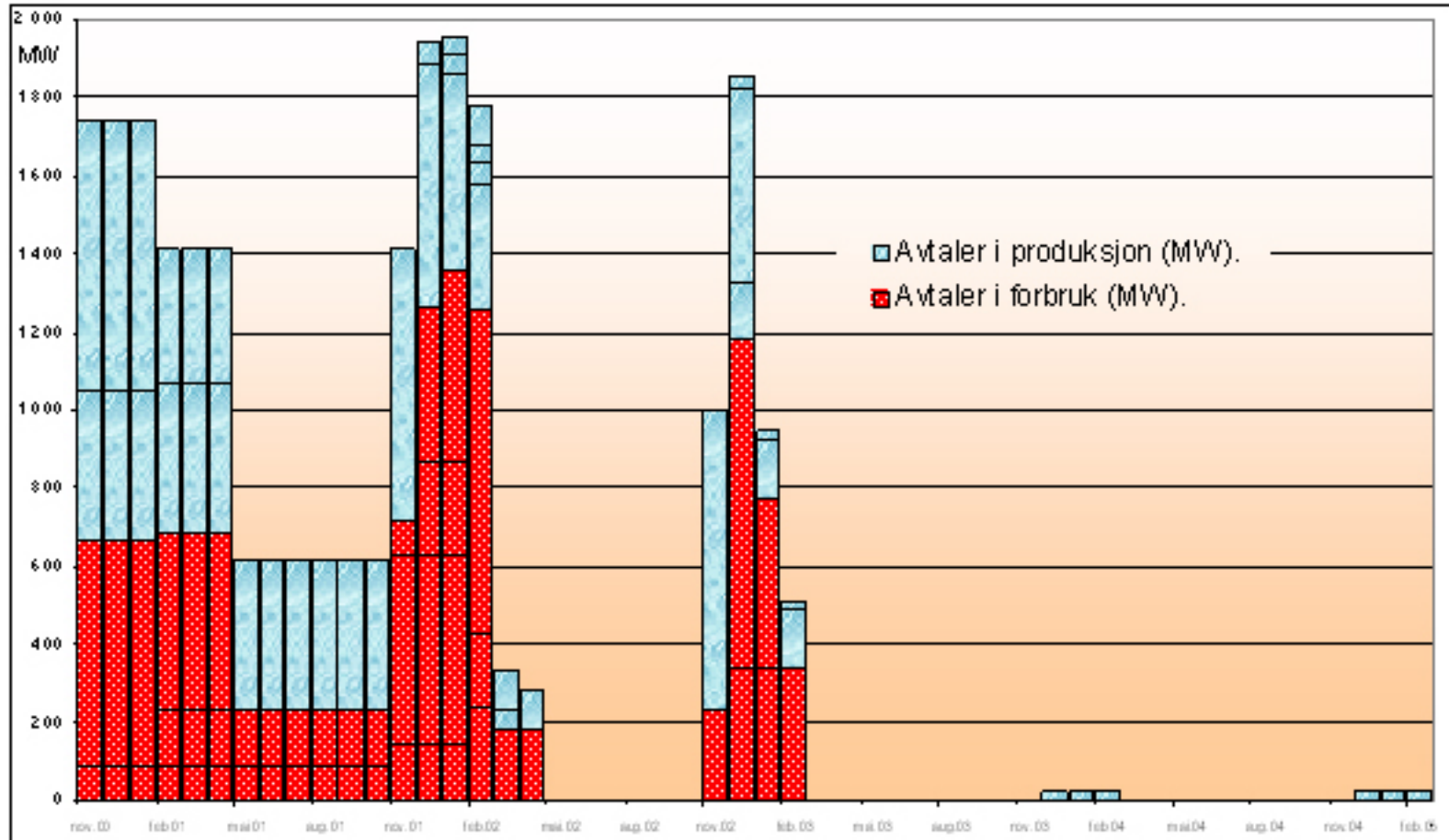
Number of companies in relation to the offered and contracted power reserves.

Main results

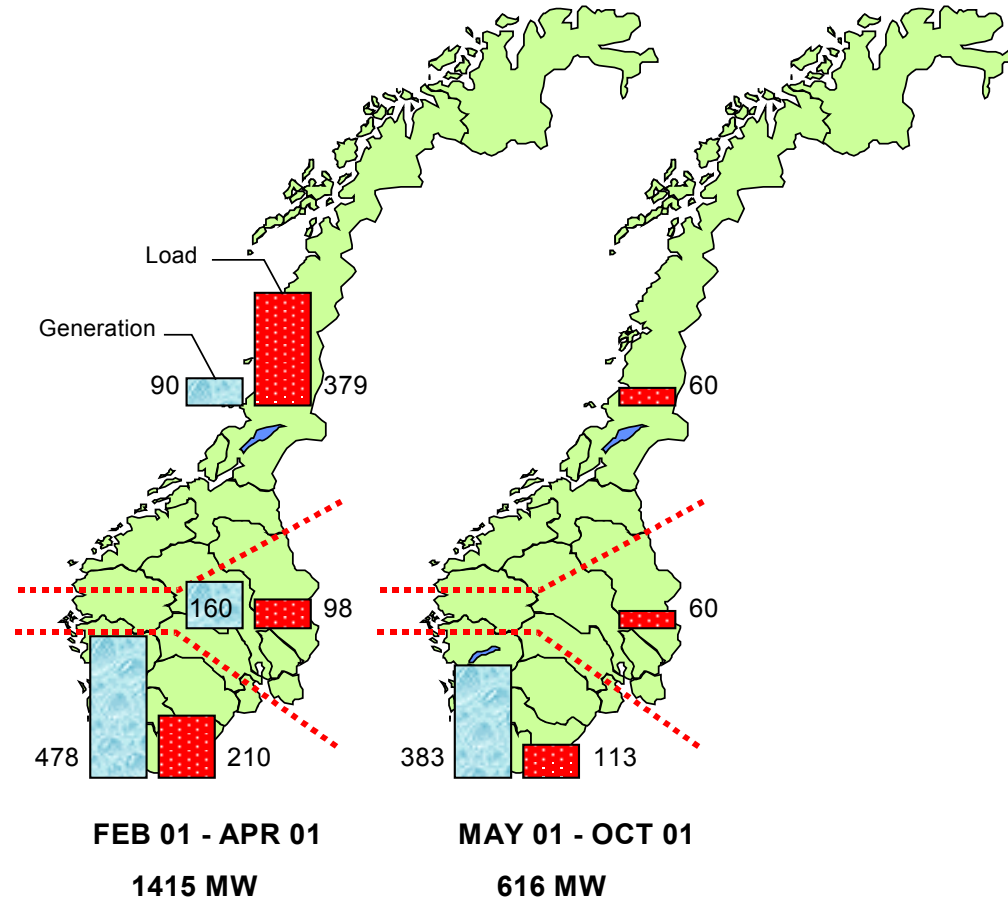


Contracts entered into from the two initial tendering rounds.

Latest update 2001 -2002



Main results



Contracted power reserves from production and consumption distributed geographically and over time.

Experience

- Good response by the companies
- Satisfaction by the customers
- Securing power reserves on RPM
- Supported by the authorities

Challenges

- Fine tune the volume of RPM
- If efficient 2 way communication will become more common, new opportunities are available
- ENEL option is very promising - a full new menu will be created

The meter: synthesis of the basic functionalities

Guaranteed life:

- 15 years

Low failure rate:

- less than 0,3%

Installable on a standard plate

Low consumption:

- less than 1,3 Wh

Range of operation:

- - 25° +55°

Accuracy: class 1 active and class 2 for reactive energy



LED Pulses

1000 pulses = 1kWh

1000 pulses = 1kvarh

Alphanumeric display (16 characters and 15 icons)

Display pushbutton

Local Communication Interface

Circuit Breaker

Conclusions

- Security of Supply has improved at least costs
- New investments in generation to serve RMP has been avoided or postponed
- End user more willing to respond to new options
- Large industry has got new business opportunities
- Regulators should give TSO incentives to Reserve Market Options
- Small customers can participate through aggregators and/or use of 2 way communication
- Should be enlarged to cover the whole NORDEL area