

Managing Electricity Shortfalls With Markets: The Nordic Experience

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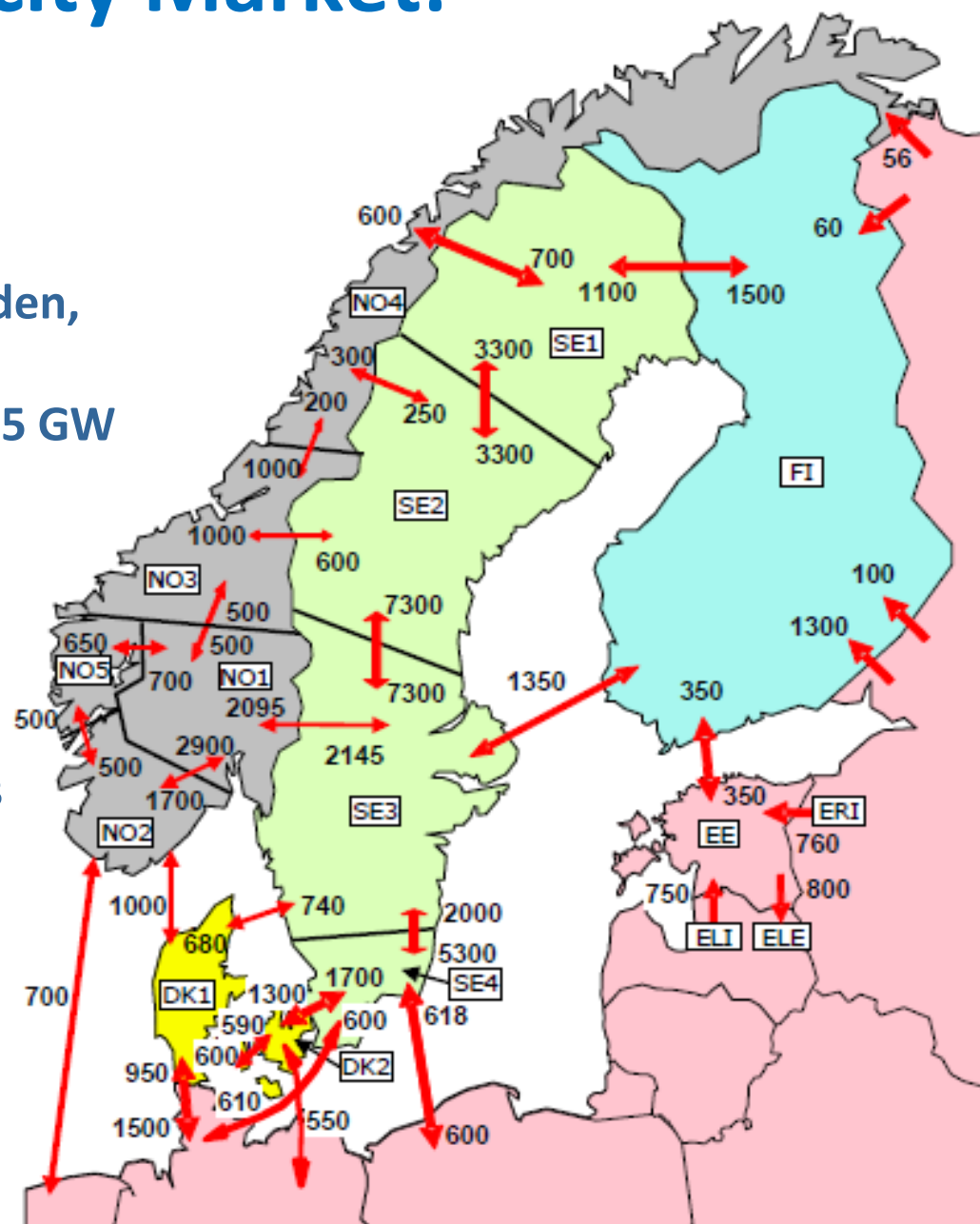


**International
Energy Agency**

Nordic Electricity Market: An Overview

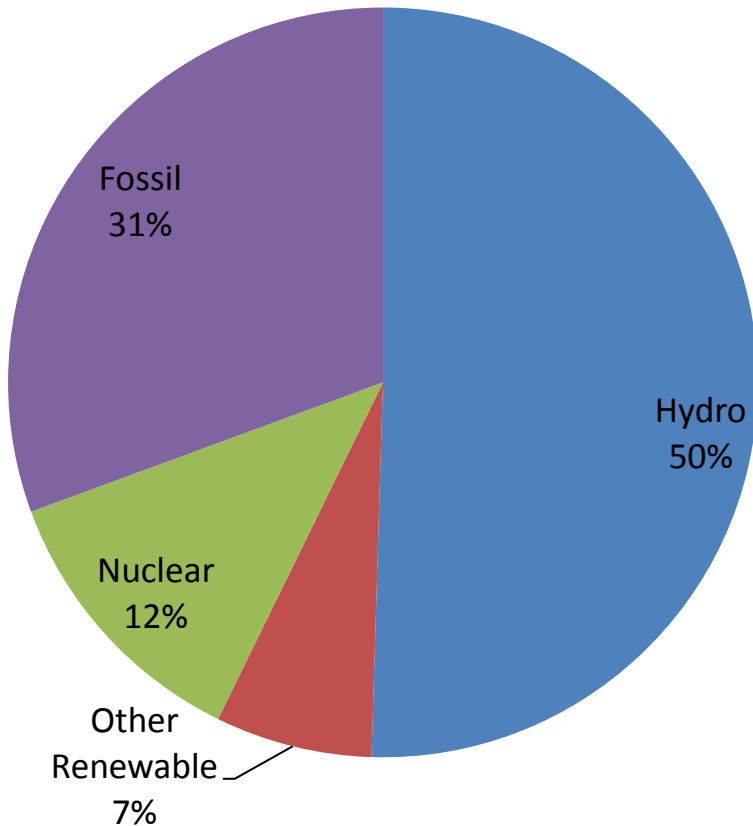
Key Features (2010):

- Integrates Norway, Sweden, Finland & Denmark
- Generating capacity: 97.5 GW
- Production: 382 TWh
- Consumption: 396 TWh
- Peak load: 69.6 TW
- Interconnects with Russia, Estonia, Poland, Germany & Netherlands
- Net imports: 19.4 TWh

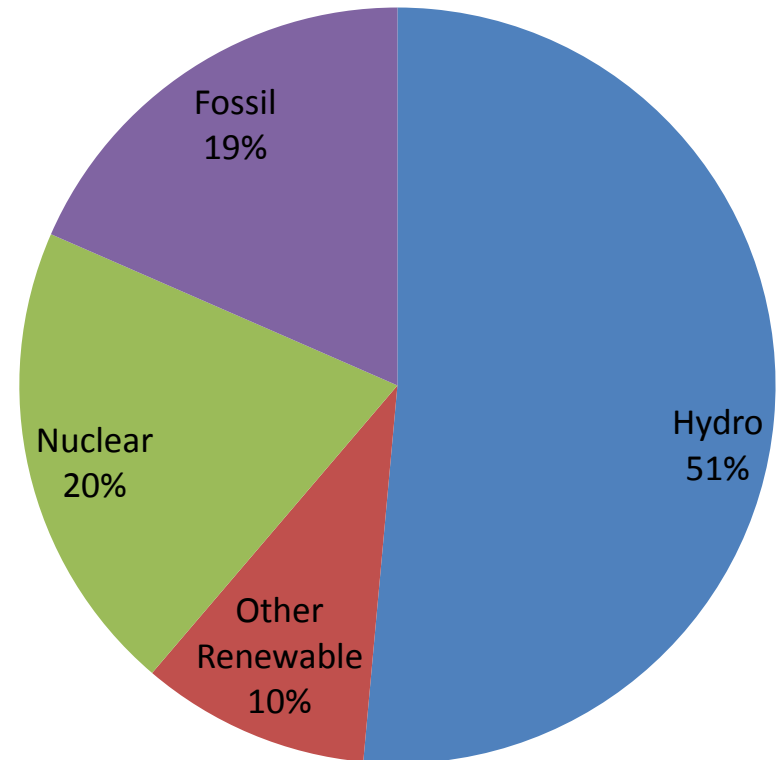


Nordic Electricity Market: Generating Capacity & Production 2010

Capacity



Production

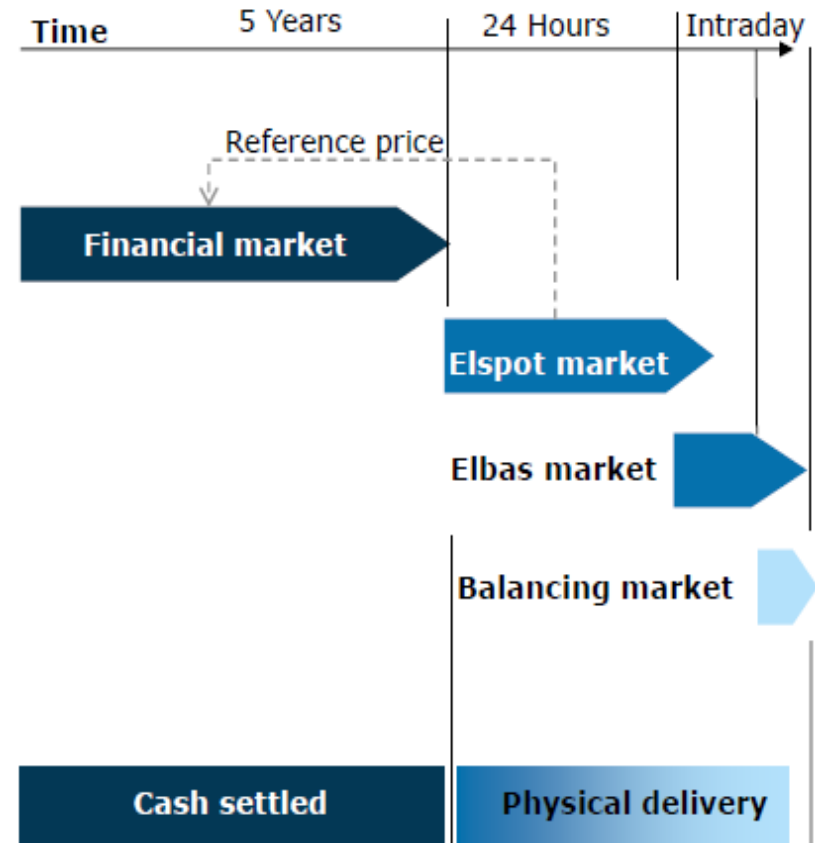


Source: ENTSO-E 2010
Nordic Energy Regulators 2011

Hydro dominates the Nordic power system

Nordic Electricity Market: Wholesale Market Arrangements

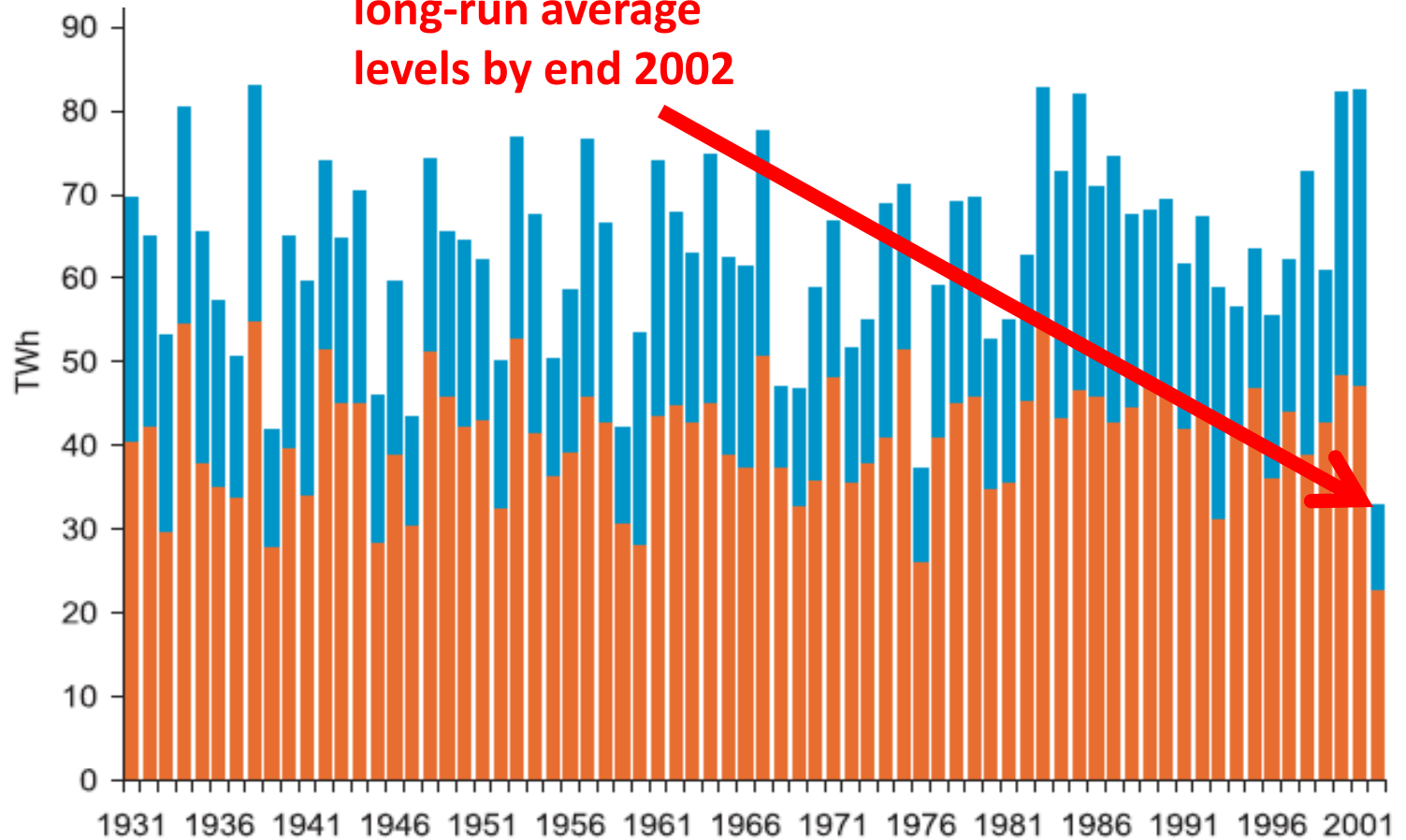
- Nordpool opened in 1996
- Key elements:
 - Financial trading &
 - Spot market (Elspot)
 - Intraday market (Elbas)
 - Balancing market
- 13 pricing zones
- Spot market is critical for efficient price formation to establish incentives for timely and efficient market-based responses



Source: Nordpool Spot 2011

Case Study - Nordic Drought 2002-03: a 1-in-200 Year Event

Inflows at half
long-run average
levels by end 2002

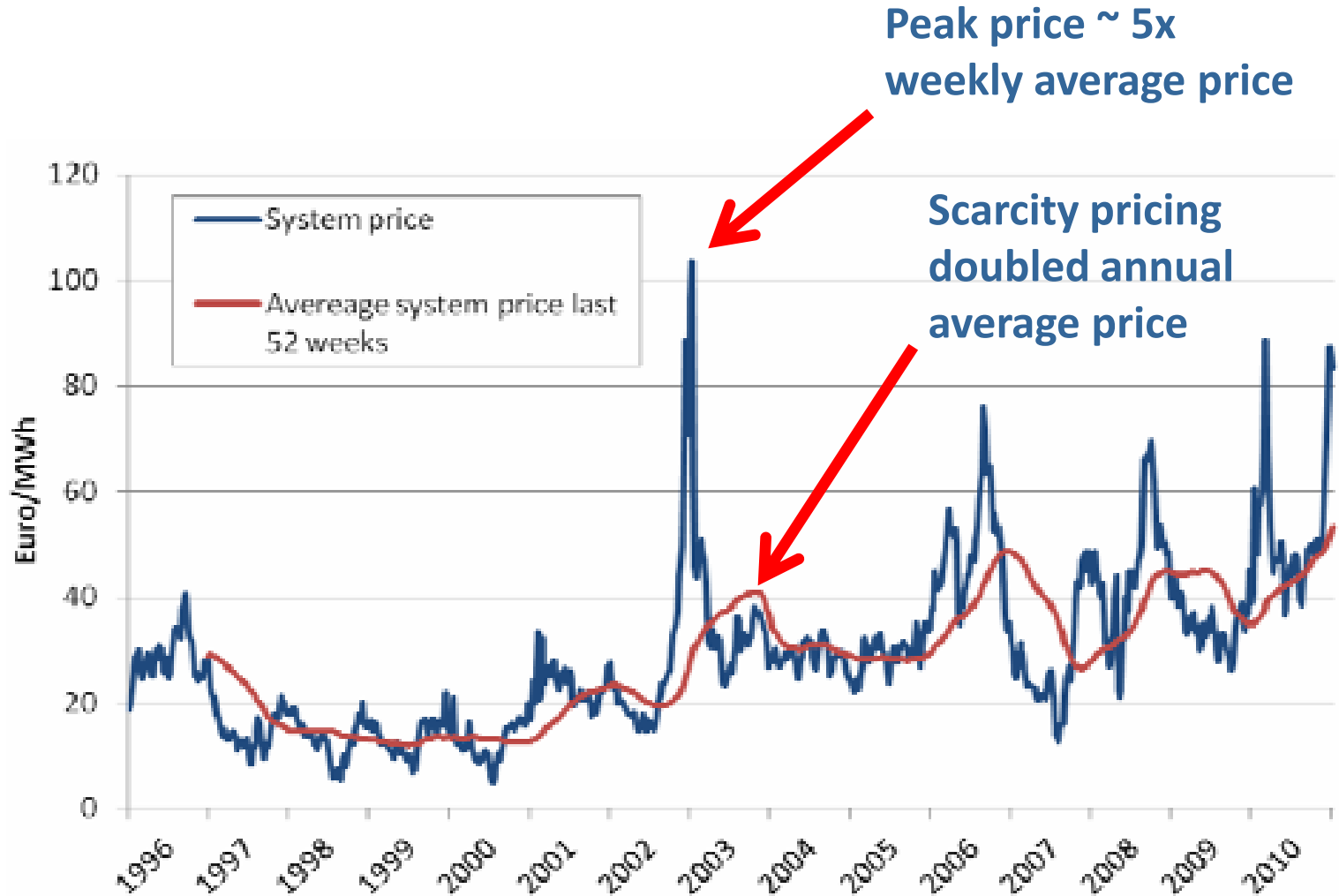
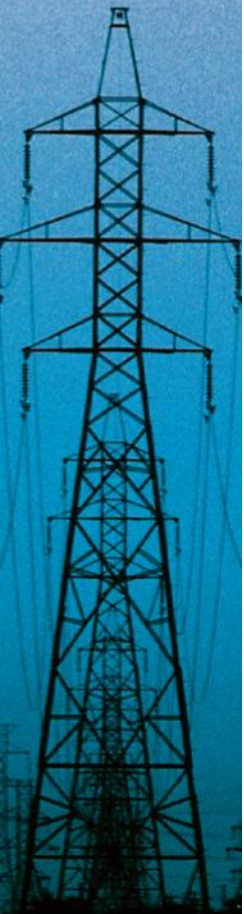


Source: Kjersti Øyen & Skjalg Holther 2005

 Norway

 Sweden

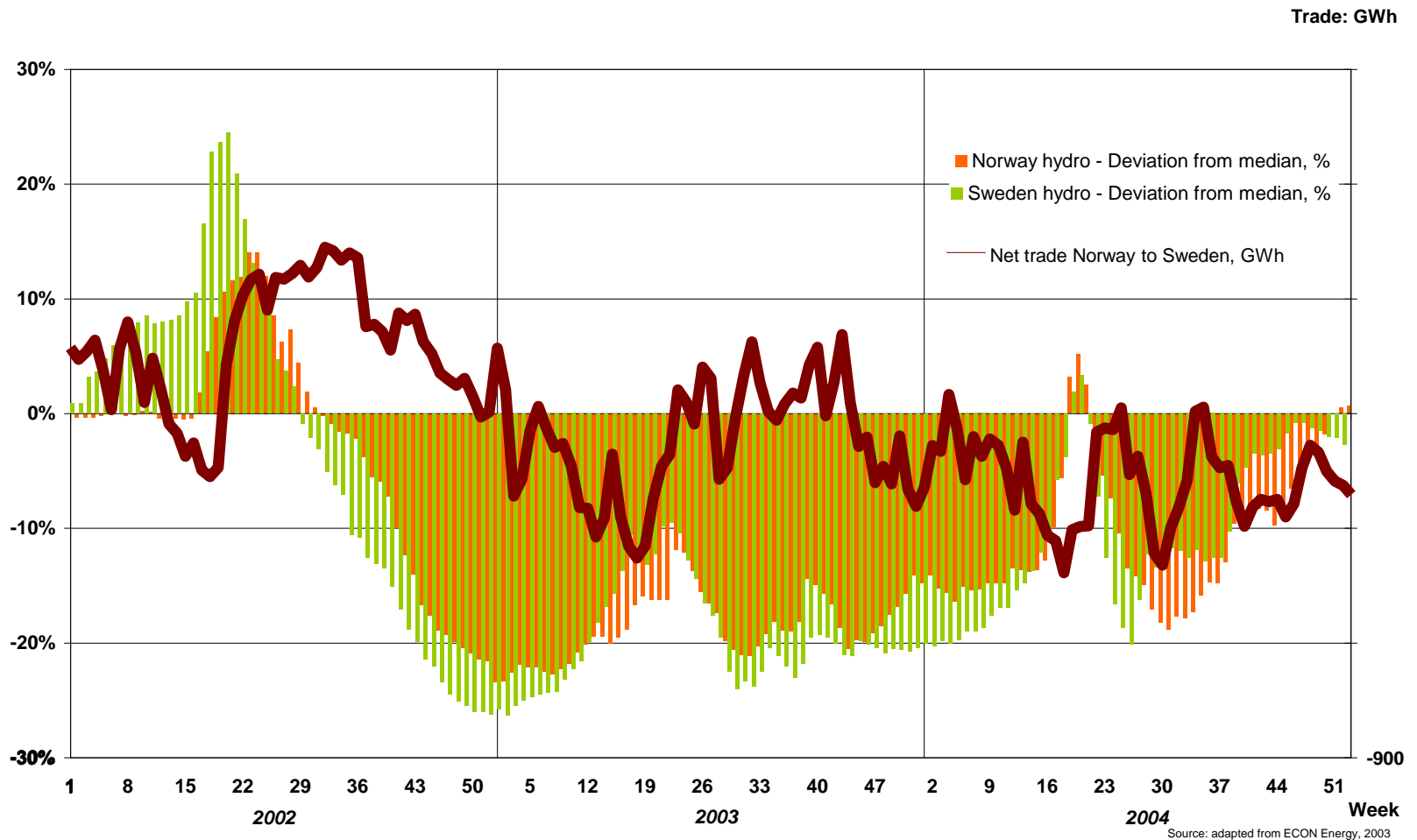
Case Study - Nordic Drought 2002-03: Price Response



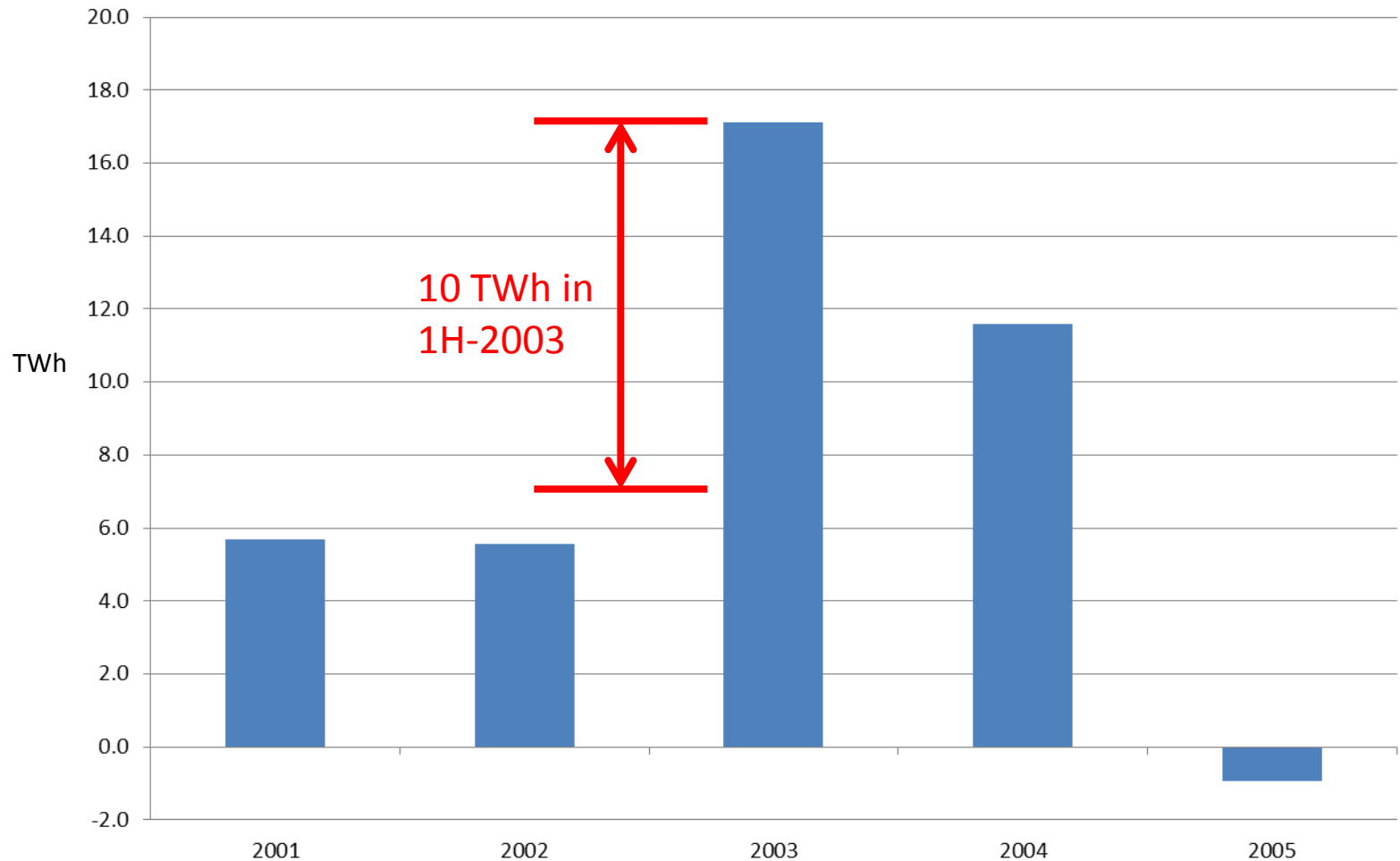
Source: Nordic Energy Regulators 2011

Case Study - Nordic Drought 2002-03: Internal Nordic Trade Response

Change in Reservoir Levels & Trade between Norway & Sweden: 2002-04

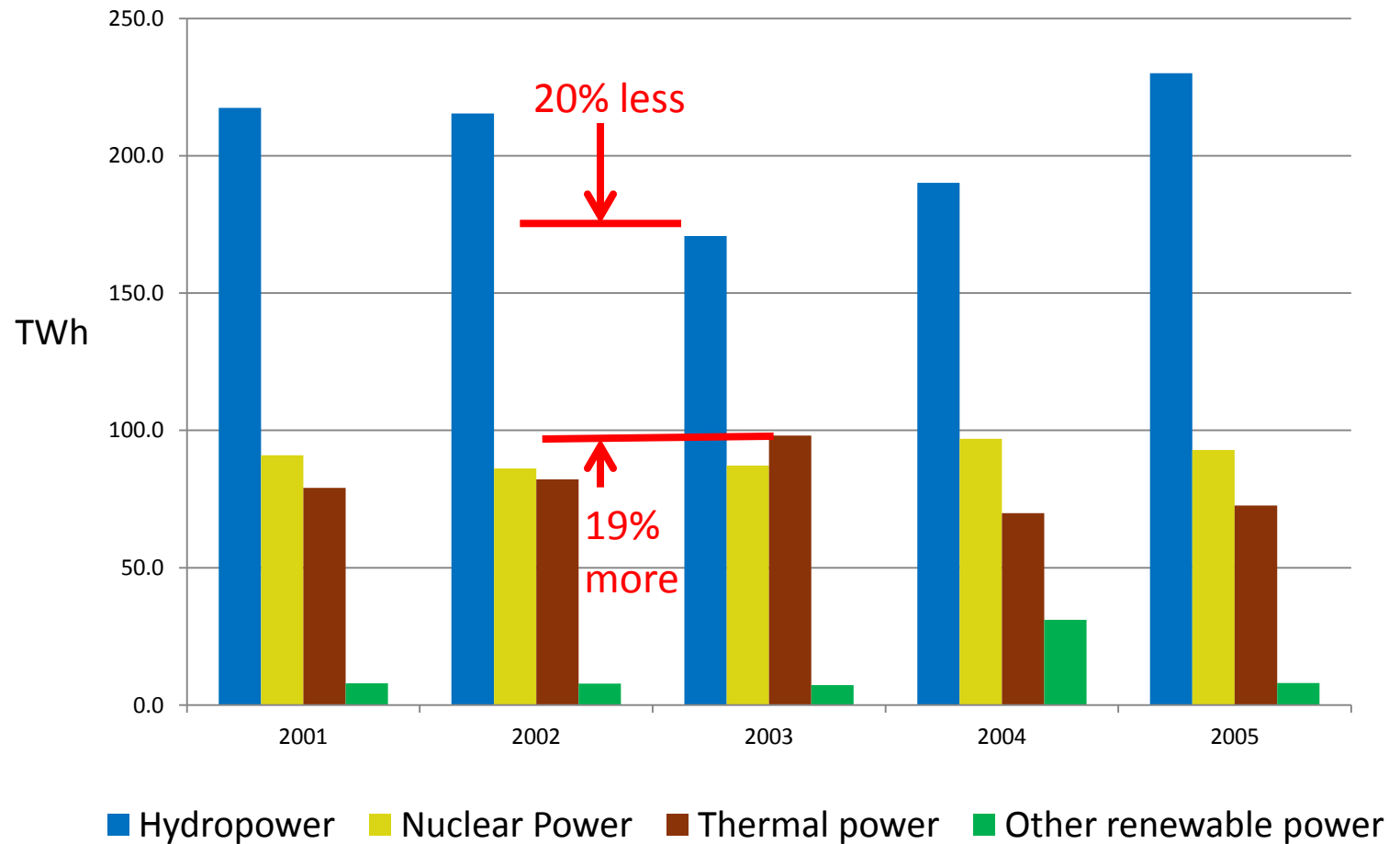


Case Study - Nordic Drought 2002-03: External Import Response



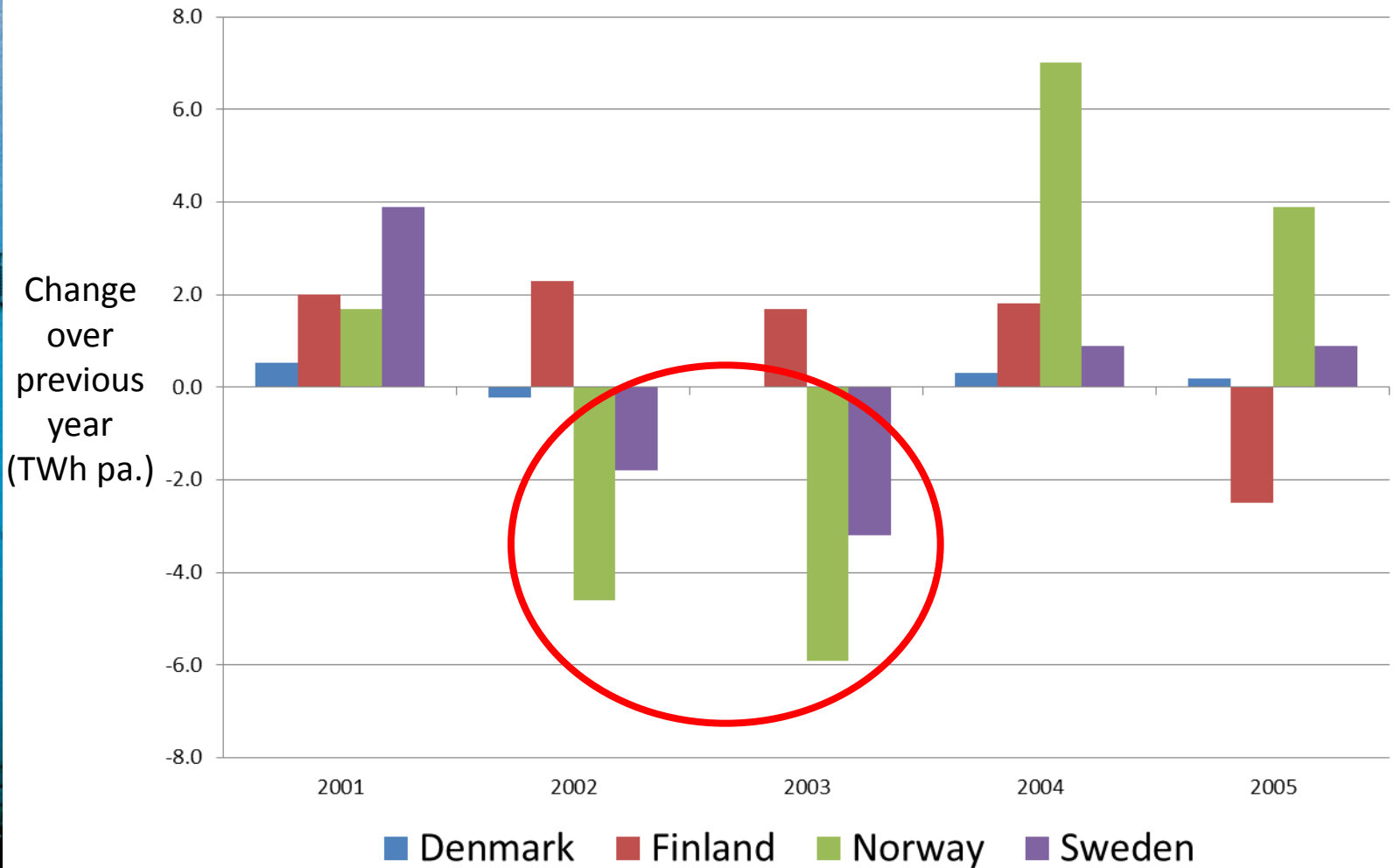
Source: IEA based on Nordel Annual Reports

Case Study - Nordic Drought 2002-03: Production Response



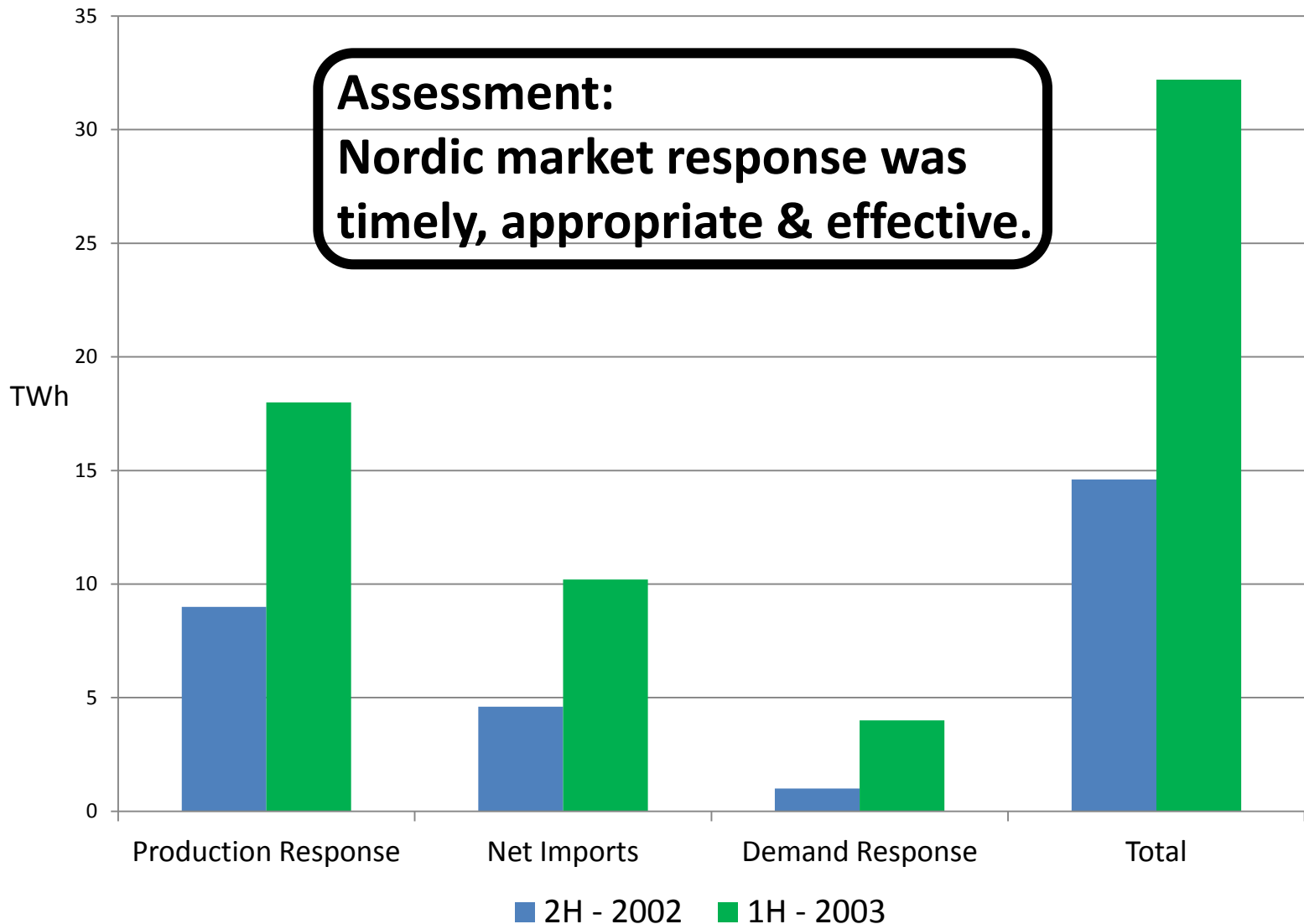
Source: IEA based on Nordel Annual Reports

Case Study - Nordic Drought 2002-03: Demand Response



Source: IEA based on Nordel Annual Reports

Case Study - Nordic Drought 2002-03: Response Summary



Source: IEA 2005

Case Study - Nordic Drought 2002-03: Key Lessons

- **Well functioning markets** can deliver timely, innovative and least cost responses – even under stress
- **Effective price signals** are needed to encourage timely, efficient and effective responses
- **Integrated regional markets** improve flexibility, responsiveness and reduce adjustment costs
- **Regulatory intervention can be minimised** where effective markets exist and are able to operate
- **Governments must** maintain consistent, predictable policies and **not panic**

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