

**Electricity Policy
Research Group**



**UNIVERSITY OF
CAMBRIDGE**

Market design

David Newbery, Cambridge University

Implementing the internal market of electricity

Brussels: 9 September 2005

<http://www.electricitypolicy.org.uk>



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EUROPEAN ELECTRICITY LIBERALISATION

Introduction *David Newbery*

Electricity Market Reform in the European Union:
Review of Progress toward Liberalization & Integration
Tooraj Jamasb and Michael Pollitt

Electricity Liberalisation in Britain:
The Quest for a Satisfactory Wholesale Market Design
David Newbery

The Nordic Market: Signs of Stress
Nils-Henrik von der Fehr, Eirik Amundsen and Lars Bergman

Regulating the Electricity Supply Industry in Germany
Gert Brunekreeft and Sven Tweleemann

The Spanish Electricity Industry: *Plus ça change...*
Claude Crampes and Natalia Fabra

Liberalising the Dutch Electricity Market 1998-2004
Eric van Damme

A Competitive Fringe in the Shadow of a State Monopoly:
The Case of France
Jean-Michel Glachant and Dominique Finon

Special Issue

International Association for Energy Economics

IAEE

Cambridge Workshop

- US: SMD and nodal pricing
- Britain: market power and market design
- Nordic market - successful cross-border trading
- Germany: delayed regulation
- Spain: contractual solutions to market power
- Netherlands: regulatory activism
- France: reform retaining a state monopoly

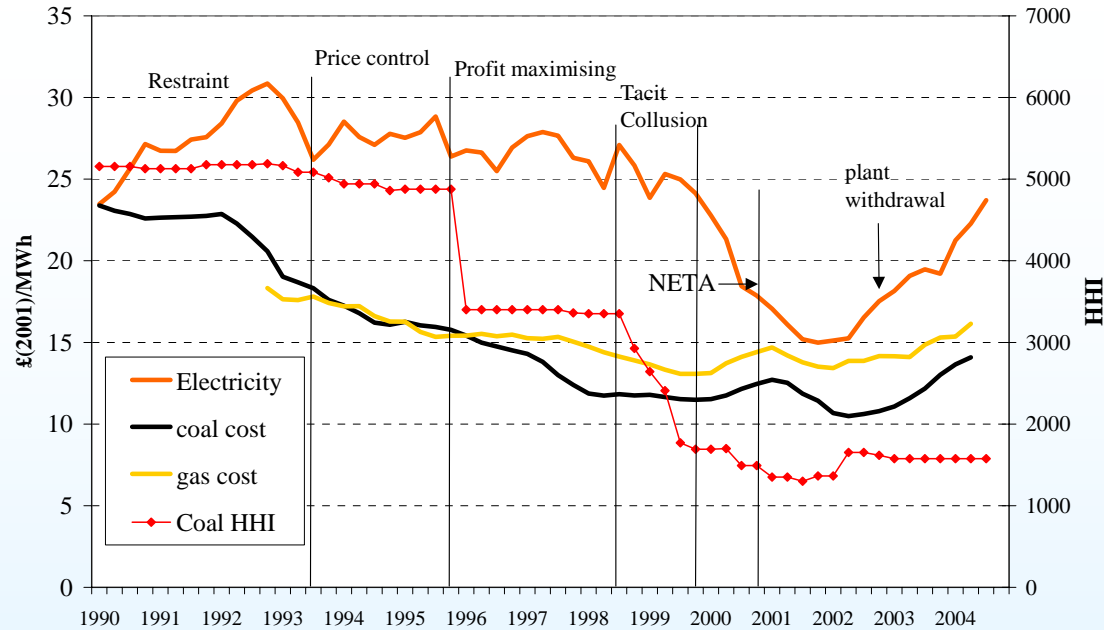
Country studies: US

- Standard Market Design, nodal pricing, and PJM+ as good practice
 - solves the “seams” or border issue
 - but ISOs unsatisfactory for transmission investment
 - Market power mitigation required under *Federal Power Act 1935* as FERC can force compensation for unjust and unreasonable prices
 - => capacity payments/obligations needed to offset chilling effect of mitigation

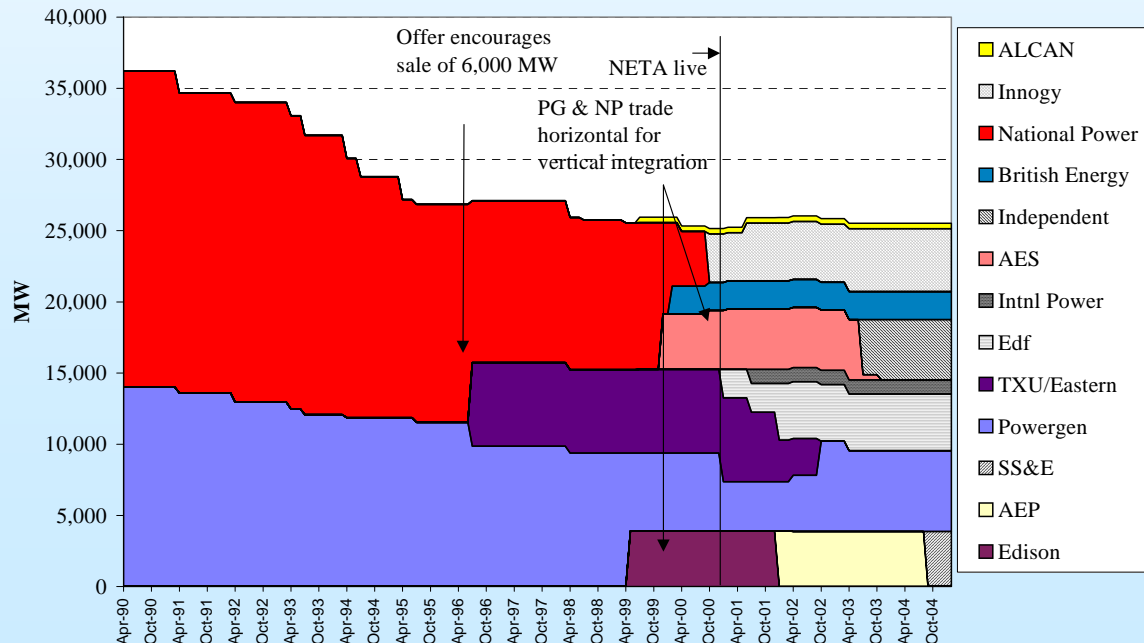
Different institutional/legal framework in EU

Britain

- Initial structure concentrated, contracts restrain market power
 - Divest 6GW + price cap
 - 3 firms maximise profits
 - Gencos divest to permit vertically integration
- ⇒ tacit collusion to keep sales price high
- competition causes margin collapse
 - NETA has no effect on margin (Evans & Green)



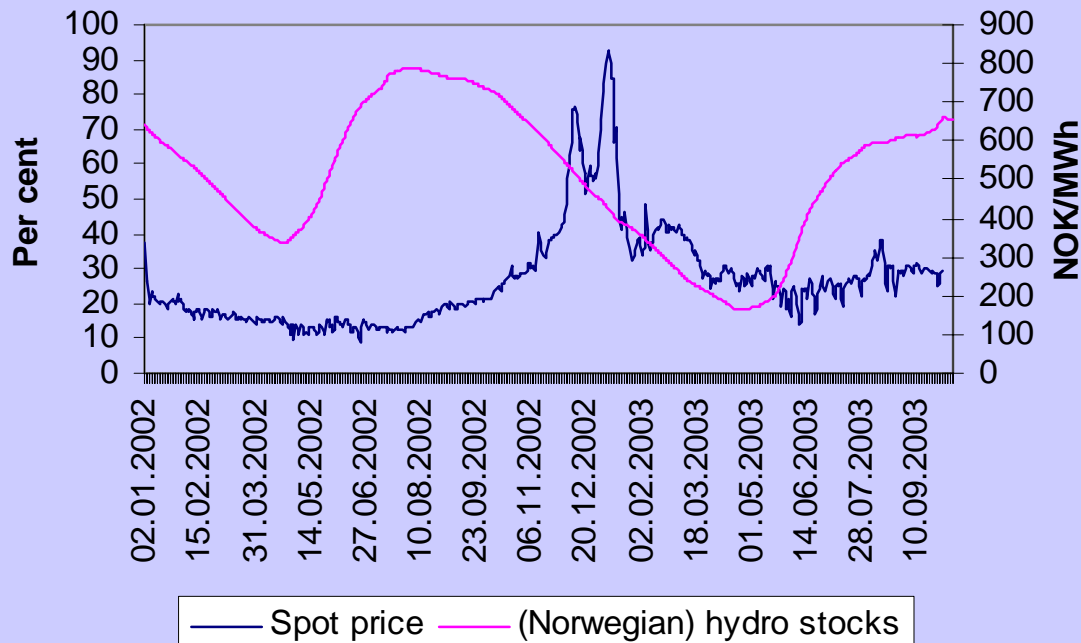
Capacity Ownership of Coal Generation 1990-2004



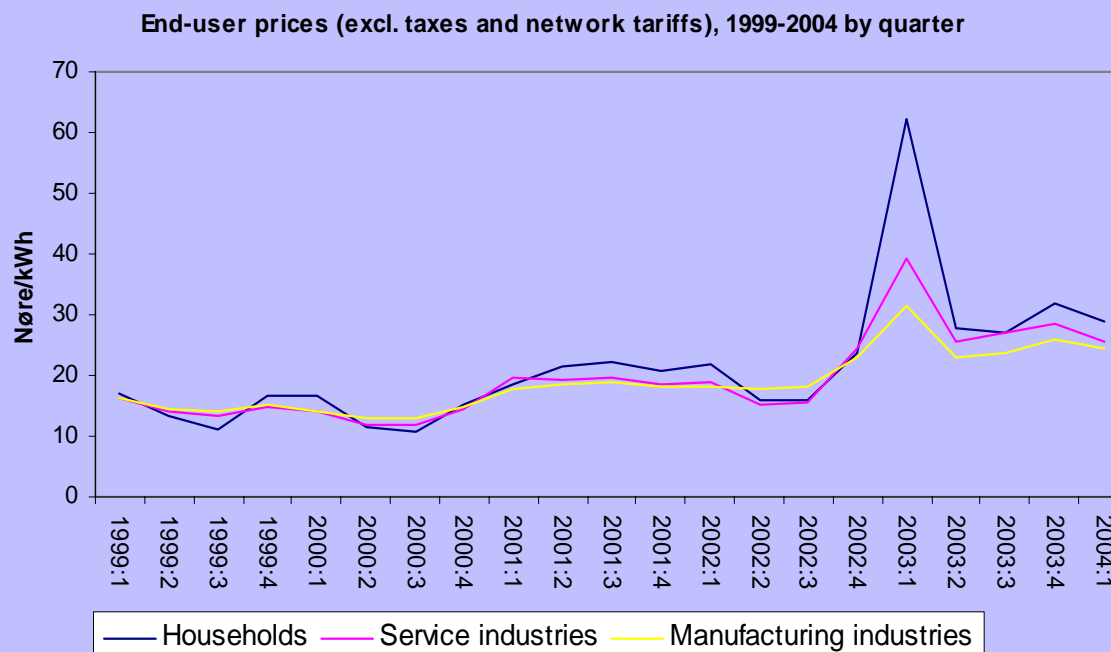
Germany: delayed regulation

- Lack of unbundling (G&T) => margin squeeze facilitating mergers => concentration
 - E.On-Ruhrgas removes gas as competitor
 - Cartel Office prohibits, over-ruled by Ministry
- => demonstrates need for active regulator and better competition policy
- REGTP July 2005 but Act restricts powers?
 - Need for better cross-border solutions

Nordic market

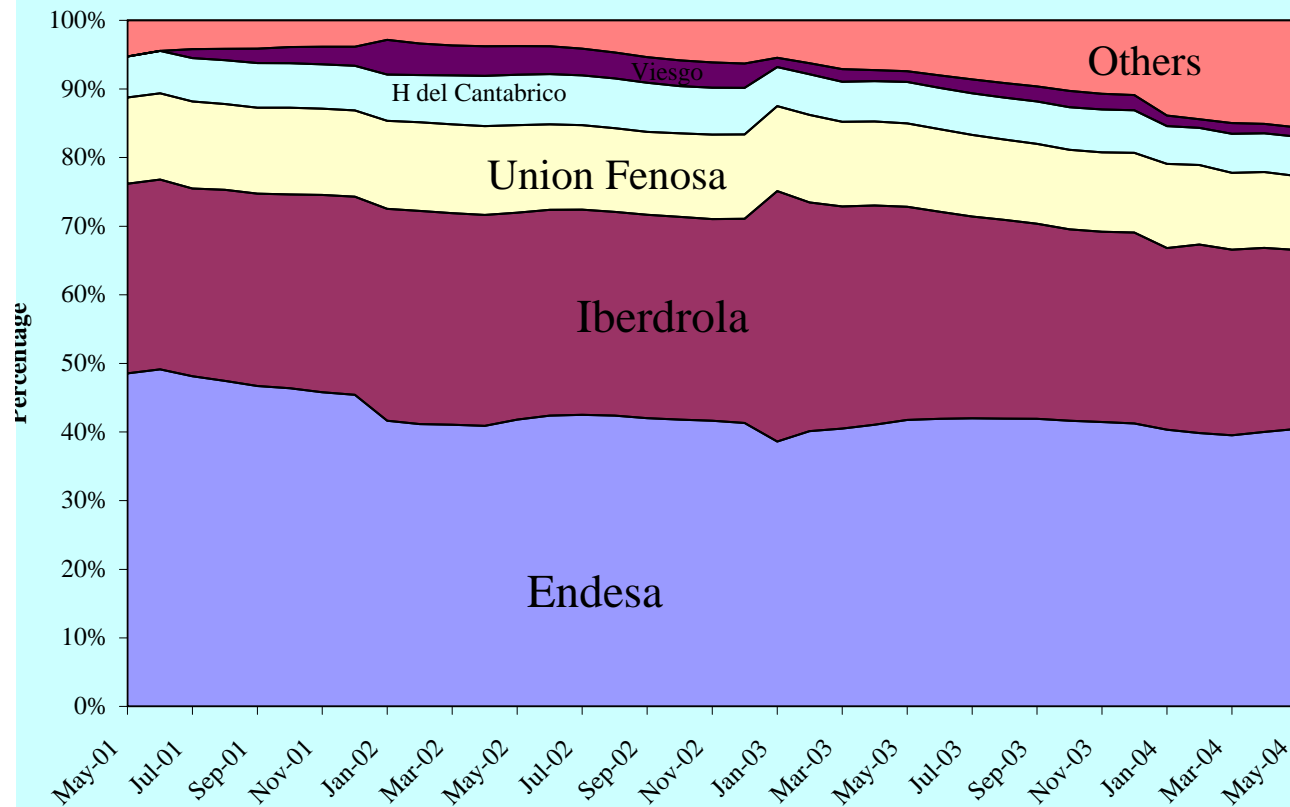


- Market coupling and good interconnections reduce concentration
- Nord Pool liquid - trades water
- Low hydro => high spot prices passed on to final customers without LT contracts
- But market resilient - demand fell, no panic, reforms sustainable

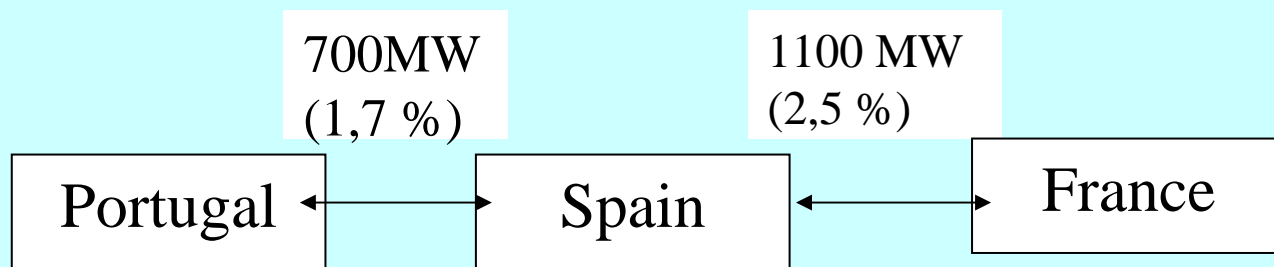


Spain: contractual solutions to market power

Shares in generation year to date



- Pool - OMEL - but concentrated ESI
- CTCs - Competition Transition Costs - distorts bidding but restrains final prices
- interconnection too small to reduce market power
- White Paper by Perez Arriaga proposes reforms



interconnections in MW (% of installed capacity)

Netherlands: regulatory activism

- 1989 Electricity Act rushed, flawed
 - nearly created one Genco
 - inadequate market surveillance
 - perverse legal interpretation of X factors
- Nma studies Nuon bid for Reliant => VPP auction addresses market power concerns
- But horizontal integration across borders
 - and inefficient interconnect allocation
- Benelux market coupling => market power?

Goals of market design

- confidence in supply security
 - efficient dispatch, reliable power, high quality
- sustainable competitive outcomes
 - for energy, capacity and ancillary services
 - for retail markets
- efficient free entry and investment
 - in the efficient locations
 - using the right fuel, technology and emissions
- efficient cross-border trading
- socially efficient emissions (at EU level)

Market design and market power

- “as-if” competitive outcomes can be imposed through contracts (c.f. Spain)
 - but are not sustainable with free contracting
- sustainable competition requires
 - adequate spare capacity
 - sufficiently numerous generators/imports
 - => individual generators rarely pivotal
- choice of market design unlikely to offset poor market structure

Desirable market structures

- unbundled ownership of grid and generation
- if impossible, ISO essential as second-best
 - but hard to incentivise an ISO
- allow integration of generation and supply?
 - reduces liquidity
 - impedes entry
 - unnecessary with liquid contract market
 - second-best solution to market power?

Wholesale market design

- Pool systems: advantages:
 - single price for contracting
 - provides liquid balancing market
 - facilitates entry
 - daily (or longer) bids reduce market power more than hourly bids
- problems
 - allows gaming (?)
 - facilitates collusion with few participants

Capacity payments

- capacity payments or energy-only bids?
 - VOLL.LOLP has attractions
 - but can be gamed with few generators
 - works well in a Pool setting
 - problematic without?
- Alternatives:
 - capacity obligations on suppliers?
 - effectively one-sided CfDs with high strike price and deliverability

Balancing - issues

- Efficient non-discriminatory balancing essential for competitive entry
- Single marginal price market: advantages
 - good scarcity signals
 - encourages bidding into market rather than self-balancing
- Disadvantages
 - occasionally very high prices?
 - Amplifies market power in tight markets?
 - Facilitates collusion?
 - Addressed by extending balancing market across borders?

Harmonising markets

- integrate spot with transmission market
- Single marginal price for liquidity
- Desirable integration likely to come from extending balancing market and making more liquid and more international
 - easier for TSOs to promote than full harmonisation
- Liquidity and competition spread back from real-time and prompt markets
 - encourages further harmonisation

Transmission pricing

- nodal pricing allows market integration
 - but reduces liquidity
- market splitting preferable to synchronised auctions
- netting important in any case
- compensation for cross-border flows encourages inter-TSO cooperation
 - undermined by vertical integration?

Cross-fuel issues

- Mergers between dominant gas and electricity industries very bad idea
 - forecloses competitive entry by gas company into electricity generation and supply
- Importance of efficient gas (and electricity) balancing markets
 - to facilitate competitive entry and dispatch
- Gas liberalisation reduces stress on electricity interconnectors

Emissions

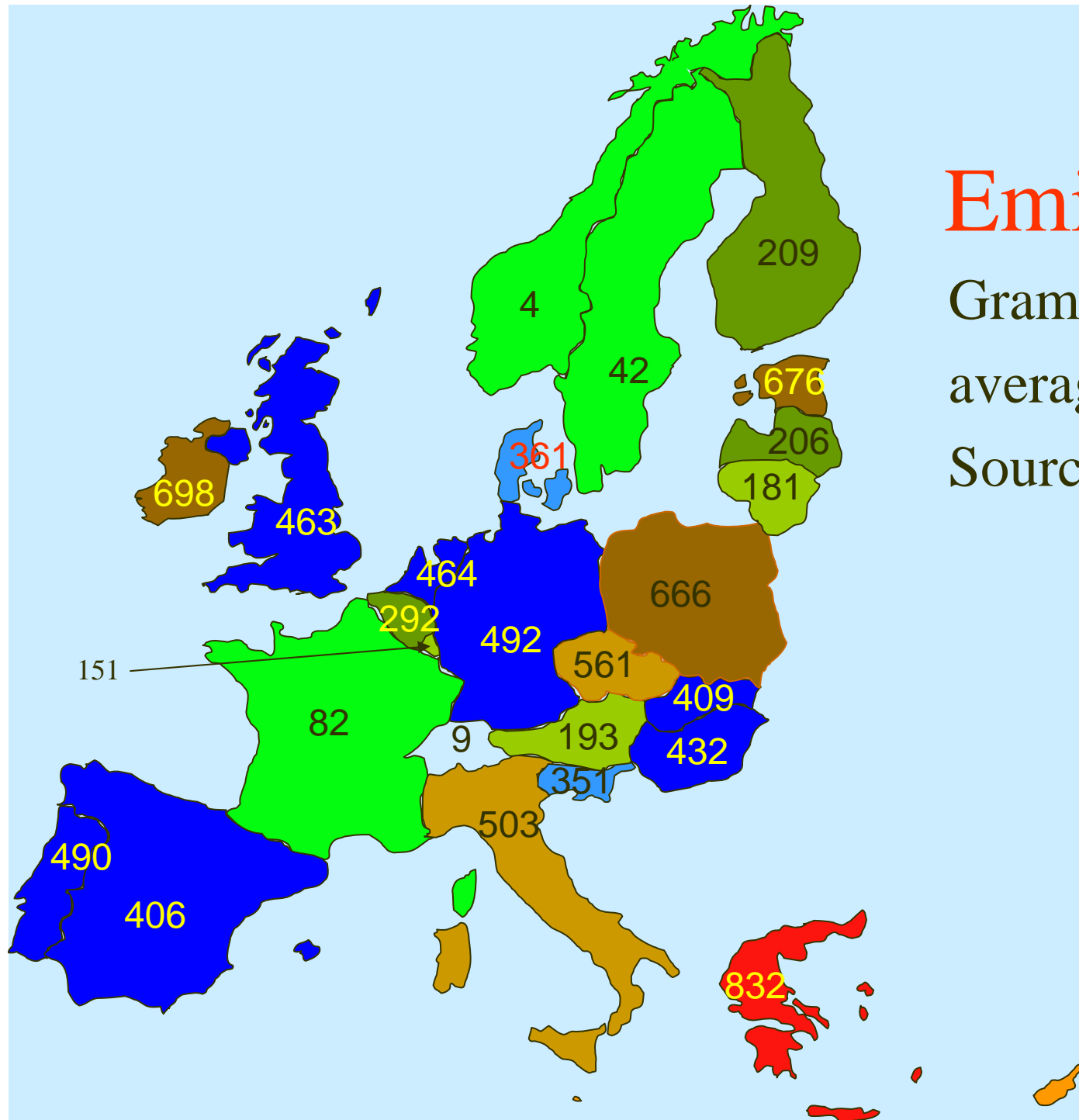
- allocation of emissions permits should
 - not distort plant entry or exit
 - nor fuel choice
 - should encourage socially efficient merit order
 - and reduce regulatory uncertainty
 - while facilitating efficient electricity trade

NAPs appear to ignore most of these requirements

Emissions

Grams CO₂/kWh
average 1998-2000

Source: IEA 2002





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