

# **The Political Economy of Regulatory Divergence**

## **Barriers to a Single Energy Market Amidst Geopolitical Challenges**

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# Four Papers on EU Electricity Market Fragmentation

## Price Controls

Lüken g.K. (2026), *Ren. & Sust. Energy Rev.*

26 states, 2008–20  
REWB logistic  
regression

## Capacity Mechanisms

Lüken g.K. (2025), *der moderne  
staat*

CRM adoption &  
design  
Logistic regression

## Path Dependence

Fink et al. (2024), *Reg. & Gov.*

DE vs. NL  
implementation  
Self-enforcing  
trajectories

## Loop Flows

Lüken g.K. (2025), working paper

Unintended  
interdependence  
Polluter-pay principle  
missing

**Unifying finding:** Rising liberalization and interconnection increase interdependence, but unresolved distributive conflicts prevent regulatory convergence.

## Priority: Single Market Integration



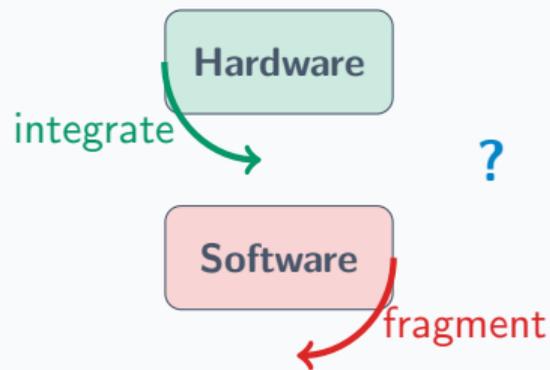
# The Integration Paradox

## Geopolitical Turn (2022)

- Russian invasion → energy dependency = security threat
- REPowerEU: 15% interconnection target by 2030
- Commission: crisis → deeper integration → autonomy

## But regulatory harmonization is contested

- State intervention rising
- Cross-border conflicts intensify
- Capacity mechanisms diverge



How do we explain ongoing regulatory divergence despite pressure from liberalization and geopolitics?

## My Argument

1. **Integration Trade-off:** Harmonization is necessary for real integration, but state intervention might be politically required to make interconnection and energy transition politically feasible (Rodrik 1997, Kuzemko 2016)
2. **Exposure to the Trilemma:** Interconnection exposes countries to coordination dilemmas previously managed domestically
3. **Interventions as Accommodation:** National policies allow participation while protecting domestic interests or allow disintegration
4. **Potential for change:** Renewable energy and alignment in conditions might disrupt lock-in mechanism
5. **Harmonization and interconnection can diverge:** reduce overall potential for interconnectedness without EU coordination



# Roadmap

1. **WHY** divergence happens — liberalization context
2. **WHERE** we see it — unbundling, price controls & Capacity remuneration mechanism
3. **HOW** lock-ins operate — self-reinforcing barriers
4. **WHAT** the plan to increase interdependence imply for the general strengthening of the common market

Then: three paths forward

# The Liberalization Context: Commission Vision vs. Reality

## Commission's 1990s Vision

- Unbundle monopolies
- Open markets to competition
- Establish independent regulators
- Markets → harmonization

## Expected outcome:

Level playing field → competition → convergence

Gap: Commission assumed markets would self-harmonize and interconnect physically as a result. Reality: national interventions persisted and clashed with integration goals

## What Actually Happened

- Four Energy Packages (1996–2019)
- Differentiated implementation
- Persistent national differences
- Conflicts intensified

## Actual outcome:

Legal harmonization  $\neq$  interconnection

# Understanding Future Integration Through Past Divergence

To understand prospects for next integration steps, we need to see existing hurdles

## Why distinguish?

- **Legacy:** Path-dependent, structural
- **New:** Political response, potentially transitional

Understanding prior non-harmonization reveals likely state reactions to deeper integration

We examine three examples: unbundling (legacy), price controls (mixed), CRMs (new)

# Defining Integration

## Two Dimensions

- **Hardware:** Physical interconnectors  
— automated interdependence, price convergence
- **Software:** Liberalisation -  
Harmonised rules, market access

Hardware Integration

Software Fragmentation

## Three Software Barriers

- **Unbundling resistance**  
(path-dependent legacy)
- **Price controls** (15+ countries;  
mixed)
- **Capacity mechanisms** (divergent new  
designs)

# The Harmonisation Paradox

**Interconnection creates a common pool resource (Schelkle 2017): In order to not cause externalities the following must be fulfilled**

- low level distributive price shifts and working competition (affordability)
- Coordinated capacity planning and grid management (security)
- coordinated cross-border renewable subsidization (environment)

→ Needs harmonised software

**But Interventions reduce market integration:**

- Price controls limit competition
- CRMs fragment capacity markets and cause instability in other markets
- Non-unbundling protects incumbents distorting the level playing field

→ Prevents harmonisation

**Central Paradox:** Interventions enable solution of trilemma domestically,

# Why Pre-Crisis Non-Harmonisation Emerged

Commission expected:

Unbundling + market opening → competition → natural harmonization

**But reality:** Directives left room for national adaptation. States faced domestic pressures.

## Incumbent Power

Liberalization *sequence* mattered. Early choices locked in actor power.

DE: incumbents strengthened

NL: incumbents dismantled

## Functional Necessity

Market failures required interventions. CRMs address missing money.

But functional pressure can't explain design variance

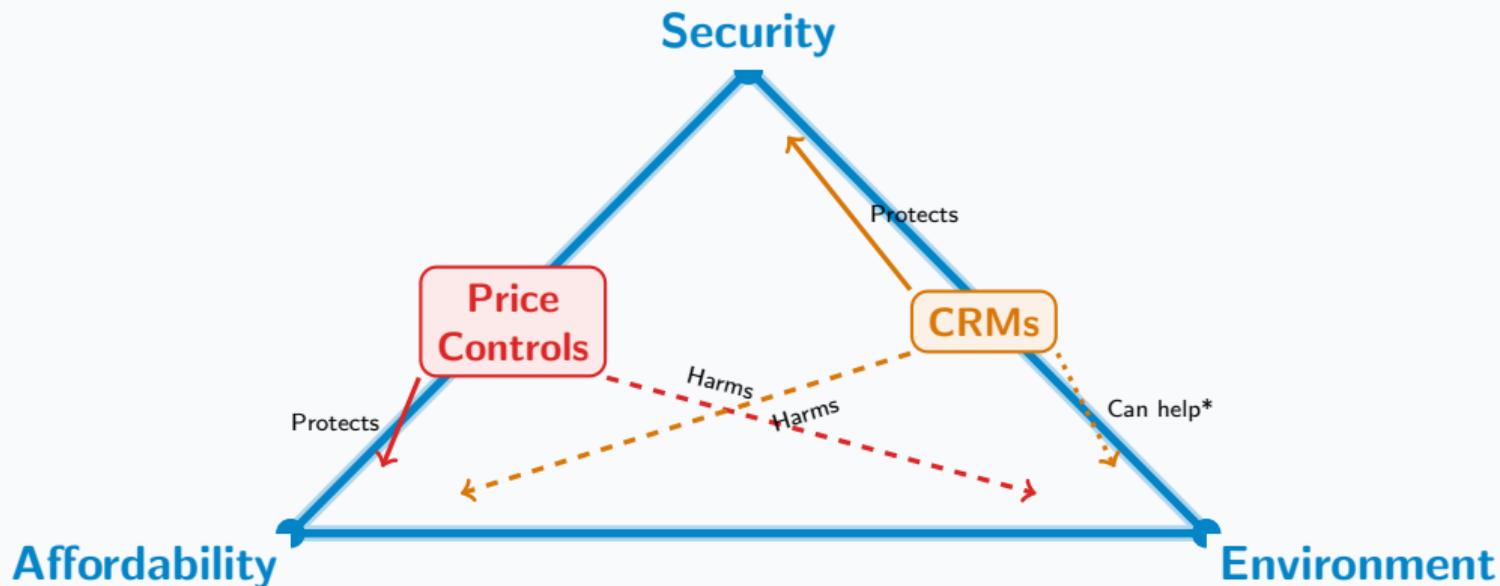
## Socio-Political

Energy poverty, consumer protection, rent-seeking. Controls shield households.

Poland, Hungary, Bulgaria

**Result:** Divergence embedded in liberalisation despite harmonization directives. Geopoliticisation amplified it.

# The Energy Trilemma & Where Interventions Fit



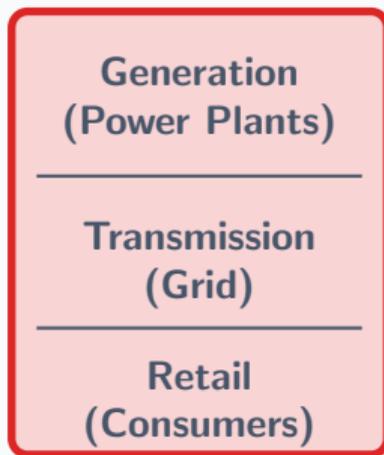
**Price Controls:** Protect affordability → harm environment (suppress price signals)

**CRMs:** Protect security → **always harm affordability**. Can enable renewables *if targeted*; risk fossil lock-in *if market-wide*

# Unpacking the Barriers

# What is Unbundling?

## Before: Integrated



One Company  
Controls All

Unbundling  
→

## After: Separated



**Goal:** Separate competitive activities (generation, retail) from regulated monopoly

# Legacy Measure: Unbundling Resistance

## Path Dependence at Work

Third Package (2009): ownership separation mandated  
— divergent implementation

## Why? Sequence mattered:

- Germany- incumbent orientated: private and well coordinated → retail opening *before* unbundling → incumbents gained STRUCTURAL power → ISO/ITO model
- Netherlands- consumer orientated: unbundling *before* opening → incumbents weakened → full separation

**Outcome:** DE <5% switching (5 years); NL >10% (1 year)

**Still operating:** Germany exploits derogations for EV/storage to protect RWE

## Full Unbundling



ISO/ITO



Vert. Integ.



# Mixed Measure: Price Controls

## What are Price Controls?

Regulatory measures that limit or set end-user electricity prices, decoupling retail from wholesale markets

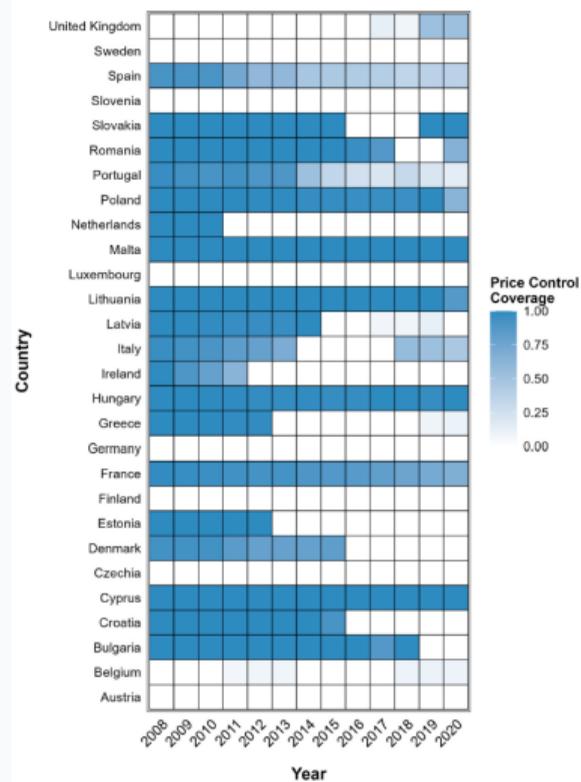
**Commission view:** Market distortion blocking liberalization

**Reality:** No single best method; design determines whether barrier or transition tool

## Status:

- 15+ EU countries pre-crisis
- Some legacy (Bulgaria), some reintroduced (Spain 2021), some abolished (Denmark, Ireland)

Coverage of Consumer by Price Controls by Country and Year



## Price Control Design Variance

Country	Design	Logic	Market Compatible?
<b>Spain</b>	Dynamic, wholesale-linked	Buffer volatility	High
<b>Denmark</b>	Nord Pool formula	Transition lubricant	High—abolished
<b>Poland</b>	Administrative, coal-linked	ETS accommodation	Medium
<b>Bulgaria</b>	Central buyer model	Embedded governance	Very low
<b>France</b>	ARENH nuclear system	Rent protection	Low

Commission perceives controls as barriers. But design variance shows: no economically optimal single approach

Why perceived as barrier? Suppress wholesale price signals, limit competition, reduce switching

# Price Control Lock-in Mechanism

## Self-Reinforcing Cycle

1. Price controls suppress wholesale competition
2. Low competition → incumbents dominate
3. Dominance → political capture
4. Captured regulators maintain controls

**Result:** Lock-in prevents liberalisation

## Transitional vs. Structural:

- **Transitional:** Average-price controls buffer volatility (Spain, Denmark pre-abolition)
- **Structural:** Fixed admin prices block competition (Bulgaria, Hungary)

Design determines whether intervention is bridge or barrier

# Price Controls: Transition vs. Brake

## Transition Function

Price controls can **increase** public acceptance of market changes.

**Denmark:** Phased out gradually, building consumer confidence

**Spain:** Cushions volatility, reducing opposition to renewables

## Brake Function

Completely decoupled from market signals. No switching, no entrants, no price discovery.

**Hungary & Bulgaria:** Fixed admin prices block competition entirely

**The cheat code becomes a dead end**

**Key insight:** Design determines whether control is **transition tool** or **structural barrier**

# What Explains Price Control Persistence?

Fractional logistic REWB regression, 26 EU countries, 2008–2020

## Strong predictors:

- **Market ideology** — strongest across all specs
- **Energy poverty** — strongest within-country
- **Government effectiveness** — strongest between-country
- **Renewables** — more renewables → phase out controls

## No effect:

- Market concentration: n.s.
- State ownership: ambiguous
- Domestic resources: mixed

**Key paradox:** Commission's justification (market failure) shows **no** explanatory power.

Renewables = pro-market power; oppose controls

Political and socio-economic factors dominate

# New Measure: Capacity Remuneration Mechanisms (CRMs)

## What are CRMs?

Payments to generators for maintaining available capacity, beyond energy-only market revenues

**Rationale:** Address “missing money problem” — intermittent renewables reduce market prices, threatening backup capacity investment

## Status:

- 13+ EU states adopted post-2008
- **New intervention** responding to renewable integration
- Highly contested: no economic consensus on necessity

# CRM Design Variance: Critical Distinction

## Two fundamentally different approaches:

### Targeted / Strategic Reserve

Keep selected generators **outside** regular market until scarcity

**Examples:** Germany, Sweden, Belgium

**Logic:** Minimize market distortion, temporary backup

**Risk:** Can become “golden handshake” for coal (Germany lignite)

### Market-Wide

Payments to **all eligible** generators operating in market

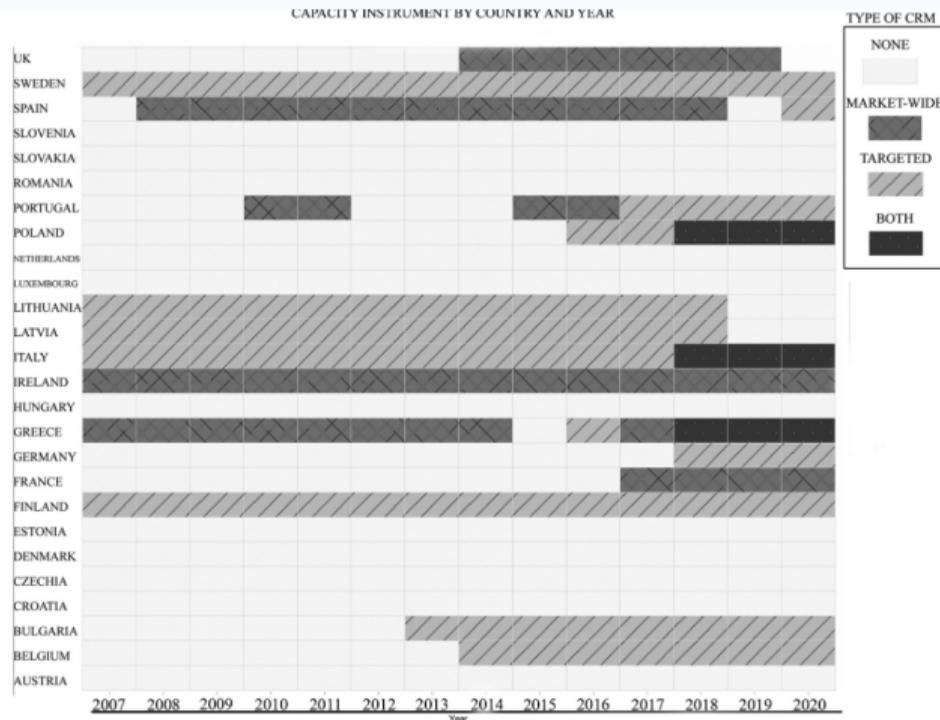
**Examples:** UK, France, Italy, Poland

**Logic:** Ensure broad adequacy, support transition to gas

**Risk:** Prolong fossil fuel viability, high costs

Same functional pressure (intermittent renewables) → opposite design choices → reflects domestic politics, not just technical needs

# CRM Adoption Overview



Source: Own illustration based on data of ACER (2020), ACER & Council of European Energy Regulators (CEER) (2022), European Commission (2016), Hancher (2021) and Publitz (2019).

# CRM Design Reflects Domestic Political Economy

Country	Design	Logic	Driver
UK	Market-wide auction, tech-neutral	Address missing money	Centre-right, market-liberal ideology
Germany	Targeted reserve, fossil-only	Coal phase-out “golden handshake”	Grand coalition; incumbent (RWE) protection
Poland	Market-wide obligation	Protect domestic coal, accommodate ETS	Low interconnection, state ownership

Same instrument → different configurations → reflects incumbent power, state ownership, party ideology

Design matters: targeted minimises fossil lock-in; market-wide risks prolonging carbon-intensive generation

# What Drives CRM Adoption & Design?

## Adoption: Techno-economic (AIC=376, R<sup>2</sup>=0.34)

- Electric heating — peak demand (strongest stable predictor)
- Interconnection — strongest non-adoption predictor (coeff -7.13)
- Intermittent renewables + gas share: raise pressure

## Design: Political & socio-technical

- Interventionist parties → market-wide
- Green parties → targeted
- High carbon intensity → targeted
- Gas utilities → market-wide

## Key deviation from functional logic:

Denmark > 50% intermittent, no CRM

Poland < 10% intermittent, CRM adopted

Functional necessity alone cannot explain variance

Note: Renewable generators = pro-market actors; oppose CRMs

# The CRM Lock-in Paradox

## The Paradox:

Big countries need CRMs domestically because insufficient interconnection creates adequacy concerns.

But CRMs prevent more interconnection because domestic capacity investments become sunk costs resisting cross-border competition.

## Lock-in Cycle

1. CRMs → domestic capacity investment
2. Domestic capacity → incumbent resistance to imports
3. Low interconnection → continued adequacy concerns
4. Adequacy concerns → maintain CRMs

Solution requires more interconnection, but CRMs create vested interests blocking that path

# **Implication of Geopoliticisation and common market integration**

# Geopoliticisation: Same Determinants, Stronger Pull

2022 crisis didn't create barriers — it strengthened conditions sustaining them

## Pre-existing Drivers

Energy poverty → controls

Security concerns → CRMs

Incumbent power → non-unbundling

Market ideology → reform willingness

## Geopoliticisation Amplifies

Energy poverty **worsens**

Security discourse **deepens**

Incumbents **entrench** via CRMs

Market ideology **retreats**

Add hardware integration: spillovers hit states *already unwilling to converge*

# Interconnection as Physical Risk Sharing

Interconnection enables risk sharing — but creates distributive conflicts

## Benefits

**Security:** Supply shocks absorbed

**Affordability:** Diverse resources → lower volatility

**Environment:** Larger markets accommodate intermittency

## Costs

**Affordability:** Price convergence is distributive

**Security:** Domestic grid problems become cross-border conflicts

**Security + Environment:** Cross-border renewable competition threatens incumbents

Risk sharing creates winners and losers → distributive conflict

# Interdependence Effects: Two Illustrations

How interconnection exposes uncompensated spillovers (ongoing work)

## Loop Flows (Physical)

German renewable surge + bottleneck → electricity routes via PL/CZ grids

**Problem:** Requester pays, not polluter pays

**Cost:** €25M lost trade vs. hundreds of millions for phase-shifters

**Result:** Defensive renationalisation

## Norway (Price Spillover)

UK + DE interconnectors (2021) → price convergence

**Problem:** Winter 2024–25 hydro depletion → Norwegian price spike

**Backlash:** Government collapse; calls to “scrap interconnectors”

**Result:** New intervention (90% price subsidies)

Both illustrate: uncompensated interdependence → defensive national responses. **Missing polluter-pay principle** prevents efficient solutions

# The Missing Piece: EU-Level Compensation

The problem isn't interconnection — it's uncompensated interconnection

National accommodations are second-best responses to unpriced spillovers. Each is rational domestically; collectively they produce divergence **that contradicts EU harmonisation goals.**

## First-best: EU mechanisms pricing & compensating spillovers directly

### What this requires:

- Reformed ITC mechanism covering loop flows (**polluter-pays principle**)
- EU-level energy poverty instrument (affordability compensation)
- Coordinated CRM design or EU strategic reserve
- Compensation for price convergence losers

Without this: national solutions continue regardless of hardware integration

# Three Paths Forward

## Scenario 1: Deep Integration

### EU-level compensation

#### Elements:

- Polluter-pays ITC reform
- EU energy poverty fund
- Coordinated CRM design
- RE alignment via structural harmonisation

**Outcome:** Hardware + software integration

## Scenario 2: Managed Divergence

### Fast hardware + transitional interventions

#### Elements:

- 15% interconnection target met
- State interventions as transition tools
- Gradual phase-out via average-price controls
- Targeted CRMs (not market-wide)

**Outcome:** Hybrid integration

## Scenario 3: Strategic Decoupling

### Slow/reverse integration

#### Elements:

- Limit automatic interdependence
- National energy systems preserved
- Voluntary cooperation only
- Manage asymmetric exposure

**Outcome:** Fragmented markets

Choice depends on political will to address distributive conflicts

## Three Implications

1. **For integration theory:** Hardware and software can move in opposite directions. Lock-in dynamics mean interventions become self-reinforcing barriers.
2. **For EU policy:** Pushing hardware without addressing asymmetries creates backlash. Trilemma discussion need to be informed by constraining dissensus **Domestic interventions contradict EU harmonisation goals** — but are rational responses to insufficient EU-level compensation and missing polluter-pay principle.
3. **For defragmentation:** Software integration requires aligned conditions — political, socio-economic, structural — not just interconnectors. Legacy vs. new measures require different policy responses.

# Thank You!

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Questions?

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