

Entangled boundaries, scales and trajectories of change: post-communist energy reforms in critical perspective

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The 2009 energy crisis

- In January 2009, halfway through one of the coldest winters in recent history, **18 European countries** found that their regular supply of Russian piped gas via the Ukraine had been **cut**
- The crisis stemmed from a **long standing pricing dispute** between the Russian gas monopoly Gazprom and Ukraine's Naftohaz
- Different countries were affected to different degrees, depending on the **availability of alternative sources of supply**



Infrastructure breakdown

- The symptom of a **deep systemic failure** at the interface between state policy and socio-technical assemblages (see, for example, Beck 1992; Berkhout et al., 2004)
- **Brought home the interactions** among energy networks and political relations at different scales (Star 1999)
- Demonstrated that the European Union is **unable to act** as a collective entity in ensuring the security of its member states' energy supplies
- Exposed the **inadequacy** of post-communist energy sector reforms

This paper draws attention to ...

- Some of the challenges, tensions and discrepancies stemming from the creation of a new set of socio-technical assemblages under conditions of economic and political transition
- The multiple ways in which the experience of energy reforms in Eastern and Central Europe (ECE) and the Former Soviet Union (FSU) has destabilised antecedent understandings of scale, reform trajectories and national boundaries in post-communism



Understanding networked energy infrastructures: key debates

- 'Technical networks are not objects as such, but projects, dreams' (Latour, 1992)
- They embody the 'congealed social interests' (Bijker, 1993) of their users and producers
- Technological 'momentum': the amount of inertia in a networked system (Hughes, 1992)
- Infrastructures are characterised by embeddedness: they are 'sunk into and inside of other structures, social arrangements, and technologies' (Susan Leigh Star, 1999)



Technological frames and interpretive flexibility

- **Technological frame:** a heterogeneous entity that belongs to both the cognitive and the social domain, involving, *inter alia*, exemplary artefacts, cultural values and goals, scientific theories and tacit knowledge
- **Stability:** a technological frame seeks to create an 'impossibility ... of returning to a situation in which its [current form] was only one possible option among others' (Callon, 1992: 89).
- **Interpretive flexibility:** the extent to which the frame's functional, cultural and social features lend themselves to change (Orlikowski, 1992; Brey, 2003; Cadili and Whitley, 2005)



The agency of networked infrastructures

- **Assemblages:** 'pulsating' networks consisting of diverse actants with an 'uneven topography', whose 'origins are historical and circumstantial' as it is not governed by a central power (Bennett 2005: 445).
- **Inscription:** reiterative algorithms that allow a given programme of action to be incorporated into a piece of technology. It is contingent on wider processes of translation and 'mobilisation of allies' into the network (see Latour, 1999; Buck and Shahrim 1999; Sarker et al. 2006)
- **Entanglements of power:** 'an amalgam of *forces, practices, processes* and *relations*, [original emphasis] all of which spin out along the precarious threads of society and space' (Sharp et al. 2000: 20)



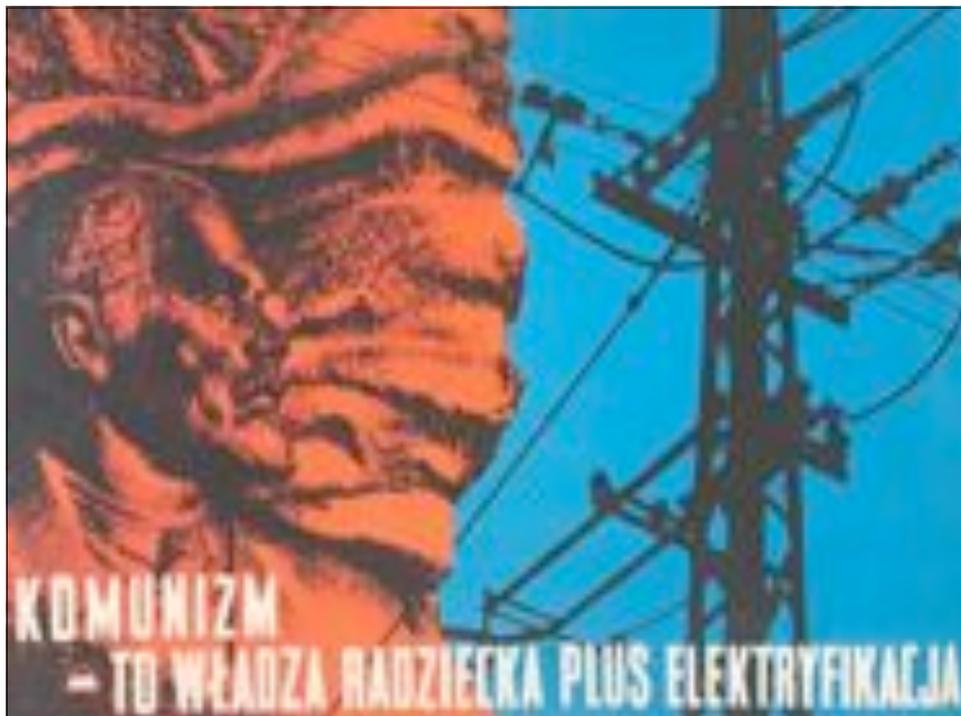
Questions

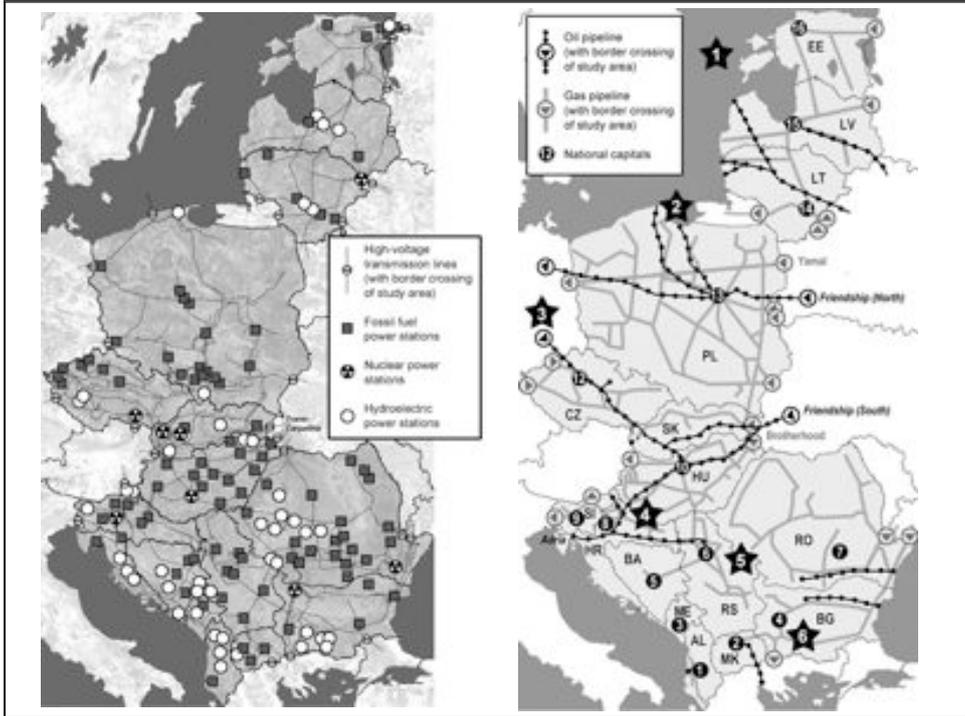
- What happens when one technological frame is imposed on another? How might the imposition of the neoliberal paradigm of energy reform across a set of very diverse spaces create new layers of difference?
- How is technological momentum and interpretive flexibility practised in this context?
- How are energy infrastructures inscribed into, and entangled with, a regional 'landscape of power'?
- What was the role of the energy reform process in creating particular materialities and imaginations of space in post-socialism?
- How have energy assemblages affected the articulation of policies in the energy security, efficiency and social inequality domains?



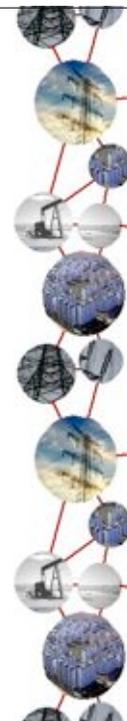
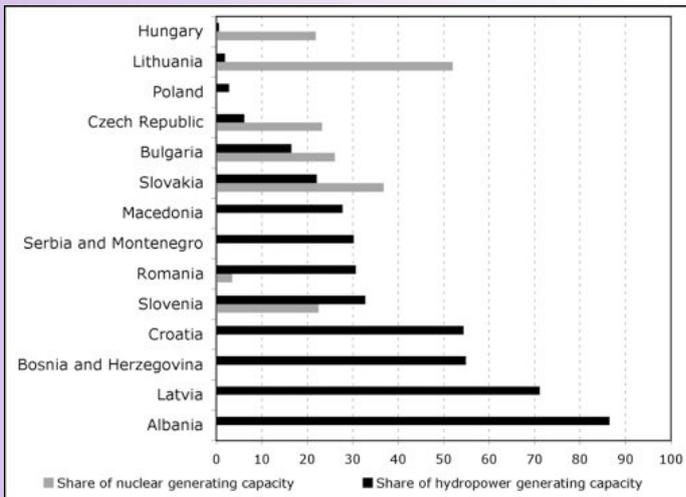
Legacies

- **Industrial and infrastructural:** universal access to electricity, district heating, emphasis on large-scale investment linked to technological complexes, hydrocarbon dependency on the Soviet Union
- **Social and economic:** across-the-board price subsidies, energy policy folded into social policy
- **Environmental:** emphasis on fossil fuels - often exaggerated for final consumption, inadequate mitigation policies





Shares of hydropower and nuclear energy (Source: IEA, AEA)



District heating

- large, centrally controlled networks for the production, transmission and distribution of heat in densely built-up areas
- an inseparable component of Soviet *micro-raions*
- major technical and management problems

Country	Total
Lithuania	58%
Estonia*	52%
Poland	52%
Belarus	50%
Czech Republic	32%
Romania*	31%
Bulgaria	20%
Hungary*	16%
Slovenia	15%
Serbia	13%
Croatia	9%

Share of households with access to district heating in selected post-socialist states (Source: Euroheat, 2006).

* Refers to share of DH in fuel mix

Energy intensity

- Eastern European states required more than double the amount of energy to produce the same unit of economic output generated by their neighbours in Western Europe (Dienes et al., 1994: 206)
- Russia needed 42 Megajoules to produce the GDP equivalent of 13 Megajoules in the United States
- **Reasons:** Low energy prices and efficiency standards, lack of technological transfer, dominance of heavy industry in the economic structure, soft budget constraints

The reform process (1)

Neoliberal, 'Thatcherite' model of restructuring:

'Post-socialist countries should 'increase prices for energy resources to reflect their real marginal cost and thereby provide consumers with a positive economic incentive to conserve energy' (Kramer, 1991:14).

'The target of reducing the overall energy intensity of GDP by 50 per cent for Bulgaria, Czechoslovakia, and Poland, and by 30 per cent for Hungary within 10 years is a goal that can be achieved by a combination of pricing policies and industrial restructuring to improve or eliminate the most wasteful industrial activities' (Hughes, 1991: 96).

'In general, the Bank supports a reform path comprising (1) corporatization and commercialization of public sector entities, (2) demonopolization and (3) privatization ...' (EBRD, 1999: 10).



The reform process (2)

- **Liberalisation** (opening up of energy markets to third parties)
- **Unbundling** of vertically- and horizontally-integrated energy utilities, and, preferably, **privatisation** of at least some parts of the network
- **'Price rebalancing'**
- Establishment of **independent energy regulatory bodies**

(EU liberalisation directive)



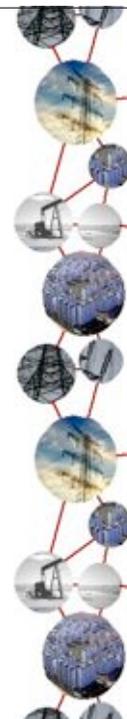
10 years later: Three modes of reform

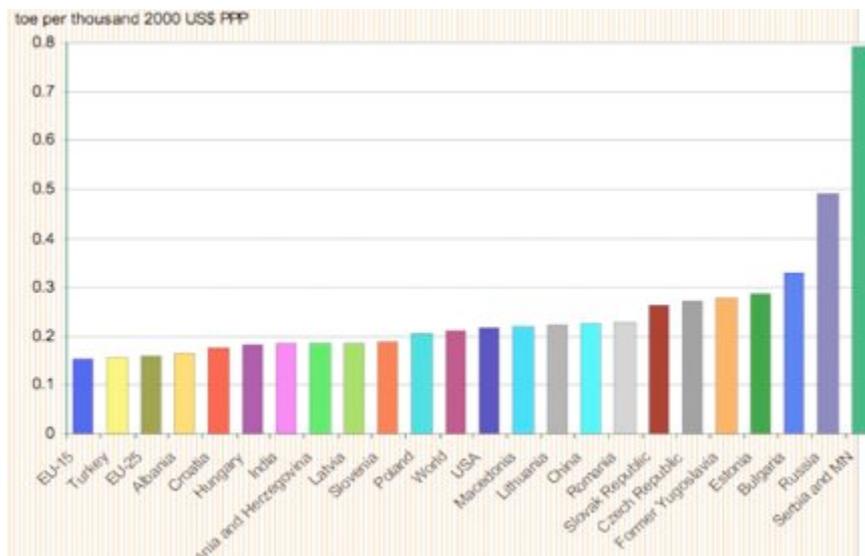
- **The 'Post-Soviet mixed economy':** 'A blend of incoherently functioning elements of a market economy and straightforward state planning' (Hirschhausen and Wälde 2001:17);
- **'Caspian state economy':** 'An autocratic, clan-based regime based upon strong state involvement in the economy' (*ibid.*);
- **'Reforming Central/Eastern European market economy':** 'Has largely adopted the formal institutions of a market economy or has at least given a binding commitment to do so in the future' (*ibid.*).



Common 'problems' ...

- Inadequate implementation of legal & regulatory frameworks
- Monopolistic / oligopolistic structures
- Significant state ownership & influence
- Low rates of 'market opening'
- Outdated and ageing infrastructure
- High energy intensity/low efficiency
- Persistence of implicit cross-subsidies
- Insufficient investment/ capital constraints
- Inadequate balance between social, economic and environmental objectives (UNECE, 2006)
- Urge Vorsatz *et al.* 2006: Neglect of 'positive legacies' of Communism (public transport, compact cities, district heating, low consumption)





Energy intensities of various European economies
(Ürge Vorsatz, 2006)

Messy reform trajectories

- Clear **drop** in energy intensity due to economic restructuring and conscious state-sponsored policies in some cases
- Structural legacies **still remain**: cultural and behavioural change much slower
- Energy transitions 'imposed' by **transnational organisations**
- Antecedent regulations and institutional cultures have played a key **differentiating** role in the transition process
- **No clear spatial pattern**, despite tendency to generalise along broad regional patterns
- **Meso-level variation** remains unexplored, although unequal access to DH, gas and coal produce significant regional differences
- Opportunities for '**leap-frogging**' towards increased energy efficiency largely missed



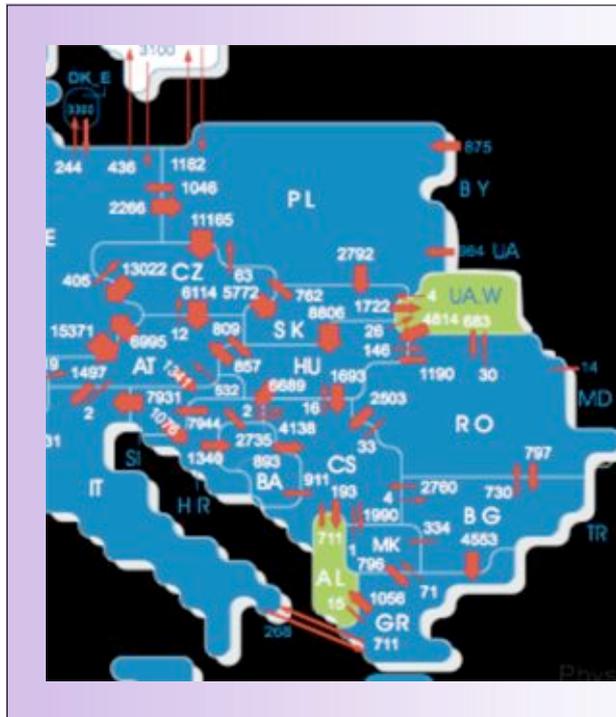
Consequences of energy reform

- The post-communist transformation introduced new socio-technical assemblages to the emergent networks of power in the post-communist space
- EU and Russia: consumer-producer relationship driving energy flows
- ECE countries: resource-poor but a key transit space
- New interdependencies across national boundaries
- Energy exchanges bring out deeper geopolitical relations and have the power to shape them: they are embedded in place while being directed by, and directing forces from, a wider network of interests and relations



Current and projected gas pipelines (inogate.org)





Electricity exchanges in 2005 (UCTE)



New energy landscapes

- Piped gas and electricity networks indicative of broader political and economic relations due to the specific nature of the technology
- New developments in these domains embody:
 - restructuring dynamics
 - power configurations
 - constraints on interpretive flexibility created by the superimposition of two technological frames
- ‘Physically invisible’ projects sustain new material assemblages
- Topologies matter: heterogeneous networks may not intersect despite being topographically sited in the same region
- ... or networks may be created where they didn't exist otherwise





Rescaling energy security

- **Upward:** towards transnational policy frameworks
- **Downward:** households matter as a result of the emergence of energy poverty and domestic energy deprivation
- **Across sectors:** need for co-ordination among urban and regional planning, housing, health, social welfare

Concluding notes:

towards a 'spatial' research agenda for energy in transition

- The energy reform process has been spatially uneven and contingent
- It has exhibited the power to both produce places and be conditioned by them (in material and discursive terms alike)
- Clearly, 'legacies, linkages and localities' (Grabher and Stark, 1998) matter!
- Energy flows through networked infrastructures have exposed:
 - Topologies of energy flows
 - Agentic capabilities of energy assemblages
 - Rescaling of energy security
- Implications for the European Union: **need for a common energy policy**
- Moving towards **human security** as a conceptual and policy framework?

