

National energy systems' adaptive capacity and consequences of New Public Management reforms

Energy systems adaptive capacity to climate change is vital. The energy system, and notably its electricity infrastructure, is a hub for the functionality of modern societies

Main problems:

- How to study limits and opportunities for adaptation of national energy systems (adaptive capacity)?
- How has NPM reforms impacted on governance and adaptive capacity?

Two main aspects of adaptive capacity:

1. Technical vulnerability assessment and mapping of possible adaptation strategies
2. Organisational adaptive capacity



Technical features, vulnerability and adaptation strategies

A national energy system consists of interdependent parts:

- Production assets
- Transmission assets
- Consumption 'technology'

Possible generic technical adaptation strategies:

- *Strengthening*
- *Diversification*
- *Decentralisation*
- *Relocation*

This is the 'engineer's view' of adaptation. *Strengthening* is the most basic adaptive strategy and refers to mechanically making existing structures (infrastructure, plants, dams, etc.) more robust for weather loads. *Diversification* aims at reducing the overall dependence on some vulnerable energy carriers or sources. *Decentralisation* refers to a reduction of dependence on vulnerability centralised solutions (such as the central grid). Last, *relocation* implies moving important infrastructure away from particularly exposed locations.

But what facilitate or hinder adaptation? - Organisational Adaptive capacity

The national energy system viewed as an 'organisational field' and adaptive capacity to be its *ability* or *potential* to respond successfully to climate change with adjustments in behaviour, resources and technologies.

Organisational adaptive capacity:

- Organisational ability to learn about vulnerabilities and solutions
- Organisational ability to act on the new knowledge

Organisational learning understood as learning by *doing* and *interacting*.

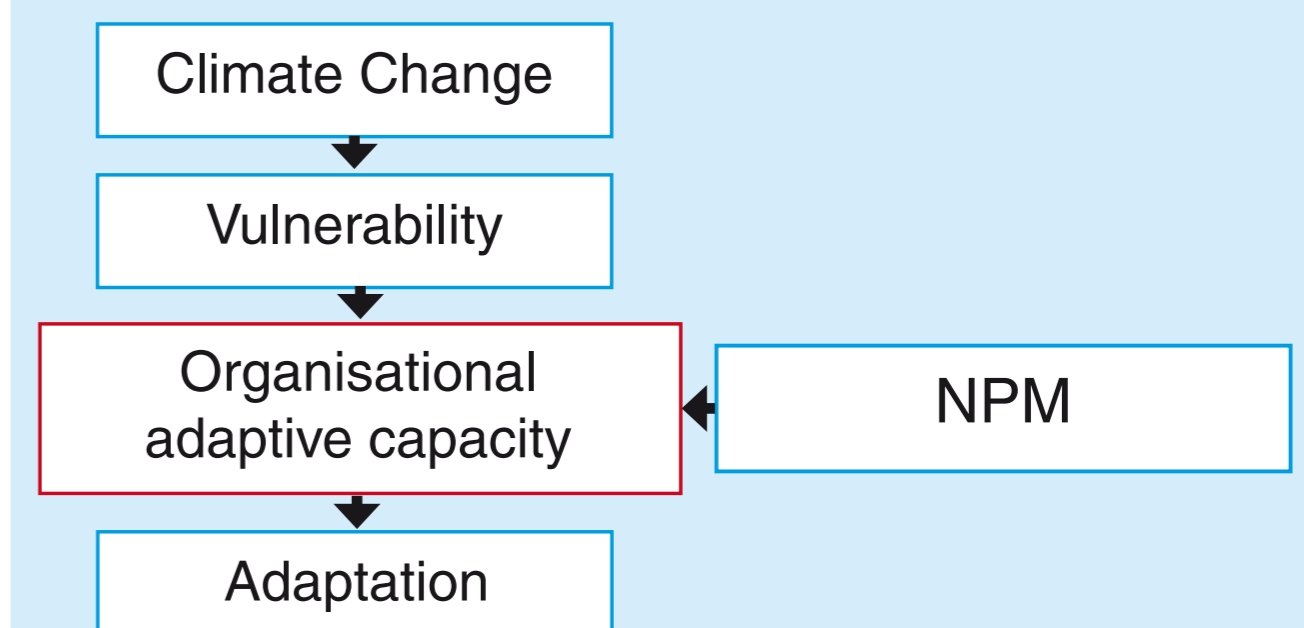
Organisational ability to act is closely connected to governance – the process whereby societies or organisations make important decisions, determine whom they involve and how they render account.

Limits or potentials for adaptive capacity in organisational fields have *cognitive*, *normative*, and *regulative* aspects.

NPM reforms and adaptive capacity - testing the framework on the Norwegian energy system

New Public Management is a liberal reform wave starting in the 80s and 90s. Its main hypothesis is that more market orientation in the public sector will lead to greater cost-efficiency without negative side effects on other objectives and considerations. **Means:** combination of unbundling, market exposure, out-sourcing and managerialism. **Critique** has been directed at 'hollowing out of state capacity': transfer of functions, loss of expertise, breakdown of traditional role relationships and a one-dimensional focus on economic efficiency. **The Norwegian energy sector** was reformed in 1991 by an extensive energy act. This was done for reasons of efficacy and for the argument of lower cost for the consumers. The most important changes were division of energy production and transmission (unbundling) and market exposure, followed by increased focus on cost-cutting, rationalisation and restructuring.

The causal model:



Preliminary statements concerning NPM influences on the adaptive capacity of the Norwegian energy system

	Possible positive influences	Possible negative influences
Ability to learn	Market-exposure → goal- and result orientation → higher resource-efficiency in search	Unbundling → fragmentation → poorer learning by interaction
	Managerialism → clearer responsibility allocation → clearer commitments to ensure system functioning	Outsourcing → knowledge drain → poorer capacity for learning by doing and interaction
	Unbundling → de-centralization → commitments vested at vulnerable spots	Managerialism → short term efficiency-focus → poorer capacity for learning by doing and interaction
Ability to act	Unbundling → de-centralisation → reduced response time	Market-exposure → Goal replacement (myopia) → one-dimensional scope of search
	Managerialism → goal- and result orientation → clearer commitments to system functioning	Unbundling → higher transaction costs → poorer co-ordination
		Unbundling → Fewer tools of governance for coordinated action
		Outsourcing → loss of accountability and control
		Managerialism → short-term efficiency-focus → fewer resources



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