



New Models of Public Ownership in Energy?

Michael Pollitt

*Judge Business School
University of Cambridge*

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University of Milan

Outline

- New challenges
- Theories of public ownership in energy
- Case studies:
 - Wind Power in Denmark
 - Nuclear Power in Finland
 - LNG in Greece
 - Electricity and gas distribution in New Zealand
 - Electricity and gas transmission in Northern Ireland
 - Energy services business models in Great Britain
- Conclusions



New Challenges

- Climate Change and Related Policies
 - CO₂ reduction
 - Renewables targets
 - Demand reduction aspirations
- Energy security concerns
 - Gas supplies in EU
 - Peak Oil (and Gas)
- Consumer engagement with regulation
- Financial crisis and investment challenge

Theories of public ownership

- Laffont and Tirole (1993) suggest public ownership has:
- Costs:
 - Absence of capital market monitoring
 - Soft budget constraint
 - Expropriation of investments
 - Lack of precise objectives
 - Lobbying
- Benefits:
 - Social welfare
 - Solves principal-agent problem within firm
- They suggest that:
 - Private firms have both regulators and shareholders who constitute conflicting principals
 - Managers in private firms appropriate investments and public sector managers suffer from imposition of social goals
- Ambiguous results for performance



Theories of public ownership

- Hart et al. (1997) look at public-private partnerships.
- Only narrow range of circumstances where public ownership would be favoured where:
 - Non-contractible quality loss serious
 - Competition is weak
 - Consumer choice is ineffective
 - Reputation effect of firms seeking contracts low

Theories of Regulation

Gilbert and Newbery (1994) highlight when regulators may want to appropriate private firm investments:

$$(1-P)(c-b) > r \quad \text{Condition for full investment}$$

P is prob of low D : $D = 1 - \sigma$, c is cost of alternative, b is MC, r is cost of capital+depreciation, θ is weight on profits, i is discount rate

Expropriate if gains exceed PDV of future costs:

$$(1 - \theta)r > \frac{\Delta C}{i} = \frac{(c - b)(1 - \sigma P) - r}{i}, \quad \text{i.e. If } i \text{ higher, } r \text{ higher, } \theta \text{ lower, } c - b \text{ small, } P \text{ higher}$$



Principles of risk allocation

- World Bank Risk Allocation and Sharing Tool Kit
- Risks most efficiently handled by private sector:
 - Economic and financing risks
 - Construction risk
 - Operational risk
 - Commercial risk
- Risks most efficiently handled by public sector:
 - Political and legal risks

Theory applied to energy

- Laffont and Tirole (1993): *how do new challenges change case for public ownership? (+ for public ownership)*
- Costs:
 - Absence of capital market monitoring (+)
 - Soft budget constraint (+)
 - Expropriation of investments (+)
 - Lack of precise objectives (+)
 - Lobbying (+)
- Benefits:
 - Social welfare (?)
 - Solves principal-agent problem within firm (?)
- They suggest that:
 - Regulators and shareholders who constitute conflicting principals (+)
 - Managers in private firms appropriate investments (?)
 - Public sector managers suffer from imposition of social goals (+)
- ***Case for some public ownership looks stronger on incentive grounds (relative to low base of course!)...***

Theory applied to energy

- Hart et al. (1997): *do new challenges make a stronger case for actual public ownership of service provided to government? (+ for public ownership)*
- Only narrow range of circumstances where public ownership would be favoured where:
 - Non-contractible quality loss serious (?)
 - Competition is weak (+)
 - Consumer choice is ineffective (+)
 - Reputation effect of firms seeking contracts low (?)
- ***Smarter procurement from private sector necessary to maintain case for private ownership for publicly financed goods (e.g. renewables and CO₂ reduction).***

Theory applied to energy

- Gilbert and Newbery (1994): *do new challenges increase risk of appropriation by regulator? (+ for public ownership):*
 - Social weight on profits declining (+)
 - Cost advantage of private sector falling (+)
 - Demand growth falling (+)
 - Rising public sector discount rate (+)
- ***This suggests appropriation by regulators more likely.***



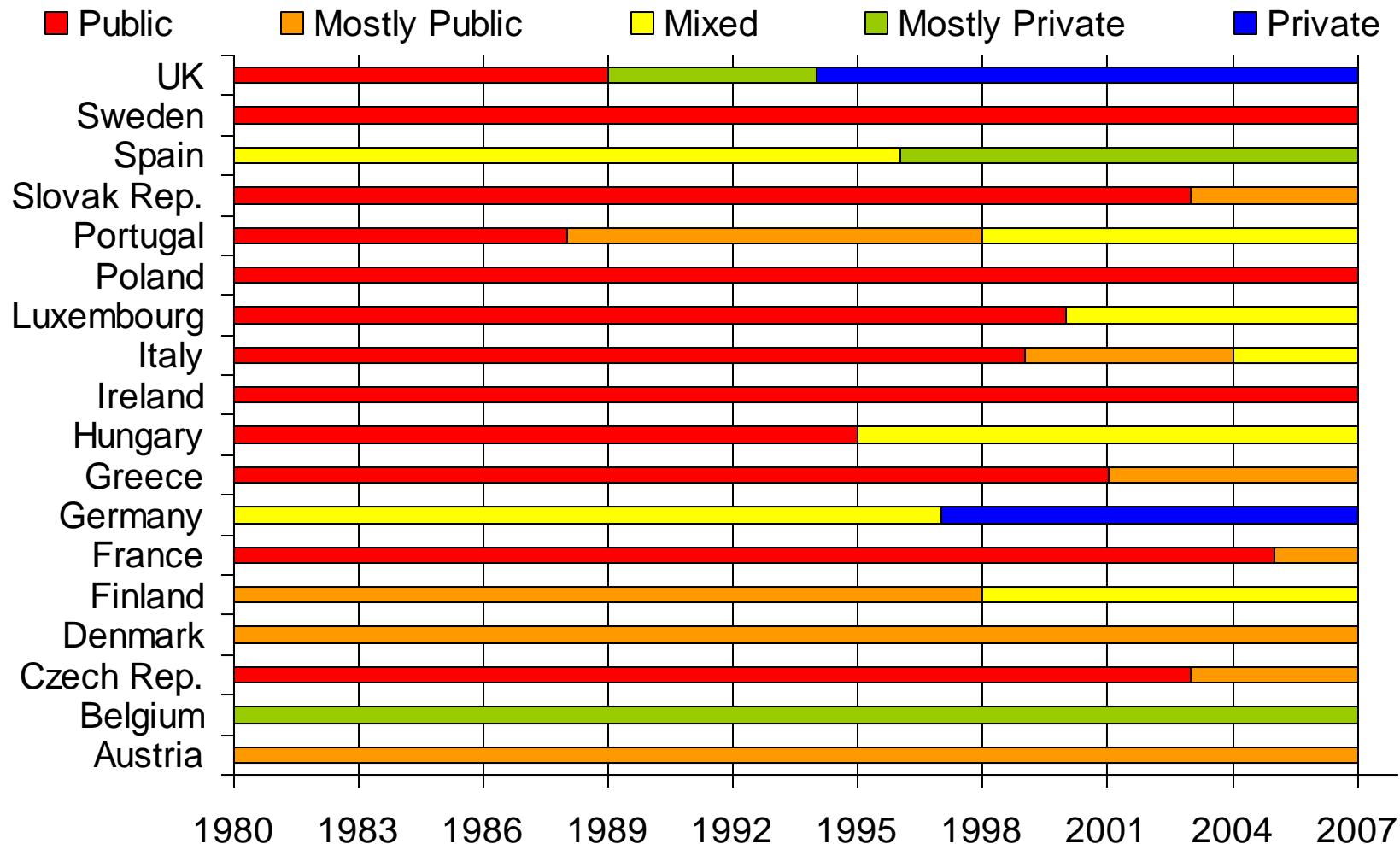
Theory applied to energy

- *Are new challenges associated with changing nature of risk, thus favouring increasing public ownership? (+ for public ownership):*
 - Economic and financing risks (+, if in financial crisis)
 - Construction risk (+, if first of kind)
 - Operational risk
 - Commercial risk (+, if markets being dismantled)
 - Political and legal risks (+)
- ***Context and nature of risks favour increasing public sector involvement in financing.***

Particular applications

- *Public ownership is more likely in:*
- Wind Power (e.g. social objectives)
- Nuclear Power (e.g. first of a kind risk, appropriation risk)
- LNG (e.g. appropriation risk, social objectives)
- Electricity and gas distribution (e.g. lack of regulation)
- Electricity and gas transmission (e.g. appropriation risk)
- Energy services business models (e.g. social objectives)
- ***Small country context makes good regulation more difficult and competition less effective.***

Privatisation in EU over time



Source: OECD international regulation database, 2009

Wind ownership models

Community-led	Developer-led	Investment funds
<i>Denmark</i> General partnerships (cooperatives)	<i>Germany</i> Limited partnerships <i>UK</i> Baywind cooperative Sweden Consumer cooperative (national) <i>Denmark</i> Middelgrunden	<i>UK</i> The Wind Fund plc <i>Netherlands</i> “Green” Funds
Real estate commune consumer cooperative (traditional/local)		
Specific projects		No specific project
Community of Locality		Community of Interest

Source: Bolinger (2001)

Middelgrunden, Denmark



- 20 offshore wind turbines (2MW each) built in 2000
- 3.5 km outside Copenhagen
- Total investment cost: €44.9 million (26.1 million for turbines)
- Ownership:
 - 50% Middelgrunden cooperative (private partnership)
 - 50% Dong Energy (Danish state as principal shareholder – 74%)

Ownership and financing of Middelgrunden

50% private partnership

- 8,650 members initially with 40,500 shares (approx. \$450 per share)
- General partnership – directly owned by electricity consumers
- Possible IRR of 8.25% over 20 years
- Worst-case scenario of 4.44% if project is unable to sell output when the feed-in tariff ends

50% publicly listed company

- Dong Energy with Danish state as principal shareholder (74%)
- Founded in 2006 when 6 Danish energy companies merged
- Company as a whole is 57% equity and 43% debt financed

Source: Bolinger (2001); Sorensen et al. (2002)

Nuclear power: Finland



- Olikiluoto nuclear power plant
- 2 active reactors: 1st connected to the grid 1978 and 2nd 1980
- 3rd reactor under construction – was due to be connected in 2009 but approx. 3 ½ years behind (initial estimate of €3 billion; 50% cost overruns)

Ownership and financing

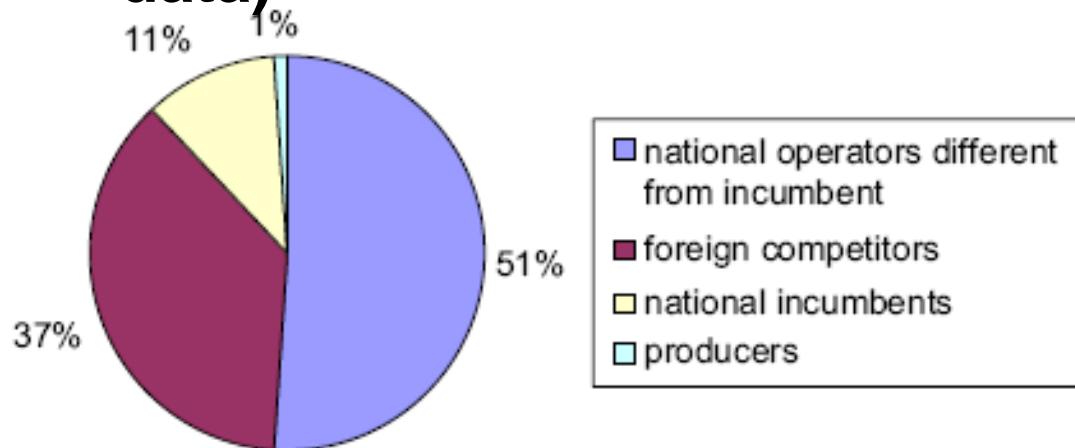
- Operator: TVO Organisation
- **Public-private partnership:** 43% owned by utilities – Fortum (51% state-owned) and Pohjolan Voima (part municipal ownership); 57% by large industrial consumers
- **Mankala principle:** shareholders receive electricity in line with ownership stake for lifecycle of plant
- 30% of construction costs for reactor 3 from shareholders and the rest from non-recourse debt financing
- Low risk financial structure

LNG terminals: Europe

Greece

- Owned/operated by DEPA (Public gas corporation)
- Shareholders: Greek state (65%); Hellenic Petroleum SA (35%)
- Operating since 2000
- Expanded to 4.5 bcm per year 2007

Ownership of planned European LNG terminals (2006 data)



Source: Dorigoni and Portatadino 2008

New Zealand: Electricity distribution networks

Ownership Type	No. of companies	Examples
Consumer Trust	18 (plus 1 with minority ownership)	Counties Power, Mainpower New Zealand, The Lines Company, Vector
Local Authority	4	Aurora Energy, Orion New Zealand
Community Trust	2	Eastland Network, WEL Networks
Public	1 (plus 1 with minority ownership)	Powerco, Horizon Energy Distribution (77% consumer trust; 23% public)
Cooperative	1	Electricity Ashburton
Other	2	Nelson Electricity (equal ownership by two consumer trusts); OtagoNet Joint Venture (b/w 2 consumer trusts and local authority)
Total	28	

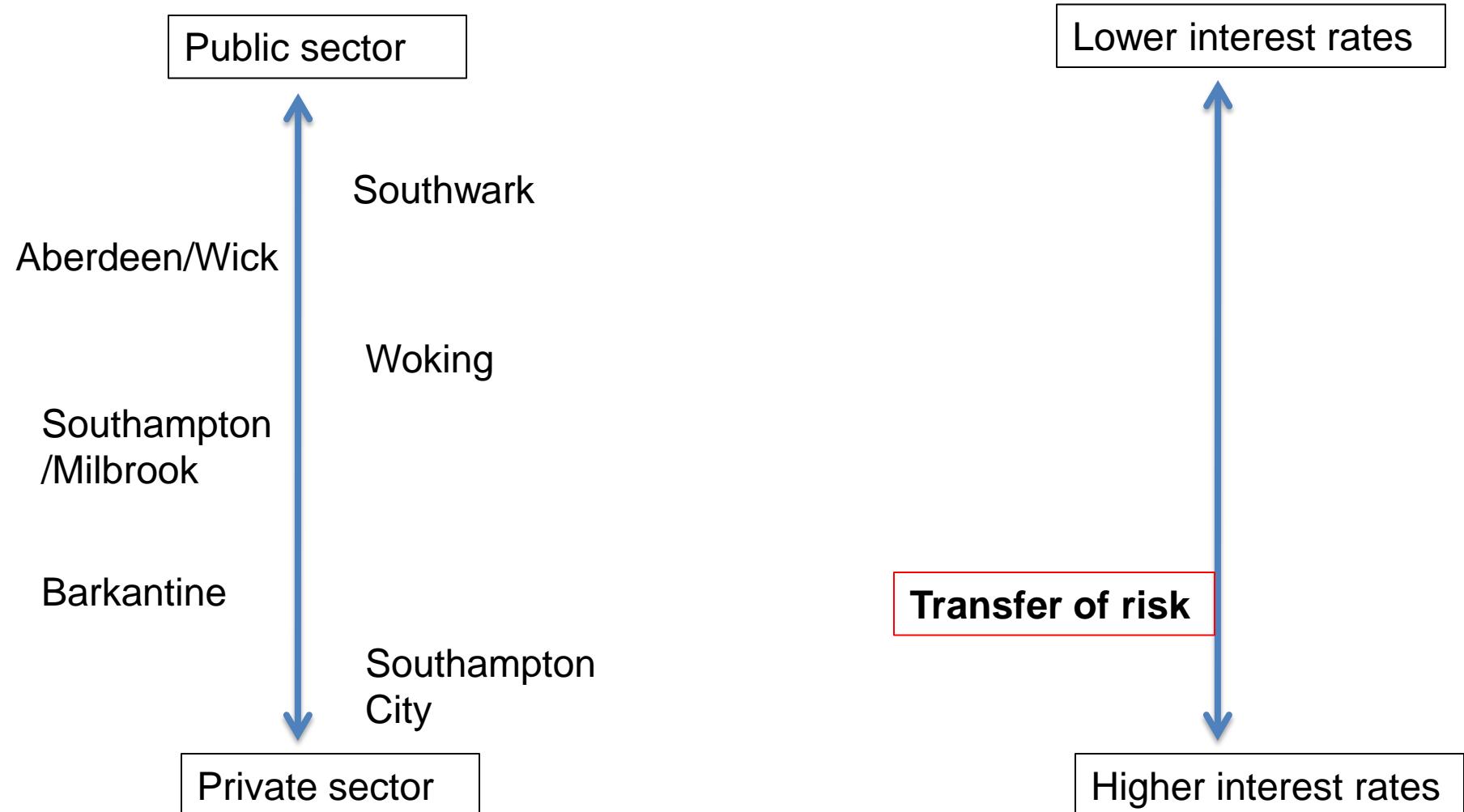
Source: Adapted from Evans and Meade 2005

Moyle Electricity Interconnector: Northern Ireland to Scotland

- Owned by Mutual Energy Northern Ireland with a capital value of £135m
- Also own Scotland to NI gas pipeline (£107m); and Belfast gas transmission pipeline (£109m)
- Operational since 2002; refinanced in 2003
 - Mutual ownership model – company limited by guarantee
 - 100% debt-financed
- Board elected by company members (at least 30, representing stakeholder groups)
- Reduced cost of capital; provides best deal for consumers

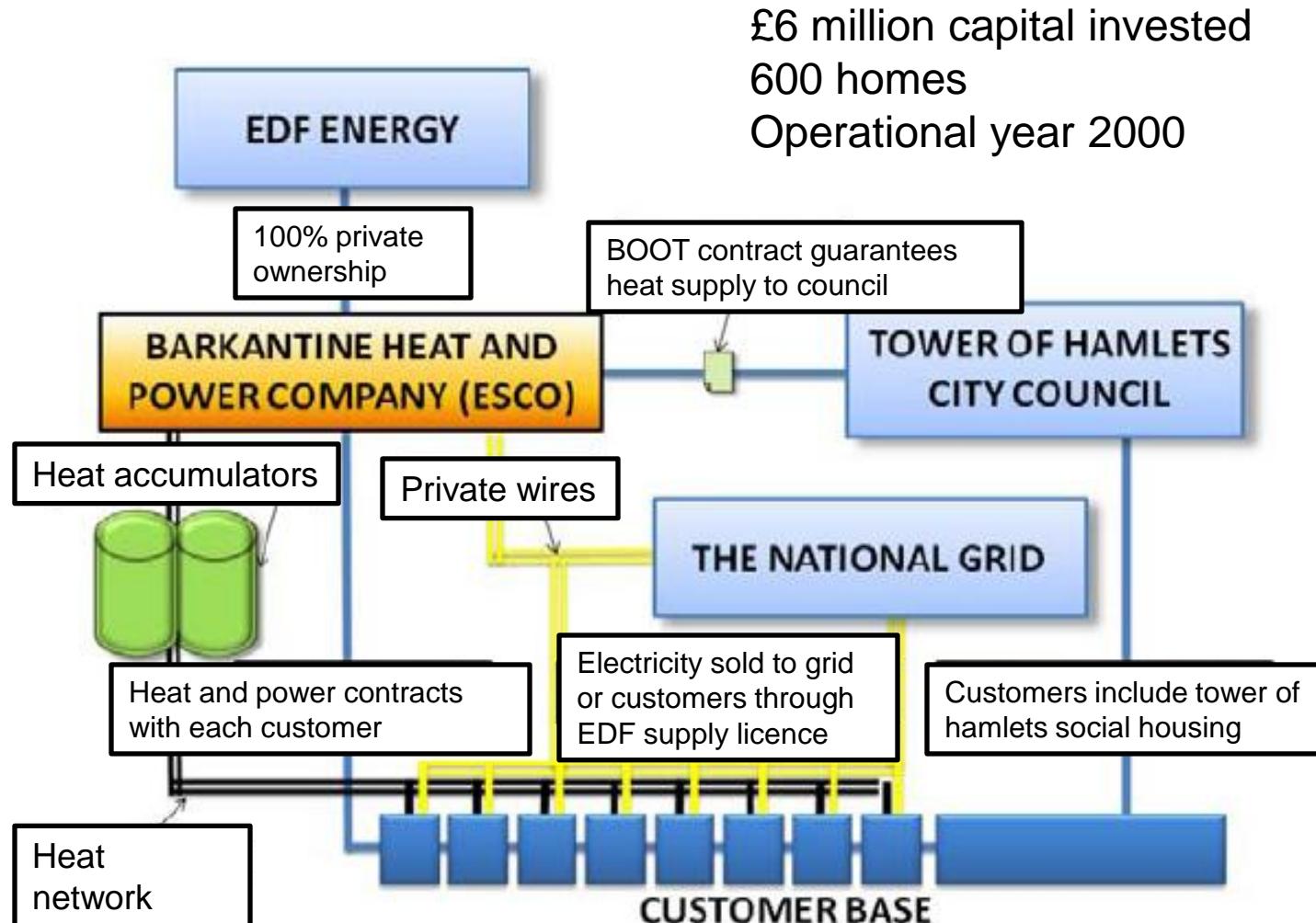


Public/private ESCO spectrum in GB



Source: London Energy Partnership (2007)

Barkantine ESCO



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Source: Kelly and Pollitt (2009)

Conclusions

- Good reasons to think that theoretical case for mixed public-private ownership improving.
- However in some cases private sector involvement still much less than might be optimal.
- ‘Public’ ownership can take a significant number of forms:
 - Mutual ownership
 - Consumer trusts
 - State ownership
 - Municipal ownership
- Key questions:
- What prevents different ownership forms from emerging?
- How can we maintain benefits of both private and public involvement?
- To what extent is improving case for public sector driven by ill-defined policy objectives and incomplete markets?

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