

Week 6: Energy systems and transitions

Mark Huberty*

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1 Hughes

Hughes' readings make three basic points of interest:

1. Technological transitions have a unique technological style that is particular and embedded in the technological/social/economic context (1976)
2. Regulation provides one, but by no means the only, determining factor (1982, Britain)

Note that Britain had the same technologies, firms, and in some cases even engineers. But it had very different regulation (municipal Victorian socialism) and a different "attitude" (though exactly what Hughes means here is a bit vague). Note here that America was the newcomer, Britain the global power. What might that suggest about today's dynamics?

3. The demands on innovators, firms, and regulators change across eras (1979) See here the difference between Edison (innovation, initial construction), Ingersoll (systems building, expansion, business formation), and Mitchell (finance). The technologies that fulfilled each of these ends were different—a different technological emphasis

*Travers Department of Political Science, University of California, Berkeley. Contact: markhuberty@berkeley.edu.

was required, even if the operation of the system writ large still operated according to the same set of physical constraints.

Note in particular what Hughes asserts is a strong link between *technological* and *corporate* structures: long-distance transmission and AC power permitted big holding companies. But big holding companies who served one community were financially vulnerable. Management required risk-spreading across larger geographic areas, hence consolidation was driven by risk management and enabled by technological innovation.

Note how it would have been different if there had been no AC. Edison's system called for smaller stations, serving smaller geographic areas. Diversification might have occurred within cities, giant holding companies might have looked very different.

We should think about what this means for RESE and distributed generation, particularly when we get to next week.

2 Troesken

Troesken is essentially about the politics of regulating new, networked industries; and how those politics interact with investment and shape it.

Issues at stake here:

1. What does the structure of energy capital do to energy politics?
2. Most of the attention paid to credibility is to price. Is that, *pace* Troesken, what really mattered for municipal utilities?
3. How did state-level utilities commissions resolve the problems of monopoly abuse

by the private sector, or corruption and caprice by the public sector?

Is the specific nature of the renewable energy problem the same? Or just conceptually the same?

3 Smil

Aside: Smil is a curmudgeon and operates on a different set of analytic assumptions and measures than most of the rest of the energy community. This provides both a range of cool ideas, and a cause for concern. Take what he says accordingly.

He raises four important points:

1. Energy systems transformations have historically taken a very long time
2. This transition will be limited by the same dynamics
3. This transformation is likely to take even longer b/c it must replace a pre-built infrastructure
4. This transformation will face additional problems b/c it reverses the trend of the last 200 years:
 - RESE is less available (p109)
 - RESE is less dense (p5, 113)

We need to map the insights of Hughes and Troesken onto these conclusions. Is he right? Might there be a different technological style here that changes the dynamics of the systems transformation? If we are reversing the technological trend of the last 200 years, what would Hughes and Troesken say that implies for what we need to do to firm and regulatory structures?