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The United States regulatory compact and energy poverty

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ABSTRACT

Utility regulation in the United States (US) was founded partly on a consensus that raw marketplace economics ignored social justice, including universal service goals. The century-old 'regulatory compact' in most jurisdictions offers 'just and reasonable rates' in exchange for investment in public services. Justice has come to justify such low-income supports as discounted rates, arrearage forgiveness, limitations on service termination, and low/no cost energy efficiency. The consensus for regulation has now evolved to encompass carbon reduction, and has led to, amongst other things, the promotion of domestic forms of renewable energy known as 'distributed generation' (DG). However, such technologies potentially threaten the current regulatory balance that includes ameliorating energy poverty, because DG reduces utility sales but not utility fixed costs and so contributes to higher bills for low-income households that cannot afford such DG investments as rooftop solar, solar domestic hot water, and cogeneration.

The aim of this paper is to analyze how utility regulation might evolve to encompass modern energy developments, thus addressing both the goals of reducing carbon and amerliorating fuel poverty. It begins by reviewing the origin of US utility regulation and describes the regulatory compact that resulted. It then discusses possible balancing measures, including tax-based subsidies, system benefit charges (taxes) on DG, stricter application of just and reasonable regulatory principles, and low-income-specific approaches to DG.

1. Introduction[1]

Energy poverty has been widely addressed in this Journal[2] and elsewhere, as has climate change. This paper reviews policy options around adoption of clean Distributed Generation (DG) technologies, particularly rooftop solar power (photovoltaics a.k.a. PV), in the US electricity system and how they interact with regulatory protection of those in energy poverty. Its thesis is that the development of DG threatens these regulatory safeguards and that regulatory responses are therefore needed. It proposes measures for consideration, based on traditional regulatory principles, to reconcile the twin goals of addressing climate change and energy poverty.

While the paper is mostly based on specifics of US policy and technological deployment, the issues addressed are common in the developed world, where addressing climate change and energy poverty often appear to be in conflict with each other.

The paper begins with a description of the early financial necessities and political bargains that resulted in what we now think of as the US Regulatory Compact (Section 2.1). The century-old Regulatory Compact in most US jurisdictions offers "just and reasonable rates" in exchange for investor security, the promise of the opportunity to earn a limited but assured "reasonable" return on prudent investments for the public service. Justice, to varying degrees depending on the jurisdiction, has come to include goals of both environmental protection and economic justice. It then describes how policies under that Compact have evolved to become increasingly protective of those suffering from energy poverty (Section 2.2).

Against this backdrop, the paper describes DG technologies, including their environmental benefits (Section 3.1) and potential economic harm to those in energy poverty (Section 3.2). It points out the tensions between regulation and innovations such as DG with respect to the maintenance of equity (Section 3.3).

Finally, the paper proposes potential measures to be explored in quest of balances between investors and customers, between the

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[1] Expanded from presentations to the New Mexico State University Center for Public Utilities conferences "Current Issues 2014" (March 204) and "Current Issues 2015" (April 2015).

[2] *E.g.*, S. Bouzarivski et al., "A global perspective on domestic energy deprivation: Overcoming the energy poverty-fuel poverty binary," 10 Energy Research & Social Sciences 31–40 (November 2015); D. Hernández et al. "Benefit or burden Perceptions of energy efficiency efforts among low-income housing residents in New York City," 8 Energy Research & Social Sciences 52–59 (July 2015); L. Middlemiss et al., "Fuel poverty from the bottom up: Characterizing household energy vulnerability through the lived experience of the fuel poor," 6 Energy Research & Social Sciences 146–154 (March 2015).

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environment and those in energy poverty, and between regulation and innovation (Section 4).

2. Development of the regulatory compact

2.1. The early bargain

Most of the 1800s were characterized by penny post cards and the golden glow of gas lights. Much like in the developing world of today, the range was a smoky wood stove, refrigeration (if available at all) was by farmed ice, any nighttime reading was by a flame, and personal communications arrived with twice-daily visits of the postman. All of that changed in the last quarter of the 19th century.

Less than 150 years ago, two great network inventions began the transformation of power and communication. Bell patented his "harmonic telegraph" in 1876, and, over the next two years, Edison developed his incandescent electric light.[3] This paper is about electricity regulation, but the early regulatory history of the telephone and electricity industries is similar and thus telephone industry history illuminates regulatory developments of the time. Both reached bargains of protection of consumers (Just and Reasonable rates) for protection of investment (reasonable rate of return).

Commercial success was less than immediate. Electricity did not reach half of America until the mid-1920s and the telephone until after World War II.[4] Bell's Company, that became the largest corporation in the world, American Telephone & Telegraph Co. (AT&T),[5] was so starved for capital that it nearly sold out to Western Union in 1877 for $100,000. (Western Union refused the offer.)[6] It was not until the next century that the telephone's market extended beyond urban business and wealthy homeowners.[7] Suffering from the aftermath of the panic, depression, and deflation of 1873, The Bell Company could only recruit capital by licensing local entrepreneurs and leasing equipment to them. Telephone equipment manufacture was also licensed based on Bell's patents, but the original patents expired in 1894 and patent contests were constant. Only after the Company bought out Western Union itself did a new charter in 1880 allow it to raise the capital it needed by defining itself as a "public service," and consolidation of the Company with its licensees began.[8] At this point, the company needed to justify the monopoly it was hoping to develop.[9] By 1910, however, there were only 3.9 million Bell telephones, two-thirds of the total; both Bell and non-Bell phones slightly more than doubled by 1920, so there were still only 8.3 million Bell telephones.[10]

Electricity, in contrast, was generally limited to local monopolies. Edison invented the incandescent lamp in 1878, but it was his development of the Pearl Street power station and network in the Financial District of lower Manhattan in 1882 that was revolutionary. The original service area of one-third of a square mile limited electric light to the offices, shops and restaurants that could afford it. Load factor was recognized as an economic issue almost immediately, since electricity cannot generally be economically stored and must therefore be used the instant it is generated—as much generation across as many hours as possible is economically preferable in order to better amortize the large capital cost of the generator. Perhaps for this reason, capital for expansion was difficult to raise and, much like Bell's, Edison's enterprise survived due to franchise and equipment sales.[11] One of those franchisees, Samuel Insull at Commonwealth Edison in Chicago, had tackled the load factor issue by offering low rates to entice large industrial customers away from generating their own power, and seeking out customers with complementary times of demand (including by promoting domestic appliances), thus creating a diversity of demand across hours. In this way Insull controlled unit costs by increasing the efficiency of his generation plant (load factor).[12] Scale was important to this strategy and, even better, monopoly. But the logic of electricity monopoly led to a late-nineteenth century debate about public ownership, particularly where populist movements were responding to growing concentrations of economic power on Wall Street.[13]

So it was that dominant players in both the telephone and electricity industries at the turn of the last century turned to political strategies to support their financial goals. The social and economic value of these dazzling new network technologies was recognized. Universal service at affordable prices was desired. But investors were slow to provide the large amounts of capital needed for massive expansion, uncertain of demand and afraid of competition. So Theodore Vail for AT&T and Samuel Insull for Commonwealth Edison tapped into existing legal and political streams to support their monopolizations.

Vail announced his "One Policy, One System, Universal Service" campaign in 1907, offering a deal with consumers: state (not municipal) regulation in exchange for an end to "destructive competition." An advertising campaign began in 1908 and lasted for decades.[14] It is well summarized in AT&T's 1910 Annual Report[15]:

> It is believed that the telephone system should be universal, interdependent and intercommunicating, affording any subscriber of any exchange to communicate with any other subscriber of any other exchange. . . . It is believed that some sort of a connection with the telephone system should be within reach of all. . . . It is not believed that this can be accomplished by separately controlled or distinct systems nor that there can be competition . . . It is believed that all this can be accomplished to the reasonable satisfaction of the public . . . Under control and regulation as will afford the public much better service at

[3] G. D. Smith, The Anatomy of Business Strategy: Bell, Western Electric and the Origins of the American Telephone Industry (Baltimore: Johns Hopkins Univ. Press, 1985) at 15, 27 [55]; T.P. Hughes, Networks of Power: Electrification in Western Society, 1880–1930 (Baltimore: Johns Hopkins Univ. Press, 1983) at 30–33 [26].

[4] A.C. Madrigal, "Most people didn't have a/c until 1973 and other strange tech timelines," The Atlantic (July 27, 2012), http://www.theatlantic.com/technology/archive/2012/07/most-people-didnt-have-a-c-until-1973-and-other-strange-tech-timelines/260427/ [35].

[5] S. Kleinfeld, The Biggest Company on Earth: A Profile of AT&T (New York: Holt, Rinehart and Winston, 1981) at 3 [27].

[6] G.D. Smith, The Anatomy of Business Strategy: Bell, Western Electric and the Origins of the American Telephone Industry (Baltimore: Johns Hopkins Univ. Press, 1985) at 27, 38 [55].

[7] G.D. Smith, The Anatomy of Business Strategy: Bell, Western Electric and the Origins of the American Telephone Industry (Baltimore: Johns Hopkins Univ. Press, 1985) at 25 [55].

[8] G. D. Smith, The Anatomy of Business Strategy: Bell, Western Electric and the Origins of the American Telephone Industry (Baltimore: Johns Hopkins Univ. Press, 1985) *generally*, *see esp.* at 5–9, 99, 104–107, 154–159 [55].

[9] *See* H. N. Casson, The History of the Telephone (Chicago: A. C. McClurg & Co., 1910) at 189–190 [10].

[10] R.W. Garnett, The Telephone: The Evolution of the Bell System's Horizontal Structure, 1876–1909 (Baltimore: Johns Hopkins Univ. Press, 1985) at 162–163.

[11] T.P. Hughes, Networks of Power: Electrification in Western Society, 1880-1930 (Baltimore: Johns Hopkins Univ. Press, 1983) at 21, 30–33, 39–42, 45–46 [26].

[12] T.P. Hughes, Networks of Power: Electrification in Western Society, 1880–1930 (Baltimore: Johns Hopkins Univ. Press, 1983) at 217–226 [26].

[13] G. Palast, J. Oppenheim, & T. MacGregor, Democracy And Regulation: How the Public Can Govern Essential Services (London: Pluto Press, 2003) at 109–111 [48].

[14] R.W. Garnett, The Telephone: The Evolution of the Bell System's Horizontal Structure, 1876–1909 (Baltimore: Johns Hopkins Univ. Press, 1985) at 130–131; T. Wu, The Master Switch: The Rise and Fall of Information Empires (New York: Vintage, 2011) at 51 [63]; A.B. Paine, In One Man's Life, Being Chapters from the Personal & Business Career of Theodore N. Vail (New York: Harper & Brothers, 1921) at 238 [46].

[15] A. Von Auw, Heritage & Destiny: Reflections on the Bell System Transition (New York: Praeger, 1983) at 5 [61]. *See* H. N. Casson, The History of the Telephone (Chicago: A.C. McClurg & Co., 1910) at 279 [10].