

Fiat Lux, or Who Invited Thomas Edison to the Tea Party?: Shedding historical light on the light bulb controversy dividing America



The planet is in the spotlight somewhat literally these days. Arguably interchangeable locutions of global warming, climate change, or “solar variations” have made headlines in the past decades—yes, those same decades that brought us *An Inconvenient Truth* and extreme storms. The underlying science has effectively bisected Washington, with the left and right offering partisan legislation aimed at the decidedly nonpartisan climate. Yet despite circular debates on Capitol Hill, options are being proffered to Americans for their fight to protect the global environment.

Efforts from Capitol Hill, you say? Given American’s conflicted relationship with the regulatory powers of Washington, this fight is unsurprisingly

politicized. Where the battlegrounds lie, however, is at once surprising and historically awkward.



If only it were so simple. Courtesy of the Thomas Edison Papers, Rutgers University (undated). Thomas A. Edison to Murray (TAED X121E).

Recently, media channels have brought to our attention the efforts underway to provide Americans with alternatives—federally mandated alternatives, no less—to the good ol’ familiar light bulb. Scientists and engineers, tasked with developing eco-friendly light sources that mimic Thomas A. Edison’s (1847-1931) incandescent bulb aesthetically while improving on it technologically have unveiled an LED version of the original with all the federal subsidies and fanfare that Washington can offer. This past summer, Philips, the Netherlands-based producer of consumer electronics, collected \$10 million in prize money for developing a highly efficient alternative to the standard sixty-watt incandescent. The award, familiarly known as the L Prize, was sponsored by the U.S. Department of Energy in the wake of George W. Bush-era legislation that requires light bulb makers to improve efficiency of bulbs by twenty-five percent. The L Prize, then, was instituted as a government-sponsored nudge to spur lighting manufacturers to develop higher efficiency alternatives to Edison-era products disparaged as “dated” on the prize website. And in a dangerous flirtation with the “nanny state,” the Website promises the prize will drive market adoption.

Apparently, however, Edison’s familiar glass-bulb-meets-metal-filament is near and dear to many American hearts. Despite those years of thoughtlessly tossing cardboard boxes of replacements into our shopping carts, we’ve become inextricably connected to these devices. *Edison*, we shout, championing for our American-scientist-hero who bore innovation. We are sure that there is some mistake, that Edison could not have led us astray; his light bulb seems irreplaceable and must be compatible with modern-day America.

Of course, the issue isn’t *really* the light bulb. At best it’s an issue of constitutionality—specifically the question of whether such federal intervention in consumer choice satisfies the framework laid out by the Founding Fathers: are individual liberties protected? And furthermore, is it the job of the federal government to protect them in this instance? At worst, the issue evokes shades of impassioned debates on the right to choose. When it comes down to it, the issue is an oft-revisited one—indeed, since the time of the drafting of the nation’s Constitution—and one that generally straddles party lines: the continual struggle between public and private, federal and local, the individual and the collective. It is an issue of authority; namely, who has enough of it to be qualified to decide what’s best for the global environment. It’s a question of appropriating federal dollars. It’s a question of equal access. It’s a question of American-brand free-market capitalism, which argues that surely many light bulb manufacturers should share the shelves

without intrusion from Washington. These are some of the same questions that the founders struggled with in drafting the Constitution, and they are the same questions that crop up time and time again as Americans attempt to define the role of governance.

The case of the light bulb offers a unique entryway to considering these fundamental issues. To start, we should revisit Edison's own efforts to popularize his invention, examining the factors that motivated our American hero in developing his ubiquitous light bulb. As it happens, Edison's narrative offers us some hints as to how to navigate the waters of technological change and social necessity.

Edison's story is not much different from that of the little yellow LED lamp. Edison, too, struggled to enter into a market dominated by the good ol' familiar gaslight industry. In 1878, armed with a prototype of a working incandescent bulb (well, the idea of one, but in typical Edison fashion he saw no need to bother media outlets with that detail), Edison fervently began studying the gas lighting industry in the spirit of knowing thine enemy. He read. He walked the streets, meticulously noting details—hundreds upon hundreds of notebook pages—of consumer usage and metering technology. He compiled tables of economic comparisons that incontrovertibly presented electric light as superior to the gaslight in use at the time; this data was later used as “judicious advertising” in company bulletins. He collected data on injuries and fatalities resulting from gas leaks that were eventually published as a near-endless string of disturbing vignettes explaining the cause of death of hapless hotel-goers. Lest the reader assume that the sixty-five listed vignettes constituted the full extent of the dangers lurking around every hotel corner, the reader was reminded that “The full statistics have never been written on this subject, but almost every hotel proprietor has had his own experience.” Similar anecdotes about restaurant fires and leaks followed, carrying with them the implied safety of the new electric lights. He examined existing central distribution systems and considered their potential modifications for dispensation of electric light. And then he sought to improve on them, embarking on a mission not unlike those aiming for the L Prize: to develop “high quality, high-efficiency solid state lighting products to replace the common [gaslamp] bulb.”

Edison, as is well known, was not the only innovator working to perfect the incandescent bulb in the 1870s. Some argue that he wasn't even the first to produce a working model. (The satirical newspaper *The Onion* ran an article titled [“Thomas Edison Invents Marketing Other People's Ideas,”](#) which indicates the widespread perception of the tenuous nature of Edison's claim to innovation.) These initial years of invention and trial, of late nights in Menlo Park, are not the crux of Edison's biography, however, and can be effectively dismissed with a recall of Edison's own words in recounting his biography—“the remainder of the story belongs to the annals of commerce.” The invention, then, is not the story; the story is in the practical implementation and widespread distribution of the invention. Edison and his bulb cannot be

extricated from the market, nor from the civic structure that houses it.

To Edison, the light bulb was “only the opening number” of his program, and with its invention he had “merely stepped over the threshold of a complete system.” The system, indeed, was always the carrot for Edison; from his undoubtedly premature, arguably deceptive, and patently competitive announcement of his invention of the incandescent bulb—not to mention his plans for lighting the entire lower part of New York—to the *New York Sun* in late 1878, Edison was focused on the economy and practicability of a lighting empire.

One thing Edison needed was money. Though financing initial research was relatively easy—Edison was well connected and professionally respected—his investors balked at the sums required for, oh, replacing the existing structural system of gaslights (that worked well enough, thank you very much) for an elaborate installation of a system that many felt had yet to be properly tested. A lighting system that stretched wires “up town as far as the Cooper Institute, down to the Battery, and across to both rivers”—Edison’s boastful claim—seemed awfully ambitious for a system never before used on such a scale. His Wall Street cronies politely made their apologies (though Edison quipped that he thought they were only “Wall Street sorry”) so Edison turned to the government.

It is important to remember, however, that Edison had a much different government to turn to than the one we are familiar with today. In his attempts to raise funds and obtain civic support, Edison looked not toward Washington, but instead to local government. Well, at first he did. In the late nineteenth century, federal government was nearly non-existent in the private sector, with the possible exception of transportation. In the laissez-faire climate of the 1870s, Edison pursued a local strategy, looking first to New York City’s business community for allies who could help woo the city’s government. Politics change, however, and as the reigning laissez-faire ideology was gradually replaced by Progressivism, federal regulation of economic matters began to be seen as a necessary protection to ensure competition and free enterprise. Alongside changing political fashions, Edison’s strategy also evolved as he pursued his dream of an electrified city.

Edison was aided in his initial endeavors by his friend and business advisor, Grosvenor Lowrey. With law offices in the same building as financier J. P. Morgan’s investment firm, Lowrey was well connected financially and savvy politically. Edison gave his friend free rein to obtain both funding and the necessary agreements from City Hall, promising to “agree to nothing, promise nothing and say nothing to any person leaving the whole matter to you. All I want at present is to be provided with funds to push the light rapidly.” In October of 1878, Lowrey formally established the Edison Electric Light Company, creating shares for potential financiers to invest in. Now able to capitalize on his financial connections, Lowrey could demonstrate his acumen for politics by organizing a lobbying extravaganza for the inventor.



Are global concerns spelling the death of the incandescent bulb? Courtesy of digitalart

Lowrey and Edison knew they needed to tread carefully in wooing city officials. At the time, local politics were effectively run by Tammany Hall, a New York political organization known for its corruption. Gas lighting held great sway within New York politics—the industry was deeply embedded in a web of monopolistic suppliers, eager consumers, and established regulatory agencies. Area gas companies diverted profits to line the pockets of politicians in the Tammany political machine. Upon first applying for an operating license, Edison was turned down by the mayor, with gas industry and lamplighter interests often cited as reasons for maintaining the status quo. Lowrey was well aware that a successful dissemination of Edison's electric light rested entirely on his ability to convince government officials to switch allegiances. Though a difficult charge, Lowrey was up to the challenge.

In December of 1879, Lowrey invited the mayor and aldermen—as well as a handful of potential investors—to visit the Menlo Park laboratory in the hopes of securing a franchise that would allow the Edison Illuminating Company to lay the underground distribution system for a commercial lighting system (Edison had formed a second company to distribute his system of illumination). A special train carried the officials into New Jersey, where guests could see an exhibition of lights. First, individual groupings of lights were illuminated along the snowy streets. Then Edison promptly shut them off in unison with the turn of a handle, only to bring them back ablaze with another touch to the handle. Nothing like this had ever before been seen, and no doubt the demonstration left many considering the practical, commercial, and promotional value of introducing such technology citywide. Indeed, this demonstration netted the Edison Electric Light Company \$57,568 in new investments, with which the young entrepreneur could help underwrite the next phase of his commercialization process.

Edison followed this pageant with a somewhat numbing presentation of his abundance of other accomplishments, parading new inventions and touting their uses. With a pre-arranged mention of thirst from one of Edison's own, the entire group was led to the laboratory floor—likely to the chagrin of the Edison-weary listeners. In the lab, however, was a spread fit for a king—or at least fit for the men who, it was hoped, would support Edison's ambitious plans. Lowrey had spared no expense, filling tables with a lavish spread of turkey, duck, chicken salad, and ham from the famous Delmonico's. Fine wines and champagnes, too, flowed freely, which no doubt helped lubricate the political transaction. By the end of the evening, Edison had his contract.

Even with contract in hand, Edison didn't consider his empire to be adequately

secure. Beginning immediately, he filed about seventy applications for patents in 1880 alone; many of these patents eventually played a central role in Edison's subsequent string of patent suits against rival electric companies. Along with arguing the merits of electric lighting versus gas, Edison also found it necessary to defend his system of direct current versus his main rival, George Westinghouse, who was a proponent of alternating current. Edison's vehement support for direct current was threefold: first, he remained protective of his patent royalties; second, DC was practicable in the early years of electrifying America, and Edison thereby built his model of electrification around its use; and finally, for all his merits, Edison was not a mathematician—and AC required a mathematical savvy with which Edison was not equipped. Crucially, Edison's decision to rely on DC (which, it should be noted, was a decision he later rued) required a prodigious infrastructure to be effected—namely, the limitations of distribution of DC necessitated the construction of generating plants at close intervals throughout the city. Though AC would ultimately prove victorious in the pursuit of economic advantage, Edison led the path to illuminating America with his DC in the early 1890s. The manner in which he ultimately succeeded is yet another example of how Edison cooperated with government—this time the state government—for his own commercial gain.

As the “battle of the currents” unfolded, it became increasingly clear that alternating current remained economically superior because of its physical properties. Supporters of direct current vociferously argued the inherent risk attributed to the higher voltage alternating current, citing examples of accidental death that did occur on occasion. Advocates of alternating current continued to support their product of choice as overwhelmingly safe, despite a few examples of misfortune. In 1886, however, this seemingly dead-end argument branched off, allowing Edison an opportunity to attack his competitors from a different angle.

At this time, the State of New York formed a commission to investigate and report on more humane methods of carrying out the death sentence at the state prison. The commission suggested electricity as a possible alternative, thus motivating Edison to become personally involved. Though promising to publicly oppose capital punishment, Edison, an opportunistic businessman extraordinaire, suggested alternating current as the ideal form of electricity to be used in electrocutions. The chairman of the committee was greatly influenced by the acclaimed Edison's endorsement, and the commission ultimately recommended an alternating current machine to replace the existing method of execution: hanging. The ensuing legislative act did not specify the type of current desired. Responsibility for determining the technical details of the law fell to the Medico-Legal Society of New York; many of the experimental procedures carried out through this charge were undertaken at Edison's own laboratory, a fact not ignored by Westinghouse in his later rebuttals. Following these experiments, the *New York Times* reported “alternating current to be the most deadly force known to science.”

Ultimately, the State of New York commissioned three generators to be installed and put in operation in the state prison in January 1889. At the instigation of the Edison Electric Light Company, considerable financial assistance for the purchase of three Westinghouse generators came from the Thomson-Houston Electric Company, a competitor of Westinghouse. With the delivery and installation of the first generator, the State of New York ordered a prisoner to be executed. Before electrocution could commence, the state had to defend death by electricity, as the prisoner's attorneys argued that electrocution was unconstitutional as a cruel and unusual punishment. One of the people who appeared to give testimony on behalf of the state was Thomas Edison. If he could not provide empirical evidence that alternating current would be certain to bring instantaneous and painless death, he opined forcefully that one thousand volts of alternating current would provide the desired result. Although agreement on the predicted efficacy of electrocution was not unanimous, in August of 1890, the prisoner was killed. His death was widely reported to be sudden and painless. Though some complications were ultimately brought to bear on the efficacy and suitability of DC, Edison maintained his opinion—thus publicly supporting the state—that alternating current was ideal for quick and painless execution.

With the streets of New York lit, and the death machine humming within the walls of the penitentiary, Edison set his sights on yet bigger targets. In 1892, the Edison General Electric Company merged with another smaller rival electric company to form General Electric (GE). Comfortably established and well on its way to a flirtation with monopoly, GE quickly adapted to thrive within a new, dynamically changing governmental structure. The fledgling corporation began looking toward the federal government as it inched into the realm of the regulation of commerce in the wake of the 1890 Sherman Antitrust Act and the subsequent emergence of federal government intervention in the private sector. It would be Washington, it seemed, that could make or break Edison's empire of light.

The electrical industry of the late nineteenth century was not tranquil; like most industries of the time, it was involved in buy-outs, mergers, patent suits, price rigging, and corruption in the attempt to eliminate the competition. GE was no exception—soon after its establishment the company became known as the "Electric Trust," a moniker derived from the anticompetitive activities of the young company. Still, though, the specter of the Sherman Antitrust Act loomed large, even if not yet actively enforced. Leaders at GE recognized that ultimate success rested on the company's ability to prosper between the lines of new federal regulatory powers.

This was achieved through some political savvy on the part of GE management. Though between 1901 and 1906 GE bought out most of the independent electrical manufacturers, very few were privy to the man-behind-the-curtain; these smaller competitors continued operations under their own names and thus presented the image of free-market competition to the public. Most employees of GE and the newly established National Electric Lamp Company—the group that oversaw the

subsidiary acquisitions—were similarly in the dark (figuratively, of course), despite the whopping near-seventy-percent national industry share enjoyed by the monopoly. GE made certain to engage in anticompetitive action only when conducted without fear of federal regulatory reprimand.

With the overwhelming market share, GE saw little need to tinker with a system that effectively balanced their books. In particular, the incandescent light bulb—so inextricably linked to a growing network of consumers and generating stations and firmly established as the status quo—was not a high-priority candidate for modification. According to most Americans, Edison's light bulb was here to stay (or so it seemed, a century and a score ago) in a world that had been forever changed by a thin filament of carbon.

Or had it?

Certainly, Edison and his inventions have affected American life in innumerable ways. Our national hero's innovation, vigorous work ethic, and masterful marketing skills can—and should—certainly be celebrated. But as we revisit Edison's impact in the 9.7-watt light of modern replacements to the traditional bulb, it is important to remember the market in which Edison sought to introduce his new-and-improved, higher-efficiency, lower-cost product. Edison was trying to update an existing system, to work within the normative structure of his time, not to invent a new wheel. "The light," he argued, "is designed to serve precisely the same purposes in domestic use as gaslights;" Edison assured the consumer that the new bulbs would be comparable practically, though "it may be safely affirmed that the limit of economy, simplicity, and practicability has been reached." Funny, it can sometimes be hard to shake the eerie feeling that marketers for the new Philips bulb are conjuring up some of Edison's own language.

Though the new bulb—squarish, weirdly yellow, and fully compatible with the existing lighting infrastructure—is taking the brunt of the hostility, the underlying target is the threat of government encroaching on those vaguely defined yet constitutionally protected civil liberties. Right-wing Republicans are making clear (most noticeably in the months leading up to the announcement of the 2012 Republican candidate) that having a government that tells its citizens what kind of *light bulbs, of all things*, to buy is wholly unacceptable. It's a Big Brother intrusion, an example of the nanny state, an assault on personal freedom. Yet the central tenet of these claims is that the government is banning the beloved bulb that one Republican representative describes as having "been turning back the night ever since Thomas Edison ended the era of a world lit only by fire in 1879." Another Tea Party activist considers the Great Light Bulb Ban to be "the world's greatest marketing scheme: you get the government to ban the competition."

The funny thing is, it's not. The 2007 legislation only demands that products meet specifications intended to address environmental needs; starting in January 2012, 100-watt light bulbs are to be more than 25 percent efficient,

and the traditional incandescent emits most of the energy it consumes as heat, not light. Edison might have turned back the night, but he didn't do so with a finger on the pulse of melting ice caps. The incandescent bulb isn't banned outright—this isn't a demonstration of Big Government restocking shelves at Mom & Pop stores across the country—it's just being held to standards set under normal regulatory operations of the modern federal government. Especially as these regulations were set under a recent Republican administration, the resulting vehemence of partisanship is perhaps misplaced.

Self-proclaimed mouthpiece of the Radical Right (as well as author of the Light Bulb Freedom of Choice Act aimed at repealing the 2007 legislation), U.S. Representative Michele Bachmann extolled Edison's heroism at a campaign stop in New Hampshire this past March: "I think Thomas Edison did a pretty patriotic thing for this country by inventing the light bulb. And I think darn well, you New Hampshirites, if you want to buy Thomas Edison's wonderful invention, you should be able to!" Perhaps, but it is important to recognize how government intrusion in the nineteenth century helped march that wonderful invention onto New Hampshire's shelves. Edison developed the light bulb with full and open recognition of the practical parameters imposed by American government, infrastructure, economics, and public opinion. He capitalized on the governmental institutions of his time, fostering relationships with New York City and state governments to make his product commercially viable, and ultimately leading his business successfully into the modern era of federal regulatory pressures. Edison sought a franchise deal that would allow the Edison Illuminating Company exclusive rights for citywide distribution. He came armed with careful arguments, including personally collected case study data on the feasibility of a potential lighting market in the Wall Street District and economic calculations of materials and operating costs. Without the cooperation of the city government (secured after heavy-handed lobbying, lavish displays of light, and decadent, catered meals presented to government officials), Edison could not have dreamed of introducing his product to the market. Without a partnership with the State of New York at the death penalty hearings, Edison might well have failed to vanquish his opponent in Westinghouse. And without navigating the terms of burgeoning federal involvement, GE would have failed to maintain a lighting empire within the American economy.

Yes, that's right—Edison mobilized the government to put his product on the proverbial shelves in a manner that uncomfortably parallels today's federally sponsored LED bulbs. Even after the crowded commercial blocks of lower Manhattan were illuminated by his light, Edison capitalized on public opinion and state and federal legislative powers to increase the power of his hold on the market. Edison was acutely aware of the social component to the success of his innovation, and it can be argued that honoring his legacy rightly includes a consideration of the needs and desires of the receiving culture and its domicile. Reconsidering the light bulb, then, is not rebuking a national hero, but rather embracing his tradition.

Further Reading:

Learn more about the U.S. Department of Energy's L Prize at [the award website](#). For Edison Lighting Company bulletins and assorted correspondence, explore the collections in the [Thomas Edison Papers](#) collection at Rutgers University. For a history of the development of electric light, see Jill Jonnes, *Empires of Light: Tesla, Westinghouse, and the Race to Electrify the World* (New York, 2003). For further information on Edison's relationship with New York City government, see Thomas P. Hughes, "Edison and Electric Light," in Donald MacKenzie and Judy Wajcman (eds.), *The Social Shaping of Technology* (Buckingham, England, 1999). For discussion on the New York state controversy over execution by electricity, see Thomas P. Hughes, "Harold P. Brown and the Executioner's Current: An Incident in the AC-DC Controversy," *Business History Review* 32:2 (July 1958). For commentary on the recent partisan controversy over the purported light bulb ban, see Andrew Rice's recent article in the [New York Times Magazine](#).

This article originally appeared in issue 12.2 (January, 2012).

Emily Redman is a PhD candidate in the history of science at the University of California at Berkeley who, when not distracted by enviro-political issues of yore, studies the history of mathematics education reform in the twentieth-century United States.