To Subsidize or Not to Subsidize?

Renewables often receive the criticism that they are not profitable without government subsidies. This is often offered by some as the primary basis for opposing the sector as a whole. This criticism, however, is lobbed without a full appreciation for "government" involvement in the energy sector – conventional and nonconventional. The history of energy generation for humans has been a history of market disruption. It has always been a competition between old and new technologies, between entrenched and outsider interests. Innovation is the constant threat to the status quo.

Previously in our energy history, it was a conflict between kerosene producers and producers of the more refined petroleum products like gasoline and diesel. Today, it is a conflict between these same fossil fuel producers and the makers of clean, renewable technologies. The fear is real as there is a certain threat that could potentially render fossil fuels obsolete. As our methods of energy use have become more complex, so too have the political and economic methods of ensuring widespread and reliable access to affordable energy. This social mission often takes the form of subsidies, which provide financial assistance to new and uncertain industries to give them an extra edge when competing against well-established industries. However, as we have seen play out, subsidies can be a point of contention for those who argue that market economics and fair play dictate that solar should be able to compete on its "own" against incumbent industries. What this argument fails to account for is that the fossil fuel industry, which has dominated global energy use for the past century, has received and continues to receive far more financial assistance – subsidies - than renewables or energy efficiency, even in the face of its costly public health and environmental impacts.

The story of fossil fuels and market disruption began in the mid-1800's, when it was discovered that oil can be extracted from shale and that kerosene can be produced from this. At the time, kerosene was relatively cheaper than existing fuel sources. Whale oil was always uncertain in supply, and gas, despite being cheaper than whale oil, was still 30% more expensive than kerosene. So kerosene became the fuel of choice, at least until the early 20th century. As electricity and energy use changed, kerosene was forced out of the market in favor of light fuel oils like gasoline. Between 1899 and 1914, kerosene sales as a percentage of all refined petroleum products declined from 58% to 25%, while fuel oil rose from 15% to 48%.[1] This would be a momentous transition, and one that would last for the rest of the 20th century.

Today, the same fossil fuels that once displaced kerosene are now at risk of being displaced themselves. What keeps them entrenched is a disproportionate amount of government financial assistance, coupled with the externalization of significant environmental costs of using fossil fuels. According to the International Energy Administration, fossil-fuel consumption subsidies worldwide amounted to $548 billion in 2013, with subsidies to oil products representing over half of the total. This is over four times the value of subsidies to renewable energy and more than four times the amount invested globally in improving energy efficiency.[2] And this is only a conservative estimate: Oil Change International estimates that these subsidies may reach as high as $775 billion to $1 trillion annually.[3] The International Monetary Fund recently estimated that global energy subsidies, including the social and environmental costs of

[1] Armentano, D.T. "The Petroleum Industry: A Historical Study in Power." *Cato Journal* 1.1 (1981): 53-85. Print.
[2] "Energy Subsidies." *International Energy Agency*. Web. 8 Jan. 2016. <http://www.worldenergyoutlook.org/resources/energysubsidies/>.
[3] "Fossil Fuel Subsidies: Overview." *Oil Change International*. Web. 8 Jan. 2016. <http://priceofoil.org/fossil-fuel-subsidies/>.

fossil fuels, are costing the world's governments $5 trillion annually.[4] Ideologically, it is assumed that subsidies go towards supporting innovative industries that simply need help competing against entrenched interests, but the reality of subsidies is much more complex and is only further complicated when the true benefits to and costs of fossil fuels are accounted for.

The fossil fuel industry receives substantial financial assistance every year, but these numbers ignore the fact that we live in society made for fossil fuels. Even if renewables can become cost-competitive, they must still work within a regulated utility system, a power grid and a highway system built for fossil fuels. Furthermore, these infrastructure projects were created with public sector support, from tax credits to low-cost loans as well as outright grants from the federal government.[5] Utilities largely argue that any changes or modernization of this infrastructure should be placed solely on the backs of those who develop and use renewables.

One additional fact often ignored by opponents of renewables is the true costs of fossil fuels. The public health and environmental costs of fossil fuels are shouldered by society and the same governments that fund the industry, and include: health problems caused by air pollution from burning coal and oil; damage to land and water from coal mining; and environmental degradation caused by climate change and acid rain. These costs reach as high as $866.5 billion annually, or 6% of our GDP.[6]

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[4] Cusick, Daniel. "Fossil Fuel Subsidies Cost $5 Trillion Annually and Worsen Pollution." Scientific American, 19 May 2015. Web. 8 Jan. 2016. <http://www.scientificamerican.com/article/fossil-fuel-subsidies-cost-5-trillion-annually-and-worsen-pollution/>.

[5] Gordon, Kate. "Why Renewable Energy Still Needs Subsidies." The Wall Street Journal, 14 Sept. 2015. Web. 8 Jan. 2016. <http://blogs.wsj.com/experts/2015/09/14/why-renewable-energy-still-needs-subsidies/>.

[6] "The Hidden Cost of Fossil Fuels." *Union of Concerned Scientists*. Web. 8 Jan. 2016. <http://www.ucsusa.org/clean_energy/our-energy-choices/coal-and-other-fossil-fuels/the-hidden-cost-of-fossil.html#.Vo8D9sArJaV>; Gerdes, Justin. "How Much Do Health Impacts From Fossil Fuel Electricity Cost The U.S. Economy?" Forbes Magazine, 8 Apr. 2013. Web. 8 Jan. 2016. <http://www.forbes.com/sites/justingerdes/2013/04/08/how-much-do-health-impacts-from-fossil-fuel-electricity-cost-the-u-s-economy/>.

I am an All-of-the-Above proponent of ensuring energy security. So let's truly examine the costs of all energy sources. The differences in the ignored costs of the fossil fuel industry versus the plummeting costs of renewables are striking. A recent paper by the U.S Environmental Protection Agency found that, if these externalized costs were accounted for, it would add an average of 14 to 35 cents per kilowatt-hour to the retail cost of electricity.[7] This realization comes at a time when solar prices have been as low as 3.87 cents per kilowatt-hour and wind prices as low as 2.5 cents per kilowatt-hour.[8] When it is closely examined and the historical, social and environmental costs of fossil fuels are accounted for, the argument against subsidies for renewables becomes untenable and highly contradictory. For an even playing field, we would necessarily discontinue subsidizing one of the wealthiest industries in human history.

Utilities have been sounding the alarm on subsidies for renewables since their inception, and one cannot entirely blame them. Distributed and community generation fundamentally threatens their business model of centralized generation. But instead of fearing this change, utilities should look to embrace it and adapt - quickly. There are a number of ways to exploit this growing industry, from owning and controlling solar PV inverters as a distribution grid asset to offering community solar programs for customers who live in apartments or homes that are not well-suited for solar.[9] While it can be hard to cut through misinformation and statistics that claim renewables threaten the average consumer's pocketbook, when the numbers are more

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[7] Gerdes 2013.

[8] Wesoff, Eric. "Price of US Wind Power at 'All-Time Low' of 2.5 Cents per Kilowatt-Hour." *Greentech Media*. 18 Aug. 2014. Web. 8 Jan. 2016. <http://www.greentechmedia.com/articles/read/Price-of-US-Wind-Power-at-All-Time-Low-of-2.5-Cents-Per-Kilowatt-Hour>; Rogers, John. "And the Cheapest Electricity in the U.S. Is… Solar?" *Union of Concerned Scientists*. 13 July 2015. Web. 8 Jan. 2016. <http://blog.ucsusa.org/john-rogers/cheapest-electricity-in-the-us-is-solar-power-799>.

[9] John, Jeff. "Survey: Utilities See Threat, Opportunity in Distributed Generation." *Greentech Media*. 13 Aug. 2014. Web. 8 Jan. 2016. <http://www.greentechmedia.com/articles/read/Utilities-See-Threat-Opportunity-in-Distributed-Generation>.

closely examined, it becomes clear that subsidies are an essential part of ensuring this new industry has a chance to become the affordable power source it has the potential to be. If fossil fuels receive subsidies, then its only fair that renewables receive them, too.