Politics and Energy

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INTRODUCTION

We are Randy Simmons and Ken Sim. Randy is a university professor of political economy and Ken provides environmental professionals across the world with rugged handheld units that improve their ability to measure and monitor environmental conditions. We have both worked on environmental policy issues for several years. This collection of essays details our ideas about how non-professionals might start to think systematically about energy issues.
POLITICS AND ENERGY

Nearly three-quarters of the USD 1.8 trillion of global energy investment is driven either by direct investing by state-owned enterprises or private-led investments incentivised by policies. In terms of direct investments, we see a growing role by state actors across all sectors in the past five years. Governments are also increasingly shaping private investment decisions through policies, regulations and standards, particularly in capital intensive sectors, such as renewables and energy efficiency.¹

The Energy Policy Act of 2005 required that all gasoline sold in the United States contain a minimum percentage of renewable fuel. One result was the Renewable Fuel Standard Program (RFS) was created, which required blending renewable fuels with motor vehicle fuel. The Energy Independence and Security Act of 2007 expanded the size of the RFS program by increasing the initial goal of four billion gallons in 2006 to 36 billion gallons of renewable fuel by 2020.²

Ethanol from corn became the primary renewable fuel source for meeting RFS goals. In the mid 2000s, ethanol from corn or seemed so simple and so...green. Nearly fifteen years later, it appears that corn-based ethanol is not simple or green. Presidents Bush and Obama claimed corn ethanol would reduce greenhouse gases and reduce dependence on foreign oil. President Trump has doubled-down on ethanol subsidies.³ US dependence on foreign oil has been greatly reduced, not because of corn ethanol, but because of the fracking revolution. And, it turns out that although growing corn for ethanol may reduce greenhouse gases, it has some negative environmental effects.⁴ A National Science Foundation (NSF) study of the economics of ethanol production found that biofuel corn costs exceeded benefits. The NSF program director concluded that, “using corn as a fuel source seems to be an easy path to renewable energy. However, this research shows that the environmental costs are much greater, and the benefits fewer, than using corn for food.”⁵

Higher ethanol blends may have little effect on overall carbon emissions. They clearly reduce fuel efficiency and harm some engines (which is why we only burn non-ethanol fuel in our own lawnmowers, high pressure sprayers, and string trimmers). As one analyst put it after reporting on how excess corn production harms wild bee populations:

So, to recap: America’s biofuel mandates don’t lower emissions, they raise global food prices and starve the world’s poor, they cost drivers billions at the pump every year, and they decimate wild bee populations.

It’s rare that a policy comes along that offers so little to so many distinct groups of shareholders. In that respect, perhaps there is something impressive about the Renewable Fuel Standard: It’s found that elusive policy sour spot.

Yale economist C. Ford Runge, concluded, “Growing corn to run our cars was a bad idea 10 years ago, increasing our reliance on corn ethanol in the coming decades is doubling down on a poor bet.”

Every policy has unintended and unanticipated consequences. Turning corn into motor vehicle fuel is no exception. Because of RFS incentives, farmers rushed to plant every available acre, many of them former conservation lands, and added a lot of fertilizer to runoff, possibly increasing the size of the dead zone in the Gulf of Mexico. A seed merchant told us the RFS was making him rich because he was selling a lot more corn seed, but he was amazed at the marginal lands being put into corn--lands where growing corn made no economic sense without the RFS incentives.

Not only did new, marginal lands get put to work growing corn rather than

6 There is actually little consensus on the effects of ethanol burning on carbon emissions. See, for example this study for that claims substantial emissions benefits: https://www.usda.gov/oce/reports/energy/2015EnergyBalanceCornEthanol.pdf.
growing wildlife habitat, RFS diverted corn from the food market into the ethanol market. Food prices increased, usually with disproportionate impacts on the relatively poor. The Sierra Club agrees with this assessment and has asked its members to petition Congress and the “EPA to stop increasing the use of corn ethanol.”

In addition to the RFS program, the federal government has a long list of incentives, requirements, standards, subsidies, tariffs, and rules that attempt to steer how energy of all types is developed, produced, and used. These programs are attempts to steer the a large portion of the economy, as if the economy were an automobile that can and ought to be steered. Utah’s Republican Senator Orrin Hatch, for example, sponsored legislation that provided loans and and other subsidies to a geothermal company because he believed that geothermal energy ought to be developed with the help of the federal government (and, possibly, because they put his name on the plant).

Governments are involved all across the economy, not just in energy markets. The general term for such involvement is “industrial policy.” The French call is dirigisme. Such policies promise economic growth and international competitiveness, but also typically entail a series of social goals that have little to do with promoting economic growth. Simply put, governments work with business to identify opportunities and then attempt to guide the economy towards these opportunities through legal and financial means. One of the aims of “dirigiste policies of strategic planning by enlightened technocrats,” as The Economist described industrial policy, has been a cleaner environment with a cleaner or more carbon-neutral economy.

Bearing in mind the basics of industrial policy -- the use of subsidies and tax systems, regulations and mandates, to create a new economic structure with heightened innovation and job growth -- consider the following excerpts from President Obama’s State of the Union addresses:

“Listen, seven years ago, we made the single biggest investment in clean energy in our history. … Now we’ve got to accelerate the transition away from old, dirtier energy sources. Rather than subsidize the past, we should invest in the future -- especially in communities that rely on fossil fuels. We do them no favor when we

don’t show them where the trends are going.” - 2016 State of the Union

“Taken together, our energy policy is creating jobs and leading to a cleaner, safer planet.” - 2014 State of the Union

“These initiatives in manufacturing, energy, infrastructure, housing -- all these things will help entrepreneurs and small business owners expand and create new jobs.” - 2013 State of the Union

“We can also spur energy innovation with new incentives. The differences in this chamber may be too deep right now to pass a comprehensive plan to fight climate change. But there’s no reason why Congress shouldn’t at least set a clean energy standard that creates a market for innovation. … Building this new energy future should be just one part of a broader agenda to repair America’s infrastructure.” - 2012 State of the Union

As a matter of fact, every State of the Union address since 2005, except for President Trump’s, has referred to investment in green infrastructure, funding for green research and developing green jobs. Along with health and security, President Obama’s industrial policy programs emphasized developing green/clean energy.

In the 1980’s, industrial policy was promoted primarily from the left, most notably by Democratic presidential candidate Walter Mondale. He thought that expert guidance was superior to market forces at determining an appropriate future. Economic stability and growth were the goals. Academic economists generally dismiss industrial policy because it is characterized by opportunistic lobbying, political favoritism, distorted prices, and policies that make no economic sense. Today, most proponents of green energy policies avoid using the phrase “industrial policy.” In fact, many of those supporting green en-

nergy policies probably do not even understand that they are following in a largely failed tradition. They just believe they have the right answers to what they consider to be big questions--primarily the question of what to do about running out of traditional energy sources and how to address climate change. Green New Deal legislation, introduced in the 116th Congress is a prime example of green industrial policy.  

Peak Oil

For several years we heard stories that we are running out of oil. A name given to this fear is Peak Oil, which is the point at which the oil industry reaches maximum extraction and declines after that. Peak Oilers believe (and believe is the operative word here) that there must be a finite amount of oil in the ground. Once we have used half of that oil, everything is downhill as we scramble to find oil for gasoline, lubricants, and raw material for plastics before the oil runs out completely. Because our society is so dependent on oil, they say, life as we know it could cease to exist. Peak oil theory has been around for about 150 years with the devout claiming that peak oil is only X number of years away. Geologist M.King Hubbert even put a date on it, claiming that oil and gas production would start to decline after about 1970.

Fears about running out of energy or of using too much from one source are not new. When the US was dependent on whale oil for lighting and lubrication, for instance, there were serious, justified, fears that the whales hunted as a source of oil would become economically extinct. That is, the cost of catching them would exceed the price of their oil. By the mid 1800’s, camphene, lard from hogs (sometimes called land whales), coal gas (made from coal), and finally kerosene (made from oil) were competing with whale oil and finally drove the whale oil business into extinction. At its peak in 1846, the whaling industry was the fifth largest sector of the American economy and fifty years later it was all but gone.

Whale oil got outcompeted by substitutes, especially kerosene. Oil was discovered in Pennsylvania in 1859 and, as a result of the development of the oil industry, kerosene became plentiful and cheap. So what happened to all those companies that were no longer based on whale oil? The cash from those industries moved into other industries, especially railroads, oil, and steel. New Bedford, Massachusetts once the richest city per capita in the United States and the center of the US whaling industry, even shifted to cotton milling and refining oil. None of this required government programs, subsidies, or

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Why have we not run out of oil? If you put a straw in a glass of water and suck it up, it’s gone, right? Many people assume this is exactly how oil wells work. A well goes in and sucks up all of the oil until it’s gone. The truth is that a better analogy is a cup of ice water with lots of ice. You can suck out the water, but there is still more water in there for future use when the ice melts. When a well is drilled, the amount of oil that can be obtained easily is called “recoverable” oil. Based on how much it costs to develop the oil (build roads, drill wells, buy pumps, run pumps, perform maintenance, etc) the recoverable oil is the amount that it makes economic sense to pull out. Later in time, say 10 years down the road, political, economic, environmental, or technological conditions may change, making oil that was previously too expensive to get out now recoverable. A standard estimate is that 65% of oil is left as currently un-recoverable in each well. Estimates of recoverable oil are constantly changing as we find additional reserves of oil, revisit previous wells, develop new technology, and become more efficient at finding, extracting, and using oil.

Peak Oil, once thought of as a legitimate tale of dire warning for the times ahead, is now generally regarded as little more than a conspiracy theory. In fact, more than 20 years after the first dire consequences failed to materialize, oil production and proven oil re-
serves have never been higher. In fact, the United States has become a net exporter of natural gas and is poised to become a net exporter of crude oil as well.

Worries that we are running out of oil persist. The *Joint Operating Environment 2010* report released by the US Joint Forces Command projected by 2015 there would be a global supply shortfall of 10 million barrels per day. Instead, by 2015 there was a surplus.21

The fact that we have not reached Peak Oil, or anything near it, has not slowed calls for new government energy policies. But now, rather than fear of running out of oil driving calls for new policies, fear of environmental problems, especially climate change, is the dominant motivator. We suggest that such calls are misplaced, not necessarily because claims about climate change are wrong, but because faith in government policies is misplaced.

**Justifications for Clean Energy Policy**

Clean energy policy advocates usually cite two purposes for government action: market failures and impending environmental catastrophe. Proponents will frequently combine these claims, suggesting that market failures will so seriously stall economic transitions that the market will be unable to curb cataclysmic environmental events, such as climate change.

Markets are said to fail when they do not produce what they might, in a perfect world. Some claim that government actions can make up for imperfection. For instance, World Bank clean energy industrial policy advocates describe the coordination failure22 of a wind energy market. Until there are long-distance transmission lines that can transport electricity from the Northern Midwest (North Dakota, South Dakota, Montana, etc.) to more populated cities, there is little incentive to create sizeable wind farms. Until these wind farms are constructed, however, there is no reason to build transmission lines. Advocates also point to positive externalities like knowledge spillovers.23 If, for example,

a company were to develop a battery that could effectively store electricity from solar panels to use when the sun is not shining, the knowledge spillover would provide countless other companies the financial benefit of new technologies without any of the research and development costs. While this by itself is a good thing, the dilemma is that the potential societal benefits of a new technology cannot be easily captured by any business or organization that would have to fund the cost. Finally, champions of clean energy industrial policy point to problems caused by economies of scale, which they say will make the fossil fuel monopoly on energy impenetrable without the government jumpstarting a competing renewable sector. Green energy policy cannot be left “in the hands of entrepreneurs, corporations, and financial markets,” essentially because private individuals are unwilling to invest their own money in it.

Clean energy industrial policy proponents add varying warnings about environmental quality. The World Bank’s proposal opens by calling climate change “the biggest market failure in the history of humanity.” According to the World Bank’s economists, the speed of technological innovation required to keep the Earth from warming two to four degrees cannot be attained by normal market developmental processes. Also citing the need to confront “the ultimate catastrophe possibly following from global climate change,” researchers from the German Development Institute provided probably the most gloomy outlook of the economic transformation required. According to them, the global economy needed to become sustainable and low-carbon, comparable to only two other economic revolutions in history: “the pre-historic Neolithic settlement and the transformation of agrarian into industrial societies.” The most upfront summary of these climate concerns comes from economist Dani Rodrik, one of the foremost advocates of clean energy industrial policy. “The imperative of addressing climate change,” he wrote, “places industrial policy squarely on the policy agenda of governments.”

**Structure of Clean Energy Industrial Policy**

Clean energy industrial policy uses tools identical to those used in traditional industrial

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27 Ibid, 5.
policies: mandates, subsidies, and regulations. Regulators have worked closely with energy and other businesses to design supposedly green and clean policies.

The United States does not have any federal mandate for renewable energy, but most states have implemented their own laws called “renewable portfolios standards” (RPS). These standards mandate how much of a state’s electricity must come from renewable sources. Sometimes these mandates can be fairly broad. Maine’s RPS, for example, simply mandated that 40 percent of the state’s energy come from any renewable source by 2017.\(^30\) Some of these laws get far more intricate, with North Carolina’s standard not only mandating how much of the state’s energy portfolio should come from renewables, but specifying that 0.2 percent should come from swine waste and 900,000 MWh should come from poultry waste.\(^31\) Further, while not creating a firm mandate, the Department of Energy in 2008\(^32\) and again in 2015\(^33\) set a goal for 20 percent of the nation’s energy to come from wind by 2030. These sorts of goals and mandates all are supposed to encourage the development of clean energy by ensuring that there will be a market for their output, regardless of the cost or variability of the energy output.

In addition to promoting the success of particular energy sources (such as swine waste), clean energy policies have also aimed at regulating competitive sectors out of business or at least out of competition. As an example, the Obama Administration’s Clean Power Plan, which was stayed by the Supreme Court in early 2016 and abandoned during the first year of the Trump administration, would have been the first federal regulations to limit the amount of carbon dioxide emissions from power plants. According to the Environmental Protection Agency, the Clean Power Plan would have cut carbon emissions from the electrical power sector by 30 percent.\(^34\) In her presidential campaign in 2016, Hillary Clinton came under fire for suggesting “[W]e’re going to put a lot of coal miners and coal companies out of business.” In context, this statement appears primarily aimed at supporting those in the coal industry who would be negatively impacted by a transition towards carbon-free or renewable energy,\(^35\) it nonetheless illustrates the importance many policymakers put on dampening the profitability of energy that competes with the

\(^{30}\) “Program Overview,” DSire, October 2, 2015, http://programs.dsireusa.org/system/program/detail/452.
\(^{35}\) “Hillary Clinton: We’ll put coal miners out of business,” CNN Money, http://money.cnn.com/vid-
Various subsidies encourage clean energy technologies. The federal government in 2009 developed a federally backed 1705 loan guarantee program with economic stimulus money. Most famously, one of these loans was granted to Solyndra, a solar company who filed for bankruptcy two years after receiving a federally-backed loan for $535 million — and a year after being heralded as a “symbol of progress” by Barack Obama. Although the 1705 program produced a number of successful companies alongside the failed Solyndra, Solyndra still illustrates many of the expected failures of industrial policy. For example, Solyndra used a semiconducting material in its PV cells that was competitive as long as silicon prices remained high. As silicon prices dropped, however, China’s PV panels became increasingly cheaper. It is hard to imagine any investor -- government or otherwise -- predicting the plummeting price of silicon. But, private investors would be expected to transition their investment away from Solyndra’s inefficient technology towards the up-and-coming competitive technologies. The Obama administration, who had already showcased Solyndra as evidence of the transformative power of stimulus spending, had a bigger incentive to continue funding the company in hopes that it would work than it did to cut its losses. There were several other Solyndra-like failures under the 1705 program as well as several successes. The successful companies most likely would have received private loans but simply prefered to benefit from the lower interest rate of the government loans.

Beyond subsidies for individual companies, the United States has an extensive system of research and development subsidies. In fact the United States has invested more money in research and development into energy efficiency and into renewable energy than any other OECD country each year since at least 2007. The U.S. R&D budget peaked in 2009, largely as a result of the American Recovery and Reinvestment Act,
which dedicated $20 billion towards research and investment in green technologies.\textsuperscript{40} Only rarely will an American policymaker refer to clean energy policies as industrial policy, as it has a negative reputation. They call it something else. In a conversation between Newt Gingrich and Paul Ryan, for example, Gingrich began talking about picking winners and losers, which he called the “influence economy” that rests on picking the right lobbyist. Ryan interrupted him at that point, saying, 

They used to call this industrial policy. Where Japan, you know, did this for years, to no avail. It’s been played with here, where government will try to push forward an industry or a technology at the expense of the free marketplace. What it really is is crony capitalism.\textsuperscript{41}

\textbf{The Problems of Clean Energy Industrial Policy}

\textit{Knowledge Problem}

The knowledge problem encompasses the non-expert problem we outlined in an earlier paper.\textsuperscript{42} Government officials cannot know which experts to listen to or even which are worth listening to when there are differing opinions offered. Worse, policymakers cannot predict the economic future of any industry. In the Solyndra case, bureaucrats had no way of knowing that Solyndra’s technology would be antiquated within two years of it receiving a federally-backed loan. Clean energy industrial policy compounds the knowledge problem even more, because it forces policymakers to make decisions not only with the economic unknowns, but also with environmental unknowns.

The German Development Institute’s paper on green industrial policy lays out the kinds of unknowns involved in implementing such a policy:

\begin{quote}
We argue that the exceedingly high level of uncertainty and the long causal chains are defining features of green industrial policy. They originate from a variety of factors, including the dynamics of complex ecosystems and the scientific modelling of climate change, the unknown technical feasibility and
\end{quote}

\textsuperscript{40} “Direct Federal Financial Interventions and ....” \url{https://www.eia.gov/analysis/requests/subsidy/}. Accessed 8 May. 2019.


commercial applicability of new transformative technologies, the unpredictability of global policy approaches, and the risks surrounding the impact of innovative policy instruments.\textsuperscript{43}

The problems associated with economic uncertainty and economic knowledge problem are well-established. Green energy industrial policy is of particular concern in this regard because so much of the technology required for green energy is especially new and untested. As such, knowing what technologies will succeed and which will fail is even more unlikely. Not only would policy makers need to identify which energy sources are the most promising, but which companies using which technologies are the most promising within those sources. Furthermore, these technologies are expensive, which means the risk of such investments is increased, because a failed investment will be even more damaging.

That said, the environmental questions compound with the economic questions to significantly increase the risks of green industrial policy. Even as the World Bank advocated for a green industrial policy, it acknowledged, “Green industrial policies are plagued with the same challenges that confront both industrial and environmental policies.”\textsuperscript{44} Among these challenges confronting environmental policies, the World Bank discussed the problems of properly pricing natural resources and spill-over costs. “Proper” pricing is difficult if not impossible, but governments continue to try with the most visible attempt being estimates of the “social cost of carbon.” The government uses the social cost of carbon to justify the value of a regulation that attempts to cut carbon emissions. The cost-benefit analysis of environmental policies -- clean energy industrial policy, included -- could hardly be conducted without an estimate of the social cost of carbon. In the government’s own report on the social cost of carbon, however, they make a telling confession:

When attempting to assess the incremental economic impacts of carbon dioxide emissions, the analyst faces a number of serious challenges. A recent report from the National Academies of Science (NRC 2009) points out that any assessment will suffer from uncertainty, speculation, and lack of information about (1) future emissions of greenhouse gases, (2) the effects of past and future emissions on the climate system, (3) the impact of changes in climate on the physical and biological environment, and (4) the translation of these environmental impacts into economic damages. As a result, any effort to quantify and monetize the harms associated with climate change will raise serious questions of science, econom-

\textsuperscript{43} Lütkenhorst, “Green industrial policy: Managing transformation under uncertainty,” 2.
\textsuperscript{44} Hallegatte, “Green Industrial Policies: When and How,” 3.
ics, and ethics and should be viewed as provisional.\textsuperscript{45}

Just to be clear, environmental policies’ potential benefits are estimated through speculation and uncertainty, which raises scientific and ethical questions. At best, these measurements should be viewed as provisional. Yet, green energy industrial policy proponents want to base an entire economic transformation on them.

The German Development Institute concedes that there are several significant value judgements that go into green industrial policy. By identifying variables to quantify in social cost measurements and by selecting specific discount rates, environmental policy is necessarily laden with value judgements. The researchers from the German Development Institute emphasize that “the normative content of green industrial policy is particularly high and pronounced.”\textsuperscript{46} This, they say, frequently results in policy-based evidence-making instead of evidence-based policy-making,\textsuperscript{47} which is amplified by the urgency and boldness with which many environmental policies are implemented.\textsuperscript{48} Again, hardly the uncertainty on which an economy should be premised.

\textit{Political Problem}

Proposals for green energy industrial policy include the “need” for collaboration between the government and business to identify industrial policy targets, or in economist Dani Rodrik’s words, the government needs to be “embedded” in the private sector.\textsuperscript{49} The idea of a congressman or bureaucrat being embedded in Wall Street banks, oil companies, or weapons manufacturers would raise red flags to many constituents. But for some reason, there seems to be an assumption that green policies would be based on a sense of the public good and altruism.

Jonathan Adler made this point in 1996:

\begin{quote}
Most Americans recognize that politics has a lot to do with the pursuit of power, privilege, and special interests; however, there is a general presumption that environmental politics is somehow different. We take for granted that environmental laws are what they seem; that the legislators who enact those
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\textsuperscript{46} Lütkenhorst, “Green industrial policy: Managing transformation under uncertainty,” 6-10.
\textsuperscript{47} Ibid, 17.
\textsuperscript{48} Ibid.
\textsuperscript{49} Hallegatte, “Green Industrial Policies: When and How,” 19.
laws and the bureaucrats who implement them are earnestly struggling to protect public interests; and, that these laws will be enforced in a fair and sensible manner. All too often, however, environmental regulations are designed to serve narrow political and economic interests, not the public interest.\(^{50}\)

Adler suggests that environmental policy might be more susceptible to rent-seeking and cronyist behaviors than more traditionally disliked relationships between governments and businesses, because of what economist Bruce Yandle refers to as “Bootleggers and Baptists.”\(^{51}\) In Yandle’s metaphor, he describes that both bootleggers and Baptists advocate for laws limiting the sale and distribution of alcohol. Baptists do so on moral grounds, while bootleggers do so in order to create a protectionist regulatory regime and prop their own income.\(^{52}\) (One might recall that Milton Friedman accused the government of protecting the drug cartels by engaging in the war on drugs.\(^{53}\) ) Bootleggers and Baptists behavior is common throughout regulatory policy. Part of the backing for legal restrictions might be based on ethics and “the public good,” but a sizeable segment of the defense is based purely off of a special interest’s private interests. In the case of environmental policy, many of the regulations that become law might have real environmental backing from environmentalists, but they will also be propped up by the green industry and its lobbyists who have a financial interest in increasing the economy’s reliance on the energy they produce.

A convenient example of rent seeking in green energy policy can be seen in the corn lobby’s influence on United States ethanol and biofuel policy. The renewable fuel standard and subsidies for American corn farmers are both remarkably unpopular.\(^{54}\) More than 85 percent of farm subsidies apparently go to only 15 percent of America’s farmers. These farmers tend to be wealthier, with more political clout and are able to maintain their piece of green energy regulatory policy through lobbying and contributing to political campaigns.\(^{55}\)


\(^{51}\) Ibid, 27.


To Illustrate: Ivanpah solar plant

Few cases illustrate the failures of green energy policy as clearly as California’s Ivanpah solar plant and its strained history. Ivanpah’s past is rife with rent seeking, political favoritism, and failed government policies. Questions of cronyism were raised as early as June 2012, when BrightSource Energy, one of Ivanpah’s owners, was granted a $1.6 billion loan from the federal government. As part of the company’s last-ditch lobbying effort to secure this loan, it hired an important spokesperson: Vice President Joe Biden’s former chief of staff, Bernie Toon. In total, BrightSource spent more than half a million dollars lobbying for this loan. The federal loan for Ivanpah is actually from the same government program that funded Solyndra. In fact, it was the negative attention directed at that program following Solyndra’s bankruptcy that encouraged BrightSource Energy to ramp up its lobbying efforts and hire Toon. In other words, the fact that the federal loan program was struggling led to the funding of a now-struggling facility. Almost humorously, Ivanpah’s owners requested a $540 million federal grant in 2014 to help it pay off its federal loan.

California’s RPS requires the state to provide 33 percent of its electricity with renewable sources by 2020. The state’s RPS was a key factor in California’s desire for Ivanpah and has played a significant role in California’s decisions not to pull the plug on the project. In order to meet the requirements of California’s RPS, the state has to guarantee prices. According to KQED News, electricity from Ivanpah costs approximately four times as much per megawatt-hour than even photovoltaic solar plants, which are by no means cheap.

Also, in order to meet the RPS, state regulators have made special rules for Ivanpah. The rule for non-fossil fuel plants is that no more than five percent of the electricity produced at the plan can come from fossil fuels. In order to meet that requirement,

61 Ibid.
regulators have to ignore all the natural gas burned at night in order to keep the system primed and up to temperature for when the sun shines. The result is that less than 25 percent of the gas burned is used to meet the 5 percent rule. The rest is ignored by the regulators because it is burned at night and the rule relates to daytime electricity production.\footnote{Ivanpah solar plant, built to limit greenhouse gases, is burning more ...” 23 Jan. 2017, \url{https://www.pe.com/2017/01/23/ivanpah-solar-plant-built-to-limit-greenhouse-gases-is-burning-more-natural-gas/}. Accessed 14 May. 2019.}

Ivanpah’s investors who are benefiting from the government loan, support, and price guarantees include Chevron, British Petroleum, Morgan Stanley, and Google.\footnote{“Investors,” \textit{BrightSource}, \url{http://www.brightsourecenergy.com/investors#VzPLztUrKVN}. Accessed 14 May. 2019.} With that assortment of wealthy investors, it is hard not to question why BrightSource needed a grant to pay off a government-funded loan.

In total, Ivanpah clearly displays the issues of green industrial policy. The government created a system of regulations and monetary incentives to guide the market in what it viewed as a socially desirable direction. Despite one of those programs -- the federal loan program -- running into serious problems elsewhere, the government did not reduce the program’s use. Ivanpah was able to receive government support by using politically powerful connections. Then, even as the project fell short, the government extended deadlines and offered more funds in hope that the solar project would eventually succeed.

**Going Forward**

We should expect industrial policy of all kinds, not just green ones, to fail. No one knows the future and politicians are good at picking \textit{political} winners, not necessarily economic ones. In fact, it appears that governments are not good at picking winners while losers are good at picking government.\footnote{“Picking losers | Matt Ridley - The Rational Optimist.” 29 Jan. 2017, \url{http://www.rationaloptimist.com/blog/industrial-strategy-1/}. Accessed 13 May. 2019.}

One of the best assessments of government attempts to influence markets came from the economist Paul Krugman more than thirty years ago:

“The case for a targeted industrial policy therefore stands or falls on the issue of criteria for selection. Can we devise criteria for choosing targets which will by and large pick the right industries? If we can, can we devise an institutional frame-
work which will actually act on these criteria and not degenerate into a system of political payoffs? The answers I will suggest are not encouraging.”

Does the green energy industrial policy live up to Krugman’s requirements? Were the criteria used for its selection and the criteria that are used to select individual companies and technologies adequate to pick the right industries? Has it avoided political payoffs. If Ivanpah were alone, it would be easy to chalk its struggles up to poor policy making. The same could be said about the US biofuel market or Solyndra.

Green energy industrial policy nationally and internationally has been rife with flaws. Policymakers, repeatedly miss the mark, spending taxpayer money for pet projects that fall through. Rather than transforming their markets into booming green economies, they falter, offering massive subsidies to politically powerful firms that raise prices and decrease quality. Green energy industrial policy falls into the same trap of traditional industrial policy: just a little more time and a little more money is needed, then the economy will transform. History suggests otherwise.

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