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# A US Clean Energy Transition and the Trump Administration

Joseph P. Tomain
*University of Cincinnati College of Law*, joseph.tomain@uc.edu

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**Joseph P. Tomain**
**Dean Emeritus and the Wilbert & Helen Ziegler Professor of Law**
**University of Cincinnati College of Law**
**Cincinnati, Ohio**
**joseph.tomain@uc.edu**

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## Executive Summary

*The Obama administration undertook several steps giving the US federal government a leadership role in a clean energy transition. Among other actions, the administration develop a Climate Action Plan, successfully negotiated higher fuel vehicle standards with car manufacturers, passed the Clean Power Plan, and signed the Paris Climate Agreement. Although the United States had been party to other international climate agreements and was a signatory to the Rio Declaration, other federal efforts were lax at best.*

*During his election campaign, Donald Trump promised his supporters to eliminate the Clean Power Plan, withdraw from the Paris Agreement, curtail the Environmental Protection Agency, bring back coal jobs, promote fossil fuels, and reduce environmental restrictions among other efforts. All of these actions are significant and nullify a federal leadership role in a clean energy transition. Regardless of the significance of these actions and the withdrawal of federal leadership, a clean energy transition is and will continue to take place for two important and, at this time, irreversible reasons. First, private sector investments continue to be made, new utility business models are developing, and new energy technologies and new energy markets are opening. Second, state regulators play an active role in supporting private sector activities pushing forward with a clean energy transition. This paper will briefly discuss private sector initiatives and then address, in detail, the role that state regulators play encouraging investment in clean power and in nudging the development of new utility business models.*

## Introduction

On November 8, 2017, the world was shocked at the news that Donald Trump was elected president of the United States. As a candidate, he arrogantly rejected the reality of climate change alleging that it was a "Chinese hoax."[1] Additionally, he threatened to terminate President Obama's Clean Power Plan, immediately withdraw from the Paris agreement,[2] and incapacitate the Environmental Protection Agency (EPA). Further, once elected, his nominee for the EPA was a man with close ties to the oil and gas industry and, once in office, he proceeded to install a number of climate skeptics to high administrative positions.[3] Additionally, Trump nominated, Rick Perry, a former Texas governor, to head the Department of Energy, an agency that Perry vowed to close if elected president.[4] Clearly, all signals from the administration have been to roll back any climate actions initiated by his predecessor.

Once in office, President Trump began to make good on his campaign promises regarding such things as immigration, health care, building a wall between the United States and Mexico, and, most drastically, signing executive orders to reduce the reach of regulation. Curiously, however, as of this writing, he has taken no action to extract the United States from Paris agreement. Regarding the Clean Power Plan, however, those actions will take place in the EPA and Trump's proposed 2017 budget is aimed at crippling the science departments at the agency and reducing the its budget by 25%.[5]

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[1] Edward Wong, *Trump Has Called Climate Change a Chinese Hoax. Bejing Says It is Anything But*,. N.Y. TIMES (November 18, 2917) available at https://www.nytimes.com/2016/11/19/world/asia/china-trump-climate-change.html?_r=0.

[2] Chelsea Harvey, *Trump Has Vowed to Kill the Clean Power Plan. Here's How He Might – and Might not – Succeed*, WASH. POST (November 11, 2016) available at https://www.washingtonpost.com/news/energy-environment/wp/2016/11/11/trump-has-vowed-to-kill-the-clean-power-plan-heres-how-he-might-and-might-not-succeed/?utm_term=.33acc57d88d6; Brandon Storm, *Can President Trump Kill the Clean Power Plan and the Paris Agreement?* LAWFARE (November 17, 2017) available at https://www.lawfareblog.com/can-president-trump-kill-clean-power-plan-and-paris-agreement.

[3] Brady Dennis & Steven Mufson, *Thousands of Emails Detail EPA Head's Close Ties to Fossil Fuel Industry*, WASH. POST (February 22, 2017) available at https://www.washingtonpost.com/news/energy-environment/wp/2017/02/22/oklahoma-attorney-generals-office-releases-7500-pages-of-emails-between-scott-pruitt-and-fossil-fuel-industry/?utm_term=.9be753b3235f; Coral Davenport, *New Administrator Stacks E.P. A. with Climate Change Skeptics*, N.Y. TIMES A17 (March 8, 2017);

[4] Coral Davenport, *Rick Perry Regrets Call to Close Energy Department*, N.Y. TIMES (January 19, 2017) available at https://www.nytimes.com/2017/01/19/us/politics/rick-perry-energy-department.html.

[5] Alex Guillen, Sources: White House Proposes to Cut EPA Budget by Quarter, POLITICO (February 27, 2017) available at http://www.politico.com/story/2017/02/epa-environment-trump-budget-235466; Warren Cornwall, *Trump Plan for 40% Cut Could Cause EPA Science Office "to Implode," Official Warns*, SCIENCE (March 3, 2017) available at http://www.sciencemag.org/news/2017/03/trump-plan-40-cut-could-cause-epa-science-office-implode-official-warns; Alan RAppeport & Glenn Thrush, *Trump Budget Seeks Sharp Cuts in E.P.A. and State Dept*., N.Y. TIMES (March 16, 2017) available at https://www.nytimes.com/2017/03/16/us/politics/trump-budget-spending-cuts.html?hp&action=click&pgtype=Homepage&clickSource=story-heading&module=a-lede-package-region&region=top-news&WT.nav=top-news&_r=0.

Regarding the environment, one message is very clear. The federal government has no intention of taking an active, leadership role in a clean energy transition. This paper argues that a failure to do so is unfortunate but not fatal. The failure of federal leadership may slow momentum of a clean energy transition; it will not destroy it. Instead, clean energy activities at the regional, local, and state levels as well as private sector investments demonstrate the necessity, and quite frankly inevitability, of a clean energy transition. This paper will briefly discuss the role of private sector investments and the development of new business models. For both of those private sector activities to contribute to a clean energy transition, public regulation is the linchpin between private finance and the redesigned and modernized electric industry. This paper, then, will mostly address the role of state regulators in advancing the transition.[6]

## I. Clean Energy Investments

The Paris conference emphasized the need for continued investment in energy/environmental innovations. Of central concern to the success of the Paris talks was the necessity for financial commitments to address both adaptation and mitigation measures. A successful clean energy transition depended upon public-private cooperation and industry–regulator participation.[7] Significantly, a group of more than 20 billionaires announced the formation of a multi-billion dollar fund named the Breakthrough Energy Coalition[8] to create a new, clean energy mix for the future. The Coalition will work together with a group of countries through a project known as the Mission Initiative to accelerate the clean energy revolution.[9]

As importantly, the need for investments in clean power is now being recognized in the marketplace as financial institutions such as Goldman Sachs, Citi and Bank of America also announce multi-billion dollar investment commitments[10] in a clean energy market that is currently estimated to be worth more than one-half trillion dollars.[11] More particularly, innovation and investment must take place along three dimensions – in technologies and new markets, in business practices, and in the regulations that monitor both the energy and the environmental sectors of our economy. This section of the paper briefly addresses public and private financing for new

[6] This paper is based in part on the recently published JOSEPH P. TOMAIN, CLEAN POWER POLITICS: THE DEMOCRATIZATION OF ENERGY (2017 Cambridge University Press).
[7] Clifford Krauss & Keith Bradsher, *Climate Deal is Signal. To Industry: The Era of Carbon Reduction is Here*, N.Y. TIMES (December 13, 2015); Andrew C. Revkin, *The Climate Path Ahead*, SUNDAY REVIEW: N.Y. TIMES (December 12, 2015).
[8] Breakthrough Energy Coalition homepage at http://www.breakthroughenergycoalition.com/en/index.html.
[9] Mission Initiative homepage at http://mission-innovation.net/.
[10] Babara Grady, *Banks Shift Billions and Billions into Clean Energy*, GREENBIZ (November 19, 2015).
[11] Goldman Sachs GS Sustain, *The Low Carbon Economy: Key Takeaways from the Paris Agreement* (December 14, 2015).

technologies and new energy markets. The following section examines new business practices and models followed by a more detailed discussion of innovative regulatory initiatives.

### *A. Private Finance*

Clean energy investing is both necessary and strong. The need for clean energy investments is palpable. It has recently been estimated, for example, that in order to fully combat climate change, and reduce greenhouse gas emissions by 40% from 2005 levels by 2035, that a $200 billion annual investment of both public and private resources will be needed. While significant, $200 billion is equal to about 1.2% of GDP and about 6.5% of total US investment for 2012.[12]

As important, declining costs for clean energy show positive investment signals. In the solar and wind sectors, as examples, costs are declining precipitously. The cost of wind energy is down from a range of $101-$169 per MWh in 2009 to $32-$62 per MWh in 2016 – a 66% decline. Utility-scale solar costs have fallen 85% from a 2009 range of $323-$394 per MWh to $49-$61 per MWh in 2016. Importantly, renewable resources are cost competitive and are reaching grid parity.[13] Grid parity, of course, is the holy grail of clean energy investments.

Energy investments in the United States and globally have been on the rise in absolute terms and they have outpaced other types of investments in relative terms even during the Great Recession of 2008-2012. In 2013, the Americas spent $66 billion on clean energy investments down from a high of $88 billion in 2011 and down from $71 billion spent in 2012[14] while during the period the United States spent $33.9 billion in renewable energy.[15] New investment records were set in 2015 as global investment in renewables rose 5% from the previous year to $285.9 billion. This exceeded the previous 2011 benchmark of $278.5 billion. The 2015 total was in excess of six times the amount invested 2004. Over the last 12 years, then, total investment has reached $2.3 trillion. Most impressively, renewable resources including hydropower, solar, and wind power represent more new installed capacity and any other resource.[16] Also during the period,

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[12] ROBERT POLLIN ET AL., GREEN GROWTH: A U.S. PROGRAM FOR CONTROLLING CLIMATE CHANGE AND EXPANDING JOB OPPORTUNITIES 242 (September 2014) (a report for the Center for American Progress and the Political Economy Research institute at the University of Massachusetts Amherst); *see also* JEFFREY D. SACHS, BUILDING THE NEW AMERICAN ECONOMY: SMART, FAIR & SUSTAINABLE ch. 9 (2017).

[13] LAZARD, LAZARD'S LEVELIZED COST OF ENERGY ANALYSIS -- VERSION 10.0 (December 2016) available at https://www.lazard.com/media/438038/levelized-cost-of-energy-v100.pdf; World Economic Forum, *Renewable Infrastructure Investment Handbook: A Guide for Institutional Investors* (December 2016) available at http://www3.weforum.org/docs/WEF_Renewable_Infrastructure_Investment_Handbook.pdf.

[14] Luke Mills, Bloomberg New Energy Finance, *Global Trends in Clean Energy Investment* 5(July 2014) 5.

[15] FRANKFURT SCHOOL-UNEP COLLABORATING CENTRE FOR CLIMATE & SUSTAINABLE ENERGY FINANCE & BLOOMBERG NEW ENERGY FINANCE, GLOBAL TRENDS IN RENEWABLE ENERGY INVESTMENT 2014 23 (2014). 23. [Hereinafter FRANKFURT SCHOOL 2014].

[16] FRANKFURT SCHOOL-UNEP COLLABORATING CENTRE FOR CLIMATE & SUSTAINABLE ENERGY FINANCE & BLOOMBERG NEW ENERGY FINANCE, GLOBAL TRENDS IN RENEWABLE ENERGY INVESTMENT 2016 Executive Summary (2016). [Hereinafter FRANKFURT SCHOOL 2016].

VC/PE investments showed a similar trend in 2015, venture capital investment was $3.4 billion a 34% increase over the previous year and the second year of success of growth.[17]

There are, however, persistent problems regarding clean energy investments that must be acknowledged. First, climate change is not amenable to a quick fix. Long time horizons exist not only for investment profiles but also to determine return on investment. Consequently, clean energy presents a certain level of risk. Second, because of the long time horizons and the short-term focus on quarterly returns, long-run costs (and returns) are difficult to predict and assess. Further, the costs of human suffering, refugee migration, climate degradation,[18] and the like, as well as regulatory signals, contribute to investment risk and, therefore, are likely to result in under investment in the sector. Nevertheless, the investment climate is increasingly attractive to venture capitalists and private equity firms (VC/PE) as well as commercial lenders.

While VC/PE firms do get involved in energy innovation, they tend to be get involved after the technology has been fully proven and marketability is on the near horizon.[19] In 2013, for example, VC/PE investment invested over two thirds of its capital in wind and solar projects, which are both proven technologies[20] although in 2014 there were signals that VC/PE was reentering clean energy investing.[21]

Commercial banks such as Citigroup or Deutsche Bank are becoming more actively involved in developing their green investment portfolios. Deutsche Bank, for example, offers an array of banking services to support an energy transition. Recently, they have reported that as a financial intermediary they have been involved in $1.23 billion of large-scale renewable energy projects in 2013 and that they manage assets that are sensitive to environmental goals of approximately $7 billion. The bank has adopted an energy and climate strategy that includes the development of sustainable products, carbon neutrality, and green building investments as well as clean energy technology innovations.[22]

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[17] FRANKFURT SCHOOL 2016 at Ch. 5.

[18] *See e.g.* Timmons Roberts & Caroline Jones, *American Soft Power, the Paris Agreement, and Climate Finance Under Trump*, BROOKINGS PLANET POLICY (February 24, 2017) available at https://www.brookings.edu/blog/planetpolicy/2017/02/24/american-soft-power-the-paris-agreement-and-climate-finance-under-trump/; World Economic Forum, *Renewable Infrastructure Investment Handbook: A Guide for Institutional Investors* (December 2016) available at http://www3.weforum.org/docs/WEF_Renewable_Infrastructure_Investment_Handbook.pdf.

[19] BENJAMIN GADDY, VARUN SIVARAM & FRANCIS O'SULLIVAN, VENTURE CAPITAL AND CLEAN TECH: THE WRONG MODEL FOR CLEAN ENERGY INNOVATION (July 2016) available at https://energy.mit.edu/wp-content/uploads/2016/07/MITEI-WP-2016-06.pdf; NEIL E.HARRISON & JOHN MIKLER (EDS.), CLIMATE INNOVATION: LIBERAL CAPITALISM AND CLIMATE Change 25-28 (2014).

[20] FRANKFURT SCHOOL 2014 at 17and Ch. 8.

[21] Hiroko Tabuchi, *Venture Capitalists Return to Backing Science Start-Ups*, N.Y. TIMES (October 12, 2014) (reporting VC investments of $1.24 billion for industrial and energy start-ups in the first half of 2014 which was below the 2008 peak of $4.46 billion for those two sectors).

[22] Deutsche Bank, *Energy and Climate Strategy: Supporting the Transition to Sustainable Growth* available at https://www.db.com/cr/en/environment/energy-and-climate-strategy.htm.

In 2009, Citi Group created its Citi Climate Change Universe to assess how to satisfy global energy needs. Citi estimated that global GDP was expected to quadruple over the next 50 years and to do so would require $37 trillion investment in energy needs. Of that $37 trillion, $24 trillion is forecast to be satisfied by clean energy sector including natural gas. Citi also estimated that $6 trillion will be required for renewable power generation alone.[23]

As a final example of commercial and investment banking activity, in April 2014, J.P. Morgan Chase & Co. published its *Environmental and Social Policy Framework* (E&S). The idea behind Morgan's E&S policy is to look at environmental and human rights issues for the express purpose of identifying risks to investments as well as exhibiting corporate responsibility. Morgan has adopted a series of best practices that are used to measure a transaction against its E&S policy. For example, hydraulic fracturing, oil sands development, and exploration in the Arctic all require enhanced risk review by the bank. In the electric sector, coal-fired power generation must be measured against greenhouse gas impacts and other pollution controls before a recommendation for investment will be made. Note that Morgan is, and has been, heavily involved in the fossil fuel sector. According to its E&S policy, however, it takes the IPCC's assessment of the impact of carbon dioxide on climate change seriously and incorporates it into its portfolio review process.[24]

### *B. Public Finance*

The energy sector operates in a heavily regulated environment. To the point, the clean energy transition is currently dependent on state policies and regulations that either lower the cost of clean energy or remove barriers for its adaptation and adoption.[25] Consequently, the sector benefits from a wide array of financial incentives and supports not the least of which involve the government support of the development of innovative clean energy technologies.

The Department of Energy under the Obama administration shifted billions of R & D dollars from defense energy projects to non-defense energy projects. The centerpiece of the Obama administration was the American Recovery and Reinvestment Act of 2009 (ARRA).[26] Notably, as a result of ARRA in 2009, $90 billion was directed towards clean energy related investments while leveraging approximately $150 billion in private and other non-federal capital for clean energy investments.[27] More significantly, the Council of economic advisers estimated

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[23] Citi, *Citi Climate Change Universe* 1 (March 2013).
[24] JP Morgan Chase & Co., *Environmental and Social Policy Framework* (April 2014) available at http://www.jpmorganchase.com/corporate/Corporate-Responsibility/driving_sustainability_through_business.htm.
[25] RETAIL INDUSTRY LEADERS ASSOCIATION, CORPORATE CLEAN ENERGY PROCUREMENT INDEX: STATE LEADERSHIP & RANKINGS (January 2017) available at https://www.itic.org/dotAsset/f9040bd1-7681-455a-9a64-5a518c16551d.pdf.
[26] *American Recover and Reinvestment Act of 2009*, 123 Stat. 115.
[27] White House, *FACT SHEET: The Recovery Act Made the Largest Single Investment in Clean Energy in History, Driving the Deployment of Clean Energy, Promoting Energy Efficiency, and Supporting Manufacturing* (February 25, 2016) available at https://obamawhitehouse.archives.gov/the-press-office/2016/02/25/fact-sheet-recovery-act-made-largest-single-investment-clean-energy.

that the ARRA lifted GDP 2 to 3% above where would have been in created over 6 million full-time jobs roughly 900,000 of which were in the clean energy sector.

Significantly, from 2008 2016, solar electricity generation increased 30-fold. Wind generation during the same time increase over three-fold. ARRA funding affected a variety of clean energy technologies including advanced vehicles, storage, and energy efficiency among others. Additionally, the funding affected deployment of smart meters, advanced manufacturing, and weatherized more than 800,000 homes.[28]

Most importantly, clean energy R & D follows a distinctly different configuration than traditional R&D. Historically, federal R&D, the Manhattan Project and Project Apollo are the paradigmatic examples, were focused on an identifiable ends such as build the atomic bomb or land on the moon. These projects were undertaken without commercialization in mind. Clean energy R&D, on the other hand, has multiple aims, uses a wide variety of technologies, and engages a wide variety of public and private actors.

In addition to the country's 17 national labs that contribute significantly to clean energy R&D, there are a variety of configurations of public-private partnerships that go under various headings including Energy Innovation Hubs and Energy Frontier Research Centers. These DOE activities are engaged in basic science as well as technological development and, most importantly, commercial deployment. In short, the agency responsible for overseeing federal project, the Advanced Research Project Administration – Energy (ARPA-E), a part of DOE, reports successful investments in a wide variety of programs from energy storage to improve transportation systems and from improve grid operations through energy efficiency and clean power technologies.[29]

Government R&D, as well as the facilitative role it plays in putting together public-private partnerships, is indispensable to the success of a clean energy transition.[30] Importantly, federal investment in clean energy technologies helps private firms traduce the technological valley of death and the commercial valley of death. By lowering the risk of developing new science and technology, government investment supports private initiatives moving from proof of concept to demonstration and, thereby, overcoming the technological valley of death. Likewise, because public sector clean energy investments focus on developing new markets and on commercialization, government subsidies and financial supports can bridge the commercial valley of death often faced by private sector innovators.[31]

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[28] EXECUTIVE OFFICE OF THE PRESIDENT, A RETROSPECTIVE ASSESSMENT OF CLEAN ENERGY INVESTMENTS IN THE RECOVERY ACT (February 2016) available at https://obamawhitehouse.archives.gov/sites/default/files/page/files/20160225_cea_final_clean_energy_report.pdf.
[29] DOE, ARPA-E, ARPA-E: THE FIRST SEVEN YEARS: A SAMPLING OF PROJECT OUTCOMES (May 17, 2016) available at https://arpa-e.energy.gov/sites/default/files/documents/files/Volume%201_ARPA-E_ImpactSheetCompilation_FINAL.pdf.
[30] JEFFREY D. SACHS, BUILDING THE NEW AMERICAN ECONOMY: SMART, FAIR & SUSTAINABLE ch. 11 (2017).
[31] JOSEPH P. TOMAIN. CLEAN POWER POLITICS: THE DEMO0CRATIZATION OF ENERGY ch. 4 (2017).

Therefore, for a successful transition to a clean energy future, there must be public and private sector alignment from R&D through commercialization. New clean energy investments are confronting a new future in which the energy and environmental sectors of the economy are not seen as separate spheres of behavior; rather, the physical reality of fuel cycle necessitates the bringing together of environmental and energy policies and activities. To the extent, then, that investments are directed to this new business reality, then new business models are necessary and they are developing as best seen with the utility of the future.

## II. The Utility of the Future

The electric utility industry faces several challenges including: flattening demand; high-priced incumbent-generated electricity; increased concern over environmental consequences of fossil fuel generation; grid defection; and, the market entry of cleaner and smaller energy technologies.[32] In part, these new technologies can be defined as distributed energy resources (DER). Resources such as rooftop solar and micro-grids can generate electricity closer to the end users, at smaller scale, and with less harmful environmental consequences.

### *A. The MIT Study*

According to some in the electric industry, these challenges threaten to put investor-owned utilities (IOUs) into a "death spiral."[33] More positively, however, the challenges have also generated a significant literature regarding the future of the electric utility. The Massachusetts Institute of Technology is now engaged in an international, comprehensive and multiyear *Utility of the Future Study*[34] to "address the technology, policy, and business models shaping the evolution of the delivery of electric services."[35] While it is clear that IOUs will no longer dominate the electric sector, most observers take the position that they will continue to be central actors and that their ability to adapt to the new environment will be central to the success of the clean energy transition.

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[32] Inara Scott, *Incentive Regulation, New Business Models, and the Transformation of the Electric Power* Industry, 5 MICH. J. ENVTL & ADMIN. L. 319 (2016).

[33] CITI, RISING SUN: IMPLICATIONS FOR US UTILITIES, 22, 26 (2013); PETER KIND, ENERGY INFRASTRUCTURE ADVOCATES, DISRUPTIVE CHALLENGES: FINANCIAL IMPLICATIONS AND STRATEGIC RESPONSES TO A CHANGING RETAIL ELECTRIC BUSINESS 1 (2013) (both reports discuss the "death spiral" for electric utilities). For an analysis of the death spiral discussion, *compare* Elisabeth Graffy & Steven Kihm, *Does Disruptive Competition Mean a Death Spiral for Electric Utilities?*, 35 ENERGY L. J. 1 (2014) *with* David Raskin, *Getting Distributed Generation Right: A Response to "Does Disruptive Competition Mean a Death Spiral for Electric Utilities?,"* 35 ENERGY L.J. 262 (2014). *See also* Joseph P. Tomain, *Traditionally-Structured Electric Utilities in a Distributed Generation World*, 38 NOVA L. REV. 473 (2014).

[34] MIT, *Utility of the Future Study* homepage at https://mitei.mit.edu/research/utility-future-study.

[35] *Id*.

New business models are being designed with the intent of capturing producer and consumer value.[36] In order to capture available economic surplus, power providers must have more reliable and responsive prices; two-way information flows between energy producers; move away from cost of service ratemaking; and encourage utilities to segregate their regulated and unregulated businesses. In other words, new forms of rate regulation will be applied to essential facilities and services that deliver electricity to the end-user.[37] At the same time, utilities can be encouraged to develop other energy services such as conducting energy audits and demonstration projects, marketing energy savings appliances and the like. To the extent that those latter activities occur in competitive markets, then they can be removed from the regulated side of a utility's books.

Preliminarily, three observations must be made. First, not only must IOUs invest in technological innovation, they must also invest in business innovation. Second, because IOUs will continue to be regulated for the foreseeable future, the transition, as discussed in the next section, will not occur without associated regulations to support it.[38] Regulations are necessary to protect past utility investments and regulations can help stimulate the transition through financial incentives and other legal supports.

The third observation is that neither a business-as-usual approach nor a fully competitive retail electricity market will develop in the near-term. The electricity future will have a wider range of providers and consumers will have more purchase options than they have had in the past. The future of the electric industry, then, is not the *utility* of the future, instead it is the *power system of the future* and it will be a cleaner future.

Utility executives acknowledge that the expansion of vertically-integrated IOUs is unlikely.[39] Nevertheless, even though IOUs will no longer dominate, a fully competitive electric industry at the wholesale and retail levels will not develop in the near-term if for no other reason than the fact that the grid is a necessary component to an electricity future and that grid, for the most part, was constructed by and is owned by incumbent IOUs. As the three models discussed below indicate, although the future will be a mixed future of regulation and more competition, smart IOUs should be able to compete in these new and emerging markets.

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[36] MASSACHUSETTS INSTITUTE OF TECHNOLOGY & ITT COMILLAS, THE MIT UTILITY OF THE FUTURE STUDY: WHITE PAPER 22 (December 2013).

[37] MASSACHUSETTS INSTITUTE OF TECHNOLOGY ENERGY INITIATIVE, UTILITY OF THE FUTURE: AN MIT ENERGY INITIATIVE RESPONSE TO AN INDUSTRY IN TRANSITION (2016); *see also* SCOTT P. BURGER & MAX LIKE, BUSINESS MODELS FOR DISTRIBUTED ENERGY RESOURCES: A REVIEW AND EMPIRICAL ANALYSIS (April 2016).

[38] STEVEN NADEL & GARRETT HERNDON, THE FUTURE OF THE UTILITY INDUSTRY AND THE ROLE OF ENERGY EFFICIENCY viii (June 2104); ELECTRICITY INNOVATION LAB ROCKY MOUNTAIN INSTITUTE, RATE DESIGNED FOR THE DISTRIBUTION EDGE: ELECTRICITY PRICING FOR A DISTRIBUTED RESOURCE FUTURE 12-13 (August 2014).

[39] UtilityDive Brand Studio, *2015 State of the Electric Utility: Survey Results* 9 (2015).

The utility of the future must respond to three current and expanding trends. First, on the supply side, the cost of producing energy from renewable resources, most particularly wind and solar, continues to decline as grid parity is in sight. Another supply-side feature is that the scale of electric power production is shrinking as DER technologies proliferate.[40] These distributed systems pose a direct threat to traditionally-structured IOUs. Second, on the demand-side, while projected future demands are relatively flat, consumers are using electricity in different ways including charging vehicles, increasing storage, self-generation, and responding to demand response regulations. The third trend involves information and communication technologies (ICT) that radically reconfigure the traditional delivery of electricity.[41] ICT systems of the future will have two-way information flows which, in turn, improve price signals in real time and can improve grid security and reliability.[42] Each of these trends is transformative for traditional IOUs and each of these trends has the potential for improving customer control as well as industry competition.

One way of conceptualizing the new utility model is that a utility's primary business will be to focus on distribution and customer service rather than maintain a singular focus on generation. The new utility's primary business will be to serve as a grid operator in an environment of increased wholesale and retail competition.[43] Innovative utilities will become more sensitive to customer needs and will be rewarded for it.[44] Demand studies show, for example, that consumers are responding to price information and that they are reducing consumption at peak times. In addition, behind the meter technologies such as home displays, programmable thermostats and other appliances together with social networking create a new environment as more information about energy use and price is available for providers and consumers. Providers can use that information to develop better business plans and consumers can use that information to better understand how to use energy more efficiently.[45]

### *B. Three Business Models*

IOUs do not enter this new environment without substantial assets including the management of and experience in building and operating power plants. Through various regulatory

[40] Richard Fioravanti, *Energy Storage: Out of the Lab and Onto the Grid*, 153 PUB. UTIL. FORT. 30 (April 2015).
[41] MASSACHUSETTS INSTITUTE OF TECHNOLOGY & ITT COMILLAS, THE MIT UTILITY OF THE FUTURE STUDY 1 (2014). *See also* MASSACHUSETTS INSTITUTE OF TECHNOLOGY & ITT COMILLAS, THE MIT UTILITY OF THE FUTURE STUDY: WHITE PAPER (December 2013); Dave Grossman, *Advancing Smart Electricity Networks: A Report of the First Aspen Institute Initiative on Smart Energy and Network Technologies (INSENT Roundtable* (2013).
[42] MASSACHUSETTS INSTITUTE OF TECHNOLOGY at 7-10.
[43] Joseph Scalise, *California Public Utilities Commission: the Business Model for the Electric Utility of the Future* (October 8, 2013).
[44] Ahmad Faruqui & Eric Shultz, *Demand Growth and the New Normal*, 150 PUB. UTIL. FORT. 22 (December 2012); Bayless at 23.
[45] Paul Woods, *The Social Utility*, 150 PUB. UTIL. FORT. 40 (December 2012).

environments, they have adapted their services and their ability to balance load and deliver reliable and affordable electricity. Today, not only is there a new regulatory environment, new technologies are coming on line that will enable traditional IOUs to adapt. Although there is no single conception, there are three prevalent models for the utility of the future – a wires only system operator, a smart integrator, or an energy services operator.

*Wires Only.* It is an easy move for an IOU, particularly in deregulated jurisdictions, to separate business functions particularly generation from transmission and distribution and then run the transportation segments. To the extent that the traditional IOU divests generation assets, its ability to manage transmission and/or distribution makes it a "wires only" company.

A utility of the future can consider building and improving transmission as a profit center. The grid is in need of upgrade as well as improvement. The smart grid will incorporate new two-way information technologies that will require greater expertise to operate. Further, as variable resources play a larger role in power generation, new transmission lines will be needed to connect wind and solar installations to the existing grid. Additionally, a wires only utility will serve a backup role for a variety of DER.[46]

Today, over half of the country's electric consumers are served by regional organizations. RTO/ISOs manage capacity markets to ensure that enough electricity is available to serve demand. RTO/ISOs owns no assets instead, transmission lines continue to be owned by private utilities that agree to the terms for RTO/ISO participation as established by each regional organization together with FERC. To keep the system in balance and operating reliably, there must be a clean interface between the transmission system operator (TSO) and the distribution system operator (DSO). The TSO will remain largely responsible for aggregating enough electric capacity to be sold to all customers and must maintain the high-voltage portion of the grid. The DSO will obtain power from the regional TSO, as well as other power providers, and will be responsible for satisfying customer demand and maintaining the reliability of the local grid.

The DSO, in contrast with the TSO, directly connects to end-users. The main task of the DSO is to "ensure that the distribution system can securely, efficiently, and economically distribute electricity to end-users."[47] The DSO is responsible for network infrastructure and will recoup its investments through sales of electricity and other services. A wires-only DSO can be the central actor in gathering a growing portfolio of distributed and renewable energy and for coordinating electricity sales through TSOs.

[46] UtilityDive at 5-6; Tom King, *New Grids Now: Connecting America's Energy Network to the 21st Century* available at http://us.nationalgridconnecting.com/wp-content/uploads/2014/02/Connect21_WhitePaper_high-res.pdf.
[47] MASSACHUSETTS INSTITUTE OF TECHNOLOGY at 31.

The DSO, because of its necessary connection with the TSO, will also use more sophisticated ICT to understand real-time pricing and customer usage keeping an eye on innovations that can improve the system for greater efficiency and reliability. The DSO, then, serves as a grid-connected firm that responds to the demand for electricity; provides energy storage and generation through the use of advanced metering controls and information technologies to the end of providing energy services at the local level;[48] can serve as an aggregator for DER thus increasing system efficiencies;[49] and can act as an integrator of distributed energy resources.

*Smart Integrator*. The wires only TSO or DSO closely represent one segment of the traditional electric utility – transportation. Another model of the utility of the future, the "smart integrator," will be more diverse in its products and services while also operating in regulated as well as more competitive marketplaces. One hallmark of such a firm is that its revenue will be decoupled from electricity sales and it will be expected to fulfill energy efficiency and other environmental mandates.[50] This firm will operate the local power grid through its mastery of ICT systems necessary to deliver electricity although the integrator will not generate its own power for sale. Instead, the smart integrator will own and maintain the assets necessary for transmission and distribution improving those services as they collect information about consumer demand and other needs.[51]

The primary business rationale for the smart integrator is to bring innovative technologies to the energy system in order to satisfy the multiple goals involved with a clean power future. Its core competency, then, will be its mastery of ICT specifically designed for two-way communications. In this regard, it must master an open architecture that is available to a variety of providers and consumers alike in order to optimize the availability of information to enrich consumer and producer choice.

The smart integrator has also been described as a firm that creates partnerships between utilities and innovative energy firms for the purpose of bringing new technologies and services online through new business practices and processes. While traditional utilities under this model would continue to either generate or transport electricity or both, the smart integrator will facilitate those transactions by: facilitating the adoption of the new regulatory regimes; rationalizing interconnections between new technologies and the existing grid; integrating new generation into the system;[52] and, providing back-up power.

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[48] IGNACIO PÉREZ-ARRIAGA ET AL., FROM DISTRIBUTION NETWORKS SMART DISTRIBUTION SYSTEMS: RETHINKING THE REGULATION OF EUROPEAN DSOS: FINAL REPORT (June 2013).
[49] Scudder Parker & Frances Huessy, *What's a Utility to Do: Next-Generation Energy Services and a New Partnership to Serve Customers* 3 (November 2013).
[50] UtilityDive at 10.
[51] Steven NADEL & GARRETT HERNDON, THE FUTURE OF THE UTILITY INDUSTRY AND THE ROLE OF ENERGY EFFICIENCY 57 (June 2014).
[52] Ronald L. Lehr, *New Utility Business Models: Utility and Regulatory Models for The Modern Era*, ELECTRICITY J. 35, 43 (October 2013)..

*Electric Services Operator*. The electric services operator (ESO) most closely resembles the traditional IOU. The ESO will preserve and extend core capabilities of generating and delivering electricity, identify new technologies, and explore a variety of new business opportunities to succeed in the new market.[53] The ESO retains aspects of vertical integration and its business is to provide electricity within a large service territory. The principal responsibility of the ESO will be to provide low-cost, reliable energy services to its customers.[54] While the ESO may own generation and other assets, it will also be required to open access and purchase or transmit power from a variety of providers.[55]

The regulation and operation of an ESO will differ from that of the IOU insofar as the new services and products are properly priced and aligned with regulatory incentives; that a level playing field is constructed for DG and DER resources; and that enable the new utility to invest in a wide variety of new technologies and business opportunities.[56]

The ESO will also have elements of the smart integrator insofar as it will be managing a more complex grid involving more actors. Consequently, it will be required to manage big data and engage in more sophisticated mid-and long-term planning. Further, the ESO will be tasked to meet other social policies including environmental and efficiency regulations that will reduce their sales revenues. Thus, an ESO and its regulators must develop a rate scheme that allows the new utility to move in both directions, that is sell electricity and "sell" efficiency and conservation.

Additionally, ESOs will advance the use of DFG/DER and expand the use of variable energy resources either by building utility-scale solar and wind projects, owning their own distributed generation business units, and/or partnering with third-party vendors.[57] In short, in ESU will make money through cost-competitive tariffs, reliable grid services, and financially attractive pricing for energy as well as for the provision of demand response and other services for customers.[58]

What should be most clear from this brief description of industry trends and new models is that the utility of the future will not involve unilateral transactions in which electricity providers exist only to sell electricity to consumers who, in turn, pay for that electricity. Rather, the future industry will involve a variety of two-way transactions in which traditional providers will also

[53] NADEL & HERNDON at 48-50.
[54] MASSACHUSETTS INSTITUTE OF TECHNOLOGY at 35.
[55] PETER FOX-PENNER, SMART POWER: CLIMATE CHANGE, THE SMART GRID OF THE FUTURE ELECTRIC UTILITIES 189 (2010).
[56] ELECTRICITY INNOVATION LAB ROCKY MOUNTAIN INSTITUTE, RATE DESIGN FOR THE DISTRIBUTION EDGE: ELECTRICITY PRICING FOR A DISTRIBUTED RESOURCE FUTURE 13 (August 2014).
[57] UtilityDive at 17-18.
[58] Owen Zinaman et al., *Power Systems of the Future: The 21st Century Power Partnership Thought Leadership Report* 23 (February 2015).

purchase energy services from traditional consumers that pay for the electricity they consume but also sell energy and services, such as storage, to those same providers. Thus, "the challenge for incumbent utilities is to find innovative ways to retain the value proposition of their assets while capturing the opportunities presented by [distributed energy systems] and their component technologies."[59]

Another way to frame the issue regarding the utility of the future is to acknowledge that IOUs cannot depend upon regulators to satisfy all of their revenue requirements. Instead, the utility of the future is better understood as an electricity system comprised of multiple actors within multiple regulated and non-regulated markets. Tomorrow's electric industry will be comprised of a wider variety of providers at different scales, generating electricity from different resources and in more competitive environments. Moreover, this new array of providers, by competitive necessity and with a desire for market share, will necessarily pay greater attention to consumer interests in energy services as well as their demand for power. Additionally, the system of the future is, and will continue to be, driven by technological changes, business value opportunities and, most importantly, supporting regulatory initiatives as explained in more depth in the next section.

## III. Clean Energy Regulations

The Trump administration's hostility to clean energy programming does not foreclose the transition to a clean future. The public sector at the regional, state, and local levels are actively involved with the transition and are adopting new sets of regulations further advancing clean energy goals. This section will discuss those initiatives in two parts. First, an array of state initiatives will be discussed. And, second, we will look in depth at one statewide initiative designed to reconfigure the electric industry within that jurisdiction.

### A. ***State Clean Energy Initiatives.***

State governments of been involved promoting clean energy for decades now. The following is a list of those initiatives that are transforming the energy sector by encouraging the development and utilization of renewable resources and efficiency; opening an operating new and more competitive energy markets; and by providing consumers with additional energy choices.

#### *1. Renewable Portfolio Standards*

[59] MASSACHUSETTS INSTITUTE OF TECHNOLOGY at 13.

Renewable portfolio standards (RPSs) have been adopted by 41 states and the District of Columbia[60] and cover over 50% of total US electric demand.[61] The intended purposes include: increasing the amount of clean power that is used to generate electricity; reducing greenhouse gas emissions; promoting technological energy innovations; and creating new and more competitive energy markets. An RPS can be defined as "a regulatory mandate to increase production of energy from renewable sources such as wind, solar, biomass and other alternatives to fossil fuels and nuclear electric generation."[62] This general definition does not convey the complexity and variety of RPS programs. Of the various state programs, for example, 29 have mandatory programs while the others are voluntary. With voluntary programs, the states set specific goals; however, there is no penalty for failure to achieve them.

There are two basic requirements behind a typical RPS program. First, the state regulator will require identified utilities (usually local IOUs) to generate a certain percentage of electricity from specific natural resources. The utility, then, will be required to purchase that percentage from qualifying providers or the regulated utility can purchase renewable energy credits to satisfy its RPS obligations.[63]

The second requirement is that the percentage goal will be set according to a published schedule. By way of example, a state may require that a utility purchase 3% renewable energy beginning in 2012 and increasing to 20% by 2020. Some RPS programs also allow utilities to satisfy their clean energy obligations through the adoption of conservation or energy efficiency programs.[64]

Because energy resources are unevenly distributed across the country, different states emphasize different resources in their RPS programs. States in the Pacific Northwest and states in New England, as an example, have more access to relatively inexpensive hydroelectric power than other states in the country. The state of Maine, for example, adopted a very aggressive 30% RPS goal. However, because eligible resources included existing hydroelectric and biomass power plants, Maine utilities satisfy the 30% requirement on the effective date that the RPS program was launched. Similarly, states in the Southwest have more access to wind and solar power than

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[60] Center for Climate and Energy Solutions, *Renewable and Alternative Energy Portfolio Standards* available at http://www.c2es.org/node/9340; DSIRE & NC Cclean Energy Technology Center, *Database of State Incentives for Renewables & Efficiency* available at http://www.dsireusa.org/.
[61] Union of Concerned Scientists, *How Renewable Electricity Standards Deliver Economic Benefits* 3 (May 2013).
[62] National Renewable Energy Laboratory, *Technology Deployment: State & Local Governments: Renewable Portfolio Standards* available at http://www.nrel.gov/tech_deployment/state_local_governments/basics_portfolio_standards.html.
[63] Joseph P. Tomain, *"Steel in the Ground": Greening the Grid with the iUtility*, 39 ENVT'L L. 931, 956-57 (2009).
[64] Joshua P. Fershee, *Renewable Mandates and Goals* in MICHAEL B. GERRARD (ed.), THE LAW OF CLEAN ENERGY 77 (2011).

northern states and Southeastern states have stronger potential for the development of biomass and less so for solar and wind power.[65]

Moreover, the various states differ on what constitutes an eligible resource. Some states, for example, include clean coal which is defined as coal-fired plants that captures and stores carbon dioxide emissions. Further, some state RPS requirements attempt to achieve other goals such as promote in-state renewable resources. And, as described below, special programs have been set up protect existing nuclear power plants.

To date, there is no national RPS program. The arguments in favor such a program include: (1) a clear understanding of what constitutes clean power; (2) an increase in the amount of clean power that is required to be provided; (3) the creation of a national market for renewable energy credits; (4) increased efficiency by electricity suppliers; (5) rationalization of utility practices i.e. utilities satisfy the national standard rather than individual state standards; (6) more uniform and reliable enforcement; and, (7) an alignment of energy and environmental regulations.[66] A national RPS should smooth out markets and bring consistency to eligible resources as well as consistency in monitoring and enforcement. While the current political climate does not favor a national RPS program, such a program does come with other political costs.

Renewable power is often more expensive than traditional energy sources, therefore, there is a political reluctance to impose higher costs on consumers. Second, as noted above, the uneven distribution of energy resources and the varied mix of power plants within each state make regional application of RPS programs attractive.[67] Further, because of the uneven distribution of resources, questions arise as to the distribution of the cost burdens associated with such programs.[68]

*2. Feed-in Tariffs*

A feed-in-tariff (FIT) has the same goal as an RPS program, which is to increase the percentage of electricity generated from low-carbon resources. A FIT operates differently. With a FIT there is a contract between a utility and a renewable energy developer. The contract sets a certain rate for the electricity purchased from the developer for a specific period of time. Through long-term contracts, new energy providers can rely on an income stream and utilities can use those contracts to satisfy state requirements.

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[65] Jim Rossi, *The Limits of a National Renewable Portfolio Standard*, 42 CONN. L. REV. 1425, 1431 (2010).
[66] Lincoln L. Davies, *Power Forward: The Argument for a National RPS*, 42 **CONN L. REV**. 1339 (2010). See also Fershee at 84-86.
[67] David B. Spence, *The Political Barriers to a National RPS*, 42 CONN. L. REV. 1451 (2010).
[68] Rossi at 1433-36.

FITs have been more widely developed in Europe than in the United States.[69] FITs can be used for the purpose of expanding renewable technologies ranging from wind and solar to geothermal and biomass to fuel cells and tidal power. There are several benefits associated with FIT programs. First, clean energy resources displace fossil fuels thus reducing carbon emissions. Second, the fixed prices can stabilize electricity rates. Third, because clean energy developers can rely on an income stream, economic development and job creation can occur. Fourth, clean power initiatives can contribute to economic growth. Even so, such programs have been controversial particularly in Germany and Spain.

Although Germany is notable for its widespread adoption of FIT programs, the German experience was not problem free because electricity rates were higher than anticipated leading some critics to argue that the program failed. Regardless of higher rates, however, corrections can be made to pricing and the German goal of increasing solar penetration can be and is being met as solar penetration exceeded expectations. Originally, the program was expected to represent about 7% of total German wholesale generation. In 2014, however, solar power was close to 20% of installed capacity and close to 50% of peak demand.[70]

In Spain a solar FIT program was designed to provide guaranteed income to power suppliers but it also put a ceiling on retail rates. As a consequence, of constraining prices, its FIT program failed.[71] Again, the challenge lies in program design.[72]

In the United States, although FIT programs include a variety of renewable technologies, they all generally include solar photovoltaic (PV). In Virginia, for example, the FIT applies only to residential consumers who have installed solar PV while Hawaii's and California's FIT regulations apply to all investor-owned utilities. In each case, the FIT specifies a rate and a contract period usually 10 to 20 years.[73]

States can adopt either RPS or FIT programs or both and the programs can be seen as complementary to each other.[74] RPSs are intended to achieve a certain quantity of electricity that is generated by renewable resources (or efficiency.) FITs, by contrast, focus on cost and creating

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[69] National Renewable Energy Laboratory, *Technology Deployment: State & Local Governments: Feed-In Tariffs* available at http://www.nrel.gov/tech_deployment/state_local_governments/basics_tariffs.html.
[70] JURGEN WEISS, SOLAR ENERGY SUPPORT IN GERMANY: A CLOSER LOOK (July 2014) (a report from the Brattle Group prepared for Solar Energy Industries Association).
[71] Craig Morris, *Spanish Feed-In Tariffs—A Wrapup*, (July 22, 2013) available at http://www.renewablesinternational.net/spanish-feed-in-tariffs-a-wrapup/150/537/71424/.
[72] TOBY D. COUTURE ET AL., A POLICYMAKER'S GUIDE TO FEED-IN TARIFF POLICY DESIGN (July 2010)(a report for the National Renewable Energy laboratory).
[73] U.S. Energy Information Administration, *Feed-in Tariff: A Policy Tool Encouraging Deployment of Renewable Electricity Technologies* (May 30, 2013) available at http://www.eia.gov/todayinenergy/detail.cfm?id=11471 and *Electricity Feed-In Tariffs and Similar Programs* (June 4, 2013) available at http://www.eia.gov/electricity/policies/provider_programs.cfm.
[74] Felix Mormann, *Clean Energy Federalism*, 67 FLA. L. REV. 1621 (2015).

clean power markets. Both programs can be seen as promoting technological innovation in order to satisfy clean energy standards.[75] In short, the RPS sets the goal and the FIT is the primary method for achieving it. By combining both regulatory tools, a larger clean power market is created simultaneously interacting with utilities and emerging clean power providers. Second, energy planning should be more comprehensive. Third, both programs should reinforce each other thus making the attainment of clean power goals more likely. Finally, the use of these tools provides public support for a clean power transition.[76]

*3. Clean Energy Standards and Zero Emission Credits*

Legislation at the state and federal levels has focused on energy efficiency and resource conservation. It is important to distinguish between the two. In a real sense, only resource conservation is truly carbon zero while energy efficiency will have some carbon effects through the manufacturing processes needed for energy efficient appliances buildings and other technologies.

Clean energy standards (CES) and energy efficiency standards (EES) are regularly considered to reduce energy demand. A CES is a requirement imposed upon a utility, similar to an RPS program, which requires utilities to reduce electricity (and/or natural gas) usage by a certain percentage by a certain date.

CES programs can be used to require utilities to invest in energy efficiency programs to reduce energy usage by consumers. The utility, in turn, would recover that investment from ratepayers. Together with either an RPS or FIT program, the CES can have two direct effects. First, investment decisions should be driven to clean energy technologies. Second, efficiency goals should lower total energy costs to the consumer.[77]

According to an Energy Information Administration report, a national CES would have the effect of "significantly reducing the role of coal-fired generation, while increasing the role of nuclear, natural gas, and non-hydropower renewable technologies." Further, such programming is expected to result in a 25% decrease in coal-fired generation by 2025 and a 54% decrease by 2035."[78] Concomitantly, the EIA projected that non-hydroelectric renewable generation would increase significantly by 42% in 2025 and 34% in 2035 with wind and biomass exhibiting largest

[75] Lincoln L, Davies, *Reconciling Renewable Portfolio Standards and Feed-In Tariffs*, 32 **UTAH ENVT. L. REV.** 311 (2012).
[76] Davies, *Reconciling* at 314.
[77] Energy Future Coalition, *Comments by the Energy Future Coalition: Key Elements for Clean Energy Standard Proposals* 5 (2011).
[78] US Energy Information Administration, *Analysis & Projections: Analysis of the Clean Energy Standard Act of 2012* 2 (May 2, 2012).

increases. Further, carbon dioxide emissions were estimated to fall 20% by 2025 and 44% by 2035.[79]

A comprehensive CES should include energy efficiency for two reasons. First, "improving energy productivity is by far the lowest-cost, largest, quickest, and cleanest way to meet clean energy goals."[80] Second, efficiency gains reduce carbon emissions.[81] Reports by the National Academy of Sciences, McKinsey and Company, and the American Council for an Energy-Efficient Economy all demonstrate that efficiency gains not only remain to be made but can promote economic growth by reducing waste.[82]

Zero emission credits (ZECs) area device first adopted by New York state for the express purpose of financially supporting existing nuclear power plants buy delaying their closures. The idea is basic and simple: because nuclear power plants emit zero carbon, therefore, they should be paid for doing it. While it is debatable whether or not nuclear power should play a role in a clean energy future,[83] ZECs are an economically perverse way of doing so. While RPSs and FITs are designed to encourage the entry of clean energy products and resources into the market, nuclear power plants (already heavily subsidized) have been in the market for decades and have recovered their capital outlays. Nuclear power plants are initially license 40 years believing that that extent of their useful lives. The nuclear meltdown in the United States, now, has lasted for over 40 years and, therefore, plants are coming up for license renewals. ZEC markets quite simply reward incumbents and do nothing to open new clean markets.

*4. Specific Programs for Vehicles, Buildings and Appliances*

[79] US Energy Information Administration, *Analysis & Projections* at 3-4. *See also* Anthony Paul, Karen Palmer & Matt Woerman, *Designing by Degrees: Flexibility and Cost-Effectiveness in Climate Policy* (February 2014) (arguing that the CES should be recalibrated to achieve higher efficiencies then as designed in the proposed legislation).
[80] Energy Future Coalition at 2.
[81] US ENERGY INFORMATION ADMINISTRATION, ANNUAL ENERGY REVIEW 2011 12 (September 2012); MONTHLY ENERGY REVIEW 16 (December 2014).
[82] NATIONAL ACADEMY OF SCIENCES, NATIONAL ACADEMY OF ENGENDERING & NATIONAL RESEARCH COUNCIL, REAL PROSPECTS FOR ENERGY EFFICIENCY IN THE UNITED STATES (2010) and MCKINSEY GLOBAL ENERGY AND MATERIALS, UN LOCKING ENERGY EFFICIENCY IN THE U.S. ECONOMY (July 2009). *But see* Hunt Allcott & Michael Greenstone, *Is There An Efficiency Gap?,* (July 19, 2012) (arguing that market failures do exist and while there is an energy efficiency gap is smaller than anticipated by McKinsey). *See also* publications of the American Council for an Energy-Efficient Economy at http://www.aceee.org/publications.
[83] *Compare* THE HORINKO GROUP, NUCLEAR POWER AND THE CLEAN ENERGY FUTURE (September 2016) available at http://www.nuclearmatters.com/resources/reports-studies/nuclear-power-and-the-clean-energy-future *with* Doug Kaplow, Nuclear Power: Still Not viable Without Subsidies (2011) available at http://www.ucsusa.org/sites/default/files/legacy/assets/documents/nuclear_power/nuclear_subsidies_report.pdf.

In response to the energy crises of 1973, legislation was passed to increase US energy independence including legislation to increase energy efficiency in vehicles,[84] appliances,[85] equipment, [86] and buildings. [87] This legislation continued into the 21st century.[88]

The CAFE standards for vehicles began in 1975 at 18.0 miles per gallon (mpg), and during the Obama administration, through negotiations with car manufacturers, they have been raised to 54.5 for cars and light-duty trucks by model year 2025.[89] A goal now threatened by the Trump administration.[90]

Appliance standards work similarly. The Department of Energy established procedures for determining standards of energy efficiency, energy use, and estimated cost for identified products. And, the Federal Trade Commission was required to adopt labeling rules based upon that information. Labeling provides consumers with information about energy savings.

Programs such as Energy Star and LEED labels have been popular as well as successful. In 2009, Energy Star prevented 45 million metric tons of greenhouse gas emissions, the equivalent of emissions from 30 million vehicles. The program has reduced energy consumption and has saved consumers $17 billion in their utility bills.[91]

It has been estimated by the EPA that Energy Star and similar programs have resulted in $19 billion in cost savings to consumers in 2009 alone.[92] Similarly, according to the EPA, from 1992 through 2013, Energy Star participants through investments in energy efficient technologies and practices have reduced utility bills by $30 billion and have prevented more than 277 million metric tons of greenhouse gas emissions in 2013 alone thus providing over $10 billion in social benefits by reducing damages from climate change.[93] The agency also reports that Energy Star

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[84] Energy Policy and Conservation Act, Pub. L. No. 94-163 (1975).
[85] John A. Hodges, *Appliances, Lighting, Computers, Data Centers, and Computer Servers*, in MICHAEL B. GERRARD (ed.), THE LAW OF CLEAN ENERGY ch. 12 (2011); National Appliance Energy Conservation Policy Act of 1987, Pub. L. No. 100-12 (1987).
[86] John C. Dernbach & Marianne Tyrrell, *Federal Energy Efficiency and Conservation Laws* in MICHAEL B. GERRARD (ed.), THE LAW OF CLEAN ENERGY 25, 27 (2011).
[87] National Energy Conservation Policy Act, Pub. L. No. 95-619 (1978); Energy Conservation and Production Act, Pub. L. No. 94-385 (1976).
[88] Energy Policy Act of 2005, 109-58 (2005); Energy Independence and Security Act of 2007, Pub. L. No. 110-140 (2007); American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5 (2009).
[89] White House, *Obama Administration Finalizes Historic 54.5 MPG Fuel Efficiency Standards* (August 28, 2012).
[90] Coral Davenport, *Trump to Undo Vehicle Rules That Curb Global Warming*, **N.Y. TIMES** (March 3, 2017) available at https://www.nytimes.com/2017/03/03/us/politics/trump-vehicle-emissions-regulation.html?_r=0.
[91] Dernbach & Tyrrell at 34; *see also* Noah M. Sachs, *Can We Regulate Our Way to Energy Efficiency? Product Standards as Climate Policy*, 65 VAND. L. REV. 1631, 1637-39 (2012).
[92] Alexandra B. Klass, *State Standards for Nationwide Products, Revisited: Federalism, Green Building Codes, and Appliance Efficiency Standards*, 34 HARV. ENVT. L. REV. 335, 344-45 (2010).
[93] For $CO_2$ reductions and energy cost savings *see* Appliance Standards Awareness Project, $Co_2$ Tracker and $$ Tracker available at http://www.appliance-standards.org/ estimating cumulative electricity savings through 2030 of 4, 429 billion kWh and cumulative $CO_2$ reduction through 2030 of 2,165 million metric tons.

has certified over 4.8 billion products and more than 1.5 million households have earned the Energy Star label since the program began. [94]

Similarly, improved energy efficiency in buildings, which account for 40% of US carbon emissions, can have a significant impact on emissions reductions.[95] Today, the most popular effort to promote the development of green buildings is the voluntary U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) program. Several states and municipalities require that all state government buildings meet LEED criteria.[96] It is been estimated that if these practices are applied to all new buildings in the United States, then projected $CO_2$ emissions could be reduced by over 10% by 2030.

*5. Renegotiating the Regulatory Compact*

For over a century, electricity rates have been set based upon some form of cost-of-service (COS). The COS formula provided incentives commit capital more buildings and equipment and, therefore, contributed to inefficient overcapacity. Even though new rate schemes have been available, public utility commissions (PUCs) have been reluctant to abandon COS ratemaking largely at the behest utilities themselves.

Today, as the electric industry faces new challenges and with the push to decarbonized the electricity system, industry and its regulators must rethink their relationship. We can begin by making certain assumptions about the electricity future including: (1) large-scale central power stations will continue to be important generators although on a diminishing scale; (2) an increasing number of non-IOU power providers are part of a more competitive electricity market; (3) the transportation and distribution segments of the industry will continue to be regulated as long as they exhibit natural monopoly characteristics; (4) IOUs can no longer be devoted exclusively to electricity sales; instead, they must provide a wider array of energy services and products including renewable resources and energy efficiency; and (5) because IOUs will continue to be regulated, a new regulatory compact must be renegotiated based upon a new set of regulatory principles such as the following.[97]

*Stranded Costs.* Utilities should not be put in a position of incurring excess costs that, due to regulatory or policy changes, may become stranded and generate little or no electricity. Yet, the stranded costs problem is a two-edged sword. On the one hand, investors should not be deprived

[94] Energy Star, *Overview of 2013 Achievements* available at http://www.energystar.gov/.
[95] Klass at 340 (2010); Edna Sussman, *Reshaping Municipal and County Laws to Foster Green building, Energy Efficiency, and Renewable Energy*, 1, 8 (2008).
[96] Klass at 344.
[97] ENERGY FUTURE COALITION. UTILITY 2.0 9-13 (March 15, 2013); Massachusetts Institute of Technology and IIT-Commillas, *The MIT Utility of the Future Study* 13-14 (2014); JAMES H. WILLIAMS ET AL., POLICY IMPLICATIONS OF DEEP DECARBONIZATION IN THE UNITED STATES 66-71 (2015) (a report for the Sustainable Development Solutions Network). *See also* Iowa Rev. Code §476.53.

of a return on their investments due to regulatory or policy changes that they could not anticipate; therefore, prudent investments that result in stranded costs should be afforded an opportunity to earn a return. [98] On the other hand, consumers should not pay for investments that yield either no or expensive of electricity. As contemporary energy policy changes, the problem of stranded costs should be anticipated and, if possible, avoided.[99]

*Legacy Financing*. Regulators should avoid legacy financing. Traditionally structured utilities should not continue to be rewarded as they have in the past if they take a business as usual path. Any argument that utilities should continue to earn the same revenue because demand is down, it is not sound. Decreased demand alone is no cause for continuing to allow a regulated firm to earn a return on unproductive investments.[100] No utility has any legal claim to continue to maintain its revenue requirement just because it loses sales.

COS ratemaking had its place, nevertheless, it should not be used to allow utilities to continue to build dirty coal-fired plants nor should it be used to reward utilities for embarking on financially risky nuclear projects.[101] As solar, wind, and natural gas generated electricity show increasingly positive cost signals, continued investments in coal and nuclear power will be viewed skeptically. Instead, of maintaining the status quo, regulators must manage the changing role of IOUs and encourage innovation in their business models.[102]

*Equity*. The new regulatory compact should encourage, rather than inhibit, competition and the development of innovative energy technologies including sales reducing technologies such as DER.[103] DER is becoming an increasingly important actor in electricity markets and it has the potential for unfair cross-subsidization. Consequently, regulators must be careful to ensure that non-DER customers do not pay more than their fair share of the remaining fixed costs. To the extent that net metering rates generate an unfair cross-subsidization, then they should be changed.[104] However, net metering benefits must also be accounted for in rates.[105] Further, regulators must be careful to avoid designing net metering rates that slow DER penetration. The

[98] J. GREGORY SIDAK & DANIEL F. SPULBER, DEREGULATORY TAKINGS AND THE REGULATORY COMPACT: THE COMPETITIVE TRANSFORMATION OF NETWORK INDUSTRIES IN THE UNITED STATES 29 (1997).
[99] Peter Kind, *Disruptive Challenges: Financial Implications and Strategic Responses to a Changing Retail Electric Business* 18 (January 2013).
[100] *Market Street Railway Co. v. Railroad Commission of California*, 324 U.S. 548 (1945).
[101] JASON CHANNEL ET ALS., ENERGY DARWINISM: THE EVOLUTION OF THE ENERGY INDUSTRY 73 (October 2013) (a report for Citi GPS).
[102] ELECTRICITY INNOVATION LAB, NEW BUSINESS MODELS FOR THE DISTRIBUTION EDGE: THE TRANSITION FROM VALUE CHAIN TO VALUE CONSTELLATION 8 (April 2013).
[103] Owen Zinaman et al., *Power Systems of the Future: A 21st Century Power Partnership thought Leadership Report* 3 (February 2015).
[104] Ashley Brown & Jillian Bunyan, *Valualtion of Distributed Solar: A Qualitative View*, 27 **ELECTRICITY J.** 27 (December 2014).
[105] R. Thomas Beach & Patrick G. McGuire, *Evaluating the Benefits sand Costs of Net Energy Metering in California* (January 2013).

smart utility will become actively involved with DER as well as with the development of utility-scale solar wind and other renewable projects.[106]

*Universal Service, Reliability, & Re4silience*. Regulators must be attentive to maintaining universal electric service. Similarly, regulators must assure energy/electricity reliability as well as system resilience.[107] For most consumers, however they will need firm service and grid connection for back-up power. An increase in electricity providers does have the potential for bringing significant benefits to utility service including: reduced load; greater reliability through reduced congestion; better balancing; and lower cybersecurity risks.

*Mitigation*. Since IOUs are well aware of the political economy of a changing energy market, they must avoid incurring expenditures based upon past assumptions in an effort to mitigate damages as is required by any contract. New Hampshire, for example, passed legislation intended to introduce competition into retail electric markets. Regulators recognized the possibility that utilities had invested in the old regulatory regime and, therefore, made provisions that would allow a utility to recover it stranded costs if they were prudently incurred. New Hampshire took an aggressive approach regarding mitigation efforts that a utility should undertake. Those steps included, among other efforts, the sale of excess generating capacity and the renegotiation of service contracts.[108]

*6. Ratemaking Reforms*

By adopting these principles a new regulatory compact can be designed and with it new ratemaking practices. Fortunately, there is no shortage of new rate designs[109] including (1) performance-based ratemaking;[110] (2) incentive rates;[111] (3) alternative regulation;[112] (4) market-based rates; [113] (5) decoupling;[114] (6) feed-in-tariffs;[115] and, (7) results-based regulation as examples.[116] In choosing among new rate designs, regulators must address the changing

[106] Brad Copithorne, *Four Utilities Thinking Beyond "Wires and Poles,"* (October 9, 2013).
[107] Meredith Hiller & Stephen J. Humes, *Resilience in the Utility Industry: Working Against the Rising Tides*, 31 NAT. RES. & ENVT. 12 (Winter 2017).
[108] *In Re Restructuring New Hampshire's Electric Utility Industry*, 171 P.U.R.4th 564 (N.H. P.U.C. 1996) (footnotes omitted.)

[109] TOMAIN, ENDING DIRTY ENERGY POLICY at 174-79.
[110] MICHAEL R. SCHMIDT, PERFORMANCE-BASED RATEMAKING: THEORY AND PRACTICE (2000).
[111] Scott H. Strauss & Jeffrey A. Schwarz, *Transmission Incentive Overhaul: FERC's ROE Incentive Adder Policy Sends the Wrong Signals*, 149 **PUB. UTIL. FORT.** 32 (February 2009).
[112] Lowry.
[113] Hempling at ch.7
[114] Regulatory Assistance Project, *Revenue Regulations and Decoupling: A Guide to theory and Application* (August 2011); *see also* Lowry at 15-21.
[115] U.S. Energy Information Administration, *Feed-in Tariff: A Policy Tool Encouraging Deployment of Renewable Electricity Technologies* (May 30, 2013).
[116] David Malkin & Paul A. Centolella, *Results-Based Regulation: A More Dynamic Approach to Grid Modernization*, 152 PUB. UTIL. FORT. 28 (March 2014).

environment including the development of new technologies and new energy markets.[117] Rates, then should be seen as a "means by which energy companies communicate their value proposition to their customers, and not merely the process by which they collect revenues."[118] Thus, while a wide variety of approaches can be adopted, any rate design should be based upon a set of new functions.

*Costs.* While cost recovery will play a role in any new rate design,[119] a move away from using historically embedded costs, or even future tests year costs, as the central element of a utility's revenue requirement must be adopted. A key move away from cost-based ratemaking is decoupling. At its simplest form, decoupling means that rates will not be based on the volume of electricity sales, instead, rates will be based on other indicators such as the number of customers served.

*Innovation and Transition.* Rate designs can promote innovation and assist in the clean power transition by allowing utilities to recover investments in innovation, energy efficiency, or renewable resources. Smart grid investments and pilot project costs should be recouped, as examples. Similarly, investments in smart meters, energy savings appliances, energy audits and the like should be encouraged and included in a utility's revenue requirement. Regulators, of course, will have a great degree of discretion. Some investments can be included in the rate base and can earn a return for shareholders. Other investments can be treated as costs and recouped dollar-for-dollar.

*Cost-sharing*. Cost-sharing can incentivize utilities to earn savings that can then be shared with customers. Again, regulators will have discretion on the proportion of cost-sharing between the parties, but the idea is to create incentives for innovation and efficiency.[120] A smart rate design may require hybrid pricing models that apply to different investments, different expenses or to different customer classes. Electricity rates, then, can be unbundled for different purposes such as for reliability, standby power, a certain level of service quality, and ancillary power services.[121] Smart rate designs "may ultimately create a nimble system that pays for required services, maximizes value, and allows for effective implementation."[122] The core idea behind moving away from COS to rate designs that are more sensitive to the market and to technological developments is to encourage competition and enable utilities to capitalize on new opportunities.[123]

*Balance of Interests.* Shareholders, naturally, will only invest if they earn a reasonable return on their investment. That return must be comparable with investments of similar risk. Still,

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[117] SOLAR ELECTRIC POWER ASSOCIATION, RATEMAKING, SOLAR VALUE AND SOLAR NET ENERGY METERING – A PRIMER 14 (2013).
[118] Philip Q. Hanser, *Rate Design by Objective*, 150 PUB. UTIL. FORT. 48, 49 (September 2012).
[119] GE Digital at 14.
[120] GE Digital at 14-16.
[121] ELECTRICITY INNOVATION LAB at 14
[122] Rocky Mountain Report, *Net Energy Metering* at 43.
[123] ELECTRICITY INNOVATION LAB at **1**3-14.

shareholders do take on some investment risk and they should not be guaranteed a return at the expense of customers who may receive little or no benefit. The trick lies in clearly identifying the risks to shareholders as well as the costs and benefits to consumers. Rates should send clear price signals that account for both fixed and variable costs;[124] avoid cross-subsidization as much as possible;[125] and, represent the value of services provided to the customer by the utility.[126] "Building a shared understanding among stakeholders and regulators in the electricity sector about the full range of costs and benefits of distributed energy resources and the implications of net energy metering is an essential first step toward devising rates and incentives that will create the greatest benefit for all."[127]

*Prudence and Need Reviews.* Prudence reviews became a matter of concern to utilities with the collapse of nuclear power. The possibility of a prudence review constitutes a risk to investors; however, all risk cannot and should not be eliminated. The fact that utility's capital investment will be reviewed for prudence should be considered simply a matter of bringing business discipline into the electricity market. A prudence review should work hand-in-hand with the obligation of a utility to mitigate the costs of unwise investments. In that regard, then, two reviews should be considered.

First, an *ex ante* a prudence review should occur at the time a utility wants to include specific investments in the rate base as part of a rate hearing or negotiated settlement. After the rates have gone into effect, then a second, *ex post*, prudence review can be done to determine the goals have been satisfied. In this review, additional allowances or disallowances is can be made.

*Market Power*. Finally, regulators will be called upon to exercise an additional review of rates to ensure that utilities are not unfairly exercising their market power. The emergence of more competition in the electric industry and the development of utility business models which encourage them to participate in those markets by, for example, selling energy services and products that are also being sold by third parties, may present market power problems. As an incumbent, a utility will have a leg up with customers and will have more experience. The larger problem, however, is that because utilities will be receiving government protected rates, they should not be able to favor the competitive arms of their businesses through those rates. Utilities should not be in a position to exercise market power on the competitive side of their businesses

[124] ELECTRICITY INNOVATION LAB at 10.
[125] *Id*. at 10.
[126] Rocky Mountain Report, *Net Energy Metering* at 41.
[127] Rocky Mountain Report, *Net Energy Metering* at 36-47.

nor should they be able to engage in market manipulation[128] certainly of the sort experienced during the Enron scandal by manipulating the way that rates are constructed.[129]

Such review is a form of antitrust analysis. Regulators must carefully assess whether or not the incumbent utility has an unfair advantage due to its regulated status in certain competitive markets.[130] More particularly, third-parties that sell energy products and services should be able to operate on a level playing field and utilities should not be able to reduce their financial risk in those markets through rate protection. Therefore, regulators must examine rates to ensure that they do not facilitate the exercise of market power in those more competitive markets.

Clearly, states of been actively involved in renegotiating the regulatory compact and considering and adopting new methods of rate make. The above examples of principles, however, are mostly one-off reforms. More ambitious state-wide reforms are being undertaken as next described.

### B. ***State-wide Industry Restructuring***

While other states, such as Minnesota[131] and Maryland[132] have examined the possibility of revamping the electric industry within those states, New York's Reforming the Energy Vision (REV) project, by contrast, is notably and importantly more ambitious. Announced in a Framework Order of the New York Public Service Commission (PSC) in February 2015, REV proposes to dramatically restructure the electric industry in the state[133] and serve as a model for the nation.[134] The REV statement of purpose favors approaches that the electric system must be more consumer friendly, incorporate new technologies, and integrate new resources. [135] The program promises to transform the distribution system through a partnership with major IOUs and two large municipal utilities. More specifically, the REV vision is to establish markets in which customers and non-utility third parties are active participants in system design and operation.[136]

The Framework Order is a fundamental reconsideration of the existing regulatory structure, distribution utilities, emerging energy markets, and clean energy policy goals. Objectives include

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[128] Joseph Hall & Thomas Gorman, Market Manipulation: The Business Questions, 153 **PUB. UTIL. FORT.** 52 (November 2015).
[129] Douglas Canter, Ronald H. Levine & Abraham J. Rein, *Market Manipulation: Staying a Step Ahead*, 153 PUB. UTIL. FORT. 22 (April 2015).
[130] New York Public Service Commission, *Order Adopting Regulatory Policy Framework and Implementation Plan* 62-72 (February 26, 2015) (Framework Order).
[131] E21 INITIATIVE, PHASE I REPORT: CHARTING A PATH TO A 21ST CENTURY ENERGY SYSTEM IN MINNESOTA (December 2014).
[132] *See* JOSEPH P. TOMAIN, CLEAN POWER POLITICS: THE DEMOCRATIZATION OF ENERGY 179-83 (2017).
[133] New York Public Service Commission, *Order Adopting Regulatory Policy Framework and Implementation Plan* (February 26, 2015) (Framework Order).
[134] Andrew O. Kaplan, *REV'ed and Ready to Go*, 153 PUB. UTIL. FORT. 16, 17 (May 2015).
[135] Framework Order at 3.
[136] Framework Order at 12.

increasing customer participation; providing for resource diversity; and maintaining system reliability and resilience among other objectives. Additionally, the report acknowledged the drivers that were changing the electricity system such as an aging infrastructure, the need for modernization and the incorporation of new technologies, greater consumer participation and the need to reduce carbon emissions.[137] In adopting the REV report, the Public Service Commission (PSC) emphasized the growing importance of ICT to provide more accurate data, enhance cybersecurity, expand customer choice, and improve reliability, power quality, and resilience.[138]

Most significantly, the report recognized that the traditional COS paradigm was inadequate to efficiently address the expansion of clean energy, energy efficiency, and new technologies. Consequently, at the heart of the REV project is regulatory and business model innovation on a broader scale than seen before. In addition to smooth interoperability of distribution systems and wholesale markets, the REV report concentrates on three areas: (1) the distribution system; (2) customer participation; and, (3) regulatory reform.

*Distribution System.* The central actor in the REV's future power system is the Distributed System Platform Provider (DSP) that will be designated to coordinate a multiplicity of power providers, consumer activities, and DER within a particular service area. The DSP will most likely operate under the management of existing utilities. Like many other states, New York has adopted measures to achieve clean power goals including performance-based rates, decoupling, energy efficiency programs, innovative R&D programs, and other activities including a Green Bank[139] to help finance alternative energy projects. Although, these various tools are uncoordinated and efficiencies remain to be gained, they position the state well for more comprehensive programming.[140]

The DSP is intended to modernize, plan, design and operate the state's distribution system[141] and, in effect, becomes the utility of the future. Thus, the DSP serves as a platform for bringing together the growing number of participants in the electric system on both sides of the meter. Proper planning should lead to intelligent integration of all actors, operational efficiencies, the adaptation technological innovations, and the development of ICT, as well as the satisfaction of public policy goals of expanding the use of DER and clean power reliably and affordably.

[137] New York State Department of Public Service Staff, *Reforming the Energy Vision* 1-2; 6-7 (April 24, 2014)(REV); *see also* Framework Order at 16-30.
[138] Framework Order at 22-23.
[139] Ken Berlin et al., *State Clean Energy Finance Banks: New Investment Facilities for Clean Energy Deployment* (September 2012); Hallie Kennan, *Working Paper: State Green Banks for Clean Energy* (January 2014) (report for Energy Innovation Policy and Technology, LLC).
[140] REV at 9-10.
[141] Framework Order at 31-45.

The PSC ruled that incumbent utilities should serve as DSPs[142] arguing that they were best situated for realizing the economic value, particularly from DER. REV recognized that incumbent distribution utilities have decades of experience in planning, construction, monitoring, and balancing the electric system. Consequently, a DSP that operates independently from established IOUs may incur wasteful and redundant learning curve costs and may operate inefficiently. Additionally, incumbent utilities regularly interact with the bulk power market as regulated by the New York ISO and, therefore, can more efficiently coordinate and integrate transmission and distribution services.

*Customer Participation*. The traditional one-way system in which IOUs sold electricity to consumers must be abandoned in favor of the two-way system discussed throughout this chapter that involves the flow of energy and information between producers and consumers. Consumers must be active participants in the design and operation of New York's new distribution system. More particularly, the REV report focuses on the products, information and communications systems, and enabling technologies available in the new electricity market that will enable traditional consumers to take on a new role as prosumers of energy and ancillary services.[143] In order to effectively enhance consumer participation, the new framework will require more intelligent use of consumer and system data particularly concerning price and product transparency and consistency.[144]

All consumers are not alike. The needs and resources of small residential consumers are significantly different than those of large industrial, commercial and manufacturing concerns. Large consumers, for example, currently avail themselves of products offered by energy services companies. Such companies can conduct audits, provide a portfolio of services and technologies, and can help those consumers realize efficiencies. Small consumers should also have access to affordable energy services and resources. By way of examples, an energy service company could provide small consumers with metering retrofit services, wireless HVAC controls, diagnostic sensors, controllable Wi-Fi thermostats, desktop dashboard alerts and financial business incentives among others. Under the New York plan, as well as the plans in Minnesota Maryland, consumer input is a necessary element in constructing the new electricity system.

*Regulatory Reform.* Regarding regulatory reforms, REV first recognized the inadequacy of traditional COS ratemaking specifically because it incentivized electricity sales and not utility performance. Further, the COS method is inconsistent with utilities acting as platform providers serving multi-participant markets as intended by the the DSP model that is intended to capture network benefits.[145] The report then goes on to recognize that New York had shifted to negotiated

[142] Framework Order at 49.
[143] REV at 30-43.
[144] Framework Order at 53-61.
[145] *See also* New York State Department of Public Service, *Staff White Paper on Ratemaking and Utility Business Models* 23-27 (July 28, 2015) (*White Paper*).

multi-year rate cases with the goal of providing opportunities for utilities to improve performance and, on occasion, provide for sharing earnings from efficiency gains with customers.[146] The New York PSC has also employed other mechanisms to adjust rates when necessary, decouple rates, and other performance measures.

The report recommended consideration of several changes to traditional ratemaking including long term rate plans, up to eight years, that would allow utilities more planning time and should reduce the number of contentious rate cases.[147] With a longer term plan, utilities should be able to take greater advantage of innovations and managers should be able to concentrate on performance and customers rather than on cost savings from internal operations.

Ratemaking should focus on performance rather than on a utility's internal costs. Even under some performance-based rates,[148] a utility can increase profits by performing better on internal budgets than the rate allows. While such a measure improves a utility's efficiency, under the traditional formula efficiency gains did not necessarily flow to customers. Therefore, rather than basing rates on the utility's costs, rates should be based upon how well a utility satisfies new functions such as improving customer information, operational resilience, integration of renewable resources, and carbon reduction. The idea behind such performance measures is to add value to customers as well as to the utility. Such a ratemaking focus, in effect, asks utilities to operate more like competitive firms rather than profit-protected firms. The need for better performance rather than for more sales is especially necessary in DER markets.[149] It should be noted that the recommendation does acknowledge that the utility service obligation will necessitate some financial protection through rates.

The REV report recognized that undergirding the adoption of any new ratemaking mechanism will be a set of principles (similar to those set out above) to guide regulators in choosing the proper tool and matching it with an articulated public policy. Above all, the system will be required to provide affordable universal energy service.

Subsequent to the Framework Order, PSC staff issued a detailed White Paper that addressed regulatory reforms and changes in utility business models. Specifically, the staff found that hardware and software innovations could provide utilities with flexibility that could reduce their costs as well as increase the value of DER. These cost savings and increased values could improve how utilities meet their service obligations while capturing the value of third-party and

[146] *White Paper* at 18-21.
[147] *White Paper* at 70-73.
[148] Benjamin Mandel, *Toward Policy-Responsive Performance-Based Regulation in New York State* (March 2015)(a report for Guarini Center: Environment, Energy and Land Use Law – NYU Law School); Sonia Aggarwal & Eddie Burgess, *New Regulatory Models* (March 2014).
[149] Guarini Center: Environment, Energy and Land Use Law – NYU Law School, *Building New York's Future Electricity Markets: Identifying Policy Prerequisites and Market Relationships* 6-7 (July 2015).

customer generated energy resources. Further, these innovations could lead to the development of the smart grid and improve reliability, resiliency, and total system value[150] including value to IOUs.[151] Thus, in order to gain these efficiencies, the staff recommended a comprehensive ratemaking reform, which, in turn, would lead to the new utility business models.

Regarding ratemaking, the White Paper recommended dramatic change. Traditional ratemaking was simply about allocating historic costs to customer classes. Under REV, however, rate designs should work to lower total cost through more accurate price signals.[152] The paper recognizes that there is no single formula to achieve that end. Instead, a variety of tools including net metering, distributed resources tariffs, market-based mechanisms, stand-by rates, demand charges,[153] smart home rates, and time-of-use rates, among others will be necessary in order to assess and value an electric system that effectively incorporates DER.[154] In addition, New York has also adopted a set of clean energy standards and zero energy credits to reach a goal that 50% of the electricity consumed in the state will be generated by renewable resources by 2030 as a statewide strategy to reduce greenhouse gas emissions by 40% by the same year.[155]

The comprehensive reforms envisioned by the staff would be based upon two ideas. First, ratemaking must allow utilities to earn a fair return on investments and must encourage the integration and deployment of DER. In brief, the business model reforms are intended to encourage traditional IOUs to become utilities of the future whose business is the delivery of energy and efficiency through DER not only the sale of electricity.[156] Second, the utility of the future will operate in a more competitive environment.[157]

The PSC concluded that the REV would put New York's electric industry "on a sustainable path to controlling customer bills and increasing system efficiency."[158] Further, the PSC recognize that traditional utility service and regulation were not sustainable because it presented greater costs and uncertainties. Further, the PSC acknowledged that current market and technological trends have changed the electricity world. In New York, a detailed cost-benefit analysis will be undertaken and implemented through additional processes that included the input from various

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[150] *White Paper*; *see also* CARL LINVILL, JOHN SHENOT & JIM LAZAR, DESIGNING DISTRIBUTED GENERATION TARIFFS WELL: FAIR COMPENSATION IN A TIME OF TRANSITION (November 2013) (a report for Regulatory Assistance Project).
[151] Steve Kihm et al., *You Get What You Pay For: Moving Toward Value in Utility Compensation: Part One – Revenue and Profit* (June 2015).
[152] *White Paper* at 73-74.
[153] *Compare* Ahmad Faruqui, *The Case for Introducing Demand Charges in Residential Tariffs* (June 25, 2015) (in favor of demand charges) *with* Barbara R. Alexander, *Residential Demand Charges: A Consumer Perspective* (June 2015) (opposed).
[154] *White Paper* at 73-76; 95-106.
[155] NY DEPARTMENT OF PUBLIC SERVICE, CASE 15-E-0302: CLEAN ENERGY STANDARD: PHASE I IMPLEMENTATION PLAN PROPOSAL (October 31, 2016).
[156] *White Paper* at 9-11.
[157] *White Paper* at 22.
[158] Framework Order at 118.

stakeholders. The REV is an ambitious starting point for the regulatory and market transformation of electric distribution not only in the state but in the nation.

## Conclusion

This paper began with the observation that the antipathy clean energy shown by the Trump administration effectively removes federal government from a leadership role to a clean power future. Regardless, the transition is actively ongoing;[159] clean energy technologies and markets are developing; utilities are experimenting with new business models; and regulators are adopting reforms that encourage and support this transition. While federal leadership would be a boon for clean energy, there are other public and private sector actors on stage.

[159] Samantha Gross, *Far from the White House, the Energy Industry Remains Focused on Climate*, BROOKINGS PLANET POLICY (March 14, 2017) available at https://www.brookings.edu/blog/planetpolicy/2017/03/14/far-from-the-white-house-the-energy-industry-remains-focused-on-climate/?utm_source=feedblitz&utm_medium=FeedBlitzRss&utm_campaign=brookingsrss/topfeeds/planetpolicy.