WATT TO KNOW ABOUT SMART METER DATA PRIVACY: A COMPARATIVE ANALYSIS ON HOW TO BEST REGULATE AND ENSURE CONSUMER PRIVACY PROTECTION

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I. Introduction

Electricity is embedded in everything around us, and electric utility meters are unique devices used to measure the consumption of commercially distributed electricity.[1] An electric utility meter generally measures the amount of energy one uses in a given month.[2] While one's daily use of electricity appears simple, it is part of a nation-wide network comprised of thousands of moving parts, known as the Smart Grid.[3] A part of this ever-growing Smart Grid is the

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1 *See* Joyce Bryant, *Electricity*, YALE-NEW HAVEN TCHR. INST. (1989), *archived at* https://perma.cc/J5ZL-5GLK (discussing how electricity is made up of electrons and electrons are a part of everything in the world); Samson Jeba Kumar, *Digital Energy Meter*, EEWEB (Nov. 30, 2011), *archived at* https://perma.cc/4ZUB-QZMY (elaborating that electric metering allows for the utility to systematically price the consumer's energy use by measuring such usage and calibrating it to billing units).

2 *See Electric Meters*, U.S. DEPT. OF ENERGY (Sept. 23, 2018), *archived at* https://perma.cc/65CV-DK8Z (illustrating that the difference between one month's reading on the utility meter and the next month's reading represents the amount of energy used in that month).

3 *See What is the Smart Grid?*, U.S. DEPT. OF ENERGY (Feb. 15, 2019), *archived at* https://perma.cc/3H8L-5RAP (detailing how the Smart Grid encompasses interaction of numerous electric energy tools). The Smart Grid involves not only the electric grid, but also includes transmission lines, substations, and transformers;

"smart meter," which is the newest generation of energy meters.[4] At its core, the smart meter is the same as a traditional utility meter; however, the smart meter collects energy usage data at much more frequent intervals, making utility bills more accurate and, thus, monetarily more fair for the consumer.[5] The Smart Grid evolution has

among many other technologies that aid in the delivery of one's electricity from the power plant to their home. *Id.*

[4] *See Smart Meters*, OVO ENERGY (Oct. 21, 2018), *archived at* https://perma.cc/D76B-PRKZ (describing what smart meters are and how they provide a two-way communication between a residence, or consumer, and a specific utility company); *see also* Christina Nunez, *Who's Watching? Privacy Concerns Persist as Smart Meters Roll Out*, NAT'L GEOGRAPHIC (Dec. 14, 2012), *archived at* https://perma.cc/6BKV-ZGRG (explaining how the term "Smart Grid" includes a wide variety of technologies involved in the process of transmitting electricity from the power plant to the consumer). For most consumers the Smart Grid symbolizes one thing—the smart meter. *See* Nunez, *supra*. For the purposes of this note, the terms "Smart Grid" and "smart meter" will be used interchangeably. *See Electric Meters*, *supra* note 2 (citing how this technology helps utility companies provide more reliable service). Smart meters utilize a wireless network as a means of communicating not only with the energy company, but also with in-home displays. *Id*. *See also* Maddie Inglis, *Smart Meters: what they are, and why you should get one*, OCTOPUS ENERGY (Mar. 20, 2019), *archived at* https://perma.cc/TCZ2-P9QH (stating smart meters can help a consumer track patterns in their energy use and see which appliances are the most costly as well as provide the consumer with more accurate utility bills); *see also What is the Smart Grid?*, *supra* note 3 (providing what makes the Smart Grid "smart"). The various technologies that comprise the Smart Grid, and smart meters, work together to ensure quick responses to rapidly changing electricity demands. *See What is the Smart Grid?*, *supra* note 3. *See also What is a Smart meter?*, NPOWER (Oct. 21, 2018), *archived at* https://perma.cc/B69E-THNC (outlining how smart meters are used for numerous utility services, including electricity, water, and natural gas).

[5] *See* JIM LAZAR, THE REGULATORY ASSISTANCE PROJECT, ELECTRICITY REGULATION IN THE US: A GUIDE 169 (2d ed. 2016) (identifying how smart meters collect and record consumer electricity usage in short intervals). The data is communicated not only to the utility company, but also the consumer as well as customer-designated energy service companies. *Id.*; Steve Chakerian, *Tracking the smart meter evolution*, ESI AFRICA: AFR.'S POWER J. (Aug. 10, 2018), *archived at* https://perma.cc/S8DD-UWWQ (explaining how smart meters provide more accurate readings and thus more accurate billing); *Data Privacy and Smart Meters*, SMART GRID (Jan. 21, 2019), *archived at* https://perma.cc/N74D-BNLA (describing how smart meters are essentially the same as traditional utility meters except for the frequency at which they retrieve data about energy consumption); Greg Miller, *Mythbusting Smart Meters: The Pros and Cons*, WALL STREET DAILY (Nov. 19, 2015), *archived at* https://perma.cc/4JLR-Y8WA (elaborating that smart meters do not just measure the amount of energy a consumer uses, but also the time at which they use it). *See The history of the electricity meter*, SMART ENERGY INT'L (June 28,

millions of consumers across the United States installing these smart meters into their homes.[6]

As smart meter technologies continue to develop, so do concerns about smart meter data security and consumer privacy.[7] These fears fall into two distinct categories: (1) that smart meter data will "reveal the activities of people inside of a home" through the frequent measurement of their electricity use; and (2) that cybersecurity measures will provide inadequate protections for the transmission of the smart meter data collected.[8] Additionally, the rapid development of smart meter technologies, as demonstrated by the growth of the Internet, makes it impossible to predict their future uses and applications.[9]

In light of the prodigious collection of personal information through smart utility meters today, consumers need to be assured that their privacy rights are adequately protected.[10] Different types of utility companies—some owned by municipalities (hereinafter,

2006), *archived at* https://perma.cc/99JJ-FUEU (summarizing the evolution of measuring electricity and noting that the smart meter allows for energy consumption to be more fairly and accurately represented in a consumer's bill).

6 *See Data Privacy and Smart Meters*, *supra* note 5 (specifying the expansive use of smart meter technology).

7 *See* BRANDON J. MURRILL ET AL., SMART METER DATA: PRIVACY AND CYBERSECURITY 1 (Cong. Res. Serv. ed., 2012) (listing aspects of smart meter use that fuel concerns about data security and consumer privacy). These aspects are:

> (1) recording near-real time data on consumer electricity usage; (2) transmitting this data to the smart grid using a variety of communication technologies; and (3) receiving communications from the smart grid, such as real-time energy prices or remote commands that can alter a consumer's electricity usage to facilitate demand response.

Id.

8 *See* GARY LOCKE & PATRICK D. GALLAGHER, GUIDELINES FOR SMART GRID CYBER SECURITY: VOL. 2, PRIVACY AND THE SMART GRID 27 (2010) (exemplifying the smart grid privacy concerns); *see also* MURRILL ET AL., *supra* note 7, at 3 (categorizing fears about smart meter security and data privacy). These fears give rise to the general concern that smart meter data will be misused by both authorized and unauthorized entities. *See* MURRILL ET AL., *supra* note 7.

9 *See* DEP'T OF ENERGY, DATA ACCESS AND PRIVACY ISSUES RELATED TO SMART GRID TECHNOLOGIES 6 (2010) [hereinafter DATA ACCESS AND PRIVACY ISSUES] (comparing the experience of the rapid growth of the Internet to the relatively new novelty of the use of smart meter technology).

10 *See infra* Part III Section A.

"publicly-owned utilities"), some owned by private investors (hereinafter, "investor-owned utilities"), and others owned by the community (hereinafter, "rural electric cooperatives")—have equally different regulatory schemes that provide oversight for the installation and use of smart meters.[11]

As the United States attempts to find a uniform standard of protection for consumer data, it should look to the Uniform Commercial Code ("UCC"), as well as the European Union's General Data Protection Regulation ("GDPR"), for guidance. Irrespective of which type of regulatory approach is employed to protect energy usage data, all smart meter customers must be guaranteed that they are equally protected from the serious threats to utility data misuse and abuse. Part II of this note examines the history of electricity as a commodity and outlines the development, implementation, and growth of the smart meter.[12] Part III discusses the most common electric utility structures and identifies the three major avenues through which a consumer's smart meter data can be protected.[13] Finally, Part IV analyzes the best methods for providing uniform smart meter data privacy protections.[14] Part IV specifically addresses how the GDPR is the strongest model for ensuring that all electric smart meter customers are afforded the same data privacy protections.[15]

II. History

A. The Development of Electricity as a Commodity

Electric energy first became a commodity eleven years after it was discovered that electric energy could be generated in large amounts.[16] In 1872, Samuel Gardiner capitalized on this discovery and

11 *See infra* Part II Section C.
12 *See infra* Part II.
13 *See infra* Part III.
14 *See infra* Part IV.
15 *See infra* Part IV.
16 *See The history of the electricity meter*, *supra* note 5 (describing how the origin of discovering the ability to generate large amounts of electric energy stems from the invention of the dynamo). The first mass application of harnessing electric energy was through the use of lightning. *Id.* In response to this discovery, it was necessary to evaluate and set the cost of electric energy in order to sell it. *Id.* It was initially difficult and unclear how to measure and monetize the use of this energy and thus challenging to bill this use. *Id.*

patented the first electric energy meter.[17] Then in 1881, Thomas Edison developed his own "electric meter," which remained in use until the end of the 19th century.[18] Nonetheless, these meters were not well equipped to handle the fluctuating demand for electric energy by consumers.[19] In 1884, Hermann Aron attempted to address this problem when he created the pendulum meter, however this creation was plagued by its limited applicability to direct currents.[20] In response to this obstacle, Aron instead developed a motor-driven meter.[21]

[17] *See id.* (elaborating that the first electric meter "measured the time during which energy was supplied to the load").

[18] *See id.* (describing how Thomas Edison used the electrochemical effect of the electric current in his meter). An accurately weighed piece of copper was placed in the calibrated meter at the beginning of the billing period and was reweighed at the end of the billing period. *Id*. When the copper strip was weighed at the end of the billing period, the difference in its weight represented the amount of energy that had been used. *Id*. *See also* Robert Matthews, *How Heavy is Electricity?*, SCI. FOCUS (Mar. 31, 2019), *archived at* https://perma.cc/4PMJ-KHH5 (addressing how, although very small, the electrons that make up electricity have mass).

[19] *See The history of the electricity meter*, *supra* note 5 (recognizing that the meters could only measure ampere-hours). *See also* Forschungszentrum Juelich, *Diverse causes behind frequency fluctuations in power grids*, PHYS ORG (Jan. 10, 2018), *archived at* https://perma.cc/GV4J-3YFK (illustrating that when there is an increase in consumer demand, the power grid's frequency must first drop before it is able to reestablish its normal frequency). The power grid's baseline frequency is fifty hertz, and too many power surges can be extremely damaging to electric devices. *See id.* Today, renewable energy causes significant fluctuations in the power grid, because they are unpredictable sources of power. *See id. See also What Are Surges*, NEMA SURGE PROTECTION INST. (Feb. 16, 2019), *archived at* https://perma.cc/86FY-ZT6S (explaining how power surges result from "brief overvoltage spikes or disturbances" on the power grid).

[20] *See The history of the electricity meter*, *supra* note 5 (discussing how pendulum meters could only measure ampere-hours or watthours). The meter contained two pendulums with a coil on each end that were connected to the voltage. *Id*. The coils would wind in opposite directions and the motion of the pendulums would wind up a clock, and the difference between the oscillation times constituted the measurement mechanism. *Id*.

[21] *See id.* (explaining how in a motor-run meter the driving torque is proportional to the load and is balanced by a braking torque). The torque allows the rotor speed to be proportional to the load when the torques are in equilibrium. *Id*. *See also Torque (Moment)*, NASA (May 5, 2015), *archived at* https://perma.cc/54ZM-6GRH (defining "torque" as the push or pull of an object in a certain direction as a result of a pointed source of force).

Despite this new development, the direct current issue remained as electric utility meters must be compatible with alternating currents.[22] The solution to this problem was the introduction of the transformer, which allowed electric utility meters and alternating currents to harmoniously work together.[23] The next generation of the energy meter was born in 1885, with the invention and implementation of the induction meter, which in turn, led to the development of the power grid.[24] Eventually, during the 1960s, the idea of remote

[22] *See The history of the electricity meter*, *supra* note 5 (elaborating that the direct current's inability to change electric voltage made it impossible to develop bigger electric systems). *See also* Gokul Dharan et al., *Alternating current*, UNIV. OF CALGARY (Sept. 3, 2018), *archived at* https://perma.cc/2VMT-QQYV (elaborating that alternating currents are advantageous for the use of electric power in commercial and residential settings); *ALTERNATING CURRENT*, NDT RESOURCE CTR. (Feb. 16, 2019), *archived at* https://perma.cc/3F7P-7VLC (explaining how alternating currents, a two-way flow of energy, send electricity back and forth between a power plant and an end source). A common alternating current relationship is between a power plant and a home. *See ALTERNATING CURRENT*, *supra*. For example, an alternative current may switch directions sixty times in one second; a speed so fast that a "light bulb does not have a chance to stop glowing." *Id.*

[23] *See* Ariel Balter, *What Is the Purpose of a Transformer?*, SCIENCING (Apr. 24, 2017), *archived at* https://perma.cc/2LKV-7W53 (describing how transformers trade voltage for current in a circuit without affecting the electric power). Electricity obtained through wall plugs is an example of an alternating current system. *Id*. *See also* Dharan et al., *supra* note 22 (explaining how transformers allow alternating currents "to be transmitted at high voltages before being taken down to safer voltages" for use in a home or a business).

[24] *See The history of the electricity meter*, *supra* note 5 (describing some of the improvements made to electric meters over the years include "reduction of weight and dimensions, extension of the load range, compensation of changes of power factor, voltage and temperature, [and] elimination of friction by replacing pivot bearings"). In 1885 Galileo Ferraris discovered that the "two out-of-phase [alternating currents] fields could make a solid armature like a disc or cylinder rotate." *Id.* Later, in 1889, Ottó Titusz Bláthy patented an "[e]lectric meter for alternating currents," which was able to display watthours more accurately. *Id*. One of the greatest improvements was made by César René Loubery who patented the first ripple control system for electric energy meters. *Id.* This system measured both active and reactive energy as well as apparent demand. *Id*. *See also Active, Reactive, Apparent and Complex Power. Simple Explanation with formulas*, ELECTRICAL TECH. (Feb. 16, 2019) [hereinafter *Active, Reactive, Apparent and Complex Power*], *archived at* https://perma.cc/8VD3-B7ZX (differentiating active and reactive energy). "Active energy," or "real power," is the raw power transferred to transformers whereas "reactive energy," is power that continuously transfers back and forth between the power plant and the transformer. *Id. See also What is the*

metering emerged, allowing electric utility meter data to be viewed and monitored from off-site, remote locations.[25]

By the 1970s, remote metering merged with newly developed electronic technology, paving the way for the development of today's smart meter technologies.[26] Hybrid meters emerged in the 1980s and combined induction meters with electronic tariff units to establish what are now known as traditional utility meters.[27] By monetizing the amount of energy used over a period of time, these meters provided a consistent system for the pricing of energy consumption.[28] Today's

Smart Grid?, *supra* note 3 (noting that today's power grid was developed in the 1890s).

[25] *See The history of the electricity meter*, *supra* note 5 (describing how remote pulse transmission was originally used in remote metering although it has been replaced by the evolving newest technologies). *See Remote Metering and Monitoring*, ACCUENERGY (Feb. 16, 2019), *archived at* https://perma.cc/YGQ9-FFQD (detailing how remote metering can work with a network to broadcast a meter's signal from the source to the end user). Remote metering establishes an easier way to access electric meter data. *Id.*

[26] *See The history of the electricity meter*, *supra* note 5 (noting that this evolution occurred when digital integrated circuits became available). *See* TONY R. KUPHALDT, LESSONS IN ELECTRIC CIRCUITS VOLUME VI – EXPERIMENTS 329 (1st ed. 2006) (ebook) (introducing the concept of digital integrated circuits). Digital integrated circuits are comprised of a network of "interconnected components" along a single plane of "semiconducting material." *Id.*

[27] *See The history of the electricity meter*, *supra* note 5 (elaborating that although this technology was not used for a long period of time, it led to the development of extremely precise static meters; relying primarily on the principle of time division multiplication). *See also* Timothy Thiele, *How an Electric Meter Reads Power Usage*, THE SPRUCE (Jan. 5, 2019), *archived at* https://perma.cc/A9TE-LULR (defining a "traditional analog meter [as] a mechanical device found near the service entrance where the utility's service wires enter a building"). Mechanical analog meters require a utility service member to read the physical every month. *Id.*

[28] *See* Kumar, *supra* note 1 (describing how hybrid meters measure the instantaneous voltage and current). The product of these measurements provide the total amount of instantaneous electric power used or consumed. *Id*. *See also Electric Meters*, *supra* note 2 (illustrating how one is charged for the number of kilowatt-hours used over the course of a month). The amount of energy consumed during a respective billing period is measured by the difference between one month's reading of the energy meter and the next month's reading. *Id*. *See also Your Electric Meter*, RICH. POWER & LIGHT (Sept. 23, 2018), *archived at* https://perma.cc/XZ2Y-4BMD (highlighting how meter measurements are calculated). They are calculated by: (1) recording one reading; (2) recording a second reading at a predetermined time; (3) subtracting the first reading from the second reading (difference is the amount of

smart utility meters are based on the newest, and continually evolving, technologies. [29] These new technologies provide numerous benefits, including, but not limited to, more accurate readings of energy consumption.[30]

B. What is the "Smart Grid" and How do Smart Meters Work?

The theory of the Smart Grid is to provide both consumers and utility providers with the most available, reliable and efficient electric energy.[31] Among the numerous technologies used to accomplish these goals are smart meters.[32] The smart meter infrastructure is comprised of a "communications network, a merger data management system and other software and analytics."[33] This communications network allows

energy/kilowatt usage); and (4) multiplying the result from step 3 by $0.09 (the average cost of electricity for Richmond residents) – and how this provides the approximate cost of electricity for that time period. *Id.* The more one uses energy, the less one pays per kilowatt hour. *Id.* Further, there are numerous methods used to correct errors in these meters. *Id.* Residential meters may be read daily through an automated system, reducing human error and eliminating estimated readings resulting from weather or accessibility issues. *Id. See also* Kumar, *supra* note 1 (discussing how most smart meters use software, which is based on a calibration process, to correct errors in their measurements).

[29] *See The history of the electricity meter*, *supra* note 5 (detailing how today's meters use "digital signal processing, with most functions being implemented in firmware"). *See also* Thiele, *supra* note 27 (contrasting traditional utility meters and digital smart meters). Digital meters allow the utility to receive the energy usage data through internet and radio signals. *Id*.

[30] *See* William J. Kemp & Andrew Trump, *Which Side of the Meter Are You On?*, POWER (Jan. 1, 2011), *archived at* https://perma.cc/CVU7-DZKF (asserting that "smart meters pay for themselves"). Utility companies argue that smart meters reduce the costs of both meter reading service (dis)connections. *Id*.

[31] *See What is the Smart Grid?*, *supra* note 3 (listing various benefits of the Smart Grid). *See also Grid Modernization and the Smart Grid*, OFFICE OF ELECTRICITY (Feb. 18, 2019), *archived at* https://perma.cc/BP28-585M (discussing how the Smart Grid "can greatly reduce the frequency and duration of power outages, reduce storm impacts, and restore service faster when outages occur").

[32] *See Grid Modernization and the Smart Grid*, *supra* note 31 (elaborating how advanced digital meters aid consumers by giving them "better information" about their energy consumption).

[33] *See* MURRILL ET AL., *supra* note 7, at 6 (describing how smart meters provide a two-way communication between the meters and the utility (or contracted, third-party entity) that stores the collected data). The data collected is not immediately transferred or transmitted to the utility company/storage space, but instead is intermittently stored at "aggregation points" before reaching the final storage

utilities to provide their consumers with the information and tools necessary to make educated decisions about their energy consumption, while the utilities simultaneously benefit from accurate data.[34]

Further, this network uses two additional networks to transmit specific details about a consumer's energy use both inside and outside of the home.[35] The first network is the Wide Area Network ("WAN"), which is used to communicate a consumer's energy usage information to the utility company.[36] The second network is the Home Area Network ("HAN"), which is used to communicate this information directly to the consumer.[37] Communication between a smart meter and a consumer within the home is much simpler than communication with the utility company.[38]

Although smart meters do not take long to transmit data about energy usage, how frequently they transmit this data varies

location. *Id*. at 6–7. *See also What is the Smart Grid?*, *supra* note 3 (elaborating how this two-way communication is part of what makes the Smart Grid "smart").

[34] *See What is the Smart Grid?*, *supra* note 3 (recognizing that smart meters, and the Smart Grid as a whole, provide consumers an opportunity to reduce their energy consumption and save money on their electric bills). These technologies provide both the utility company and its customers with real-time data about the customer's energy use. *Id*. *See also Smart Grid: What is it and why is it important?*, NEMA (Feb. 18, 2019), *archived at* https://perma.cc/3UXP-AREC (illustrating how the Smart Grid provides consumers with the ability to use electricity in a highly efficient manner).

[35] *See Smart meters*, EMFS.INFO (Oct. 21, 2018) [hereinafter *Smart meters EMFs*], *archived at* https://perma.cc/T4SY-5SLR (comparing the technology used for the transmission of information inside and outside of the home). *See also Smart Meters*, *supra* note 4 (explaining different technologies used to communicate between the device and in-home display).

[36] *See What is the Smart Grid?*, *supra* note 3 (articulating how smart meters communicate important information to consumers regarding their energy use).

[37] *See Smart meters EMFs*, *supra* note 35 (describing how Smart Meters typically use 2.4 GHz wireless signals similar to WiFi and Bluetooth technologies).

[38] *See id.* (laying out the three common transmission methods used to communicate information about smart meter data outside of the home). The three methods are: (1) the use of existing mobile-phone systems which communicate to the closes base station when needed; (2) the use of a radio signal to send data to a collecting point—a place where information is collected from a few thousand to tens of thousands of homes before being sent to the utility company; and (3) the use of a "mesh" system where information is transmitted among Smart Meter homes and is only sent to the utility company once every few hundred homes. *Id*.

immensely.[39] For example, these meters can transmit and use data about energy consumption at intervals varying from minutes to hours.[40] Nevertheless, smart meters do not change what information or data the utility company collects.[41] Instead, the meters simply allow the utility company to collect the data more frequently.[42] As a result, this bolsters the communication between the utility companies and their customers.[43]

C. Regulation of Electric Utilities

The frequent collection and transmission of smart meter data involves immense amounts of individualized information about the consumer.[44] The authority responsible for regulating the protection of this consumer data depends on both the utility's structure and the type of government the utility company provides electricity to.[45] For

[39] *See also* MURRILL ET AL., *supra* note 7, at 3 (describing how smart meters provide "near real-time data" as they can measure energy consumption up to once every minute). *See What is a Smart meter?*, *supra* note 4 (detailing that a smart meter must, at a minimum, collect data once a month, but can be set to send readings daily or even on the half hour). Half-hourly readings allow the consumer to visualize how their energy consumption varies throughout the day. *Id*.

[40] *See Smart meter EMFs*, *supra* note 35 (noting the different intervals at which smart meter data can be collected and shared with the utility company). *See, e.g.*, *Automated Meters: Soon, You'll be Able to Access Your Energy Information Anytime, Anywhere!*, MIDWEST ENERGY, INC (Oct. 26, 2018), *archived at* https://perma.cc/46DB-DLU2 (noting how MidWest Energy's automated meters contain a small radio transmitter that sends consumer usage data back to the utility company every four hours).

[41] *See Data Privacy and Smart Meters*, *supra* note 5 (assuring that the smart meters only collect data about how much energy is consumed; just like traditional analog meters).

[42] *See id.* (discussing how smart meters collect energy consumption data on a more frequent basis, e.g. every fifteen minutes or every hour).

[43] *See Smart meters EMFs*, *supra* note 35 (predicting that there will be an increase in communication with individual meters as smart grids are developed).

[44] *See* MURRILL ET AL., *supra* note 7, at 1 (addressing how smart meters collect significant amounts of personal data about electricity consumers).

[45] *See* THE REGULATORY ASSISTANCE PROJECT, ELECTRICITY REGULATION IN THE US: A GUIDE 9–10 (2011) [hereinafter RAP GUIDE] (providing an overview of the different regulatory structures for privately-owned utilities, publicly-owned utilities and rural electric cooperatives); *see, e.g.*, Electric Usage Data Protection Act, H.B. 1079, 53rd Leg., 1st Reg. Sess. (Ok. 2011) (explaining how the rules to implement the provisions of the Act will be developed by the state commission regulating

instance, there are three different types of electric utility companies – Publicly-Owned ("POU"), Investor-Owned ("IOU"), and Rural Electric Cooperatives ("REC").[46] Each of these utilities is regulated by a different regulatory body.[47] While each of these regulatory bodies essentially performs the same basic functions, there are additional opportunities to implement state-wide protections for utility

Investor-Owned Utilities and by the board of trustees regulating a self-regulated cooperative).

[46] *See Electric Competition Dictionary*, PA. PUB. UTIL. COMM'N (Oct. 21, 2018), *archived at* https://perma.cc/9MUP-2ZBJ (defining IOUs and RECs). IOUs are utility companies that are "owned and operated by private investors." *Id.* In contrast, RECs are "customer-owned electric utilit[ies] that distribut[e] electricity to members and . . . receiv[e] lower-cost financing through the federal government." *Id. See also* NRECA, *America's Electric Cooperatives: 2017 Fact Sheet*, AMERICA'S ELECTRIC COOPERATIVES (Jan. 31, 2017), *archived at* https://perma.cc/PS4S-4DA5 (defining RECs as private, independent, non-profit electricity utility businesses that are owned by those they serve).

[47] *See* RAP GUIDE, *supra* note 45, at 9–10 (outlining the various regulatory mechanisms and bodies of IOUs, POUs, and RECs). IOUs are financed through investors (i.e. shareholders and bondholders) and regulated by the state. *Id.* at 9. In contrast, POUs are governed by locally elected government bodies. *Id.* at 10. Additionally, RECs are subject to regulation by a board of customers elected by the community. *Id. See* Robert J. Michaels, *Electric Utility Regulation*, LIBRARY OF ECON. AND LIBERTY (Nov. 18, 2019), *archived at* https://perma.cc/HQ59-ZD3S (explaining how state commissions are made up of elected or appointed individuals who, as a single entity, set utility rates upon application by the utility company and against which affected parties are allowed to submit testimony). *See also* Kenneth Wiseman et al., *Electricity regulation in the United States: overview*, *in* GLOBAL GUIDE TO ENERGY AND NATURAL RESOURCES (2018), Westlaw (comparing the Federal Energy Regulatory Commission and state public utility commissions). FERC is an independent federal agency that regulates the rates, terms and conditions of wholesale sales and transmission of power in interstate commerce by public utilities. *Id.* Additionally, FERC's responsibilities include, but are not limited to, "review[ing] specific mergers, acquisitions and corporate transactions by electricity companies; licens[ing] and inspect[ing] private, municipal and state hydroelectric projects; [and] issu[ing] and enforce[ing] mandatory reliability standards." *Id.* On the other hand, a state public utility commission only has jurisdiction over an IOU's retail sales of electricity in the state in which the sale is made. *Id.* The commission regulates the terms and conditions of the sale of electricity to the consumers and also oversees the siting and physical construction of generation, transmission and distribution facilities. *Id.*

consumers, and their smart meter data, regardless of whether their utility company is a POU, IOU or REC.[48]

1. Publicly-Owned Utilities

POUs are not found in a one-size fits all package, but instead appear in a variety of organizational formats to best accommodate the structure of their respective service areas.[49] Nevertheless, since they are all exclusively owned by a public entity, they are subject to local regulation and control.[50] POUs are not typically regulated by state commissions, but instead by local governing bodies, such as city

[48] *See Utility Regulation and Policy*, ACEEE (Dec. 24, 2018), *archived at* https://perma.cc/R4EL-FGYN (discussing how state policymakers and regulators may prescribe energy efficiency programs, including the establishment of methods for recurring costs through rate case proceedings). *See State and Local Policy Database*, ACEEE (Dec. 24, 2018), *archived at* https://perma.cc/8FVR-NQ45 (providing a list of states and cities that prescribe energy efficiency programs and comparing them to other cities and states in the database). *See also* RAP GUIDE, *supra* note 45, at 11 (elaborating that the U.S. Constitution provides for federal involvement in private economic activity solely when such activity is part of interstate commerce). Examples of this activity include the transmission of electricity across state lines. *Id*. The courts have held that various parts of the electric utility industry influence interstate commerce and, thus, are subject to FERC regulations. *Id*.

[49] *See* LAZAR, *supra* note 5, at 12 (outlining different examples of POUs). City-owned, or municipal, utilities are one example of a POU and are regulated by the city council or a locally elected commission. *Id*. Public utility districts are another example of a POU and are generally subject to regulation by a board elected by the voters of the service area. *Id*. *See also Differences Between Publicly and Investor-Owned Utilities*, CAL. ENERGY COMMISSION (Oct. 21, 2018) [hereinafter *Differences Between Utilities*], *archived at* https://perma.cc/NP8A-N45G (exemplifying various forms of POUs); *see also* KEISHA PATENT, LEGISLATIVE RESEARCH OFFICE, PUBLIC POWER IN NEBRASKA 2 (2018) (explaining how Nebraska is the only state in which electricity is supplied exclusively through POUs or RECs). Every other state relies on electricity supply from IOUs. *See* PATENT, *supra.*

[50] *See* LAZAR, *supra* note 5, at 12 (discussing how POUs are typically subject to the control of a local City Council or special committee). *See also Differences Between Utilities*, *supra* note 49 (describing how not only are POUs regulated by the local government body and/or consumers or members of the utility, but they are also typically limited to the area served). POUs usually have their own generation facilities and if they do not, they purchase power through contracts. *Id. See also* PUBLICLY OWNED UTILITIES WHAT MAKES US DIFFERENT? 2 (Cal. Mun. Util. Ass'n et al. eds.) [hereinafter PUBLICLY OWNED UTILITIES] (exemplifying the infrastructure of a POU). *See also* PATENT, *supra* note 49, at 2 (highlighting Nebraska as an example of the use of public energy).

councils or other municipal government agencies or departments.[51] Additionally, the federal government has little-to-no regulatory control over POUs.[52]

2. Investor-Owned Utilities

While POUs are limited to a local municipality or district, IOUs can be extremely large both in their geographical reach and their customer-base.[53] In greater contrast, IOUs are owned by shareholders or investors, and are managed by an appointed or elected board of private-sector individuals.[54] Further, state utility commissions have historically been responsible for regulating investor-owned utility companies and, specifically, the protection of consumer data collected by these companies.[55] These regulations outline extensive precautions

[51] *See* LAZAR, *supra* note 5, at 29–30 (noting that in most states the state utility regulator does not have any economic regulatory power over POUs). The majority of state regulatory commissions follow the same procedures as one another as well as FERC. *Id*. at 29. However, a POU's governing body is not tied to this process and may choose to adopt whatever process it deems appropriate. *Id*. at 30.

[52] *See FEDERAL REGULATION*, EDISON ELECTRIC INST. (Feb. 18, 2019), *archived at* https://perma.cc/VNH7-FJ7M (explaining FERC's oversight authority over an independent group, the Electric Reliability Organization ("ERO"), responsible for enforcing mandatory electric reliability rules). The ERO establishes required reliability rules for utilities previously unregulated by the federal government. *Id*.

[53] *See* LAZAR, *supra* note 5, at 11–12 (noting that IOUs serve roughly 75% of the United States population while POUs serve approximately 25% of the population). Many IOUs are not only financially large, but are also "multi-fuel . . . or multistate operations." *Id*. at 11. *See also Differences Between Utilities*, *supra* note 49 (elaborating that these utilities are not limited to a specific service area). Even though POUs can be large, they are generally small or mid-sized; whereas IOUs are typically "very large in size and number of customers" and tend to serve a more diverse customer base. *Id. See, e.g.*, SHELDON SILVER & PAUL TONKO, THE ELECTRIC INDUSTRY IN NEW YORK (N.Y. St. Assembly ed., 1995) (noting how the State of New York relies on seven IOUs to provide electric energy to its residents).

[54] *See* LAZAR, *supra* note 5, at 11 (defining IOUs as "private companies . . . financed by a combination of shareholder equity and bondholder debt"). *See RURAL ELECTRIC COOPERATIVES*, U. WISCONSIN MADISON (Feb. 18, 2019), *archived at* https://perma.cc/A3UB-AG3F (detailing how the profits of an IOU proportionately distributed back to investors based on the number of shares an investor owns).

[55] *See* RAP GUIDE, *supra* note 45, at 8–9 (explaining how, initially, electric and gas companies were allowed to operate without regulation, but the emergency of the first centralized electric utility company in the 1900s led to the first state regulation of

necessary to protect consumers' energy usage data and are regularly tested and reviewed.[56] While IOUs are widely regulated by the state, they are also subject to federal regulation, and many companies partner with federal agencies to strengthen and improve their consumer protection measures.[57]

3. Rural Electric Cooperatives

Unlike both POUs and IOUs, RECs are membership organizations which are owned by the people they serve.[58] The main focus of a REC is to provide a utility service that best serves the needs of its members, and, thus, RECs are governed by a board of directors

utilities). State utility commissions are regulatory bodies with limited power as their authority is governed by the state legislature. *Id*. at 22. The state utility commissions promulgate regulations, decisions and policies that oversee, authorize and influence various aspects of the IOUs' operations such as investment decisions, daily operations, and customer rates. *Id*. at 20. Additionally, the commissions establish the regulations and policies that guide the development and implementation of various energy programs. *Id*. *See also Data Privacy and Smart Meters*, *supra* note 5 (explaining how utilities are required to provide in-depth consumer protection plans to their respective state regulatory commissions).

56 *See* RAP GUIDE, *supra* note 45, at 20 (detailing how these state regulatory commissions are responsible for, among other things, "setting service quality standards and consumer protection requirements").

57 *See* 16 U.S.C. § 824 (2005) (defining FERC's regulatory powers as stemming from its exclusive jurisdiction over "the transmission of electric energy in interstate commerce and the sale of such energy at wholesale in interstate commerce").

> The Commission shall have jurisdiction over all facilities for such transmission or sale of electric energy, but shall not have jurisdiction . . . over facilities used for the generation of electric energy or over facilities used in local distribution or only for the transmission of electric energy in intrastate commerce, or over facilities for the transmission of electric energy consumed wholly by the transmitter.

Id. See also LAWRENCE R. GREENFIELD, AN OVERVIEW OF THE FEDERAL ENERGY REGULATORY COMMISSION AND FEDERAL REGULATION OF PUBLIC UTILITIES 14 (2017) (citing the *Federal Power Act*, 16 U.S.C. 824). *See Data Privacy and Smart Meters*, *supra* note 5 (identifying the Department of Homeland Security, the Department of Energy, and the National Institute of Standards and Technology as federal agencies that partner with utility companies).

58 *See* NRECA, *supra* note 46 (defining RECs as private, independent, non-profit electricity utility business that are owned by those they serve); *see also RURAL ELECTRIC COOPERATIVES*, *supra* note 54 (comparing and contrasting RECs to IOUs and POUs, and explaining how RECs are "owned by its customer members").

elected by the members of the cooperative.[59] But, depending on various factors, RECs may also constitute as a "public utility."[60] If a REC is a "public utility" then the common law "duty to serve," which is unique to public utilities, is applicable to its actions.[61] Nevertheless, most states provide RECs with statutory exemptions from the jurisdictional authority of a state utility commission.[62]

[59] *See RURAL ELECTRIC COOPERATIVES*, *supra* note 54 (highlighting the differences between the service efficiency of RECs as compared to IOUs and POUs). RECs provide the most efficient service for its rural customers who are more geographically dispersed than other utility customers. *Id*. Further, they are not-for-profit organizations, but instead provide their services for the sole purpose of benefiting their consumer base. *Id*. Additionally, the board is responsible for setting the RECs policies and procedures. *Id.*

[60] *See* ROGER COLTON, THE UTILITY LAW PRACTICE SERIES: THE REGULATION OF RURAL ELECTRIC COOPERATIVES 19 (Nat'l Consumer Law Ctr. ed., 1993) (discussing the fundamentals of a rural electric cooperative that make it a "public utility"). If a REC (1) seeks to serve the general public, (2) receives public funds or perquisites, (3) is vested with the power of eminent domain, (4) serves nonmember customers, (5) effectively serves the entire public, and (6) has no discretion to limit membership, it may amount to the status of a "public utility." *Id.* at 21–23.

[61] *See* COLTON, *supra* note 60, at 19 (noting how the common law requires a provided service be available to all who seek it, absent discrimination, under reasonable rules and at reasonable rates). If a REC is considered a "public utility" it is liable under unique common law duties that are only enforceable by the courts and not through a state regulation. *Id*. at 25.

[62] *See* Black River Elec. Coop. v. Pub. Serv. Comm'n 120 S.E.2d 6, 14 (S.C. 1961) (holding that the state lacked jurisdiction to hear the RECs complaint). *See, e.g.*, TENN. CODE ANN. § 65-25-123 (2018) (exempting rural electric cooperatives from the "jurisdiction and control of the Tennessee public utility commission"); *State Policy*, TENN. ELECTRIC COOPERATIVE ASS'N (Jan. 28, 2020), *archived at* https://perma.cc/ZT2R-P5S5 (exemplifying how Tennessee statute exempts RECs from the jurisdiction and control of the state's public utility commission). *See* RAP GUIDE, *supra* note 45, at 27 (recognizing that state utility commissions do not generally regulate POUs and RECs). State regulatory commissions are governing bodies of limited power, and its jurisdictional reach is defined by law. *Id*. This authority allows state utility commissions to promulgate rules, implement statutory mandates and provide guidance on statutory interpretation. *Id*. at 27. However, some state legislatures have given their state utility commissions the authority to regulate RECs. *Id*. at 184.

D. The Use and Regulation of Smart Meter Data in the European Union

In addition to being used in the United States, smart meters are also used by electric utility companies throughout the European Union ("EU").[63] Similar to the United States, the EU is also experiencing a rapid growth in the installation and use of smart meters.[64] The EU government first approached the need for intelligent energy technologies in its 2006 Energy Service Directive.[65] Under the new leadership of the Czech Republic's Presidency, the EU again addressed the need to establish protections for consumer energy consumption.[66] In September of 2009, the EU addressed this need for

63 *See* Green Energy News Desk, *Impact of General Protection Regulation (GDPR) On Smart Meters & Smart Pumps*, GREEN ENERGY NEWS (May 8, 2018) [hereinafter *Impact of GDPR*], *archived at* https://perma.cc/V3ZV-L7LZ (addressing how EU utilities utilize smart meters to generate, collect and use "raw operational data and consumer data" as a means of optimizing their services).

64 *See id.* (noting how the EU is projected to replace 80% of its electricity meters with smart meters by 2020, and the installation of smart electricity meters is predicted to increase by 200 million during this time). *See also Smart meters: unlocking the future*, GOV.UK (Dec. 31, 2018), *archived at* https://perma.cc/2ELY-DVJ9 (explaining how the United Kingdom is "committed to all homes and small businesses being offered smart meters by the end of 2020"); Council Directive 2009/72, annex 1 2009 O.J. (L 211) 55, 91 (EC) [hereinafter Internal Market in Electricity] (calling for 80% of electricity consumers to have smart meters by 2020).

65 *See Institutions and bodies*, EUR. UNION (May 22, 2018), *archived at* https://perma.cc/TN7X-DAZM (outlining the "institutional set-up" of the European Union). There are three institutions that make up the legislative process for the EU: (1) the European Parliament (representing, and elected by, EU citizens), (2) the Council of the European Union (representing "the governments of the individual member countries"), and (3) the European Commission (representing the EU's collective interests). *Id.*; Council Directive 2006/32, 2006 O.J. (L 114) 64, 64 (EC) [hereinafter Energy End-Use and Energy Services] (addressing the need for "improved energy end-use efficiency"). Additionally, the public needed encouragement to engage and invest in energy-efficient improvement measures. *See* Energy End-Use and Energy Services, *supra* at 68. *See also ICO raises privacy concerns over plans to collect smart meter data half-hourly*, PINSENT MASONS (Feb. 3, 2017) [hereinafter *ICO raises privacy concerns*], *archived at* https://perma.cc/AA9B-4XDE (outlining the legislative history of smart meter use in the EU).

66 *See The History of the European Union – 2009*, EUR. UNION (Mar. 27, 2018), *archived at* https://perma.cc/W47G-7WNM (outlining how the Czech Republic obtained its role of Presidency of the Council of the European Union on January 1, 2009). During its Presidency, the Czech Republic was focused on addressing

specific energy-related consumer rights through the enactment of the 2009 Third Energy Package Directive.[67] Additionally, this 2009 Directive strongly supported the use and implementation of smart meters.[68]

With the support behind the use of smart meters, EU utility companies began utilizing smart meters to collect consumer energy usage data in regular and frequent intervals.[69] Additionally, their smart meter equipment is capable of storing vast amounts of energy usage data for long periods of time.[70] Nevertheless, with smart meters

economic and energy issues. *Id*. In March of 2009, the Council agreed to spend €5 billion to upgrade both energy and internet connections across the EU. *Id.*

67 *See Third energy package*, EUR. COMMISSION (Mar. 22, 2020), *archived at* https://perma.cc/N94G-YQ66 (summarizing the history and purpose of the Third Energy Package); *Market legislation*, EUR. COMMISSION (Feb. 23, 2019), *archived at* https://perma.cc/Q6US-QYWT (addressing how the Third Energy Package rules include the consumer's right to receive information about their energy consumption). *See also Energy consumer rights*, EUR. COMMISSION (Feb. 23, 2019), *archived at* https://perma.cc/NH2H-BUJ7 (providing specific rights that EU citizens are afforded as energy consumers). Consumers are guaranteed access to "accurate information on [their energy] consumption and the billing based on it." *Id. See also ICO raises privacy concerns*, *supra* note 65 (discussing the evolution from the Energy Service Directive to the Third Energy Package).

68 *See* Internal Market in Electricity, *supra* note 64, at 65 (noting that the introduction of "intelligent metering systems or smart grids" were necessary to promote energy efficiency and "optimise the use of electricity"). Additionally, the EU states are required to ensure that the smart meters will "assist the active participation of consumers in the electricity supply market." *Id*. at 91.

69 *See ICO raises privacy concerns*, *supra* note 65 (discussing the proposed mandate for "half-hourly settlement" under the United Kingdom's new smart metering system). The United Kingdom's energy regulator, Ofgem, stated that the more frequent data collection would provide consumers with a better experience as it would "facilita[te] lower bills, reduce environmental impacts, enhance[e] security of supply and a better quality of service." *Id*. *See* Alessandra Fratini & Guilia Pizza, *Data protection and smart meters: the GDPR and the 'winter package' of EU clean energy law*, EU L. ANALYSIS (Mar. 22, 2018), *archived at* https://perma.cc/CXE8-KUQJ (noting how utility companies are able to more efficiently produce energy through the smart meter data because of their short, regular collection intervals). *See Smart meters: unlocking the future*, *supra* note 64 (detailing how data shared over the HAN is accessible through an in-home display or a consumer access device). Further, since this data is available every ten seconds, consumers have near-instant access to information about their energy usage. *Id*.

70 *See Smart meters: unlocking the future*, *supra* note 64 (identifying how the smart meters have the capacity to store data collected every thirty minutes for a minimum

storing such large amounts of consumer data, the EU Council had to address the need for smart meter data privacy and security.[71] Thus, in its 2012 Energy Efficiency Directive, this concern was addressed and EU States were required to follow "[u]nion data protection and privacy legislation."[72] Further, in a more recent effort to protect consumer data, the EU implemented the GDPR, a multi-country legislation addressing data ownership and the protection of an individual's personal data.[73]

E. A State's Responsibility to Regulate Smart Meter Data

As smart meter technology continues to rapidly develop, states' concerns continue to grow as to how to effectively protect consumers.[74] As of 2009, sixteen countries either regulated or discussed some minimum consumer protection standards for smart electric meters.[75] In contrast, the United States House of Representatives has chosen to only regulate retail-level decisions, thus

of thirteen months). Additionally, daily energy consumption data can be stored for at least twenty-four months. *Id.* In contrast, the meters can also provide data about energy generated onsite. *Id.* If collected every half an hour, the meters are capable of storing up three months of the exported data. *Id.*

71 *See* Rainer Knyrim & Gerald Trieb, *Smart metering under EU data protection law*, 1 INT'L DATA PRIVACY L. 121, 121–22 (2011) (assessing the dangerous consumer data privacy implications arising from the use of smart utility meters). There are also considerable data security risks that arise from the use of smart meters as well as concerns regarding compliance with data protection principles and regulations. *Id*. at 122.

72 *See* Council Directive 2012/27, 2012 O.J. (L 315) 1, 18 (EC) [hereinafter Energy Efficiency Directive] (adding that the data protection and privacy legislation specifically pertained to the "security of smart meters and data communication").

73 *See infra* Part III Section D.

74 *See* Cassarah Brown, *STATES GET SMART: ENCOURAGING AND REGULATING SMART GRID TECHNOLOGIES*, NCSL (July 2013), *archived at* https://perma.cc/8B75-QAG7 (suggesting that smart grid and smart meter legislation is influenced by the emerging smart technologies).

75 *See* EUROPEAN REGULATORS GRP. FOR ELEC. & GAS, STATUS REVIEW ON REGULATORY ASPECTS OF SMART METERING (ELECTRICITY AND GAS) AS OF MAY 2009, at 31 (2009) (identifying the sixteen countries: Germany, Austria, Cyprus, Estonia, Finland, France, Hungary, Iceland, Italy, Lithuania, the Netherlands, Norway, Poland, Portugal, Spain and Sweden). Additionally, the goal of the minimum standards was to ensure equal protection of function and options for every customer receiving a smart meter, despite the lack of a visible uniform approach for regulators. *Id.* at 32.

leaving the regulation of smart meters and energy usage data to the discretion of each state.[76] In 2013, fourteen state legislatures had pending legislation targeted at regulating how a utility company may operate and utilize smart meters.[77] Of the pending legislation in those fourteen states, only two, California and Vermont, successfully enacted statutory privacy protections for smart meter customers.[78] These legislative efforts offer an opportunity to deter smart meter data privacy breaches, specifically by assigning civil and criminal penalties to the misuse of said data.[79]

[76] *See "LIST OF COVERED ELECTRIC UTILITIES" UNDER THE PUBLIC UTILITY REGULATORY POLICIES ACT OF 1978 (PURPA)*, OFF. OF ELECTRICITY (Feb. 24, 2019) [hereinafter *PURPA*], *archived at* https://perma.cc/GJ9V-WENZ (describing how the regulation of smart meters varies from state to state and is driven by a state's legislation and utility commissions); U.S. CONST. amend. X (providing that "[t]he powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people"); Linda R. Monk, *State Powers*, PBS (Mar. 31, 2019), *archived at* https://perma.cc/3WY8-893B (discussing how the Constitution provides both the federal government and the governments of each respective state regulatory powers, but federal law is superior to all state law); *Branches of the U.S. Government*, USA GOV (Nov. 9, 2018), *archived at* https://perma.cc/CYB9-C92L (outlining how the Legislative Branch of the U.S. Government is responsible for drafting proposed law and is made up of representatives from each state in both the House of Representatives and the Senate). *See also* Alexander Mey & Sara Hoff, *Nearly half of all U.S. electricity customers have smart meters*, EIA (Dec. 6, 2017), *archived at* https://perma.cc/X3CY-DV4F (highlighting how the frequency of smart meter use varies by state, and how the use of smart meters is generally influenced by state legislation and regulation).

[77] *See* Brown, *supra* note 74 (stating that "[s]tates are working to enable authorization of smart meter use as well as customer opt-out and data privacy protections"). Further, in 2013, twenty-one states were considering a bill relating to the Smart Grid issues and development. *Id*.

[78] *See* CAL. CIV. CODE tit. 1.81.4, §§ 1798.98–1798.99 (West 2014) (outlining specific data privacy practices electric and natural gas businesses must take to protect consumer data from third-party access); VT. STAT. ANN. tit. 30, § 2811(West 2018) (establishing costumer rights in which customers must receive prior notice of smart meter usage, have the ability to choose whether they want a smart meter installed or want it removed).

[79] *See* MICHAEL DWORKIN ET AL., SEE ACTION, A REGULATOR'S PRIVACY GUIDE TO THIRD-PARTY DATA ACCESS FOR ENERGY EFFICIENCY 24 (2012) (discussing how state legislatures or public utility commissions could set and enforce rules, penalties and sanctions for data privacy breaches).

III. Facts

A. Legal Privacy Concerns about Smart Meter Data Collection

Historically, energy consumption patterns have not been afforded the same public concern, or legal protections, as financial or health data.[80] Yet, given the recent disclosures about physical and cyber-attacks on utility companies, the collection and use of smart meter data has created substantial concerns about the risks associated with the technology.[81] Two legal privacy concerns in particular exist

[80] *See* LOCKE & GALLAGHER, *supra* note 8, at 12 (discussing how traditional utility meters do not provide the detailed information that smart meters may illustrate). Traditional utility meters typically have to be physically accessed, and the data does not illustrate the usage of specific appliances. *Id*. Instead, the energy data only represents a long-term timeframe of energy use. *Id*. Additionally, the way in which such data is shared is drastically different from how Smart Grid data is shared. *Id*. *See also* Naperville Smart Meter Awareness v. City of Naperville, 900 F.3d 521, 527 (7th Cir. 2018) (finding the government's argument that the consumers sacrificed an "expectation of privacy in smart-meter data" to be unpersuasive because the consumers voluntarily entered into a relationship with the city to purchase electricity and use smart meters). Nevertheless, the court ruled in the government's favor because the government's interest in the modernization of the electric grid far outweighed the privacy interests of its citizens. *Id.* at 528.

[81] *See* ELIAS LEAKE QUINN, COLO. PUB. UTIL. COMM'N, SMART METERING & PRIVACY: EXISTING LAW AND COMPETING POLICIES 3 (2009) (showing the variance in household electricity demands); Rebecca Smith, *PG&E Among Utilities Cited for Failing to Protect Against Cyber and Physical Attacks*, THE WALL STREET J. (Apr. 9, 2019), *archived at* https://perma.cc/H2K5-KP6E (addressing how PG&E, among other utility companies, "lost control of a confidential database of its cyber assets in 2016 resulting in their internet exposure"). *See* LOCKE & GALLAGHER, *supra* note 8, at 23 (noting that there are questions about whether there will be automated sharing, without consumer consent, of otherwise private activities or events as well as concerns about how smart meter data might be used by law enforcement and whether such use would (a) be unlawful and (b) constitute an invasion of privacy). Additionally, there are concerns that outside entities may seek to obtain and utilize a consumer's smart meter data for non-utility-related purposes. *Id*. at 14. *See* Kevin Stark, *Survey: Consumers eager to use, cautious to share smart meter data*, ENERGY NEWS NETWORK (Oct. 22, 2018), *archived at* https://perma.cc/H8LD-8UHD (elaborating that consumers worry about the security of their energy usage information as it travels from the smart meter to their smart phones). Historically, utilities have simply been a business in charge of providing electricity, not maintaining technological innovation. *Id*. Therefore, the utilities are not necessarily prepared to develop and maintain smart meter and home energy applications. *Id*.

surrounding both smart meter data and the Smart Grid as a whole.[82] The first is rooted in the increasing volume and depth of the data that smart meters collect.[83] The second is whether smart meters, and the entire Smart Grid infrastructure, implicates private, confidential communication between the consumer and the utility company.[84]

For instance, hyper-specific electricity usage data provides an inside look at the life of the consumer.[85] As smart meter data becomes more detailed, it also becomes more attractive and valuable to third parties outside of the electric utility industry.[86] Subsequently, the

[82] *See* LOCKE & GALLAGHER, *supra* note 8, at 11–12 (outlining the concerns that smart meter data collection is too detailed, and that the two-way communication is confidential).

[83] *See id.* at 11 (discussing how the amount, and the detail, of data that the Smart Grid collects, greatly differs from traditional utility usage data collection). Some concerns are rooted in the smart utility meters' ability to collect energy usage data at intervals ranging from sub-15 minutes to 15-minutes; all significantly shorter than electricity usage data has previously been collected. *Id.* at 13. As the frequency of this data collection increases, the level of detail of the information collected increases as well. *Id*. at 24. This data provides information and insight into business activities, manufacturing procedures and personal activities in a specific location. *Id*. at 18. *See* MURRILL ET AL., *supra* note 7, at 13 (discussing the difference between smart meter data collection and traditional third-party privacy cases); United States v. Kyllo, 533 U.S. 27, 33–34 (2001) (finding it "foolish to contend that the degree of privacy secured to citizens by the Fourth Amendment has been entirely unaffected by the advance of technology"); United States v. Hamilton, 434 F. Supp. 2d 974, 980 (D. Or. 2006) (reasoning that, unlike in *Kyllo*, the means of obtaining records pertaining to electric utility data from a third-party was not akin to "intrusion on the home by 'sense enhancing technology'").

[84] *See* LOCKE & GALLAGHER, *supra* note 8, at 12 (examining how this potential confidential communication might also apply to relationships between utility companies and third-parties as well as the consumer and third-parties).

[85] *See* MURRILL ET AL., *supra* note 7, at 4 (detailing the information that can be gathered and inferences that can be drawn from the data collected through smart meters). The data can reveal what appliances the consumer is using and when, as well as explaining how the recording of the consumer's energy usage exposes the data to "interception or theft" by unwanted or unauthorized third parties or hackers. *Id.* at 2. *See also* DATA ACCESS AND PRIVACY ISSUES, *supra* note 9, at 2 (recognizing how smart meters can reveal both the daily lifestyle patterns of the consumer, including when a consumer is at home or away, and the presence of home alarm systems). Additionally, the data from these meters can identify medical devices and expensive electronic equipment. *Id*.

[86] *See* LOCKE & GALLAGHER, *supra* note 8, at 36 (providing an example of how large appliance manufacturers may be attracted to the use of smart meter data). Moreover,

value of smart grid, and the data it creates and stores, makes the current electric grid more vulnerable to cyber-attacks and hacking.[87] Additionally, although consumer data is eventually stored by the utility company, the data becomes widely dispersed and stored across the entire Smart Grid while it is in transit.[88] The dispersion of this data has sparked debate about whether a greater number of digital touch points makes the U.S. electric grid more vulnerable to cyber-attacks or more secure from them.[89]

B. Contractual Data Privacy Protections

Every relationship between a utility company and its customers is established through a contract.[90] In these contracts, each

the parties range from appliance manufacturers to unauthorized third parties who pose a great risk to consumer safety. *Id.* This unauthorized third parties may be drawn to accessing smart meter data as a means of engaging in identify theft, theft of tangible property or surveillance of a residence. *Id. See* MURRILL ET AL., *supra* note 7, at 6 (discussing how smart meters collect more than just energy use data). Smart meters also provide access to personal information such as the consumer's name, service address, and billing information. *Id*.

87 *See* Megan McLean, *How Smart is Too Smart?: How Privacy Concerns Threaten Modern Energy Infrastructure*, 18 VAND. J. ENT. & TECH. L. 879, 883 (2016) (addressing how the current electric system in the United States is vulnerable to cyber-attacks); Eric Niller, *Energy Grid: Safe From Cyber Attack?*, DISCOVERY NEWSLETTER (May 9, 2012), *archived at* https://perma.cc/TM9P-9GHA (highlighting how the electric utilities in the United States are not prepared for cyber-attacks). *See* Smith, *supra* note 81 (reporting that "Russian hackers targeted the unprotected computer systems . . . in an attempt to move up the supply chain and compromise defenses of electric companies"); Siobhan Gorman, *Electricity Grid in U.S. Penetrated By Spies*, THE WALL STREET JOURNAL (Apr. 8, 2009), *archived at* https://perma.cc/ZDP5-GHT5 (noting that the cyberspies who infiltrated the United States electric grid left behind software programs that are capable of disrupting the system).

88 *See* MURRILL ET AL., *supra* note 7, at 7 (identifying how vulnerable smart meter data can be to unwanted and unauthorized interception by third parties as it can be stolen while in transit across a wireless network).

89 *See* McLean, *supra* note 87, at 884 (concluding that greater dispersion makes the electric grid more secure as problems can be detected more easily).

90 *See Elements of a Contract*, U.N.M. JUD. EDUC. CTR. (Jan. 30, 2019), *archived at* https://perma.cc/HF35-WSGM (providing an outline for determining when a contract exists). A contract exists when a party has offered to provide a service, something of value was promised in exchange for something such as money, the offer was unambiguously accepted, and there was a meeting of the minds in regard to the agreement. *Id*. *See also Know your rights as a utility consumer*, MASS.GOV

independent utility company typically outlines its own respective privacy policy.[91] A utility company's data privacy policy may include protections for a consumer's personally identifiable information, however it may also include an internal privacy policy – one that is separate from that which is provided to the consumer.[92] Further, when it comes to commercial transactions, these transactions are governed

(Jan. 30, 2019), *archived at* https://perma.cc/H3Z5-MEBE (outlining how utility suppliers are required to provide consumers with a contract as well as details about their service).

91 *See* DATA PRIVACY GUIDELINES FOR LARGE UTILITIES 8 (2019) (suggesting a model customer rights/customer data and privacy statement utility companies should follow when informing consumers of the utility's privacy policy). Under the Data Privacy Policy, the utility defines "personally identifiable information" as a consumer's: first name, last name, email address, phone number, password and username. *Id.*; *Enel X North America Inc Data Privacy Policy*, ENEL X (Aug. 30, 2018), *archived at* https://perma.cc/X9RF-FBD2 (identifying the utility's privacy protection policy for the collection, storage, use and processing of personal data of its consumers). The model provides guidelines for a utility's openness about the customers' right to privacy, data security and integrity, transparency and customer choice. *See Enel X North America Inc Data Privacy Policy*, *supra*. The utility's data privacy policy also specifically addresses how the company will not sell or transfer a consumer's personally identifiable information to a third party without disclosing to the consumer to whom it is given to and why. *Id.* Additionally, the utility promises consumers that their personally identifiable information will never be sold. *Id.*

92 *See* DATA PRIVACY GUIDELINES FOR SMALL UTILITIES AND SAMPLE DOCUMENTS 4 (2019) (providing suggestions for what utility companies should consider personally identifiable information as covered in their respective privacy policies). The Washington PUD encouraged the utility companies to consider such information as: names, street addresses, telephone numbers, email addresses, social security or unified business identifier numbers, account numbers, account balances, information received during the identity and customer credit worthiness process, identifying information from a driver's license or passport, and meter interval/electricity use data for less than a billing cycle. *Id.* However, as for internal customer privacy policies for utilities, they follow in accordance with RCW requirements and the best practices of the industry. *Id.* The model suggests that utilities include policies pertaining to personally identifiable consumer information, disclosure of such information to contractors/subcontractors, affirmative consumer consent and breach of data notice practices. *Id. See also Privacy Policy*, NAT'L GRID (May 18, 2018), *archived at* https://perma.cc/CPM3-NVYF (detailing what individual information the utility collects from its customers, how it uses that information, and its policy on disclosure of that information to third-parties).

by the UCC.[93] Historically, courts have held that, pursuant to traditional beliefs, utility companies provide consumers a service when they sell electricity.[94] Nevertheless, more recently, other state courts have determined that electricity supplied by utility companies constitutes a sale of goods and is, thus, governed by the UCC.[95]

[93] *See* U.C.C. § 1-102 (West 2018) (establishing that the UCC applies to commercial transactions "to the extent that [they] are governed by another article of the [Uniform Commercial Code]"). *See generally* U.C.C. §§ 1-101–310 (West 2018) (detailing the UCC's general provisions, definitions, territorial applicability, and general rules for the entire code); *see also* U.C.C § 1-205(2) (West 2018) (defining "usage of trade" as "any practice or method of dealing having such regularity of observance in a place, vocation or trade as to justify an expectation that it will be observed with respect to the transition in question"). *See* U.C.C. § 2-102 (West 2018) (specifying that Article Two applies exclusively to "transactions in goods" and "does not apply to any transaction . . . intended to operate only as a security transaction").

[94] *See* Jane P. Mallor, *Utility Services under the Uniform Commercial Code: Are Public Utilities in for a Shock*, 56 NOTRE DAME L. REV. 89, 89 (1980) (highlighting that the sale of electricity constituted a service); Otte v. Dayton Power & Light Co., 523 N.E.2d 835, 838 (Ohio 1988) (finding utility companies do not "manufacture" electricity, but instead set into "motion the necessary elements that allow the flow of electricity"); Buckeye Union Fire Ins. Co. et al. v. Detroit Edison Co., 38 N.W.2d 325, 328 (Mich. Ct. App. 1972) (reasoning that the sale of electricity is the sale of a service, and not a good, as defined by the Uniform Commercial Code). Yet, the court held that the implied warranties, as defined by the Michigan courts, is applicable to both the sale of services and the sale of goods. *See Buckeye Union Fire Ins. Co. et al.*, 38 N.W.2d at 329. However, the court clarified that its decision was narrowly applicable to the sale of electricity and not to the sale of goods as a whole. *Id*. at 330.

[95] *See* Norcon Power Partners, L.P. v. Niagara Mohawk Power Corp., 705 N.E.2d 656, 662 (N.Y. 1998) (finding that "the policies underlying the U.C.C. 2-609 counterpart" should be applicable to the sale of electricity). The court held that if the contract in question had been for the sale of a tangible commodity such as gas, the parties would not have hesitated at the notion that it was for the sale of a good. *Id*. The court subsequently found that the sale of electricity was analogous to the sale of such tangible commodities. *Id*. *See also* In re Pac. Gas & Elec. Co., No. C 02-3464 SI, 2004 U.S. Dist. LEXIS 22023, at *13 (N.D. Cal. Sept. 30, 2004) (finding that the "transport of a quantity of electricity is considered a movable 'good' within the meaning of the UCC"). *See also* Mallor, *supra* note 94, at 89–90 (providing examples of case law where the courts held the sale of electricity to be a sale of a good instead of a service).

C. The Lack of State and Federal Legislative Protections Specific to Data Privacy

1. State Legislation

The Federal Energy Regulatory Commission and the Federal Power Act acknowledge the importance of state power in regulating retail utilities.[96] Nevertheless, while a number of states provide, at a minimum, consumer data protections, over half of the states "have no policy in place for electricity data access."[97] Further, developing and solidifying general legislation for state data privacy as well as smart meter data protection is a lengthy process.[98] Nonetheless, numerous

[96] *See* Wade v. Ill. Commerce Comm'n, 91 N.E.3d 383, 388 (Ill. App. Ct. 2017) (finding that FERC's federal authority only extends to subject matters which are not regulated by the state and that agency action can only be overruled if the agency acts in an arbitrary and capricious manner when making its decision). The Commission also found that FERC is only "responsible for and regulates the transmission component of ComEd's facilities in Illinois" while the "Commission is responsible for and regulates the distribution component." *Id*. The Illinois Commerce Commission approved ComEd's installation of smart meters throughout its entire service area as part of an upgrade to its utility transmission and distribution infrastructure. *Id*. at 385. ComEd intended to off-set the costs that came with the use of traditional, or non-smart, meters by charging consumers a monthly fee when they refused to install smart meters. *Id*. The Commission reasoned that the installation and use of smart meters fell under the definition of an "upgrade" pursuant to 220 ILCS 5/16-108.6 (West 2016). *Id*. at 387. *See also* Letter from Scott Pruitt et al., Former Att'y Gen. of Okla., to Sally Jewell, Sec. of the U.S. Dept. of the Interior (Aug. 23, 2013) (on file with the Montana Dept. of Just.) (arguing that "state regulatory programs have been carefully designed to address state-specific issues and needs . . . " and they are better equipped than the federal government to adapt to new information and "modify or update their rules" in a timelier fashion).

[97] *See* CONSTANCE DOURIS, BALANCING SMART GRID DATA AND CONSUMER PRIVACY 10 (2017) (highlighting states that have established rules, via either state statute or agency regulations, pertaining to a consumer's energy usage data). *See also* AARP ET AL., THE NEED FOR ESSENTIAL CONSUMER PROTECTIONS: SMART METERING PROPOSALS AND THE MOVE TO TIME-BASED PRICING 13 (2010) [hereinafter THE NEED FOR ESSENTIAL CONSUMER PROTECTIONS] (addressing concerns related to the use of smart meter technology and the lack of governmental oversight or guidance).

[98] *See* S.B. 356, 2017-2018 Leg., Reg. Sess. (Cal. 2017) (detailing one of California's attempts at addressing energy usage data privacy protections); Assemb. 375, 2017-

states have successfully passed legislation, or highlighted the need for legislation, pertaining to the use and implementation of smart meter utility programs as well as the regulation of the protection of the data they collect.[99]

For instance, some states, such as New Jersey, directly addressed the benefits of smart meters, while others, like California, have simply provided legislation establishing data privacy mandates that are applicable to utility companies.[100] Additionally, in 2011, Oklahoma successfully passed the Electric Data Usage Protection Act after the legislature found that smart grids and smart meters posed potential benefits to both energy consumers and the environment.[101]

2018 Leg., Reg. Sess. (Cal. 2018) (outlining California's most recent legislation, in response to the EU's GDPR, pertaining to data privacy as a whole).

[99] *See* sources cited *infra* note 101–102 (referring to a proposed bill aimed to establish privacy protections for consumer goods). *See* DATA PRIVACY GUIDELINES FOR LARGE UTILITIES, *supra* note 91, at 4–6 (detailing that RCW19.29A established numerous requirements that utility companies must follow such as consumer consent to data releases and rules for the release of consumer data to third parties); Consumers Council of Missouri, *Privacy policies are needed with utility smart meters*, THE ST. LOUIS AM. (Aug. 9, 2018), *archived at* https://perma.cc/EM8Q-M2JL (arguing that the State of Missouri needs to promulgate and implement privacy protections for consumers as it rolls out smart meter programs). As of 2016, nineteen states had specific consumer data privacy policies. *See* Consumers Council of Missouri, *supra*.

[100] *See* S.B. 3467, 217th Leg., 2d Reg. Sess. (N.J. 2017) (finding that the implementation and use of smart meters would provide a profound benefit to utilities as they are able to pinpoint power outages in an efficient and accurate manner). Additionally, the New Jersey legislature found that the use of smart meters reduces the cost of utility rates as they provide more accurate readings of energy use and thus the utility produces more accurate energy bills. *Id*. The legislature reasoned that the installation of smart meters would "help the state meet its energy efficiency goals." *Id*. *See* Cal. Assemb. 375 (granting consumers the right to request that any personal information collected by a business be deleted). Businesses are required to disclose the categories of personal information that are collected as well as the purpose for which they are collecting said information. *Id*. Consumers are also granted the right to know if a business is selling their information and to whom it is being sold. *Id.* Further, all consumers are provided the ability to "opt out" of the sale of their personal information to a third-party. *Id.*

[101] *See* Electric Usage Data Protection Act, H.B. 1079, 53rd Leg., 1st Reg. Sess. (Ok. 2011) (explaining how the installation and use of smart utility meters could reduce utility costs, increase energy efficiency, and better the reliability of the electric grid). The state legislature acknowledged that the more advanced and more newly developed smart meter technologies also produced more detailed data on energy consumption than was previously provided by traditional utility meters. *Id*. Thus,

In 2012, following Oklahoma, Vermont's legislature also addressed the use of smart meters and consumer rights.[102] Further, some state legislatures have provided specific statutory provisions for the use of smart meters, and others have delegated regulatory authority to utility commissions.[103] These commissions address various challenges pertaining to the general installation and use of smart utility meters.[104]

the legislature provided both the utility companies and their customers access to this data. *Id.*

102 *See* S.B. 214, 2011 Gen. Assemb., 71st Biennial Sess. (Vt. 2011) (providing for the protection of consumer rights and the requirement of a follow-up report regarding the success and progress of smart meter use). Utility companies in the state are forbidden from installing smart meters without first notifying the consumer of its installation and informing the consumer how smart meters work. *Id.* The utilities are further required to obtain the permission of the consumer to install the smart meter technology. *Id.* Additionally, a consumer is not required to use the smart meter to measure his or her energy use and the utility is prohibited from adding any additional charge or cost to the utility bill as a result of the consumer's non-smart meter use. *Id.*

103 *See, e.g.*, *An Introduction to Your Georgia Public Service Commission*, GA. PUB. SERV. COMMISSION (Jan. 21, 2020), *archived at* https://perma.cc/RS32-3GAX (detailing the structure, function and powers of the Commission); *About the California Energy Commission*, CA. ENERGY COMMISSION (Feb. 24, 2019), *archived at* https://perma.cc/SQK7-4Y67 (noting that the Commission was established in 1974 by the Warren-Alquist Act).

104 *See* LOCKE & GALLAGHER, *supra* note 8, at 9 (addressing how these privacy protections may not cover the specific data created and collected by the Smart Grid). *See, e.g.*, In re Entergy Ark., Inc., 2017 WL 5067558 (Ark. P.S.C.), at *58 (approving the utility company's implementation of smart utility meters, because such installation and use was in the interest of the public). *See* Donna Bervinchak v. PPL Elec. Util. Corp., 2018 WL 4185438 (Pa. P.U.C.), at *13 (concluding that the petitioner failed to prove by the preponderance of the evidence that the installation of smart meters was unsafe or unreasonable, and thus the steps taken by the utility company to protect consumer data and privacy were adequate); *see also* Catherine Lamagna v. Pa. Elec. Comp., 2018 WL 6124353 (Pa. P.U.C.), at *20 (reasoning that the petitioner failed to provide evidence that the utility company's privacy policy and any smart meter privacy protections were unreasonable). *But see* CAL. PUB. UTIL. CODE § 8380 (West 2020) (outlining the various regulations for the use, ownership and protection of smart meter data as it applies to utilities, consumers and third-parties). Utilities are prohibited from selling consumer energy data or any identifying information for any purpose. *Id.* The companies, or any third-parties they contract with, also may not provide any energy incentives or discounts to consumers for the utilization of their energy use data unless the consumer consents to such use. *Id.* Additionally, if a utility company contracts with a third-party to allow a utility customer access to his or her energy usage data, and that third party

Yet, without state constitutional or statutory energy usage privacy provisions, the courts and state commissions are unable to effectively address privacy interests for consumers.[105]

2. Federal Legislation

While states are granted substantial discretion in their regulation of utility companies and smart meters, the Federal Privacy Act of 1974 further protects consumer's smart meter energy usage data.[106] This Act specifically addresses the protection of data that

uses the data for a commercial purpose, the consumer must be informed of that secondary purpose prior to its use. *Id*. Furthermore, the Code mandates for reasonable measures to be taken as a means of ensuring that consumer energy usage data and identifying consumer information is protected. *Id.*; *see also* Application of Duke Energy Carolinas, LLC, 2018 WL 3209373 (N.C.U.C.), at *12 (ordering the utility to annually file a verified statement of all the ways the company is not only using consumer-related smart meter data, but also the means by which the company is ensuring the protection of consumer privacy); Modernization of the Elec. Grid, 2014 WL 2883889 (Mass. D.P.U.), at *13 (requiring utility companies who utilize smart meters, and share the data collected by them with third-parties, to submit their procedures for not only obtaining consumer consent, but also their procedures for ensuring consumer privacy protection).

105 *See* Levine v. City of Bothell, No. 2:11-CV-1280-MJP, 2012 U.S. Dist. LEXIS 91513, at *11–12 (W.D. Wash. 2012) (holding that there is a minimal privacy interest in power usage records and that a reasonable person would not be offended by the release of such information); In re Personal Restraint of Maxfield, 945 P.2d 196, 197 (Wash. 1997) (holding that state constitutional or statutory provisions are necessary to trigger electric consumption privacy interests). The Court reasoned that such information was not "private" under the State of Washington Constitution, because it did not provide or disclose any discrete or personal information about an individual's activities. *Id*. *See* State v. McKinney, 60 P.3d 46, 51 (Wash. 2002) (finding that electric consumption records from the Department of Licensing do not trigger the need for protection of a privacy interest). Additionally, the court held that information kept in the Department of Licensing's records did not "reveal intimate details of the defendant's lives, their activities, or the identity of their friends or political and business associates." *Id. See also* RESTATEMENT (SECOND) OF TORTS § 652D (defining Publicity Given to Private Life).

> One who gives publicity to a matter concerning the private life of another is subject to liability to the other for invasion of his privacy, if the matter publicized is of a kind that (a) would be highly offensive to a reasonable person, and (b) is not of legitimate concern to the public.

Id.

106 *See* 5 U.S.C. § 552(a) (2012) (establishing federal standards for the collection, maintenance and usage of data by federal agencies).

pertains to any personally identifying information of the consumer.[107] Nevertheless, the Act only provides protections to smart meter data records collected and maintained by a federal "agency."[108] Congress also addressed, and strengthened, the federal government's role in the development of Smart Grid technologies through the Energy Independence and Security Act of 2007.[109] Furthermore, there are several other potential federal protections available to consumers, such as the Smart Grid Investment Grant program, and a proposed "privacy seal."[110]

Moreover, there have been numerous proposals addressing a national framework for data privacy protections, but not without

[107] *See* MURRILL ET AL., *supra* note 7, at 43–44 (noting that the Act is only applicable to smart meter data if (1) the smart meter data pertains to a resident, (2) the resident is a United States citizen or a permanent resident, (3) the data is personally identifiable, and (4) the data is obtainable by either the resident's name or some other personal identifier).

[108] *See* 5 U.S.C. § 552(f)(1) (2016) (defining "agency" as the executive and military departments, government corporations, government-controlled corporations, and other establishments of the Executive Branch as well as independent regulatory agencies). The Act defines "maintain" as to "maintain, collect, use or disseminate." *See* 5 U.S.C. § 552a(a)(3) (2014).

[109] *See* Energy Independence and Security Act of 2007, 42 U.S.C. § 17381 (2007) (addressing how "[it] is the policy of the United States to support the modernization of the Nation's electricity transmission and distribution system to maintain a reliable and secure electricity infrastructure . . . "). The Act specifically highlights the need to do so as a means of being able to "meet future demand growth." *Id*.

[110] *See* MURRILL ET AL., *supra* note 7, at 3 (listing the Stored Communications Act, the Computer Fraud and Abuse Act, and the Electronic Communications Privacy Act as potential federal avenues available to consumers; protecting them from issues arising from the use of their smart meter data). Section five of the FTC may subject an electric utility company to compliance standards regarding its privacy and security measures. *Id.* However, privacy protections afforded under the Federal Privacy Act of 1974 generally only protect smart meter data that is controlled by, or in the possession of, federal agencies. *Id.* at 43. *See* ENERGETICS INC., U.S. DEPARTMENT OF ENERGY SMART GRID PRIVACY WORKSHOP SUMMARY REPORT 1 (2012) (discussing the potential role of the Federal Government as a facilitator of privacy protections for Smart Grid technologies such as the smart utility meter). *See also* 15 U.S.C. § 7262(a) (2019) (requiring public companies to maintain adequate "internal controls" on information and data collected). *See* DWORKIN ET AL., *supra* note 79, at 16 (summarizing the basic privacy principles that many federal privacy practices and industry standards follow).

pushback.[111] After the enactment of the Federal Privacy Act, the United States Senate attempted to address the issue of securing and protecting utility data with the proposed American Energy Innovation Act of 2015; however, the Senate's session adjourned before the proposed Act could be further considered.[112] Additionally, in February of 2012, the Obama Administration presented a proposed framework for protecting consumer data.[113] Also, more recently, Senator Ron Wyden introduced the Consumer Data Protection Act ("CDPA"), which found much support from many major technology companies and service providers.[114] Nevertheless, these same companies have

111 *See* Dan Clark, *Federal Data Privacy Legislation Is Likely Next Year, Tech Lawyers Say*, LAW.COM (Nov. 29, 2018), *archived at* https://perma.cc/8RGS-ZZUT (summarizing the various Congressional proposals aimed to "create an overarching law governing data privacy and cybersecurity"). Representative Hank Johnson proposed rules for governing the collection and security of data from mobile devices. *Id.* Representative Johnson also introduced a bill, the Data Broker Accountability and Transparency Act of 2018, requiring the establishment of data access and correction procedures for data brokers. *Id. See also* Derek Hawkins, *The Cybersecurity 202: Why a privacy law like the GDPR would be a tough sell in the U.S.*, WASHINGTON POST (May 25, 2018), *archived at* https://perma.cc/9BQV-XHXS (addressing how challenging it is to "pass simple legislation in a gridlocked Congress").

112 *See* American Energy Innovation Act, S. 2089, 114th Cong. § 1001(c)(2)(A) (2015) (proposing that the Secretary be required to issue voluntary guidelines). *But see Actions Overview: S.2089 – 114th Congress (2015-2016)*, CONGRESS.GOV (Feb. 18, 2020), *archived at* https://perma.cc/4XMA-QCZE (detailing how the initiative never made it past the Senate and failed when the session adjourned).

113 *See* CONSUMER DATA PRIVACY IN A NETWORKED WORLD: A FRAMEWORK FOR PROTECTING PRIVACY AND PROMOTING INNOVATION IN THE GLOBAL DIGITAL ECONOMY 6 (2012) [hereinafter CONSUMER DATA PRIVACY IN A NETWORKED WORLD] (highlighting how the "existing data privacy framework in the United States is flexible and effectively addresses some data privacy challenges in the digital age"). The administration noted, however, that data privacy protection at the federal level is limited, because most of the federal privacy statutes are only applicable to specific sectors, and, therefore, large amounts of personal consumer data is not federally protected. *Id*. The administration also asserted that the Consumer Privacy Bill of Rights "[set] forth individual rights and corresponding obligations of companies in connection with personal data." *Id*. *See also* Cameron F. Kerry, *Why protecting privacy is a losing game today—and how to change the game*, BROOKINGS (July 12, 2018), *archived at* https://perma.cc/3D4R-CY2N (discussing how the Consumer Privacy Bill of Rights was drafted to be put into law, but failed to gain momentum and "remains unfinished business").

114 *See* Consumer Data Protection Act, H.R. 4544, 115th Cong. § 2 (2017) (proposing the establishment of general national data privacy protections for consumer goods). *See also* Sarah Parker, *A Step Forward for Federal Privacy Legislation*, JOLT DIG.

vocalized that their support is contingent on federal preemption of state data privacy laws.[115] Thus, Congress is facing significant pressure to address and preempt any state or local laws that conflict with any national data protection framework it creates.[116]

D. General Data Regulation Plan: The European Union's Approach to Data Security and Consumer Protection

In response to data privacy concerns across the EU, the GDPR was implemented as a means of providing "consistent and homogenous application" of personal data protection rules to all EU

(Dec. 5, 2018), *archived at* https://perma.cc/YVQ8-A875 (commenting on Senator Ron Wyden's proposed federal data privacy legislation). Under the proposed bill, consumer data would be more transparent, and consumers would have greater control over how their personal data is used. *Id.* Additionally, the bill suggests increasing the FTC's authority to assess and enforce punitive damages for violations. *Id. See* David Meyer, *In the Wake of GDPR, Will the U.S. Embrace Data Privacy?*, FORTUNE (Nov. 29, 2018), *archived at* https://perma.cc/2JZU-JAZ3 (analyzing how the European Union's GDPR legislation has influenced the proposed Consumer Data Protection Act). *See* David Shepardson, *Tech companies back U.S. privacy law if it preempts California's*, REUTERS (Sept. 26, 2018), *archived at* https://perma.cc/4C6R-B2QC (discussing how major technology companies, including Amazon, Apple, and Twitter, informed the Senate Commerce Committee that they supported the CDPA's proposed privacy regulations); Scott W. Pink, *The Big Push for a Federal Privacy Law: What Does it Mean for State Regulators? (Contributed)*, GOV'T TECH. (Oct. 19, 2018), *archived at* https://perma.cc/J93G-9DWZ (noting how the Internet Association, representing big technology companies has proposed "an economy-wide, national approach to regulation that protects the privacy of all Americans").

115 *See* Shepardson, *supra* note 114 (detailing how major technology and internet service companies back the proposed federal data privacy law so long as it preempts California's recent state data privacy law).

116 *See* Andy Green, *Wyden's Consumer Data Protection Act: Preview of US Privacy Law*, VARONIS (Jan. 8, 2019), *archived at* https://perma.cc/M3RT-TMM6 (outlining how various big-name technology companies have offered their own frameworks for data privacy protections). These proposed frameworks are a much simpler version of the EU's GDPR. *Id. See also* Pink, *supra* note 114 (highlighting that pressure to develop a national framework that preempts state and local laws stems from concerns from the technology industry). *Contra* Liam Tung, *GDPR, USA? Microsoft says US should match the EU's digital privacy law*, ZDNET (May 21, 2019), *archived at* https://perma.cc/Z96U-KPCL (summarizing how Julie Brill, Microsoft's deputy general counsel, openly supports the United States implementing legislation modeled after the GDPR).

citizens.[117] The GDRP regulates not only data ownership, but also the protection of the personal data of all EU citizens; however, if data is anonymous, then the regulations are not applicable.[118] Further, although the European Parliament and Council recognize the need to facilitate the free flow of personal data, they acknowledge that "the right to the protection of personal data is not [absolute]."[119] Nevertheless, when processing personal data, the GDRP requires the

[117] *See* European Parliament and of the Council 2016/679, art. 9, 2016 O.J. (L 119) 1, 2 (EU) [hereinafter GDPR] (addressing how protection of personal data is a fundamental right, and "the level of protection of the rights and freedoms of natural persons with regard to the processing of . . . data should be equivalent in all Member States"). As technology and globalization have advanced, the amount of personal data shared and used has also experienced significant growth. *Id.* These new technological advancements have provided both private companies and public authorities an avenue to "make use of personal data on an unprecedented scale to pursue their activities." *Id.* Further, in part, the Regulation "applies to the processing of personal data wholly or partly by automated means." *Id.* at 32. *See also Impact of GDPR*, *supra* note 63 (noting how the EU's GDPR was created in an effort to protect the personal data of EU citizens). *See also Smart meters: unlocking the future*, *supra* note 64 (detailing how the GDPR "governs the processing of personal data by any party which obtains consumption data").

[118] *See* GDPR, *supra* note 117, at 5 (recognizing how even if a person undergoes "pseudonymi[z]ation," data may still be traceable to that individual). Any means that may be reasonably likely to be taken by either data controllers or other people should be considered when determining whether data is directly or indirectly identifiable. *Id.* *See also Impact of GDPR*, *supra* note 63 (adding that any utility that uses location data of a consumer is required to communicate the purpose of that data to said consumer).

[119] *See* GDPR, *supra* note 117, at 2 (addressing the necessary balance between the benefits of the free flow of personal data and the insurance of "high level" protection of personal data). Additionally, the right to personal data protection must be balanced against other fundamental rights. *Id.* Further, there are four circumstances under which the GDPR does not apply to the processing of personal data:

> (1) in the course of an activity which falls outside the scope of Union law; (2) by the Member States when carrying out activities which fall within the scope of Chapter 2 of Title V of the TEU; (3) by a natural person in the course of a purely personal or household activity; [and] (4) by competent authorities for the purposes of the prevention, investigation, detection or prosecution of criminal offenses or the execution of criminal penalties, including the safeguarding against and the prevention of threats to public security.

Id. at 32.

data-processing parties to take every reasonable step to "ensur[e] appropriate security and confidentiality" of that data.[120]

Similar to the United States, EU countries have recognized the numerous benefits associated with the use of smart meters and the collection of energy usage data.[121] Yet, there is still an on-going debate in the EU about the security of smart meters and the data they collect and store.[122] However, European utility companies have insisted that the smart meter's energy consumption data is safely stored and untraceable to an individual consumer.[123] But, despite these repeated assurances, privacy concerns have accompanied the growth of the smart meter.[124] In light of these concerns, the EU has even gone

120 *See id.* at 7 (elaborating how personal data should be protected from unauthorized third-party access).

121 *See Smart meters: unlocking the future*, *supra* note 64 (addressing the crucial role smart meters play in the necessary upgrade to the European Union's energy infrastructure).

122 *See* Nick Ismail, *UK smart meters could be vulnerable to cyber attacks – GCHQ warns*, INFORMATION AGE (Feb. 19, 2018), *archived at* https://perma.cc/D8BX-YBPU (quoting Robert Cheesewright, who declared smart meters as "one of the safest and most secure pieces of technology" in the consumer's home). Cheesewright works for Smart Energy GB, the government-funded agency spearheading the implementation of smart meters. *Id.* Others state that smart meter systems' connection to the internet generates a serious security risk for a connected smart home. *Id.* If a smart meter is compromised, other internet-connected devices in the home are easily accessible to hackers. *Id.* Sensitive, personal information may be contained on such devices. *Id.*

123 *See* Patrick Collinson, *Is your smart meter spying on you?*, THE GUARDIAN (June 24, 2017), *archived at* https://perma.cc/B38R-E7JA (discussing how electric utilities insist that a consumer's smart meter data cannot be used for non-energy efficiency purposes without specific permission).

124 *See ICO raises privacy* concerns, *supra* note 65 (recognizing how the half-hour data collection mandate contradicts the data privacy framework governing the use of smart meter data). Energy consumption data collected at such frequent intervals provides utility companies the ability to analyze the data and build energy usage "profiles" for individuals. *Id.* These profiles could then be used "to make decisions about that person." *Id. See also* Collinson, *supra* note 123 (highlighting that "we all know that once data is out there it is used in ways we didn't anticipate"). In France, those opposed to smart meters label them as a "'Trojan horse' that could harvest vast amounts of data about" the daily activities of the consumer. *Id.* Other critics fear how smart meters are able to provide insight into the number of showers taken in a residence and when an individual was cooking, as well as when the home is occupied or unoccupied. *Id. See also* Ismail, *supra* note 122 (highlighting the security concerns from the GCHQ, a British intelligence agency, regarding installing and

as far as to establish a provision allowing Member States to implement their own supplemental regulations as a means of maintaining the effectiveness of the GDPR.[125]

IV. Analysis

A. Contractual Approaches to Protecting Consumer Privacy

At their core, all utility-consumer relationships, regardless of the utility's structure, are the same.[126] These utility-consumer relationships are rooted in contracts that outline various agreements the parties make with one other.[127] Nevertheless, since the structure of a utility, alone, does not automatically influence the smart meter data privacy protections of its customers, the protections must be created through the parties' contract.[128] Yet, the content of these contracts varies immensely as the contract's formation is influenced

using smart meters). The agency fears that such use could open the door for hackers to steal personal and detailed information about consumers and use that data to defraud customers. *Id.* The agency believes that the smart meters' connection to the internet makes them vulnerable to such attacks. *Id.*

125 *See* GDPR, *supra* note 117, at 3 (elaborating how Member State laws are necessary to strengthen the EU personal data protection regulations). The GDPR also establishes "supervisory authorities" in the EU Member States; empowering them to independently "perform their tasks and exercise their powers. *Id.* at 22.

126 *See* RAP GUIDE, *supra* note 45, at 9–10 (detailing the numerous structural forms a utility can take).

127 *See Elements of a Contract*, *supra* note 90 (outlining the four basic requirements of a contract). A contract requires: (1) an offer, (2) consideration, (3) acceptance, and (4) mutuality. *Id.*; *see also* DATA PRIVACY GUIDELINES FOR LARGE UTILITIES, *supra* note 91, at 3 (providing utilities with guidelines for their contracts with individual customers as a means of addressing consumer data privacy concerns). The Commission advises that each utility should consult with their respective regulatory bodies before implementing the suggested policy, because different regulatory counsels may have different individual policies and practices. *See* DATA PRIVACY GUIDELINES FOR LARGE UTILITIES, *supra* note 91.

128 *See Elements of a Contract*, *supra* note 90 (defining an offer, consideration, acceptance and mutuality). An offer is made when one party promises to do something, or refrain from doing something, in the future. *Id.* Additionally, consideration occurs when "something of value was promised in exchange" for said action or inaction. *Id*. Further, acceptance of the promise and exchange must be express and unambiguous. *Id*. Lastly, there must be a "meeting of the minds" for the contract to be finalized; all parties must understand and agree upon the basic premises of the contract between them. *Id*.

by the utility's structure and leadership.[129] Although these utility contracts accomplish the same basic concept of establishing an agreement between the service provider and the consumer, their inconsistencies prevent smart meter data protection from being universally regulated.[130] Nonetheless, the UCC is applicable to all utilities and offers an avenue for equal regulation of POU, IOU, and REC smart meter data because, regardless of their structure, they all encompass the commercial sale of a consumer good.[131]

According to the UCC, Sections 1-205(2) and 2-315 can be used to protect and regulate consumer's private smart meter data.[132] Specifically, Section 1-205(2) holds utility companies accountable to the common practices of their trade, while Section 2-315 offers protection to smart meter customers from the sale of their energy usage data without their knowledge or consent.[133] As evidenced by the use

[129] *See* RAP GUIDE, *supra* note 45, at 9–10 (providing the structure and governing powers of POUs, IOUs, and RECs).

[130] *See* DATA PRIVACY GUIDELINES FOR LARGE UTILITIES, *supra* note 91, at 3 (illustrating the need for universal or more consistent privacy clauses in utility contracts).

[131] *See* U.C.C. § 2-102 (2018) (describing the "Scope; Certain Security and Other Transactions Excluded from this Article"). The provision states:

> Unless the context otherwise requires, this Article applies to transactions in goods; it does not apply to any transaction which although in the form of an unconditional contract to sell or present sale is intended to operate only as a security transaction nor does this Article impair or repeal any statute regulating sales to consumers, farmers or other specified classes of buyers.

Id. *See also* Mallor, *supra* note 94, at 89–90 (providing examples of case law where the courts held the sale of electricity to be a sale of a good instead of a service); *see also* In re Pac. Gas & Elec. Co., No. C 02-3464 SI, 2004 U.S. Dist. LEXIS 22023, at *13 (N.D. Cal. Sept. 30, 2004) (finding that the "transport of a quantity of electricity is considered a movable 'good' within the meaning of the UCC"). *See* Matthews, *supra* note 18 (noting that electricity is "the flow of electrons" and electrons have mass); U.C.C. § 2-105 (2018) (defining goods as "all things (including specially manufactured goods) which are movable at the time of identification to the contract for sale other than the money in which the price is to be paid . . ."). The UCC further establishes that goods "must be both existing and identified before any interest in them can pass." *Id.*

[132] *See* COLTON, *supra* note 60, at 127 (recognizing that even when the UCC is not directly applicable, it may be analogous to an electric utility transaction).

[133] *See* U.C.C § 1-205(2) (2018) (defining "usage of trade" as "any practice or method of dealing having such regularity of observance in a place, vocation or trade

of privacy clauses in utility contracts as well as company-wide privacy policies, it is clearly common practice to protect the privacy of consumers, which is further established under Section 1-205(2).[134] As a result, POUs, IOUs and RECs should all be aware that consumers expect their smart meter data to be adequately protected.[135] Additionally, the utility company, as the seller, should know at the time of the contracted sale of the electricity and the sale of the smart meter that the utility company might provide the consumer's energy data to a third party.[136] Therefore, in accordance with Section 2-315 of the UCC, the consumer has a reasonable expectation that their smart meter data will be protected, and that the utility companies are taking such measures to protect this data.[137]

B. Why Data Specific Legislation is Necessary for the Privacy Protection of Smart Meter Data

1. State Legislation

While there is a role for the federal government to play in providing minimum standards for smart meter data privacy protections, state legislation is more appropriate.[138] States have the best insights into their own needs as well as the technologies used to

as to justify an expectation that it will be observed with respect to the transition in question"); *see also* U.C.C. § 2-315 (2018) (defining "Implied Warranty: Fitness for a Particular Purpose").

134 *See* U.C.C § 1-205(2) (2018) (requiring that a practice be regularly used in a specific trade); *Privacy Policy*, *supra* note 92 (outlining National Grid's company-wide privacy policy as advertised to consumers). *See* U.C.C. § 2-103 (1994) (requiring merchants to act in "good faith" which is defined as "honesty in fact and the observance of reasonable commercial standards of fair dealing in the trade").

135 *See Privacy Policy*, *supra* note 92 (illustrating National Grid's awareness of the need to protect consumer information pertaining to energy usage and thus its awareness that this protection is expected by said consumers).

136 *See* Consumers Council of Missouri, *supra* note 99 (highlighting that utility companies may sell consumer energy data to third parties and that data in other consumer industries has been highly susceptible to hacking and third-party breaches).

137 *See* U.C.C. § 2-315 (2018) (requiring sellers to provide their buyers with goods fit for a specific purpose when the seller is aware of the buyer's reliance on its expertise to supply suitable goods).

138 *See* DWORKIN ET AL., *supra* note 79, at 24 (highlighting the enforcement authority of state legislatures and public utility commissions).

meet those needs.[139] In contrast, while the federal government can provide a floor of protections, it lacks the ability to tailor the consumer protections necessary to respond to these local smart meter data privacy concerns.[140] For example, the needs in a warm-weather state like California greatly differ from the needs of a cold-weather state like Vermont.[141] More importantly, states like Nebraska, which are serviced exclusively by POUs, experience different utility and data privacy needs than states that are serviced by a mix of POUs, IOUs and RECs.[142]

Nevertheless, this furthers the need for more state legislative direction because it is a necessary means of remedying the current unequal consumer smart meter data privacy protections across the country.[143] Further, specific state legislation is also necessary because public utility commissions and agency regulations are inapplicable to

[139] *See* Letter from E. Scott Pruitt et al. to Sally Jewell, *supra* note 96 (asserting that states are better equipped to address the needs of their citizens and of the state as a whole as opposed to the federal government); *see also* CONSUMER DATA PRIVACY IN A NETWORKED WORLD, *supra* note 113, at 37 (proposing that the States be allowed to enforce the federal legislation at the local level). Such an approach would allow States to "address consumer data privacy issues that [they] identify while maintaining uniformity at the national level." *Id*. at 38.

[140] *See* CONSUMER DATA PRIVACY IN A NETWORKED WORLD, *supra* note 113, at 37 (asserting that federal legislation "should provide a national standard" for consumer data privacy protections). Additionally, the administration argues that uniform federal legislation is a necessary means of providing equal privacy protections for all consumers. *Id*. *See* Kerry, *supra* note 113 (concluding that the Consumer Privacy Bill of Rights "could use a lodestar to guide the application of its principles," because it fails to provide any guidelines for how the context principle should be applied in specific scenarios). Kerry elaborates that existing data privacy laws in the United States, both at the state and federal level, have created a "checkerboard," because they were "developed as a series of responses to specific concerns." *Id*.

[141] *See* S.B. 214, 2011 Gen. Assemb., 71st Biennial Sess. (Vt. 2011) (providing for the protection of consumer rights and the requirement of a follow-up report regarding the success and progress of smart meter use); *see also* Nunez, *supra* note 4 (describing the updated consumer data privacy regulations the California Public Utilities Commission promulgated in 2011).

[142] *See* PATENT, *supra* note 49 (detailing how the State of Nebraska does not receive any of its electricity from IOUs).

[143] *See* THE NEED FOR ESSENTIAL CONSUMER PROTECTIONS, *supra* note 97, at 13 (discussing the lack of privacy rights surrounding the implementation and use of smart meters). New smart metering systems "should be planned to meet a robust set of interoperability and privacy standards prior to their widespread installation." *Id*.

POUs and RECs.[144] Therefore, it is necessary for these state specific legislations to apply to all utility companies, regardless of their status.[145] While there have been attempts at passing federal smart meter legislation, successful state action pertaining to smart meter privacy protections is more obtainable, which was evidenced by the proposed federal American Energy Innovation Act.[146] State governments have demonstrated that they are best equipped to address the specific, and more detailed, needs of the local consumer.[147] However, although most states already have some form of privacy laws in place, the majority of these laws predate the use of smart meters and must be updated to account for the Smart Grid system.[148]

Fortunately, numerous states have already provided the rest of the country with legislative and regulatory models for how to protect consumer smart meter data.[149] For example, Oklahoma's Electric Data Protection Act imposes the best state-specific restrictions on utility companies who use smart utility meters.[150] This Act also provides a

144 *See* COLTON, *supra* note 60, at 27 (discussing how RECs, while immune from state commission regulation, are still under the control of state and federal consumer protection laws). *See also* American Energy Innovation Act, S. 2089, 114th Cong. § 1001(c)(2)(D)(ii)(II) (2015) (failing to pass proposed legislation for the protection of electric consumer information when the consumer receives smart meter services).

145 *See* Nunez, *supra* note 4 (highlighting how current "state privacy frameworks may have limited power"). There is currently a lack of federal or state laws ensuring the protection of a consumer's smart meter data. *Id.* However, there is also a general consensus that utilities should be subject to rules governing "how they can use smart meter data" as well as an agreement that "a customer should be able to know and have access to the data being collected." *Id.*

146 *See id.* (identifying how there are no federal laws in place to protect consumer smart meter data).

147 *See also* S. 2089 § 1001(c) (failing to provide an explanation for the standards that would be required to protect smart meter data). The Senate additionally proposed that the voluntary guidelines include provisions for the security of data collected by utility meters and the privacy of electric utility consumers. *Id.* at § 1001(c)(2)(D)(i)(III). Although the initiative was paced on the Senate Legislative Calendar under General Orders. Calendar No. 241, it failed when the session adjourned, and the executive deadline passed before the proposed Act could be further considered. *Id.* § 1.

148 *See* Nunez, *supra* note 4 (highlighting how although numerous states have some form of privacy laws, "'those laws predate the smart grid, and they do not really account for the complexity of the smart-grid ecosystem'").

149 *See* Brown, *supra* note 74 (identifying four states that had enacted smart meter legislation and seventeen states that had pending smart meter legislation, as of 2013).

150 *See* Electric Usage Data Protection Act, H.B. 1079 § 3(6), 53rd Leg., 1st Reg. Sess. (Ok. 2011) (defining "electric utility" as "any person, firm, partnership,

solid guideline for other states by illustrating how to allow consumers greater access to their smart meter and general energy usage data, while also restricting third-party access to this data.[151] However, though this Act restricts third parties access to consumer's smart meter data, the broad interpretation of this Act still leaves consumers vulnerable.[152] Nevertheless, just as they have historically influenced state energy efficiency programs, state commissions and agencies continue to play a strong role in establishing smart meter data privacy protection standards.[153]

corporation, association, or cooperative corporation furnishing retail electric service to the public in Oklahoma"). The Act further requires utility companies to provide consumers with "reasonable access" to their energy consumption data as well as preserve confidentiality of this data). *Id*. at § 4(A). The statute also restricts the use of consumer smart meter data to "internal regulated business purposes" although such use does not require the consent of the consumer. *Id*. at § 4(B). However, the utility may charge the consumer for access to this nonstandard, but the cost must be reasonable and calculated to simply cover the actual cost of providing the data. *Id*.

151 *See id.* at § 5(A) (mandating that such access be a component of the basic service provided). The Act also guarantees consumers access to their nonstandard usage data so long as they request it in writing, and it is feasible for the utility to provide it. *Id*. at § 5(B). Further, the Act grants utilities access to consumer energy usage data only upon the consent of the consumer and when the third party has contracted with the utility to: (1) provide regulated services, or (2) otherwise carry out the business objectives of the utility. *Id*. at § 6(A).

152 *See id.* at § 4(B) (subjecting the "internal regulated business purposes" to approval by the Oklahoma Corporation Commission, or the board of trustees for self-regulated cooperatives). Third parties are required to maintain the confidentiality and security of any and all consumer data they have access to. *Id*.

153 *See Utility Regulation and Policy*, *supra* note 48 (outlining the differences between the regulation of investor- and publicly-owned utility companies). IOUs are primarily regulated at the state level by public commissions. *Id*. These commissions promulgate regulations, decisions and policies that oversee, authorize and influence various aspects of the IOUs' operations such as investment decisions, daily operations and customer rates. *Id*. Additionally, the commissions establish the regulations and policies that guide the development and implementation of various energy programs. *Id*. *See also* GREENFIELD, *supra* note 57, at 11 (identifying how the FERC's regulatory powers stem from its "exclusive jurisdiction over the 'transmission of electric energy in interstate commerce,' and over the 'sale of electric energy at wholesale in interstate commerce,' and over 'all facilities for such transmission or sale of electric energy'"). Thus, FERC is authorized to regulate and oversee any activity by an IOU that involves interstate commerce. *Id*. at 13. *See also* Michaels, *supra* note 47 (explaining how, unlike state agencies, the FERC requires cost justification).

Ideally, state legislation is the best avenue for providing smart meter customers with equal privacy protections for their energy consumption data.[154] Nevertheless, as shown by Oklahoma's Electric Data Protection Act, state legislation does not always guarantee that a smart meter data privacy law will be applicable to all utilities; regardless of their status as a POU, IOU or REC.[155] In contrast, RECs are not immune from state legislation (e.g. state taxation laws, tort liability, territorial competition and consumer protections).[156] Therefore, they are subject to future smart meter privacy protections, and state legislatures should establish specific mandates that are applicable to all forms of utility service providers.[157]

2. Federal Legislation

The federal government has also made it clear that it has a duty to support, and spearhead, the development and security of Smart Grid technologies.[158] Therefore, although the states are best equipped to address privacy protections for smart meter consumers, the federal government can still play an important role in energy consumer protection.[159] While state legislation is the best tool available to provide equal protections within a respective state, in order to universally protect smart meter data and the consumers behind it, the

154 *See* Brown, *supra* note 74 (highlighting various enacted and pending state legislative initiatives regarding the intersection of emerging smart grid technologies and consumer protection).

155 *See* H.R. 1079 (clarifying that "[e]lectric utility shall not mean a municipal corporation"). Further, any rules promulgated by the Commission to implement the Act are inapplicable to "self-regulated cooperatives." *Id.* Instead, these cooperatives have the authority to promulgate their own rules as a means of implementing the Act. *Id*. The Act also subjects the "internal regulated business purposes" to approval by the Oklahoma Corporation Commission, or the board of trustees for self-regulated cooperatives. *Id.*

156 *See* COLTON, *supra* note 60, at 27 (commenting on how RECs are not immune from tort liability.

157 *See, e.g.*, TENN. CODE ANN. § 65-25-123 (2018) (illustrating that the RECs are subject to state law).

158 *See* Energy Independence and Security Act of 2007, 42 U.S.C. § 17381(1) (2007) (noting that one goal of the Act is to "[i]ncrease [the] use of digital information and controls technology to improve reliability, security, and efficiency of the electric grid").

159 *See* MURRILL ET AL., *supra* note 7, at 2 (discussing how current federal laws may establish legal consequences for the use and misuse of consumer smart meter data).

federal government must provide more detailed guidance.[160] Not only should the federal government provide an opportunity for communication between states and utilities on the national level, but it should also establish national standards pertaining to data sharing and communications as they pertain to the Smart Grid and smart meter data.[161] Nevertheless, state legislation continues to be the best way to universally protect consumers because the federal government's one-size-fits-all approach would significantly harm consumers.[162]

C. What the United States can Learn from the EU's Data Privacy Protections

The root of the data privacy protection problem in the United States is that there is "a mosaic of different federal and state rules" that simultaneously govern data privacy while also lacking a central enforcement authority.[163] Therefore, the United States would do well to implement technology-neutral, base-line privacy protections modeled after the EU's GDPR.[164] The EU's GDPR provides a much more detailed, in-depth approach to data privacy protections than any

160 *See* ENERGETICS INC., *supra* note 110, at 1 (determining that the Department of Energy should organize forums for both utilities and state legislators as a means of sharing experiences and successful practices). The workshop also concluded that the federal government should provide a framework, or guidelines, for states to follow pertaining to Smart Grid consumer protections. *Id*. at 3.

161 *See id*. at 9 (calling for the need to develop national data sharing and communication standards). *See also* Tung, *supra* note 116 (discussing how Julie Brill has "call[ed] . . . for the law to place greater emphasis on companies' accountability when they collect and use consumers' personal information").

162 *See* Shepardson, *supra* note 114 (quoting Senator Brain Schatz, "'The Holy Grail is preemption . . . .' [Democrats] would not replace a 'progressive California law with a non-progressive federal law'"). *See also* Hawkins, *supra* note 111 (highlighting the numerous obstacles hindering successful federal regulation of data privacy). The most significant challenge is that the policymaking infrastructure has no uniformity. *Id*.

163 *See* Hawkins, *supra* note 111 (noting the wide variety of state and federal data privacy rules in the U.S.).

164 *See* Tung, *supra* note 116 (quoting Julie Brill that "Congress should 'adopt a new framework that reflects the changing understanding of the right to privacy in the United States and around the world'").

of the proposed legislation in the United States.[165] The EU Parliament and Council are analogous to the United States Senate and House of Representatives, and the EU Member States are equally analogous to the fifty individual states of the U.S.[166] Thus, this model of legislation would allow the United States federal government to establish a strong partnership with the state similar to that in the EU.[167] It would allow for further development and implementation of optimal consumer protections for smart meter data.[168]

For example, similar to how the United Kingdom developed extensive smart meter data privacy protections specific to their citizens, California's Consumer Privacy Act only strengthens the data privacy protections in that state.[169] Moreover, the EU model negates the various regulation issues that arise from POUs, IOUs and RECs because the protections are applicable regardless of where a consumer lives.[170] This framework would address and resolve the problems stemming from the current patchwork of data privacy protections

165 *See* Hawkins, *supra* note 111 (addressing how there have been attempts to pass privacy legislation in Congress that is much less extensive than the GDPR). "Getting something as complex as the GDPR approved would be a huge undertaking." *Id.*

166 *See Branches of the U.S. Government*, *supra* note 76 (describing how the House of Representatives and the Senate are responsible for drafting proposed legislation); *Institutions and bodies*, *supra* note 65 (discussing how the European Commission proposes legislation and the Council and Parliament implement the legislation).

167 *See* Hawkins, *supra* note 111 (highlighting how successful federal data privacy regulation would also require a central enforcement authority as seen in the EU through the Member States).

168 *See* GDPR, *supra* note 117, art. 11 at 3 (noting how individual, supplemental Member State laws strengthen the EU personal data protection regulations). Member States are able to provide consumer's more detailed rights as well as establish more in-depth obligations for data processors and controllers to follow. *Id.* These additional regulations also establish not only the Member State's powers for "monitoring and ensuring compliance with the rules," but also the sanctions specific to that individual Member State. *Id.*

169 *See* Assemb. 375, 2017-2018 Leg., Reg. Sess. (Cal. 2018) (establishing that the purpose of the Act is to "further the constitutional right of privacy and to supplement existing laws relating to consumers' personal information"). *See also* Shepardson, *supra* note 114 (referring to California's Consumer Privacy Act as "tough new rules"); Pink, *supra* note 114 (highlighting the "significant new obligations" the California Legislature placed on companies).

170 *See* GDPR, *supra* note 117, art. 14 at 3 (stating that "[t]he protection afforded by this Regulation should apply to natural persons, whatever their nationality or place of residence, in relation to the processing of their personal data").

across the United States.[171] Additionally, although the GDPR is technology-neutral, it is specifically applicable to the data collected by smart meters and used by utilities.[172] However, the GDPR is not so exhaustive so as to prevent data privacy protections from growing with the advancements of technology.[173]

The current United States legislation, as proposed, lacks baseline data privacy protections that the EU's GDPR provides.[174] The GDPR ensures that no EU citizen is exposed to the mis-use or abuse of their personal data or left with no source of remedy.[175] By the United States modeling an approach to data privacy protections after the EU, it would establish, at a minimum, a specific legislative approach that is always applicable to electric utility companies.[176] If the legislation is drafted with more specificity, than the GDPR, it could

171 *See* Clark, *supra* note 111 (referencing David Hoffman's, associate general counsel at Intel Corp., quote about the CCPA regulation, "it's the patchwork issue that people are most worried about"). *See also* Parker, *supra* note 114 (concluding that Senator Wyden's proposed legislation would "replace the current patchwork" of different and contradicting state and federal privacy laws).

172 *See* GDPR, *supra* note 117, art. 15 at 3 (addressing the importance of the GDPR being technologically neutral as to "prevent creating a serious risk of circumvention"). The protection of personal data should not be dependent on specific techniques used. *Id*.

173 *See id.* (setting forth technology-neutral data privacy regulations).

174 *See* GDPR, *supra* note 117, art. 4, cmt. 1 at 33 (defining general terms in such detail that they are widely, and flexibly, applicable to various technologies). For example, "[p]ersonal data" is defined as "any information relating to . . . an identifiable natural person is one who can be identified, directly or indirectly, in particular by reference to an identifier." *Id.* Further, "processing" is defined as "any operation or set of operations which is performed on personal data or on sets of personal data." *Id*. *See also* Consumer Data Protection Act, H.R. 4544, 115th Cong. § 2 (2017) (defining sensitive personal information as "information—'about the individual relating to the education, financial transactions, medical history, criminal history, or employment history of the individual'"); Green, *supra* note 116 (recognizing that the CDPA's definition is "about as encompassing as you get and would include quasi-identifiers").

175 *See* GDPR, *supra* note 117, cmt. 10 at 2 (ensuring data privacy protection across all of the EU Member States and "remov[ing] the obstacles to flows of personal data within the Union").

176 *See Smart meters: unlocking the future*, *supra* note 64 (recognizing how the GDPR applies to utility companies). Any use of consumer location data for the purpose of "enhanc[ing] the consumer experience" cannot be done without consumer consent. *Id*.

provide easily identifiable categories that address smart meter data privacy concerns, and better protect the consumer.[177]

V. Conclusion

As the use of smart meters expands, so do concerns about the protection of consumer privacy. Nevertheless, there are multiple way to address these concerns. The UCC allows for industry-wide protections, holding utility companies accountable, while protecting consumers' data. However, to protect consumers, it is not just about regulating the industries, but each community on a Federal and State level. The Federal government needs to be setting general data privacy frameworks, and the States need to be filling in these frameworks with specific legislation responding to their individual needs. The United States would do well to not only emulate the EU and their ability to protect consumers, but to also grow with the advancing smart meter technology.

[177] *See* GDPR, *supra* note 117, art. 30, cmt. 1 at 50–51 (addressing concerns that personal information about a consumer can be deciphered from, or traced back to, their smart meter data).