

STATE OF NEW YORK  
PUBLIC SERVICE COMMISSION

At a session of the Public Service  
Commission held in the City of  
Albany on October 19, 2017

COMMISSIONERS PRESENT:

John B. Rhodes, Chair  
Gregg C. Sayre  
Diane X. Burman  
James S. Alesi

CASE 14-M-0196 - Tariff filing by Central Hudson Gas & Electric Corporation to establish fees for residential customers who choose to opt out of using Automated Meter Reading devices.

ORDER GRANTING, IN PART, AND DENYING, IN PART, REQUESTS FOR  
MODIFICATIONS OF OPT-OUT TARIFF

(Issued and Effective October 20, 2017)

BY THE COMMISSION:

INTRODUCTION

On September 8, 2014, the Commission approved tariff amendments filed by Central Hudson Gas & Electric Corporation (Central Hudson or Company) establishing tariff fees for residential customers who choose to opt out of using Automated Meter Reading (AMR) devices.<sup>1</sup> The tariffs allow residential customers to opt-out of using AMR meters that are equipped with radio frequency (RF) transmitters, and pay a monthly fee to reflect the costs of continuing to manually read the meter. These tariffs also authorize the Company to replace the AMR

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<sup>1</sup> Case 14-M-0196, Central Hudson Opt-Out Tariffs, Order Approving Proposed Tariff Amendments (issued September 8, 2014) (Opt-Out Order).

meter with a standard (typically solid-state), non-communicating meter.

On May 29, 2015, petitions were filed by Jane Valand, et al., to amend the opt-out tariff. The petitions request that the Commission order Central Hudson to offer electromechanical meters as a replacement for installed AMR Meters, and to allow customers participating in the opt-out program to retain their installed electromechanical meters. On June 29, 2015, Ms. Valand filed a Resolution of the Town of Woodstock, which petitions for the same relief sought in the earlier petitions, and further requests that the Commission order that customers who opt-out will not be subject to the one-time meter change fee or the monthly non-AMR meter reading fee.<sup>2</sup>

The Modification Petitions allege that RF and other electromagnetic frequency (EMF) emissions from AMR meters, as well as the solid state or "digital" meters that would replace them, pose significant health and safety risks, which the Commission should have considered when establishing opt-out fees. The Modification Petitions further allege that the risks created by these meters can only be alleviated if the Company furnishes an electromechanical or "analog" meter.<sup>3</sup>

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<sup>2</sup> As described in greater detail herein, additional filings include additional resolutions of the Town of Woodstock, additional signatures to the original petitions, and additional party comments in support of the petitions (referred to collectively with those petitions mentioned above as the "Modification Petitions").

<sup>3</sup> Although the parties use these terms interchangeably, the terms "analog" and "digital" technically refer to the meter display, while "electromechanical" and "solid-state" refer to the design of the meter components. Some meters have electromechanical components and digital displays. To avoid confusion, this Order will use the terms "electromechanical" and "solid-state" when referring to the respective meter types, except when directly quoting a party's comments that refer to them as "analog" and "digital" respectively.

In this Order, the Commission finds that available research shows solid-state meters pose no credible threat to the health and safety of Central Hudson's customers, nor, for that matter, do the AMR meters which they replace. Furthermore, electromechanical meter technology is obsolete and currently not in production by any major meter manufacturer. Offering customers an electromechanical meter as an alternative to an AMR meter is not a long-term solution. Therefore, the Commission declines to order Central Hudson to offer customers an electromechanical meter option.

The Commission also affirms its conclusion in the Opt-Out Order that reasonable cost based fees properly balance the concerns of customers who opt-out with other customers' interests in achieving optimally efficient utility operations. For customers who currently have an AMR meter installed at their premises, payment of a one-time meter change fee to cover the cost of replacing the meter with a non-AMR meter is appropriate; however, the monthly non-AMR meter reading fees assessed on opt-out customers is not appropriate, as the strategy the Company has employed to implement AMR generates little or no labor savings. Central Hudson is directed to file amended tariffs that withdraw the monthly meter reading fees.

#### BACKGROUND

AMR devices enable the automated collection and transfer of consumption data, typically, as with Central Hudson's systems, through RF transmission. Central Hudson has been installing AMR devices since 1990 and approximately 41% of the Company's residential meters are AMR equipped. The meters were initially installed to resolve meter reading access issues. Currently, the Company installs AMR meters on all new installations and meter replacements.

AMR devices enable the automated collection and transfer of consumption data, typically, as with Central Hudson's systems, through RF transmission. AMR equipped meters provide benefits to customers through: 1) a reduction in meter reading estimates due to access issues and adverse weather conditions; 2) improved accuracy of meter readings; and 3) improved operating efficiency through reduced operating and maintenance costs.

The Opt-Out Order noted that

There is a significant body of research regarding the effects that exposure to low level RF transmissions might induce. To date, the research in this field has not established any negative health impacts from such transmissions. In addition, there are no scientific studies supporting a conclusion that RF transmissions from utility meters result in negative health impacts. In fact, studies of the specific RF outputs of utility AMR meters show that their emissions are exceedingly small relative to other commonly used RF devices, and are orders of magnitude below the Maximum Permissible Exposure limits established by the Federal Communications Commission (FCC).<sup>4</sup>

Notwithstanding the existing research, according to Central Hudson, a small number of customers continue to object to exposure to RF emissions from AMR meters. For customers who have such concerns and who may be willing to forgo the benefits of AMR, the Company's tariffs are designed to allow them to opt-out of having AMR meters installed on their homes. Central Hudson's opt-out tariffs assess these customers for costs related to meter change-out, if applicable, and a monthly fee to

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<sup>4</sup> Opt-out Order, p. 4. The Opt-Out Order also notes that the authority for establishing standards for RF emissions rests with the FCC, and that the FCC currently has an open docket addressing RF exposure levels. See Federal Communications Commission, ET Docket No. 13-84, In the Matter of Reassessment of Federal Communications Commission Radiofrequency Exposure Limits and Policies.

cover the additional costs associated with the manually read meter.

NOTICE OF PROPOSED RULE MAKING

Pursuant to the State Administrative Procedure Act (SAPA) §202(1), a Notice of Proposed Rulemaking was published in the State Register on March 23, 2016 (SAPA No. 14-M-0196SP3). The time for submission of comments pursuant to the Notice expired on May 9, 2016. In addition, in a Notice issued on April 26, 2016, the Secretary advised that the Commission would consider the filings requesting modifications to Central Hudson's opt out tariffs. The time to submit comments was extended to June 23, 2016. In a Notice issued June 29, 2016, the Secretary provided parties the opportunity to submit reply comments by July 29, 2016. The comments received are addressed below.

THE PETITIONS AND PARTY COMMENTS IN SUPPORT

Petitions Filed by Jane Valand

The petitions filed on May 29, 2015, which were signed by 50 individuals, are accompanied by a letter from petitioner Jane Valand, which states that Central Hudson's tariff is ambiguous, because the term "non-AMR" meter can refer to an electromechanical or solid-state meter. The petitions request customers be allowed to retain their electromechanical non-AMR meter.<sup>5</sup>

Resolutions of Town of Woodstock

The Resolution of the Town of Woodstock filed on June 29, 2015 states that the Town Board has received complaints from residents applying to retain their electromechanical meter that

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<sup>5</sup> Case 14-M-0196, Petition of Jane Valand and Others to Amend AMR opt-out Tariff 12.2 (filed May 29, 2015).

they were being told by Central Hudson that their electromechanical meter would be replaced by a solid-state non-AMR meter. The June 29 Resolution expressed the Town Board's preference to allow Woodstock residents to retain their electromechanical meter.<sup>6</sup>

On July 6, 2015, Town of Woodstock filed a copy of a further resolution, that urges "the New York State Legislature to adopt in its respective chambers the proposed legislation known as the NYS Utility Consumers Health, Safety & Privacy Protection Act" which would require by law the same provisions outlined in the June 29 Resolution.<sup>7</sup>

On July 10, 2015, Town of Woodstock filed a further Town Resolution which petitions the Commission for the same and additional relief.<sup>8</sup> According to the July 10 Resolution, although a solid-state AMR meter "may not contain a [RF] transmitter. It does contain components and switch mode power supply, which creates excessive and unsafe amounts of dirty electricity."<sup>9</sup> The July 10 Resolution defines "dirty electricity" as "high frequency voltage transients, created by switch mode power supply units installed in all digital meters. This form of EMF has adverse biological effects on the human body."<sup>10</sup> The July 10 Resolution seeks the right for customers to retain an existing electromechanical meter without fee,

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<sup>6</sup> Case 14-M-0196, Letter transmitting Town of Woodstock Resolution: 127-2015 (filed June 29, 2015).

<sup>7</sup> Case 14-M-0196, Town Resolution: 138-2015 (filed July 6, 2015).

<sup>8</sup> Case 14-M-0196, Resolution of the Town of Woodstock and Petition in Support of the Resolution (filed July 10, 2015) (July 10 Resolution).

<sup>9</sup> Id., p. 2 (punctuation as in original).

<sup>10</sup> Id.

limitation of time or other constraint. Apparently cognizant that electromechanical meters are no longer manufactured, the July 10 Resolution proposes that if an electromechanical meter needs to be replaced, the customer would have the right to demand a refurbished electromechanical meter. Notably, the July 10 Resolution seeks the Commission's prohibition of the use of "Trojan" meters, which it defines as "a transmitting smart digital utility meter or any type of transmitter concealed under an analog utility meter face."<sup>11</sup>

In comments filed on March 9, 2016, Woodstock Town Councilman Jay Wenk states that remanufactured electromechanical meters can pass the Commission's standards, and should be approved for use by Central Hudson. Mr. Wenk states that the Company "has incorrectly stated that these meters are no longer available" since refurbished meters are available, and he calls upon the Commission to waive its rule, and allow an application for approval of analog electric utility meters to be made without the utility's cooperation.<sup>12</sup>

In comments filed on July 24, 2015, Kenneth S. Panza, Woodstock Town Councilman, states that:

No one should be required to live in fear of their electric utility meter, and no one should be criticized for not understanding electricity and electromagnetic radiation... Stop Smart Meters has expanded nationwide with chapters in over twenty-five states. New York and Woodstock have particularly active Stop Smart Meter chapters. Additionally, Stop Smart Meters spawned a large number of affiliated websites with titles such as 'EMF Safety Network,' 'Smart Meter Safety,' 'Smart Meter Health Alert,' 'Smart Meter Dangers,' 'Microwave Factor,' 'Electrosensitive Health,' 'Center for Electrosmog

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<sup>11</sup> Id.

<sup>12</sup> Case 14-M-0196, Response to Letter (filed March 9, 2016), p. 1.

Prevention,' etc. all affirming the dangers of smart meters.<sup>13</sup>

In comments filed on April 18, 2016, Mr. Panza states that the July 10 Resolution "was written by Stop Smart Meters Woodstock, an organization opposed to smart meters."<sup>14</sup> Mr. Panza states that several states "allow utility customers to opt-out of smart meters and retain their analog meters."<sup>15</sup>

In reply comments filed on June 27, 2016 Mr. Panza states that the Commission may have recognized the benefits of enhancing New York's meter infrastructure and adopting advanced technologies for other utilities, but Central Hudson Gas & Electric has not embraced advanced metering infrastructure.<sup>16</sup> In reply comments filed on June 29, 2016 Mr. Panza states that Company owned electromechanical meters carry none of the deficiencies identified with refurbished meters.<sup>17</sup> In comments filed on October 16, 2016, Mr. Panza asked the Commission to render its decision on the Modification Petitions forthwith.<sup>18</sup>

Stop Smart Meters NY

Multiple comments were filed by or on behalf of Stop Smart Meters NY. In comments filed on June 23, 2016, Michele Hertz states that she "founded Stop Smart Meters NY," and that

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<sup>13</sup> 14-M-0196, Letter in support of Jane Valand's submissions and Town Resolution (filed July 14, 2015), p. 3.

<sup>14</sup> Case 14-M-0196, Comments of Kenneth S. Panza (filed April 18, 2016), p. 1. From this point forward, Mr. Panza no longer identified himself as a Woodstock Town Council member.

<sup>15</sup> Id., p. 4.

<sup>16</sup> Case 14-M-0196 Reply Comments (filed June 27, 2016), p. 1-2.

<sup>17</sup> Case 14-M-0196 Response to Comments submitted by Central Hudson and the Joint Utilities (filed on (June 29, 2016) p. 3.

<sup>18</sup> Case 14-M-0196, October 13, 2016 Letter to Chair Zibelman (filed October 16, 2016). In this letter, Mr. Panza stated that he represents Ms. Valand.



We hired an expert RF/MW [radio frequency/microwave] engineer to investigate and write a report about the RF/MW emissions from electronic utility meters. The Isotope Report explains that in an FCC laboratory, the technicians testing an electronic meter, added a power cord to the meter. This is not the way that a utility meter works. A utility meter does not employ a power cord. The meter was altered to fit a test modality that was not designed for a utility meter. The test results were unrealistic and the test set-up was a failure. As a result the FCC approved the meters. The stage was set for other government regulatory agencies to approve electronic meters that were never properly tested.<sup>19</sup>

In comments filed on June 24, 2016, Timothy D. Schoechle, PhD. of Smarhome Laboratories, Ltd., states that he "was personally involved in the early engineering development and testing of smart meters."<sup>20</sup> Dr. Schoechle stated that he agrees with findings contained in the report entitled "An Overview of Smart Meter Hazards" by Stop Smart Meter NY, a link to which was included in his comments. Dr. Schoechle states that:

The Report particularly raises issues related to public health risks from exposure to microwave radiation. This topic is particularly timely due to the recent release of preliminary findings of a U.S Government-funded, multi-year, peer reviewed study by the National Toxicology Program that found positive evidence of cancer tumors in animals exposed to microwave radiation of the type found in cellular phones and smart meters.<sup>21</sup>

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<sup>19</sup> Case 14-M-0196, Comments of Michele Hertz (filed June 23, 2016), p. 3.

<sup>20</sup> Case 14-M-0196, Comments (filed June 24, 2016), p. 1.

<sup>21</sup> Id. See, [http://websites.networksolutions.com/share/scrapbook/73/731498/SSMNYHAZ\\_4.5.16.pdf](http://websites.networksolutions.com/share/scrapbook/73/731498/SSMNYHAZ_4.5.16.pdf)

In comments filed on July 29, 2016, Ms. Hertz states that "the federal government does not approve utility meters. Electronic meters were never tested by any federal government agency for radiation emissions or electrical fire risks."<sup>22</sup> On the same date, Stop Smart Meters NY filed resolutions by the City of Kingston, the Town of Gardner, the Town of Olive, the County of Dutchess, and the County of Ulster, supporting the Modification Petitions.<sup>23</sup>

On the same date, Stop Smart Meters NY also filed the Isotrope "Report on Examination of Selected Sources of Electromagnetic Fields at Selected Residences in Hastings-on-Hudson."<sup>24</sup> The Isotrope Report states that Isotrope, LLC was engaged to evaluate the electromagnetic environment at several residences in Hastings-on-Hudson, New York, and that the clients sought an evaluation of the radiated and conducted emissions characteristics of AMR meters and other devices. The Isotrope Report states that it "draws no conclusions about the risks of human exposure to these emissions."<sup>25</sup> Notwithstanding that the authors were hired by Ms. Hertz, the Isotrope Report states that

the emissions under observation are at levels that are lower than the FCC safety limits... Ultimately, all radiated power densities observed were substantially

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<sup>22</sup> Case 14-M-0196, Comments of Stop Smart Meters NY (filed July 29, 2016), p. 2.

<sup>23</sup> Case 14-M-0196, Resolution of the Town of Gardiner, Resolution of the City of Kingston, Dutchess County Resolution, Ulster County Resolution, Town of Olive Resolution (all filed July 29, 2016).

<sup>24</sup> Case 14-M-0196, Isotrope Report - Engineer's Examination of RF Radiation - AMR Utility Meters (filed July 29, 2016) (Isotrope Report).

<sup>25</sup> Id., p. 3.

below the sensitivity of the Isotrope NARDA human exposure compliance meter.<sup>26</sup>

The Isotrope Report offers a range of remediation strategies for individuals who are concerned about adverse health effects from RF exposure emitted by AMR meters, including removal of the meter, reducing the duty cycle (the amount of time the meter is actively transmitting), and retrofitting the meter with a shield to diminish transmissions or focus them away from the residence.<sup>27</sup>

In comments filed on August 8, 2016, Ms. Hertz states that "Obviously, to be read remotely, a transmitting utility meter spreads RF radiation near and far from the meter. RF radiation penetrates walls and all living matter. It is a Class 2B carcinogen."<sup>28</sup>

On August 10, 2016, Ms. Hertz furnished a link to a paper entitled "Debunking the Utility Industry Myth About Smart Meter Safety: The Antenna Effect."<sup>29</sup> She states that "An RF engineer's technical report confirms that smart meters cause an antenna effect when connected to electrical distribution systems, resulting in extraordinary RF exposures that are

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<sup>26</sup> Id., p. 5. NARDA is a manufacturer of test equipment.

<sup>27</sup> Id., p. 14.

<sup>28</sup> Case 14-M-0196, Comments of Michele Hertz (filed August 8, 2016).

<sup>29</sup> Case 14-M-0196, Myth About Smart Meter Safety -- The Antenna Effects (filed August 10, 2016). See, <http://stopsmartmetersny.org/images/UtilityDebunk.pdf>

significantly higher than those reported in isolated laboratory testing."<sup>30</sup>

On August 12, 2016, Ms. Hertz filed the comments of David O. Carpenter, Director, Institute for Health and the Environment at the University of Albany. Dr. Carpenter's comments state that he takes,

a public health approach that has as a fundamental principle the need to protect against risk of disease even when one does not have all the information that would be desirable... There is clear and strong evidence that intensive use of cell phones increases the risk of brain cancer, tumors of the auditory nerve and cancer of the parotid gland, the salivary gland in the cheek by the ear... There have been few careful studies specifically of the health effects of electronic meters to my knowledge, in great part because they haven't been around very long. But they utilize the same type of RF radiation that is used in cell phones.<sup>31</sup>

On the same date, Ms. Hertz filed testimony of Norman W. Lambe, apparently "submitted to a New Mexico Public Regulation Commission smart meter rate increase proceeding."<sup>32</sup> Mr. Lambe's testimony states that he is a Senior Property Claims

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<sup>30</sup> Id. It should be noted that the Isotrope report states that:

"Reradiated energy from in-house conductors (such as electrical wiring) is lower than the emissions in the vicinity of the radiating antenna. The nature of passive reradiation is that the reradiating object or material cannot increase the power it receives. Therefore, the amount of energy emitted by the reradiator cannot be greater than that which is emitted by the source that excites the reradiator. Also, as the distance from the source to the reradiator increases, the field intercepted by the reradiator diminishes." [Isotrope report, p. 13]

<sup>31</sup> Case 14-M-0196, Comments from Dr. David Carpenter (filed August 12, 2016).

<sup>32</sup> Case 14-M-0196, Cover Letter (filed August 12, 2016).

Examiner at Precision Risk Management. He states that he is "submitting evidence that 'smart' meters have caused fires and that these meters are sometimes removed by utility companies before a proper investigation can be conducted" and a document that "indicates that an insurance company that has Lloyds of London as its reinsurer, will not pay for any physical illness that is directly related to the insured's exposure to radio frequency radiation ('RFR'). 'Smart' meters are one of the major appliances that produce RFR."<sup>33</sup>

On August 22, 2016, Ms. Hertz filed comments stating:

"There should have been full disclosure, to utility consumers, by utility companies about the radiation emissions, lack of electrical fire safety testing, privacy invasion and cyber security risks associated with electronic meters. There was none. By refusing to disclose the facts, utilities and the [Commission] are posing a threat to public health and safety."<sup>34</sup>

On October 12, 2016, Ms. Hertz filed a copy of a paper, authored by her, titled "EXPOSED - Electronic Utility Meters - A Fire Safety, Health, Privacy and Security Threat." The author states that the paper

"exposes the reckless decision, by meter manufacturers, utility companies and government regulators to eliminate life-saving electrical safety features from the design of electronic meters... These meters pose unacceptable hazards because they lack essential electrical safety components - circuit breakers and surge arrestors."<sup>35</sup>

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<sup>33</sup> Case 14-M-0196, Testimony of Norman Lambe (filed August 12, 2016), pp. 1-2.

<sup>34</sup> Case 14-M-0196, Comments of Michele Hertz (filed August 22, 2016).

<sup>35</sup> Case 14-M-0195, Comments of Michele Hertz (filed October 12, 2016).

On October 26, 2016, Ms. Hertz filed a request for the record regarding the Modification Petitions to be closed, and for the Commission to advance to the next phase of these proceedings. Ms. Hertz requested that her several submissions made after July 29, 2016 (the deadline for comments listed in the Secretary's Notice) be included in the record.<sup>36</sup>

Stop Smart Meters Woodstock NY

Multiple comments were filed by or on behalf of Stop Smart Meters Woodstock NY. In comments filed on June 28, 2016, Lisa Senior, President, Hialeah Meter Company, states that her firm "refurbishes electromechanical kilowatthour meters according to ANSI C12 accuracy requirements and acceptable performance percentages for watthour meters."<sup>37</sup>

In comments filed on July 1, 2016, Steve Romine, representing Stop Smart Meters Woodstock NY, states that

[t]here are no peer-reviewed studies that the wireless industry can point to that prove chronic electromagnetic radiation exposure from any kind of digital meters are safe over a long period of time. Also it has never been determined what the cumulative effect of digital transmitting meters and the opt-out digital meters are with all the multiple electromagnetic radiation emitting devices in the home. The most recent scientific research demonstrates low level EMR has been shown to cause adverse biological effects below controversial FCC standards in the Bioinitiative Report of 2012."<sup>38</sup>

In comments filed July 28, 2016, Mr. Romine states that:

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<sup>36</sup> Case 14-M-0196, Letter to Chair Zibelman (filed October 26, 2016).

<sup>37</sup> Case 14-M-0196, Letter regarding refurbished electromechanical kilowatt-hour meters (filed June 28, 2016).

<sup>38</sup> Case 14-M-0196, Initial Response to Ken Panza and the Joint Utilities (filed July 1, 2016), p. 3, citing <http://www.bioinitiative.org/rf-color-charts>.

We now know tobacco does indeed cause cancer and respiratory problems. So it is just not our 'belief' that electromagnetic radiation (EMR) and Dirty Electricity cause adverse health effects but our personal experiences with before and after installations of digital meters and the mountain of recent peer-reviewed research that demonstrates what we are saying is chronic exposure to low-level EMR is a health risk we should not be forced to have to live with just so the Joint Utilities can save money on their meter reading. Nor should we have to pay extra to be free of EMR exposures.<sup>39</sup>

In comments filed on July 29, 2017, Mr. Romine states that "[e]very person in the USA has constitutional rights to be secure in their homes and the forced acceptance of potentially unsafe digital meters, transmitting and non-transmitting violates that constitutional right."<sup>40</sup> In comments filed on October 27, 2016, Mr. Romine states that:

As a designated party, Stop Smart Meters Woodstock NY respectfully petitions the Commission to render its decision and allow residents of New York who have been suffering with the documented adverse effects of digital meters including the present opt-out choice, which is also a digital meter, to end their personal nightmares and move forward with the approval and installation of re-manufactured analog electric utility meters.<sup>41</sup>

In a letter filed January 18, 2017, Mr. Romine states that:

Presently, two-thirds of the people who use the services of Central Hudson/Fortis have electro-mechanical analog utility meters. These meters are replaced gradually. These retired electro-mechanical

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<sup>39</sup> Case 14-M-0196, Rebuttal of Joint Utilities Response Concerning Issue of the Petition (filed July 28, 2016), p. 7.

<sup>40</sup> Case 14-M-0196, Addendum to Rebuttal of Joint Utilities Response (filed July 29, 2017), p. 4.

<sup>41</sup> Case 14-M-0196, Letter to Chair Zibelman (filed October 27, 2016), p. 2.

analog utility meters could very easily be refurbished and put back into use, exactly as other states have done and are presently continuing to do (and such as Central Hudson used to do if our information is correct). This would enable those utility customers that ask for a non-transmitting digital meter to obtain one and those utility customers that wish to obtain a re-manufactured electro-mechanical analog meter to also be able to make that choice.<sup>42</sup>

On January 24, 2017, Mr. Wenk and Mr. Romine jointly filed a letter requesting that the Commission allow the Town of Woodstock, or the Hialeah Meter Company, to petition to allow the use of refurbished electromechanical meters.<sup>43</sup>

#### UTILITY RESPONSES

On June 23, 2017, Central Hudson filed comments jointly with Niagara Mohawk Power Corporation d/b/a National Grid, New York State Electric & Gas Corporation and Rochester Gas and Electric Corporation (Joint Utilities) opposing the Modification Petitions. The Joint Utilities state that while Central Hudson empathizes with its customers who are concerned for their health, permitting the installation of refurbished electromechanical meters would not solve any health issue and would create compliance and safety issues for Central Hudson's employees and customers:

A few of these customers engaged in dangerous activities, including one who pulled Central Hudson's meter from its socket and installed an unauthorized meter in its place... These customers are concerned for their health based upon their belief that electromagnetic frequency ("EMF") and a subset of EMF, radio frequency ("RF"), causes health issues for some people and that the use of switch mode power supply

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<sup>42</sup> Case 14-M-0196, Letter Re: Proposed Technical Conference (filed January 18, 2017).

<sup>43</sup> Case 14-M-0196, Request for Answers (filed January 24, 2017).



("SMPS") causes dirty electricity and associated health issues."<sup>44</sup>

Regarding "Trojan" meters, Joint Utilities state that the July 10 Resolution offers no support for the assertion that non-AMR meters could be AMR meters with transmitting capability, and that all solid-state non-AMR meters installed by Central Hudson remain incapable of transmission.<sup>45</sup>

Regarding "dirty electricity," Joint Utilities state that non-AMR solid-state meters use less electricity and, therefore, produce less EMFs than do electromechanical meters:

SMUD [Sacramento Municipal Utility District] independently tested the EMFs of analog meters against those of digital meters. SMUD found at every distance that analog meters, which operate on the same electric current as digital meters, emit more EMFs when measured at distances of zero, one, three and five feet.<sup>46</sup>

Joint Utilities state that electromechanical meters are no longer manufactured and new electromechanical meters are not available for purchase. Although several entities sell refurbished or reconditioned electromechanical meters, based upon Central Hudson's direct contact with refurbished meter sellers, none will certify compliance with the required ANSI standards.<sup>47</sup>

In comments filed on June 23, 2015, Consolidated Edison Company of New York, Inc. and Orange and Rockland Utilities, Inc. state that,

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<sup>44</sup> Case 14-M0196, Joint Utilities Comments in Opposition to the Petition (filed June 23, 2017), p. 2.

<sup>45</sup> Id., p. 5.

<sup>46</sup> Id., p. 6.

<sup>47</sup> Id., p. 7.

analog meters are no longer manufactured. Parts are increasingly challenging to procure, and as a result utilities across the country have stopped offering these meters to customers. Moreover, just like an analog meter, non-communicating digital meters are simply not capable of the data transmissions that the Petitioners are seeking to avoid.<sup>48</sup>

In reply comments filed on July 29, 2016, Central Hudson states that the Modification Petitions have not shown that refurbished electromechanical meters meet ANSI standards because

to comply with ANSI Standards and be eligible for installation in New York a refurbished meter must comply with ANSI Standards C12.1 (2014), C12.10 (2011), C12.20 (2010), and C37.90.1 (2012). Mechanical analog meter refurbishers do not, and cannot, test for and comply with these standards even if they comply with the ANSI C12 accuracy standard.<sup>49</sup>

#### PUBLIC COMMENTS

As of October 4, 2017, 125 public comments were posted in this Case. Most of the comments are from consumers who state that the installation of smart meters on or around their residences have caused them to develop health problems. Other comments addressed safety concerns, and the right to opt-out of AMR meter installation at no cost.

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<sup>48</sup> Case 14-M-0196, Letter in Response to the Notice (filed June 23, 2015), p. 3.

<sup>49</sup> Case 14-M-0196, Reply Comments of Central Hudson Gas & Electric Corporation (issued July 29, 2016), p. 3. ANSI C12.1 describes acceptable accuracy performance for meters and ancillary devices. ANSI C12.10 establishes standards for physical aspects of meters. ANSI C12.20 establishes separate accuracy classes and supersedes certain details in C12.1 and 12.10. ANSI C37.90.1 establishes standards for surge withstand capability.

STAFF INVESTIGATION

Central Hudson AMR System

Central Hudson uses several different types of AMR meters for residential service, including meters manufactured by Itron, Inc. (models C1SR6 and CN1SR6) Aclara (formerly GE) (models I210+ and I210+N) and Landis+Gyr (model Focus ALF). These meters utilize a "bubble-up" type system, where data travels in only one direction, from the meter transmitter to a receiver in a reading device. The meter transmits data at preset intervals, usually between 6 and 30 seconds, with each transmission lasting a few milliseconds. Even at more frequent intervals, the cumulative transmission time of an AMR meter amounts to minutes per day.

AMR receivers can be deployed in various ways, including in a fixed network installed across the service territory, in vehicles (drive-by systems), or in handheld devices (walk-by systems). As Central Hudson is only partially converted to AMR and still maintains regular meter reading routes, it utilizes a walk-by system and equips its meter readers with handheld devices. As meter readers go through their meter reading routes, they walk by the locations where AMR meters are installed, and the readings from AMR meters are automatically captured.

These devices operate in the 900 MHz (902 - 928 MHz) band, which is primarily designated by the FCC to industrial, scientific and medical devices, but is also used by a variety of consumer devices, including cordless phones, walkie-talkies, and some amateur radios. At low power, such as used in AMR meters, use of devices in this band does not require a FCC license.

As of September, 2017, a total of 78 active customers have opted out of using AMR meters. This includes 77 residential customers and one non-residential customer.

Measurement of RF Emissions and Exposure Levels

Power density is defined as power per unit area, and is expressed in terms of milliwatts per square centimeter (mW/cm<sup>2</sup>) or microwatts per square centimeter (µW/cm<sup>2</sup>). One mW equals 0.001 watt of power, and one µW equals 0.000001 watt.

The amount of RF exposure that a person is subjected to during the signal transmission is evaluated based on the following formula:

$$S = PG / (4\pi R^2)$$

where:

S = power density (in mW/cm<sup>2</sup>)

P = power input to the antenna (in mW)

G = power gain of the antenna

R = distance to the antenna (in cm)

This formula demonstrates that the strength of the RF signal drops off exponentially with increases in the distance from the antenna. In addition, the formula assumes that there is no absorptive or reflective material between the device and the subject of the exposure. Any such material (e.g., a meter enclosure, exterior siding, insulation, drywall, etc.) would necessarily decrease the level of exposure for a given distance from the device.

FCC Emissions Standards

The FCC is charged at the federal level with regulating communications by radio, television, wire, satellite and cable within the United States and its territories. The development and enforcement of the federally-mandated RF exposure standard is part of the FCC's responsibilities under the National Environmental Policy Act of 1969 (NEPA).<sup>50</sup> NEPA establishes the basis for evaluating the effect of emissions

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<sup>50</sup> 42 U.S.C. §4321, et seq.

from FCC-regulated transmitters on the quality of the human environment and identifying situations where adverse health impacts may occur. The FCC is responsible for providing licenses for RF emissions and its regulations address matters relating to public health and safety and have been designed to ensure that the levels of RF emissions that consumers are exposed to are not harmful.

The FCC has adopted Maximum Permissible Exposure (MPE) limits for field strength and power density. Different safety factors are applied to this value depending upon whether the exposure is related to the general public ("uncontrolled") exposure or for occupational ("controlled") exposure. Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment, have been made fully aware of the potential for exposure, and can exercise control over their exposure. General population/uncontrolled exposure limits apply to situations in which the public may be exposed, or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. The applicable MPE for members of the public is 10 watts per square meter, or its equivalent -- 1 milliwatt per square centimeter (1mW/cm<sup>2</sup>) averaged over 30 minutes.<sup>51</sup>

Devices such as utility meters that operate on an unlicensed basis have pre-defined rules for both the hardware

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<sup>51</sup> 47 CFR §1.1310. As previously noted, the FCC has requested comments to determine whether its RF exposure limits and policies need to be reassessed. As of October 4, 2017, Comments and Reply Comments have been submitted by interested citizens and industry groups in the FCC docket, but no further action or schedule has been set by the FCC.

and the deployment methods of the transmitting radio to ensure compliance with MPE limits. Because of this, utility meters equipped with RF transmitters must be tested and evaluated by certified laboratories prior to Commission approval to ensure their compliance with the FCC's requirements.<sup>52</sup>

The laboratory testing of the meters requires dosage measurements of radiated power/radiation. This equipment testing shows utility meters comply with FCC standards even at 20 cm from the meter.<sup>53</sup> At 3 feet, the average signal strength is three orders of magnitude below the standard of 1.0 mW/cm<sup>2</sup>. Id. At 3 feet and through a wall, the average exposure is four orders of magnitude (roughly 10,000 times) lower than the FCC standard.

#### World Health Organization Classification

The World Health Organization (WHO) is charged with assessing cancer risks through its agency the International Agency for Research of Cancer (IARC). The IARC is the definitive international scientific body charged by the United Nations to assess the cancer risk of chemicals and substances and to classify those chemicals and substances according to the most current science available into cancer risk categories. The IARC has several classifications of carcinogenicity:

- Group 1: The agent is carcinogenic to humans. This category is used when there is sufficient evidence of carcinogenicity in humans.
- Group 2A: The agent is probably carcinogenic to humans. This category is used when there is limited or inadequate evidence of carcinogenicity in humans and sufficient evidence of carcinogenicity in experimental animals.

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<sup>52</sup> Such compliance must be documented in equipment certification reports provided by the manufacturer as part of its petition for Commission approval.

<sup>53</sup> Landis+Gyr FOCUS ALF = 0.0412 mW/cm<sup>2</sup>; Aclara I-210 = 0.0445 mW/cm<sup>2</sup>; Itron = 00.0292 mW/cm<sup>2</sup>.

- Group 2B: The agent is possibly carcinogenic to humans. This category is used for agents for which there is limited or inadequate evidence of carcinogenicity in humans and less than sufficient evidence of carcinogenicity in experimental animals.
- Group 3: The agent is not classifiable as to its carcinogenicity to humans. This category is used most commonly for agents for which the evidence of carcinogenicity is inadequate in humans and inadequate or limited in experimental animals.
- Group 4: The agent is probably not carcinogenic to humans. This category is used for agents for which there is evidence suggesting lack of carcinogenicity in humans and in experimental animals.<sup>54</sup>

IARC classified radiofrequency electromagnetic fields as a Group 2B carcinogen. The IARC findings and other studies suggest there is a potential risk of tumors (in terms of glioma for cancer and neuroma for non-cancer tumors) from RF/EMF associated with cell phones, cordless phones and other personal devices. The IARC provided more detail as to why RF/EMF was classified as a Group 2B carcinogen:

The international pooled analysis of data gathered from 13 participating countries found no increased risk of glioma or meningioma with mobile phone use of more than 10 years. There are some indications of an increased risk of glioma for those who reported the highest 10% of cumulative hours of cell phone use, although there was no consistent trend of increasing risk with greater duration of use. The researchers concluded that biases and errors limit the strength of these conclusions and prevent a causal interpretation. Based largely on these data, IARC has classified radiofrequency electromagnetic fields as possibly carcinogenic to humans (Group 2B), a category used when a causal association is considered credible, but

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<sup>54</sup> World Health Organization, International Agency for Research on Cancer, Non-Ionizing Radiation, Part 2: Radiofrequency Electromagnetic Fields, IARC Monographs on the Evaluation of Carcinogenic Risks to Humans (2013).

when chance, bias or confounding cannot be ruled out with reasonable confidence.<sup>55</sup>

In June 2012, the National Cancer Institute (NCI) updated its information about cellular phones and concluded that although there have been concerns regarding radiofrequency energy from cellular phones and how it may affect the brain and other tissues, "to date there is no evidence from studies of cells, animals, or humans that radiofrequency energy can cause cancer."<sup>56</sup> This finding is consistent with the WHO/IARC reclassification which found the reclassification justified in part on epidemiology studies in addition to studies of cells, animals or human. The NCI also reviewed what other expert agencies have concluded regarding cell phones and cancer. The NCI notes that the Food and Drug Administration (FDA) has also stated that while some studies have reported biological changes associated with radiofrequency energy, these studies have failed to be replicated. Additionally, the FDA has stated that the majority of published studies have failed to show a relationship between exposure to radiofrequency energy from cell phones and health problems.<sup>57</sup>

Relative RF Exposure Levels from Meters and Other Common Devices

The table below compares exposure levels from utility meters and other common RF/EMF-emitting devices:

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<sup>55</sup> International Agency for Research on Cancer (IARC), IARC Monographs on the Evaluation of Carcinogenic Risks to Humans (January 2006) (WHO Study). Available at <http://monographs.iarc.fr/ENG/Preamble/currentb6evalrationale0706.php>

<sup>56</sup> NCI, Cell Phones and Cancer Risk (June 18, 2012) (available at <http://www.cancer.gov/cancertopics/factsheet/Risk/cellphones>).

<sup>57</sup> Id.



RF/EMF Emissions Compared<sup>58</sup>

Device	Location	Average Exposure (mW/cm <sup>2</sup> )	Notes
FCC limit		1.0000000	
Cell phone	At ear	0.1900000	High end of range
		0.0900000	Low end of range
WiFi router	1 yard away	0.0010000	High end of range
		0.0002000	Low end of range
TV, radio, cell towers	Typical distances away	0.0000050	
AMR meter @10% duty cycle	1 yard away, meter and person outside	0.0031000	
AMR meter @ 10% duty cycle	1 yard away, meter outside, person inside	0.0001500	
AMR meter @ typical operation	1 yard away, meter outside, person inside	0.0000008	
Electro-mechanical meter @ typical operation	1 yard away, meter outside, person inside	0.0000080	
Solid-state meter @ typical operation	1 yard away, meter and person outside	0.00000000000000000004	Below ambient levels (“noise floor”)

A field study of smart meter RF emissions performed by the Electric Power Research Institute (EPRI) in 2010 concluded that RF emissions from smart meters are well below regulatory limits set by the FCC. Although there are differences between the meters used in the EPRI study and those used by Central

<sup>58</sup> This data is derived from reports filed by the California Council on Science and Technology and other sources, which are summarized in greater detail below.

Hudson, the results are still useful to consider. The EPRI study was conducted on a cluster of 10 smart meters located within a "meter farm" containing approximately 7,000 smart meters over 20 acres. The smart meters were operated continuously (100% duty cycle) for purposes of the study and measurements were taken both in front and behind the rack over a four-day period. The EPRI study reported that even under continuous operation, at one foot in front of the smart meter bank, the maximum exposure was only 10% of the FCC limit and behind the smart meter bank, even at eight inches, exposure was less than 1% of the FCC limit.<sup>59</sup>

The Vermont Department of Health (VDH) conducted a study of smart meters installed by Green Mountain Power. The meters examined were similar in power and frequency to the meters in the EPRI study. The VDH Report also found the exposure from the smart meters was well below the FCC limits (0.05 mW/cm<sup>2</sup> - 0.14 mW/cm<sup>2</sup> at 12 inches from the meters) and that RF levels dropped to near background levels at a testing distance of three feet or more from the meter. The VDH Report also examined RF exposure inside the residence and found that no level above the background level was detected during meter operation.<sup>60</sup>

Since most exposures occur from a meter outside with an external wall and meter enclosure in between, there is an additional margin of safety as well from the barriers presented by the structure and meter enclosure, both of which reduce RF field strength. Even allowing for a possibly outdated FCC standard and the WHO/IARC reclassification, these measurements indicate a reasonable margin of safety for the vast majority of

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<sup>59</sup> Electric Power Research Institute, "Radio-Frequency Exposure Levels from Smart Meters" (November 2010).

<sup>60</sup> Vermont Department of Health, "Radio Frequency Radiation and Health: Smart Meters" (February 10, 2012) (VDH Report).

exposures from AMR meters. Moreover, AMR meters generally comply with regulations in numerous other jurisdictions that are more up to date than the U.S., including the European Union and 23 other countries.

At an average duty cycle, Central Hudson's meters would meet all the referenced governmental standards even for a person standing six inches from the meter full-time. For a single meter, the most restrictive governmental standard would be met for a person 17 inches away during operation at a 10% duty cycle.

An electromechanical meter contains no radio transmitter and emits no RF, but a substantial amount of EMF. Electromechanical meters operate by counting the revolutions of a metal disc which is caused to rotate at a speed proportional to the power passing through the meter. The disc is acted upon by two sets of coils that exert an electromagnetic force on the disc in proportion to the level of electricity consumed, resulting in the disc rotating at a speed proportional to the power or rate of electric usage. The disc drives a register mechanism which counts disc revolutions, rendering a measurement of the total electricity consumed. The amount of EMF emitted by the coils increases as the amount of current increases. Under typical use, an electromechanical meter produces approximately ten times as much EMF radiation as a solid-state meter.<sup>61</sup>

#### Investigations of Utility Meter Safety

Numerous detailed investigations into the safety of RF transmissions from utility meters have been conducted in several states and other jurisdictions. These investigations have in turn reviewed a wealth of evidence, including testimony in those proceedings offered by internationally renowned experts,

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<sup>61</sup> See <http://www.emfs.info/sources/meters/traditional/>.

exposure regulations in the United States and elsewhere, and over one hundred peer-reviewed scientific studies. The results of several of these investigations are summarized here.

California Council on Science and Technology (CCST)

CCST states that California Assembly Members requested that CCST perform an "independent, science-based study...[that] would help policy makers and the general public resolve the debate over whether smart meters present a significant risk of adverse health effects."<sup>62</sup> CCST states that it consulted with over two dozen experts and sifted through over a hundred articles and reports, providing a thorough, unbiased overview. Its key findings were as follows:

- Wireless Smart meters, when installed and properly maintained, result in much smaller levels of radio frequency (RF) exposure than many existing common household electronic devices, particularly cell phones and microwave ovens.
- The current FCC Standard provides an adequate factor of safety against known thermally induced health impacts of existing common household electronic devices and smart meters.
- To date, scientific studies have not identified or confirmed negative health effects from potential non-thermal impacts of RF emissions such as those produced by existing common household electronic devices and smart meters.
- Not enough is currently known about potential non-thermal impacts of radiofrequency emissions to identify or recommend additional standards for such impacts.<sup>63</sup>

Michigan Public Service Commission Staff Report

In Case U-17000, Staff of the Michigan Public Service Commission (MPSC) engaged in a review of resources in response

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<sup>62</sup> California Council on Science and Technology, "Health Impacts of Radio Frequency from Smart Meters (January 2011), p. 6.

<sup>63</sup> Id., p. 4.

to public concerns about smart meters. The MPSC Report states that Staff's review supports the following conclusion:

After careful review of the available literature and studies, the Staff has determined that the health risk from the installation and operation of metering systems using radio transmitters is insignificant. In addition, the appropriate federal health and safety regulations provide assurance that smart meters represent a safe technology.<sup>64</sup>

The MPSC Report notes that some states with opt-out policies allow customers to retain their electromechanical meter, while others provide a smart meter with the radio transmitter turned off. The Report concludes that:

Electromechanical meters may be a viable opt-out option for some customers; however, maintaining electromechanical test facilities, inventory, and manual meter reading could result in higher incremental costs. The traditional electromechanical meter is obsolete and currently not in production. Offering customers an electromechanical meter as an alternative to a smart meter is not a long-term solution.<sup>65</sup>

Texas Public Utility Commission Staff Report

Public Utility Commission Texas (PUCT) Staff surveyed existing scientific research and analyses that have been performed to investigate the potential health effects of exposure to low-level radiofrequency electromagnetic fields emitted by wireless communication devices including smart meters. Its findings were as follows:

- Decades of scientific research have not provided any proven or unambiguous biological effects from exposure to low-level radio frequency signals. Further, Staff reviewed all available material and found no credible

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<sup>64</sup> Case U-17000, Report to the Commission (June 29, 2012) (MPSC Report), p. 2.

<sup>65</sup> Id., p. 27.

evidence to suggest that smart meters emit harmful amounts of EMF radiation.

- Radiation comes in two forms: ionizing and non-ionizing. The methods of data transmittal by smart meters most common in Texas (which communicate wirelessly) and other forms of telecommunications (television, radio, cell phones, satellite) utilize non-ionizing EMF radiation in the RF band, commonly known as RF EMF.
- In contrast, ionizing radiation carries an inherently greater amount of energy; it may come from the decay of fissionable material like uranium or from EMF at significantly higher frequencies, such as X-rays or cosmic rays. Because of its inherent high energy, ionizing radiation is known to cause cellular disruption which may lead to various acute or chronic medical problems, including the induction of cancer.
- Smart meters do not emit or utilize ionizing radiation.
- RF EMF can cause the heating of living tissue (thermal effect) when the tissue is exposed to a certain level of intensity, which is the only known risk of exposure to such emissions. The FCC has therefore established two tiers of MPE - one tier applies if exposure occurs in an occupational or "controlled" situation, and the other tier applies if the general population is exposed or exposure results from an "uncontrolled" situation. The FCC uses a safety factor for the general population tier that sets the MPE at 1/50th of the level of known thermal effects while the occupational MPE is set at 1/10th of the level. Because smart meters are devices deployed among the general population, the more restrictive of the two safety factors is applied; the MPE for the general population is 80% lower than the occupational MPE.
- Many governmental health agencies from around the world, including those at the state, provincial, county, and city levels, in addition to academic institutions and other researchers have stated that there are no known non-thermal effects from exposure to RF EMF. This lack of non-thermal effect includes the effects which manifest from exposure to ionizing radiation. Nonetheless, substantial medical research on any potential non-thermal effects of non-ionizing radiation has been conducted and is ongoing. It is anticipated that medical researchers will continue to perform investigations of both the potential thermal

and non-thermal health effects of RF for the foreseeable future.

- It is important to note that one must use caution when relying solely on the results of individual research studies because conflicts or inconsistencies may exist among the results of other individual studies. Laymen often may not recognize poorly executed studies, or they can misinterpret the results of properly conducted scientific research. Either circumstance may lead a casual observer to draw errant conclusions. Furthermore, it is impossible to scientifically prove absolute safety (the null hypothesis).<sup>66</sup>

The PUCT Report notes that EPRI's research found that in-residence exposure to the emissions from a smart meter is greatly mitigated by several factors:

- The intensity of RF EMF is reduced exponentially with greater distance from the emitting device;
- The shielding provided by the meter enclosure;
- The home's building materials further weaken the field strength;
- The meter antenna orientation inhibits the inward direction of the field pattern; and
- RF EMF emissions are only intermittent; a smart meter typically transmits 1 - 5% of the time.<sup>67</sup>

The PUCT Report also found that several governmental entities, including the City of Naperville, Illinois, the Vermont Department of Health, the Victorian State Government of Australia, and the City of Richmond in British Columbia, Canada had performed their own tests on RF EMF from smart meters. These tests corroborated the results of EPRI's investigations.<sup>68</sup>

The PUCT Report states that the Bioinitiative Report, which was co-edited by Dr. Carpenter, is often cited by

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<sup>66</sup> Public Utility Commission of Texas, Health and RF EMF from Advanced Meters (December 2012) (PUCT Report), p. 1.

<sup>67</sup> Id., p. 2.

<sup>68</sup> Id.

opponents of wireless technology, but has been widely criticized by government research agencies and subject matter experts in Australia, Belgium, the European Commission, France, Germany, and the Netherlands; as well as EPRI and the IEEE. Some of the stated criticisms were that the report:

- provided views that were not consistent with the consensus of science;
- recommended safety limits that were not supported by the weight of scientific evidence;
- included selection bias in several research areas;
- lacked objectivity and balance; and
- suffered from uneven editing quality.<sup>69</sup>

The PUCT Report notes that Dr. Carpenter and other researchers have developed a level of notoriety for their assertions regarding the purported dangers of EMF exposure, and that opponents of wireless technology have often called upon them to testify as expert witnesses. For example, Dr. Carpenter testified as an expert for intervenors opposed to plans by Hydro Québec, a utility in Canada, to install wireless smart meters on homes and businesses. The regulatory authority for the province, The Québec Energy Board

[r]efuse[s] to grant the requested expert status on the grounds that David Carpenter is not a doctor, never had clinical experience with patients and has never personally done any research on the effects of RF health. The Board does not, however, reject his testimony in the case because of his knowledge on the research done by others in this field. It therefore accepted this testimony, subject to establishing the probative value to be accorded.. "Clearly, the witness

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<sup>69</sup> Id., 17 (citations omitted).



Carpenter, expert or not, does not meet the criteria of objectivity which the Board is entitled to expect.<sup>70</sup>

With respect to the inclusion of RF EMF into the IARC 2B classification, the PUCT Report notes that smart meter opponents typically mention the pesticide DDT (dichlorodiphenyltrichloroethane) and elemental lead as also having been placed into the same classification. The PUCT Report states that:

Decades ago, DDT was found to have a demonstrable negative environmental impact widely viewed as outweighing its perceived benefits and found to accumulate in living tissue, leading to obvious health issues. For those reasons, it was removed from the market. Note that the potential for cancer is not why the substance was withdrawn. Lead is also a bioaccumulative substance and has known toxic effects, such as interfering with a variety of body processes including those of the nervous system. As a result, its use has been continually reduced over the past few decades. Again, the potential for lead to cause cancer is generally not why the use of the substance has fallen out of favor.<sup>71</sup>

The PUCT Report also notes that the IARC 2B classification includes several other well-known substances, including coffee, pickled vegetables, and talcum powder.<sup>72</sup>

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<sup>70</sup> Id., p. 18, citing [http://internet.regie-energie.qc.ca/Depot/Projets/111/Documents/R-3770-2011-A-0163-DEC-DEC-2012\\_10\\_05.pdf](http://internet.regie-energie.qc.ca/Depot/Projets/111/Documents/R-3770-2011-A-0163-DEC-DEC-2012_10_05.pdf), and [http://www.regie-energie.qc.ca/regie/DirectivesInstructions/Regie\\_RoleExperts\\_18juillet2011.pdf](http://www.regie-energie.qc.ca/regie/DirectivesInstructions/Regie_RoleExperts_18juillet2011.pdf) (each translated from French). The PUCT Report states that Dr. Carpenter holds a medical degree from Harvard but is not accredited to practice medicine.

<sup>71</sup> Id., p. 34.

<sup>72</sup> Id., p. 35.

Citing a study conducted in the Australian State of Victoria Commissioned by the state government, the PUCT Report states that,

the test results showed that the fields from the smart meter are slightly lower than the fields from the analog (electromechanical) meter. The report concluded that the smart meters themselves do not cause any increase in the power line-related EMF levels and that replacement of the older analog meters with AMI meters would reduce [extremely low frequency] EMF exposure.<sup>73</sup>

Regarding non-thermal effects, the PUCT Report states that, "[g]overnmental health agencies from around the world, including but not limited to the U.S., Canada, the UK, and Australia, as well as academic institutions and other researchers, have stated that there are no known non-thermal effects from exposure to RF EMF."<sup>74</sup>

In addition to those summarized here, the PUCT Report exhaustively covers numerous additional studies and expert opinions support of its conclusions, including studies completed by or on behalf of the United Kingdom, Ontario Province, the Norwegian Institute of Public Health, the Swedish Council for Working Life and Social Research, and the Health Council of the Netherlands.<sup>75</sup>

British Columbia Utilities Commission Decision

The British Columbia Utility Commission (BCUC) rendered a decision approving an AMI project proposal submitted by the utility company FortisBC. In reaching its decision, the BCUC made a number of key findings, including:

- Health Canada's Safety Code 6 takes into account the scientific evidence related to the impact of thermal and non-thermal effects of radio frequency emissions

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<sup>73</sup> Id., p. 46.

<sup>74</sup> Id., p. 62.

<sup>75</sup> Id., pp. iii-iv (Table of Contents).

- on human health and provides an appropriate degree of precaution in setting the limits for these emissions;
- The radio frequency emissions generated by the Project are significantly below the levels set out in Safety Code 6 established by Health Canada to ensure such emissions are not harmful to human health;
  - While there are individuals who feel strongly the low level electromagnetic emissions will have a negative impact on their health, the scientific evidence in this Proceeding does not persuade the Panel that there is a causal link between radio frequency emissions and the symptoms of electromagnetic hypersensitivity.<sup>76</sup>

A number of witnesses offered testimony in the BCUC proceeding, including Dr. Carpenter. According to the BCUC Decision, "Dr. Carpenter noted that he did not have expertise in exposure levels and was not qualified to comment on the exposure levels from the AMI meters. He provided no scientific reason to disagree that the AMI meters meet the Safety Code 6 limit for both average and peak pulse levels."<sup>77</sup> The BCUC further found that a key piece of evidence provided by Dr. Carpenter was not well-respected and had been found to be implausible:

Dr. Carpenter cites reference item (g) Mortality by neoplasia and cellular telephone base stations in the Belo Horizonte municipality, Minas Gerais state, Brazil by Dode AC et al without caveat and characterizes it as showing higher rates of death from cancer among individuals living close to cell towers than among those living further away. Rates were highest in residences less than 100 m, falling to near background a 1,000 m. This report has been subject to considerable critique and one of the other witnesses, Dr. Blank recognized that the results did not make sense... The Panel has significant concerns about Dr. Carpenter's testimony. Of particular concern is that Dr. Carpenter, in the words of FortisBC, 'summarizes

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<sup>76</sup> In the Matter of FortisBC, Inc., Certificate Of Public Convenience And Necessity For The Advanced Metering Infrastructure Project - Decision (issued July 23, 2013) (BCUC Decision), p. ii.

<sup>77</sup> Id., p. 20.

the references he cites in a manner consistent with his own beliefs, rather than accurately reporting their findings.' The Panel is also concerned with Dr. Carpenter's reference to studies that suit his views and his inability to properly defend them as exhibited by the Belo Horizonte municipality study example. In his attempt to summarize the references, Dr. Carpenter adopted a less than objective and fully informed approach. For this reason, the Panel gives little weight to his evidence.<sup>78</sup>

Dr. Schoechle did not verbally give evidence to the BCUC during its hearing; however, he submitted written evidence in the form of a paper entitled, "Getting Smarter About the Smart Grid." The BCUC noted that Dr. Schoechle's work experience lies primarily in research, education, and consulting in standardization, innovation, and intellectual property rights.<sup>79</sup> The BCUC concluded that:

Dr. Schoechle, while making comments in his paper on health, environment, safety and privacy issues associated with smart meters, does not appear to have personal expertise in any of these areas... Given Dr. Schoechle's educational background and experience and his lack of knowledge of the specifics of the Application, the Panel finds that no weight can be given to Dr. Schoechle's evidence.<sup>80</sup>

The BCUC Decision reviews a number of matters regarding the relationship between utility meter RF emissions and health, including the difference between actual and potential exposure, the difference in emissions between a single meter and a bank of meters, the incremental effect of RF from utility meters when added to exposure from other sources, whether meters may interfere with medical devices, and whether

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<sup>78</sup> Id., p. 22.

<sup>79</sup> Id., p. 36.

<sup>80</sup> Id., p. 37.

the frequency of utility meter transmissions creates a chronic health problem. The BCUC found no evidence in any of these areas that caused them to change their decision.<sup>81</sup>

With respect to frequency of transmissions, the BCUC Decision cited testimony provided by Dr. Yakov Shkolnikov, a witness who testified for FortisBC.<sup>82</sup> In response to a question regarding the impact of continuous transmission, Dr. Shkolnikov testified:

The cell phone that you have, whether you use it or don't use it, actually continuously transmits... About 30 times a minute, your phone in your pocket communicates with a tower. It does it for purposes of notifying that you're still available to receive phone calls, to receive control information to know how to communicate with the network. And so from that perspective, if you were to use that definition of "continuous," there are a lot of technologies that do it.<sup>83</sup>

With respect to electromagnetic hypersensitivity (EHS), the BCUC Decision cites the WHO:

EHS is characterized by a variety of non-specific symptoms that differ from individual to individual. The symptoms are certainly real and can vary widely in their severity. Whatever its cause, EHS can be a disabling problem for the affected individuals. EHS has no clear diagnostic criteria and there is no scientific basis to link EHS symptoms to EMF exposure. Further, EHS is not a medical diagnosis, nor is it clear that it represents a single medical problem.

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<sup>81</sup> Id., pp. 114-132.

<sup>82</sup> Id., p. 28. Dr. Shkolnikov's education includes a B.S. in Engineering Physics from Cornell University, and an M.A. and a Ph.D. in Electrical Engineering from Princeton University. He was tendered and qualified as an expert in the BCUC proceeding to give opinion evidence in the fields of electromagnetic exposure, electromagnetic interference and engineering physics, including the physics of electromagnetic fields.

<sup>83</sup> Id., p. 129.

Physicians: Treatment of affected individuals should focus on the health symptoms and the clinical picture, and not on the person's perceived need for reducing or eliminating EMF in the workplace or home. This requires:

- a medical evaluation to identify and treat any specific conditions that may be responsible for the symptoms,
- a psychological evaluation to identify alternative psychiatric/ psychological conditions that may be responsible for the symptoms,
- an assessment of the workplace and home for factors that might contribute to the presented symptoms. These could include indoor air pollution, excessive noise, poor lighting (flickering light) or ergonomic factors. A reduction of stress and other improvements in the work situation might be appropriate.
- For EHS individuals with long lasting symptoms and severe handicaps, therapy should be directed principally at reducing symptoms and functional handicaps. This should be done in close co-operation with a qualified medical specialist (to address the medical and psychological aspects of the symptoms) and a hygienist (to identify and, if necessary, control factors in the environment that are known to have adverse health effects of relevance to the patient).

Treatment should aim to establish an effective physician-patient relationship, help develop strategies for coping with the situation and encourage patients to return to work and lead a normal social life.<sup>84</sup>

District of Columbia Public Service Commission Report

The Public Service Commission of the District of Columbia (DCPSC) investigated and reported on smart meters on the request of the Committee on Public Services and Consumer Affairs of the D.C. Council. As part of its investigation, the DCPSC contracted with consulting firm, West Monroe Partners

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<sup>84</sup> Id., pp. 134-135, citing "Electromagnetic Fields and Public Health" Available at <http://www.who.int/peh-emf/publications/facts/fs296/en/>.

(WMP) to assess the safety of Potomac Electric Power Company's (Pepco) Advanced Metering Infrastructure. Some of the key findings are as follows:

- WMP's review of scientific literature and studies by government agencies around the world demonstrate that ongoing health and safety research has not established any negative health impacts from smart meters and associated two-way telecommunication systems. Furthermore, studies that tested specific RF outputs of the smart meters show that their emissions are orders of magnitude below the FCC MPE limits.
- The smart grid devices in Pepco's Washington, D.C., service territory, including meters, access points, and relays, are all operating within the FCC limits for MPE. Field testing observed a maximum measurement of 1.45% of this FCC limit for MPE. The FCC considered a large number of comments submitted by industry, government agencies, and the public. In particular, the FCC considered comments submitted by the EPA, FDA, NIOSH, and OSHA, which have primary responsibility for health and safety in the Federal Government. The guidelines the FCC adopted were based on the recommendations of those agencies, and they have sent letters to the FCC supporting its decision and endorsing the FCC's guidelines as protective of public health.<sup>85</sup>

WMP also investigated smart meter transmissions not related to data transmissions. WMP found that when the meter is not transmitting data, the amount of RF transmission from other meter components is very small:

According to [Silver Spring Networks, Pepco's AMI contractor], the maximum emissions of a Pepco smart meter that is not transmitting are 39.3 microvolts/meter or  $4.097 \times 10^{-14}$   $\mu\text{W}/\text{cm}^2$  [microwatts per square centimeter]. During RF spot testing, the measured emission from a meter that was not

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<sup>85</sup> Report of an Investigation into Smart Meters Conducted by the Public Service Commission of the District of Columbia In Response to Questions from the Committee on Public Services and Consumer Affairs of the Council of the District of Columbia (September 20, 2013) (DCPSC Report), p. 4.

transmitting could not be distinguished from the noise floor of the 902 MHz - 928 MHz frequency band. During spot testing, the noise floor was typically 250 times lower than the peak smart meter RF emissions. This includes minute emissions from certain components within the meter such as the power supply, LCD Display, AC/DC converter, and DC/DC converters, which are often so small that they can't consistently be measured and are considered insignificant.<sup>86</sup>

WMP testing and measurements further confirm that RF from smart meters is much lower than other common household devices (such as cell phones, cordless phones, wifi routers, microwave ovens and laptop computers); that the meters communicate in short bursts ("briefer than the blink of an eye"), so that total transmission time amounts to seconds per day; and that even in multi-unit buildings with banks of meters, WMP spot-testing found that residents will experience less than 1% of the FCC MPE limit.<sup>87</sup>

Maine Supreme Judicial Court Decision

In Maine, Mr. Ed Friedman and other opponents challenged Central Maine Power's (CMP) AMI system deployment, and the matter reached the state's highest court, the Maine Supreme Judicial Court. In a decision issued last year, the court affirmed "an order of the Maine Public Utilities Commission (MPUC) finding that CMP's AMI system poses no

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<sup>86</sup> Id., p. 5. The noise floor is the measure of the signal created from the sum of all the noise sources and unwanted signals measured in the test environment. Noise is defined as any signal other than the one being monitored during a test (i.e., cell phone tower signals, baby monitors, and all other devices that are outside of the testers' control and operate in the 902-928 MHz frequency band being tested).

<sup>87</sup> Id., pp. 6-8.



credible threat to the health and safety of CMP's customers."<sup>88</sup> Mr. Friedman contended that (1) the Commission applied an improper standard and burden of proof, and (2) the determination was not supported by substantial evidence in the record.<sup>89</sup>

Regarding the standard applied, the court had previously determined that the MPUC must

"determine whether smart meters and their associated RF constitute a 'credible threat' to the health and safety of CMP customers... Friedman argues that 'ensure' means that any credible evidence of a risk precludes a finding that smart meters are safe, and therefore the Commissioners impermissibly relaxed the standard by allowing some potential for harm 'in light of the context and purpose of the service and facility...'"<sup>90</sup>

The court decided that,

evidence of a hypothetical future risk is not sufficient to preclude a finding that CMP satisfied its burden; rather, the threat of harm must be probable and convincing. The Commission, therefore, properly rejected Friedman's approach because it would require an impractically high threshold for ensuring safety, and as a result would render nearly all utilities unsafe.<sup>91</sup>

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<sup>88</sup> Docket PUC-15-20, Ed Friedman et al. v. Public Utilities Commission et al., Decision 2016 ME 19 (Decided January 26, 2016), ¶1.

<sup>89</sup> Id. Friedman also appealed on the grounds that two MPUC Commissioners submitted separate opinions, offering different rationales for the finding, and therefore, did not concur. The challenge to the MPUC order on that legal objection is not reviewed here.

<sup>90</sup> Id., ¶7, citing MPUC Docket No. 2011-00262, Ed Friedman, et al., Request for Commission Investigation into Smart Meters and Smart Meter Opt-Out, and Docket No. 2012-00412, Deborah Oliver, et al., Request for Commission Investigation into Central Maine Power Company and Smart Meters, Order (issued December 19, 2014) (MPUC Order).

<sup>91</sup> Id., ¶8.

Regarding the argument that the MPUC's finding is not supported by substantial evidence in the record, the court concluded that "contrary to Friedman's contention, the record is replete with evidence supporting the Commission's eighty-two-page order finding that smart meters do not pose a credible threat to the health and safety of CMP's customers under reasonable operational scenarios."<sup>92</sup> The court went on to state:

The evidence supporting the Commission's finding includes data that smart meters comply with RF exposure regulations promulgated by the FCC. Trilliant, the manufacturer of CMP's smart meters, had the meters tested pursuant to FCC standards, and this testing showed that the smart meters complied with FCC exposure limits even at the unrealistically close distance of twenty centimeters from the meter. At average exposure three feet away from a smart meter, the exposure levels are 'five orders of magnitude (roughly 100,000 times) lower than' the standards set forth by the FCC and the International Commission on Non-Ionizing Radiation Protection. Trilliant also measured peak exposures at a distance of three feet and found that the levels were 'two orders of magnitude below' the relevant standards. In addition, in response to concerns about banks of smart meters -- that is, meters grouped together -- the FCC indicated that 'based on the practical separation distance and the need for orderly communications among several devices, even multiple units or banks of meters in the same location will be compliant with the public exposure limits.'<sup>93</sup>

The court further found that:

The Commission's determination is also supported by extensive field-testing of smart meters. The Maine Center for Disease Control and Prevention, after reviewing studies and evidence submitted to it in 2010, concluded that '[o]ur review of these agency assessments and studies do[es] not indicate any consistent or convincing evidence to support a concern

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<sup>92</sup> Id., ¶11.

<sup>93</sup> Id., ¶12, citing MPUC Order.

for health effects related to the use of [RF] in the range of frequencies and power used by smart meters.’<sup>94</sup>

Finally, the court found that:

In addition to field-testing, the Commission also considered numerous peer-reviewed studies, many of which focused on the effects of RF emissions from cell phones, and concluded that ‘there have been no studies provided or cited that even purport to indicate negative health effects from the much lower RF exposure levels from smart meters.’ The Commission acknowledged that there had been some evidence presented of potential future risk posed generally by RF exposure, but nonetheless concluded that the current state of the evidence was insufficient to conclude that smart meters amount to a credible threat of harm. In light of all of this evidence, along with a host of additional studies and information not discussed in detail here, we conclude that the Commission’s determination is supported by substantial evidence in the record.<sup>95</sup>

#### DISCUSSION AND CONCLUSION

##### AMR Meter Safety

The Commission must ensure that service provided by electric and gas utilities is safe and adequate.<sup>96</sup> The statutory mandate means the Commission must limit risks to those that are reasonable considering the purpose, context and reasonable risk mitigation measures that can be implemented consistent with the provision of a utility service and facility.

The question of safety in this context is a public policy determination and not a scientific conclusion. The New York State Legislature’s charge to the Commission was to ensure "safe and adequate" service. Safety, especially in the case of electricity, which by its very nature has inherent risks, is

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<sup>94</sup> Id., ¶13, citing MPUC Order.

<sup>95</sup> Id., ¶14, citing MPUC Order.

<sup>96</sup> Public Service Law (PSL) §65.

determined not only by an understanding of the scientific evidence and potential risks, but also by a policy judgment as to the acceptability of those risks given the benefits (including safety benefits) of the technology. These standards of safety may change with time - indeed almost certainly will change - as technologies and scientific understanding advances.

The Commission hereby takes administrative notice of the investigations related to smart meters prepared by and for other jurisdictions both in the United States and abroad. This evidence establishes that utility meters currently and generally operate within a range of exposures that are lower than those to which members of the public are commonly exposed to in private and business environments. Given this extensive amount of study, there is a wealth of evidence that shows that AMR meters pose no credible threat to the health and safety of Central Hudson's customers.

Commenters in support of the Modification Petitions frequently cite the WHO classification of RF EMF as a class 2B carcinogen in support of their smart meter health concerns; however, the IARC Group 2B classification is only a suggestion of a possible causal relationship with carcinogenic effects. Furthermore, the WHO/IARC research and classification of RF/EMF as potentially carcinogenic focuses on exposures from cellular and cordless phones operated very near the body - often next to the ear and head - as opposed to utility meters installed on the outside of a building. For this reason, the cell phone exposure scenario is higher and different from exposures from a meter transmitter.

The Commission therefore affirms its conclusion in the Opt-out Order, that research in this field has not established any negative health impacts from low level RF transmissions, nor are there any scientific studies supporting a conclusion that RF

transmissions from utility meters result in negative health impacts. For customers who object to exposure to RF emissions from AMR meters, the ability to opt out of using AMR devices and instead elect to have the Company install and maintain non-AMR meters is an appropriate remedy.

Availability of Electromechanical Meters

The Commission has carefully considered the evidence concerning the potential threat of RF from meters equipped with radio transmitters that emit measurable RF radiation, as well as the evidence with respect to non-RF equipped solid state meters, and also with respect to putative benefits of electromechanical meters.

Solid-state meters are no different than other electronic devices used inside and outside the home such as razors, coffee makers, cameras, and cell phones, all of which have devices that convert AC to DC. Furthermore, solid state meters are now the industry standard meter, and the older electromechanical technology is already headed to obsolescence. In this way, utility meters are no different than clocks, watches, TV tuners, telephone lines, audio and video recording devices, etc., all of which have moved beyond "analog" or electromechanical technology, to "digital" or solid-state designs. By comparison, solid-state devices are less expensive to manufacture, more accurate, and more reliable over the long term.<sup>97</sup> Finally, the available evidence demonstrates that electromechanical meters emit more EMF than a solid-state device, actually the reverse of the alleged EMF emissions intensity of the two technologies.

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<sup>97</sup> A frequently noted weakness of electromechanical meters is that over time, as the bearings and other mechanical parts become worn, the meter will bind and slow down, causing the meter to under-record usage. This may explain the fondness of at least some customers for their electromechanical meters.

In addition, the meter is an instrument of commerce, and customers can no more supply their own meter than they can shop at their local grocery store and insist that their purchases be totaled on a cash register they supply. Furthermore, the utility is responsible for reading, maintaining, and ensuring the accuracy of the meter. The Commission's regulations require that only utilities (and certain other authorized entities, such as a competitive meter service provider) may apply for approval of a given meter type.<sup>98</sup> Central Hudson has not indicated its willingness to sponsor refurbished electromechanical meters. As noted by the Joint Utilities, refurbished meters likely cannot meet all of the standards required for Commission approval, and replacement parts are in increasingly short supply. The Commission therefore concludes that continuing to supply electromechanical meters is not a viable, long term solution, and is not in the public interest.

#### Opt-out Meter Reading Tariff

In the Opt-out Order, the Commission concluded that customers who opt out should pay a cost-based fee to cover the additional costs associated with the manually read meter.<sup>99</sup> Customers who currently have an AMR meter installed at their premises are required to pay a meter change fee to cover the cost of replacing the meter with a non-AMR meter. The factors related to the one-time charge include travel time, the time to install the meter(s), straight time hourly rate, vehicle costs and labor burdens.

Monthly cost calculations include the same variables, substituting meter read time for meter install time. Upon

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<sup>98</sup> 16 NYCRR §93.5.

<sup>99</sup> Opt-out Order, p. 5.

further review, however, it appears that such costs are overstated and inapplicable to monthly meter reading because of the strategy the Company has employed to implement AMR.

Rather than saturating a given district with AMR, which would entail labor savings, the Company has chosen to implement AMR meters incrementally, in the course of routine meter replacement. At the present time, only about 41% of the Company's meter are converted to AMR, and those meters are dispersed throughout the service territory. Meter readers still walk each meter reading route, and AMR readings are captured by a handheld device as the meter reader walks by, thus producing little or no labor savings from AMR, and conversely, no incremental costs related to travel, vehicle costs, etc., to manually read customers who opt-out. Thus, the cost study supporting the monthly meter reading fees overstates such costs, and monthly fees are hereby rejected. Central Hudson shall file tariff revisions on not less than 15 days' notice, to become effective December 1, 2017, withdrawing such monthly fees. At such time as it believes the monthly opt-out fee is cost-justified, Central Hudson may petition to reinstate the charge.

The Commission orders:

1. Central Hudson Gas & Electric Corporation shall file, on not less than 15 days' notice, tariff revisions to P.S.C. No. 15 - Electricity, consistent with the body of this Order, to become effective December 1, 2017.

2. The requirements of Public Service Law §66(12)(b) and 16 NYCRR §720-8.1 as to newspaper publication of the tariff revisions directed in Ordering Clause No. 1 are waived.

3. In the Secretary's sole discretion, the deadlines set forth in this Order may be extended. Any request for an extension must be in writing, must include a justification for

the extension, and must be filed at least one day prior to the affected deadline.

4. Except as provided in the body of this Order, the Modification Petitions addressed in this Order are denied.

5. Upon compliance with Ordering Clause No. 1 this proceeding will be closed.

By the Commission,

(SIGNED)

KATHLEEN H. BURGESS  
Secretary