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January 27, 2015

Ms. Maureen Scott
Arizona Corporation Commission
1200 West Washington Street
Phoenix, Arizona 85007

ORIGINAL

RE: In the Matter of the Commission's Own Generic Investigation
of the Energy Policy Act of 1992
Docket No. E-00000C-11-0328

Dear Ms. Scott:

As we discussed, I am attaching the Order issued by the Maine Public Utilities Commission (MPUC) on December 19, 2014, on remand from the Maine Supreme Judicial Court,¹ in which the MPUC finds that advanced metering infrastructure including "smart meters" (as implemented by the utility in question, Central Maine Power) does not present a credible threat to the health and safety of CMP's customers.

I am also enclosing for your information the California Public Utilities Commission final decision in December of 2014 in the matter of an advanced metering opt-out program for Pacific Gas and Electric, Southern California Edison, San Diego Gas and Electric, and Southern California Gas.² This decision addresses the cost of utility opt-out programs, who should bear that cost, and the exclusive use of analog meters as the non-standard meter used for opt-out customers.

As per your request, by copy of this letter I am filing these documents in Docket Control in the Commission's Generic Investigation as noted above.

Sincerely,

Thomas L. Mumaw
Attorney for Arizona Public Service Company

TLM/bgs

- c: Chairman Susan Bitter Smith (Letter only)
- Commissioner Bob Stump (Letter only)
- Commissioner Bob Burns (Letter only)
- Commissioner Doug Little (Letter only)
- Commissioner Tom Forese (Letter only)

Arizona Corporation Commission
DOCKETED

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¹ Friedman v. Pub Util's Comm'n, 2012 ME 90.

² California Public Utilities Commission, Decision 14-12-078, December 23, 2014.

STATE OF MAINE
PUBLIC UTILITIES COMMISSION

December 19, 2014

ORDER

ED FRIEDMAN, ET AL.
Request for Commission Investigation into
Smart Meters and Smart Meter Opt-Out

Docket No. 2011-00262

DEBORAH OLIVER, ET AL.
Request for Commission Investigation into
Central Maine Power Company and Smart
Meters

Docket No. 2012-00412

WELCH, Commissioner;¹ LITTELL and VANNOY, Commissioners

TABLE OF CONTENTS

I.	SUMMARY	3
II.	BACKGROUND	3
	A. <u>Smart Meter Proceedings</u>	3
	1. Authorization of AMI Investment	3
	2. Opt-Out Investigation	4
	3. Friedman Complaint	6
	B. <u>Law Court Decision</u>	7
III.	INVESTIGATION ON REMAND	8
	A. <u>Parties</u>	9
	B. <u>Public Comments</u>	10
	C. <u>Evidence and Discovery</u>	10
	D. <u>Hearings and Post-Hearing Process</u>	11
IV.	CMP SMART METER SYSTEM	12
V.	NATURE AND EFFECTS OF RF EMISSIONS; EXPOSURE LEVELS	13
VI.	RF EMISSION STANDARDS	15
	A. <u>Federal Communications Commission</u>	16
VII.	RELATIVE RF EXPOSURE LEVELS FROM COMMON DEVICES	18
VIII.	POSITIONS OF THE PARTIES	20
	A. <u>Central Maine Power Company</u>	20
	B. <u>Mr. Friedman</u>	20

¹ Chairman Welch did not participate in this proceeding.

C.	<u>Ms. Wilkins</u>	21
D.	<u>Ms. Foley-Ferguson</u>	22
E.	<u>OPA</u>	23
IX.	DECISION	23
X.	OPINION OF COMMISSIONER LITTELL	24
A.	<u>Overview</u>	24
B.	<u>Whether a Utility Service or Facility is Safe is an Appropriate Stand Alone Inquiry</u>	25
C.	<u>The Burden of Proof is on CMP</u>	25
D.	<u>Safe Utility Practices Depend On the Purpose and Context of the Service and Facility as Well as Knowledge of the Effects and Alternatives to Fulfill the Same Service or Facility Function and Risk Mitigation</u>	26
E.	<u>A Credible Threat to Human Health and Safety Does Not Mean Any Credible Evidence of Risk is Sufficient to Create a Credible Threat</u>	29
F.	<u>The Commission is Mandated to Ensure the Safe Provision of Utility Service</u>	32
G.	<u>The Commission's Jurisdiction to Address Safe Utility Services and Facilities is Not Preempted</u>	34
H.	<u>The FCC Guidelines may be Valid but are Out of Date and Should be Reexamined</u>	35
I.	<u>AMI RF Meter RF Exposures are Far Below Other Commonly Used Consumer Devices</u>	37
J.	<u>Complainants Present Credible Studies and Witnesses that RF Radiation may Cause Possible Non-Thermal Effects</u>	38
K.	<u>Actual Testing of the Meters by Trilliant and Field Measurement Indicate RF Levels are Below all Governmental and International Standards and Well Below Other Forms of RF</u>	47
L.	<u>AMI Meters are Safe Under Average/Normal/Standard Operating Conditions</u>	50
M.	<u>Exponent has not Proven that the Meters are Safe Under the Worst Case Operating Condition as Described by Dr. Bailey</u>	53
N.	<u>Customer No-Cost Opt-Out Under Certain Conditions Represents a Low-Cost Mitigation Measure</u>	55
XI.	OPINION OF COMMISSIONER VANNOY	61
A.	<u>Overview</u>	61
B.	<u>Legal Standards and Burden of Proof</u>	63
C.	<u>Compliance with RF Emission Standards</u>	64
1.	FCC Smart Meter Certification	64
2.	Field Tests of CMP Smart Meters	65
3.	Other Field Studies	66
4.	Meter Banks	67
D.	<u>Adequacy of FCC Standards</u>	67

E.	<u>Scientific Studies and Health Impacts</u>	69
1.	The Precautionary Principle and the Hill Criteria	69
2.	Industry Bias	71
3.	Animal Studies	72
4.	Human Studies	72
5.	World Health Organization Classification of RF Emissions as Potentially Carcinogenic	73
6.	Maine CDC	74
7.	Electromagnetic Hypersensitivity	75
F.	<u>Decisions of Health and Regulatory Agencies</u>	75
1.	California Council on Science and Technology	76
2.	Michigan Public Service Commission	77
3.	Texas Public Utility Commission	77
4.	Vermont Department of Health	77
5.	British Columbia Utilities Commission	78
6.	Health Canada	78
G.	<u>Voluntary Use of Technology</u>	78
XII.	CONCLUSION	81
XIII.	ORDERING PARAGRAPH	81

I. SUMMARY

As discussed in this Order, we find that Advanced Metering Infrastructure (AMI), including the use of "smart meters," as implemented and operated by Central Maine Power Company (CMP or the Company), does not present a credible threat to the health and safety of CMP's customers and, based on the record of this proceeding is, therefore, safe.

II. BACKGROUND

A. Smart Meter Proceedings

1. Authorization of AMI Investment

CMP initially proposed to implement Advanced Metering Infrastructure (AMI) in 2007. The proposal included providing solid-state meters or meter modules to all of its customers that supported a two-way communications network and a meter data management system ("smart meters"). AMI includes smart meters, as well as the network devices and related systems that allow for automated and remote meter reading, detailed customer usage measurement and data storage, and communications to and from customer meters. AMI systems provide potential operational savings (e.g., lower storm restoration costs) and a platform for programs that allow customers to lower their energy costs through more accurate and timely information and pricing programs

that better reflect the hourly and seasonal differences in electricity costs (e.g., time-of-use rates).

Concurrent with the Commission's consideration of CMP's AMI proposal, Congress enacted the American Recovery and Reinvestment Act of 2009 (ARRA). Pub. L. No. 111-5, 123 Stat. 115 (2009). The ARRA included a provision whereby electric utilities could become eligible for grants of matching funds from the U.S. Department of Energy (DOE) for up to 50% of the cost of a qualifying Smart Grid program. *Id.* § 405; 123 Stat. 115, 143. CMP applied for a grant and, in October of 2009, received notice of a grant award of \$95.9 million.

On July 28, 2009, the Commission gave initial approval to CMP's AMI project. *Central Maine Power Company, Request for Alternative Rate Plan*, Docket No. 2007-00215(II), Order Approving Installation of AMI Technology (July 28, 2009). In that Order, the Commission stated that AMI:

[is] an important technology that will ultimately reduce utility operational costs, improve customer service and provide customers with necessary tools to use electricity more efficiently and lower their electricity bills, for example, by reducing or shifting usage during high cost periods in response to market price signals. In particular, AMI and associated systems are necessary to provide customers with the option of obtaining rates that are time-differentiated to more closely reflect the actual power costs through the day.

Id. at 2.

The Commission subsequently granted final approval for the installation of CMP's AMI project on February 25, 2010. *Central Maine Power Company, Request for Alternative Rate Plan*, Docket No. 2007-00215(II), Order Approving Installation of AMI Technology (Feb. 25, 2010).

2. Opt-Out Investigation

On January 7, 2011, the Commission initiated a proceeding to consider whether CMP should provide customers with the option to "opt-out" of the installation of a smart meter on their premises. *Elisa Boxer-Cook, et al., Request for Commission Investigation in Pursuing the Smart Meter Initiative*, Docket No. 2010-00345, Notice of Investigation (Jan. 7, 2010); *Teresa Swinbourne, et al., Request for Commission Investigation into Unreasonable, Insufficient and Discriminatory Decisions to Implement the use of Smart Meters to CMP Customers Disregarding Choice in Regards to Wireless Activity and Consumer's Right to Privacy Within Their Homes*, Docket No. 2010-00389, Notice of Investigation (Jan. 7, 2010). The Commission's initiated its investigation pursuant to 35-A M.R.S. § 1302 in response to two ten-person complaints regarding the safety of CMP's smart meters, particularly with regard to the RF emissions

associated with the smart meters' communication system. The Commission limited the scope of the proceeding to the issue of whether CMP's position of not providing alternatives to the installation of a smart meter was an unreasonable, insufficient, or unjustly discriminatory utility practice.

The Commission subsequently received three other ten-person complaints regarding CMP's smart meters, and consolidated these complaints into the investigation commenced as a result of the Boxer-Cook and Swinbourne complaints. *Suzanne A Foley-Ferguson, et al., Request for Commission Investigation Into Advanced Metering Infrastructure In Accordance with the Legislature*, Docket No. 2010-00398, Notice of Investigation (Feb. 18, 2011); *Stephen & Diane Wilkins, et al., Request for Commission Investigation Into CMP's Violation of Homeowner Rights and the Exposure of the Public Health Risk of Smart Meters*, Docket No. 2010-00400, Notice of Investigation (Feb. 18, 2011); *Julie Tupper, et al., Request for Commission Investigation to Allow CMP Customers to Retain Existing Analog Meters*; Docket No. 2011-00085, Notice of Investigation (Apr. 22, 2011) (collectively with the Boxer-Cook and Swinbourne complaints, the Opt-Out Investigation).

On May 19, 2011, the Commission issued a Part I Order, and on June 22, 2011 issued a Part II Order, jointly in all five Dockets cited above (collectively, the "Opt-Out Orders").² The Commission made no specific findings regarding the safety of CMP's smart meters but, based largely on a recognition of the desire of many customers to have a choice regarding the installation of a smart meter, ordered that CMP's provide its residential or small commercial customers with two alternatives to the installation of a smart meter: (1) an electro-mechanical meter ("existing meter option"); or (2) a standard smart meter with the internal network interface card (NIC) operating in a receive-only mode ("transmitter-off option"). The Commission ordered that customers electing either "opt-out" option be assessed both an initial one-time charge and a monthly charge to cover the incremental system costs CMP would incur to provide and maintain the opt-out options.³

² Chapter 110, § 11(C)(2) of the Commission's Rules provides that the Commission may, in certain circumstances, issue a decision in two or more parts. If the Commission issues a decision in multiple parts, the first part (the "Part I Order") must plainly state the result of the decision, specify the orders made by the Commission, and summarize the factual conclusions reached by the Commission. *Id.* The second part of the decision (the "Part II Order") must contain the Commission's full statements or findings of fact. *Id.*

³ For customers that choose the existing meter option, there is a one-time charge of \$40 and a recurring monthly charge of \$12.00. For customers that choose the transmitter-off option, there is a one-time charge of \$20 and a recurring monthly charge of \$10.50. *Part I Order* at 3. Customers who are eligible for the Low Income Home Energy Assistance Program qualify for low-income assistance as follows: a customer whose income is equal to or less than 100% of the Federal Poverty Guidelines receives a 50% reduction in the initial and ongoing opt-out fees; a customer whose income is greater

On July 12, 2011, Suzanne Foley-Ferguson filed a motion to requesting that the Commission reconsider the Opt-Out Orders. *Suzanne A Foley-Ferguson, et al., Request for Commission Investigation Into Advanced Metering Infrastructure In Accordance with the Legislature*, Docket No. 2010-00398, Motion to Reconsider Order (July 12, 2011). Among Ms. Foley-Ferguson's grounds for reconsideration was information reflected in a May 2011 World Health Organization (WHO)/International Agency for Research on Cancer (IARC) report that classified RF emissions generally as a possible carcinogen (WHO Report). Ms. Foley-Ferguson also cited as grounds for reconsideration the proposition that asking people to pay to protect their health from what the WHO determined to be a possible carcinogen amounted to extorting money for a perceived public benefit in violation of the Hobbs Act (18 U.S.C. § 1951). Ms. Foley-Ferguson argued that the above information and the other grounds put forth in her motion should compel the Commission to reconsider its decision to authorize opt-out fees and instead "socialize" the costs among all ratepayers. On August 24, 2011, the Commission issued an order addressing each of Ms. Foley-Ferguson's concerns and denying her Motion. *Suzanne A Foley-Ferguson, et al., Request for Commission Investigation Into Advanced Metering Infrastructure In Accordance with the Legislature*, Docket No. 2010-00398, Order Denying Motion for Reconsideration (Aug. 24, 2011). Neither Ms. Foley-Ferguson nor any other party in the Opt-Out Proceeding filed an appeal of the Opt-Out Orders.

3. Friedman Complaint

On July 29, 2011, Ed Friedman and eighteen other persons filed a complaint pursuant to 35-A M.R.S. § 1302. *Ed Friedman, et al., Request for Commission Investigation into Smart Meter Opt-Out*, Docket No. 2011-00262, Ten-Person Complaint (July 29, 2011). Mr. Friedman's complaint was against CMP for charging its customers a fee to opt-out of CMP's smart meter program, and against the Commission for its Opt-Out Orders which required CMP to charge an opt-out fee. *Id.* at 1. Mr. Friedman requested that the Commission open an investigation to examine CMP's opt-out program based on new information released subsequent to the Opt-Out Orders and examine privacy and electronic trespass issues that the Mr. Friedman felt had not been satisfactorily addressed in the Opt-Out Investigation. *Id.* As relief, Mr. Friedman requested that the Commission stay the installation of smart meters or, in the alternative, that future installations be on an "opt-in" basis, that CMP provide opt-outs at no charge to customers, that the Commission require CMP to present information regarding health, interference, and privacy concerns associated with smart meters, and that the Commission establish a toll-free hotline within the Office of the Public Advocate where consumers could place smart meter-related complaints. *Id.* Mr. Friedman also accused CMP and the Commission of extortion in violation of the Hobbs Act and raised issues regarding the health effects of smart meters, along with privacy and trespass concerns. *Id.* at 4-5.

than 100% of the Federal Poverty Guidelines receives a 25% reduction in the initial and ongoing opt-out fees. *Part II Order* at 14.

On August 31, 2011, the Commission dismissed Mr. Friedman's complaint (Order Dismissing Complaint). The Commission stated that the opt-out options in the Opt-Out Orders addressed, in a comprehensive way, the issues raised in Mr. Friedman's complaint. *Order Dismissing Complaint* at 5. The Commission found that all of the issues raised by Mr. Friedman were raised by one or more of the parties in the Opt-Out Investigation and were considered by the Commission and resolved during that investigation or in subsequent orders on motions for reconsideration. *Id.* The Commission stated that CMP was implementing the directives contained in the Opt-Out Orders and the related orders on reconsideration; thus, CMP had taken and was in the process of taking adequate steps to remove the cause of Mr. Friedman's complaint. *Id.* Accordingly, the Commission dismissed Mr. Friedman's complaint as to CMP. *Id.* As to the portions of Mr. Friedman's complaint directed at the Commission, the Commission found that there was no statutory basis for a complaint of this type. *Id.* Accordingly, the Commission dismissed the portions of the complaint directed at the Commission as without merit. *Id.*

Mr. Friedman subsequently filed, on September 20, 2011, a motion asking that the Commission reconsider its dismissal of his complaint. The Commission took no action on Mr. Friedman's motion; the motion was denied by operation of law on October 11, 2011.⁴

On October 31, 2011, Mr. Friedman filed notice of his intention to appeal the Commission's dismissal of his complaint (Notice of Appeal). Mr. Friedman appealed the Commission's dismissal of the portions of his complaint directed at CMP and raising health, safety, privacy, trespass, and Fourth Amendment concerns. *Notice of Appeal* at 2. Mr. Friedman also appealed the Commission's dismissal of the portions of his complaint directed at the Commission itself. *Id.*

B. Law Court Decision

On July 12, 2012, after briefing and argument, the Maine Supreme Judicial Court sitting as the Law Court issued a decision on Mr. Friedman's appeal. *Friedman v. Pub. Util's Comm'n*, 2012 ME 90. The Law Court affirmed the Commission's dismissal of the portions of Mr. Friedman's complaint directed at CMP which raised privacy, trespass, and Fourth Amendment concerns. *Friedman*, ¶¶ 12. The Law Court also affirmed the Commission's dismissal of all of the portions of Mr. Friedman's complaint directed at the Commission itself. *Id.* ¶ 13. However, the Law Court reversed the Commission's dismissal of the portion of Mr. Friedman's complaint directed at CMP that raised issues regarding the health and safety implications of smart meters and remanded those issues back to the Commission for further proceedings. *Id.* ¶ 11.

The Law Court found that, while the Commission, in the Opt-Out Investigation, considered the health and safety issues raised by Mr. Friedman in his complaint, the

⁴ Pursuant to Chapter 110, § 11(D) of the Commission's Rules, any petition for reconsideration not granted within 20 days from the date of filing is denied.

Commission did not "resolve" those issues. *Id.* The Law Court then found that because the Commission explicitly declined to make a determination regarding the health concerns raised in the Opt-Out Proceeding, the Commission could not then rely on the Opt-Out Proceeding as a basis for treating the concerns in Mr. Friedman's complaint as resolved.⁵ *Id.*

III. INVESTIGATION ON REMAND

Pursuant to the Law Court remand, on July 24, 2012, the Commission opened an investigation into "the health and safety issue related to CMP's installation of smart meter technology"⁶ (Notice). In the Notice, the Commission stated that it would conduct the investigation in accordance with "the general purpose of Maine's utility regulatory system," as described in 35-A M.R.S. § 101, which states: "[t]he basic purpose of this regulatory system is to ensure safe, reasonable and adequate service" *Notice* at 1.

⁵ The Law Court also found that because the Commission had not made a finding on the safety of smart meters, the Commission was not in a position to conclude that the opt-out fee was "not unreasonable or unjustly discriminatory." Because we make the finding today that AMI, including the use of smart meters, as implemented and operated by CMP, is safe and does not present a credible threat of harm to CMP's customers or the public at large, our conclusion in the June 22, 2011 Part II Order in the Opt-Out Proceeding that the fees associated with opting-out are reasonable and not unjustly discriminatory is supported by the necessary finding regarding safety as specified by the Law Court. Regarding the reasonableness of the opt-out, the concurring opinions below take a slightly different approach regarding customers with medical treatment recommendations to avoid the AMI meters. Commissioner Littell would have CMP provide an AMI meter with transmitter off as part of the safety determination while Commissioner Vannoy would not find that necessary. Both Commissioner Littell and Commissioner Vannoy concur that this difference in approach does not vitiate their concurrence that smart meters do not present a credible threat to the health and safety of CMP's customers and are therefore safe based on the record of this proceeding.

⁶ On August 7, 2012, the Commission received a complaint signed by Deborah Oliver and twenty-three other persons against CMP. *Deborah Oliver, et al., Request for Commission Investigation into Central Maine Power Company and Smart Meters*, Docket No. 2012-00412, "Ten-Person" Complaint Pursuant to 35-A M.R.S.A. Section 1302 (Aug 7, 2012) (Ms. Oliver's complaint is dated August 6, 2012, but was filed at the Commission on August 7, 2012). Ms. Oliver requested that, in response to the July 12, 2012 Law Court decision, the Commission initiate an investigation, pursuant to 35-A M.R.S. § 1302, into health and safety concerns associated with CMP's smart meters. *Id.* at 2. Because the issues raised in Ms. Oliver's complaint are identical to issues raised in Mr. Friedman's complaint, the Commission consolidated Ms. Oliver's complaint into this proceeding. *Deborah Oliver, et al., Docket No. 2012-00412, Notice of Investigation and Consolidation* (Sep. 26, 2012).

The Commission further clarified the scope of this proceeding after being presented with a motion by CMP to limit the investigation to a determination of whether CMP's smart meters complied with current Federal Communication Commission (FCC) RF emission standards. The Commission declined to find, as was suggested by CMP, that it was preempted from making independent findings regarding RF emissions, and stated that the applicability of the FCC standards to this investigation "is a matter that should be further explored through evidence and argument during the proceeding." *Friedman, et al*, Docket No. 2011-00262, Order Denying Motion for Order on Scope of Proceeding at 2 (Oct. 10, 2012).

A. Parties

The Commission's July 24, 2012 Notice of Investigation designated CMP as a party in this proceeding and provided interested persons with an opportunity to intervene and become full parties. *Notice* at 1-2. On August 10, 2012, the Hearing Examiners issued a procedural order stating that Mr. Friedman, as the lead complainant, is a party to the proceeding pursuant to Chapter 110, § 105(m).⁷ Further, the Hearing Examiners granted the following petitions to intervene:⁸

- Office of the Public Advocate (OPA)
- Deborah Oliver
- Diane Wilkins
- Rep. Andrea Boland
- Alan Stone
- Paulette Beaudoin
- Suzanne Foley-Ferguson
- International Brotherhood of Electrical Workers Local 1873
- Autumn Brook
- Jane Edwards
- Elery Keene
- Averyl Hill
- David Fournier
- Mary Fournier⁹
- Theodore and Cornelia Tibbals
- Mary Hankins

⁷ Since the commencement of this proceeding, the Commission has revised and updated Chapter 110 of the Commission's Rules. Chapter 110, § 105(m) is now Chapter 110, § 2(K). Further, pursuant to Chapter 110, § 2(L), the lead complainant is designated as the agent for all other signatories to a complaint filed under 35-A M.R.S. § 1302.

⁸ None of the signatories to Mr. Friedman's complaint filed petitions to intervene in this proceeding.

⁹ Mary Fournier's petition to intervene was granted over CMP's objection.

- Elisa Boxer
- Jack and Deborah Heffernan
- Jennifer Lunden
- Citizens for Health
- John Evrard
- Laurie Wolfrum
- Julie Tupper

Id.

B. Public Comments

Throughout the course of this proceeding, the Commission has received in excess of forty comments from members of the public. All public comments are available in the Commission's Case Management System (CMS) which may be accessed via the Commission's website at www.maine.gov/mpuc. The Commission also received extensive public comments in the Opt-Out Investigation (Docket No. 2010-00345).

C. Evidence and Discovery

On September 19, 2012, in support of CMP's assertion that its smart meters are safe, the Company submitted the pre-filed direct joint testimony of Dr. Yakov Shkolnikov, Ph.D. and Dr. William H. Bailey, Ph.D. (Exponent Testimony). CMP also submitted, as Exhibit B to the Exponent Testimony, an RF monitoring field study, "Measurement Validation of Exposure Predications from Central Maine Power Smart Meter Network" conducted by Dr. Shkolnikov (Exponent Study). As another exhibit to the Exponent Testimony, CMP included the joint testimony of Dr. Linda S. Erreich, Ph.D., Dr. Shkolnikov, and Dr. Bailey that was submitted on November 16, 2010 in the Opt-Out Investigation.

On February 1, 2013, Mr. Friedman submitted pre-filed testimony from Girish Kumar, Ph.D.; David O. Carpenter, M.D.; Richard Conrad, Ph.D.; Dariusz Leszczynski, Ph.D.; De-Kun Li, M.D., Ph.D., MPH; Lennart Hardell, M.D., Ph.D.; Jerry L. Phillips, Ph.D.; Lloyd Morgan, B.S. Electrical Engineering; William J Rea, M.D.; and Richard Conrad, Ph.D. Mr. Friedman also submitted lay testimony from multiple witnesses. The lay witnesses testified primarily on their perceived sensitivity to RF emissions and the associated health impacts the witnesses believe to be caused by smart meters.

Also on February 1, 2013, the OPA filed a Smart Meter RF Testing Report conducted by True North Associates and C2 Systems, and Citizens for Health submitted the pre-filed testimony of Timothy Schoechle, Ph.D.

On April 17, 2014, CMP filed the rebuttal testimony of Drs. Shkolnikov and Bailey, generally refuting the testimony of Mr. Friedman's witnesses.

The parties and Staff conducted extensive discovery throughout the proceeding, including multiple rounds of data requests and several technical conferences. Moreover, during the proceeding, the Hearing Examiners admitted over one hundred peer-reviewed scientific studies into the evidentiary record. The Commission also admitted into the evidentiary record, or took administrative notice of, several other documents related to smart meters prepared by and for other jurisdictions both in the United States and abroad, including reports from the Health Council of the Netherlands, the Vermont Department of Health, the Public Utilities Commission of Texas, the California Council on Science and Technology, the Electric Power Research Institute, the FCC, the Lawrence Berkeley National Laboratory, the Michigan Public Service Commission, the Federal Energy Regulatory Commission, and the Institute of Electrical and Electronics Engineers.¹⁰

D. Hearings and Post-Hearing Process

On August 7, 2013, the Commission held a public witness hearing at the University of Maine at Augusta. Additionally, public witnesses who were unable to attend the public witness hearing were allowed to submit written testimony provided that the testimony was submitted in affidavit form under oath. Multiple witnesses who testified at the public witness hearing submitted sworn testimony and several public witnesses put forward scientific studies for admission into the record of this proceeding as addenda to their sworn oral testimony.

The Commission held a hearing in this matter on October 30, 2013. Mr. Friedman's witness Dr. Lennart Hardell and CMP's witness Laney Brown were available for examination at the hearing.

On December 13, 2013, CMP, Mr. Friedman, Ms. Wilkins, Ms. Foley-Ferguson, and the OPA filed post hearing briefs. These parties, with the exception of Ms. Foley-Ferguson, also filed reply briefs on January 24, 2014.

On March 25, 2014, Commission Staff issued an Examiners' Report in this matter. On April 8, 2014, Ms. Wilkins filed exceptions to the Examiners' Report. On April 11, 2014, Citizens for Health, CMP, and Mr. Friedman filed exceptions to the Examiners' Report.¹¹ The parties' exceptions are discussed in Section VIII of this Order.

¹⁰ A list of the studies and reports admitted into the evidentiary record of this proceeding is attached to this Order as Appendix A.

¹¹ On April 11, 2014, the OPA filed a letter stating that the Office would not be filing exceptions to the Examiner's Report.

IV. CMP SMART METER SYSTEM

CMP's AMI system communicates and transmits metering data using a "mesh" network made up of individual customer smart meters and other devices installed throughout CMP's service territory. *Boxer Cook, et al.*, Docket No. 2010-00345, Part II Order at 2. A radio device in the smart meters communicates with other smart meters and network devices ("repeaters") within a Neighborhood Area Network (NAN). *Id.* The NANs link to the Wide Area Network (WAN) through network devices referred to as "Extender Bridges" or "Collectors." *Id.* The WAN is a high-capacity wireless communications network covering CMP's entire service area that moves information to and from CMP's Head End System (HES) using "extenders" and "gateway devices." *Id.* The HES is the "controller" for the AMI system, and coordinates information flows between CMP customers and CMP's Meter Data Management System. *Id.* at 2-3. The smart meters and other devices transmit customer usage and other data via RF signals between and among various points in the network. *Id.* at 3.

CMP's smart meters and other NAN devices communicate via an internal radio that transmits and receives radio signals at a frequency of approximately 2.4 GHz (2.4 billion cycles per second). *Boxer-Cook, et al.*, Docket No. 2010-00345, Data Request ODR-01-21. The smart meters and other NAN devices each have a single antenna and operate at an equivalent isotropically radiated power (EIRP) of between 1.6 - 2.5 watts.¹² *Data Request DW-01-10 Attch. 1.* WAN devices each have multiple antennas and communicate at a frequency of approximately 5.8GHz and an EIRP of between 4 watts and 63 watts.¹³ *Id.* WAN devices are typically mounted on pole-tops, towers, lighting structures, and occasionally on other structures such as windmills. *Data Requests DW-01-32, DW-01-30, DW-01-70.* Gateway devices transmit data approximately eight times per day and poll the extender bridges for data, on average, eight times per day. *Data Request DW-01-33.*

Other than for software updates and other occasional system communications, CMP's smart meters are expected to each generate one, 4.26 millisecond "stay alive" beat signal per hour to let the network know the smart meter is still functioning, and then generate a ten beat signal of approximately 42.6 milliseconds once per day containing energy usage information.¹⁴ *Exponent Study* at 5-6. However, because CMP's system is configured as a "mesh network," in addition to its own information a smart meter may also be transmitting information from other smart meters. *Exponent Study* at 4. The

¹² The EIRP of a device is the product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna. *FCC, Office of Engineering and Technology, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields" OET Bulletin 65, Edition 97-01 at 2 (Aug. 1997) (OET Bulletin 65).*

¹³ 5.8 GHz is a frequency also used by many Wi-Fi routers.

¹⁴ A millisecond is one one-thousandth of a second.

number of "descendant" smart meters that a given smart meter has determines the total duration of time that the smart meter will be transmitting each day. Ninety-nine percent of CMP's smart meters have sixty or fewer descendants.¹⁵ *Exponent Study* at 9-11.

With sixty descendants, a smart meter would transmit "stay alive" signals each day for approximately 6.24 seconds (61 x 4.26 milliseconds x 24 hours), and energy usage signals each day for approximately 2.6 seconds (61 x 42.6 milliseconds) for a total signal duration of approximately 8.8 seconds per day. The vast majority of CMP's smart meters transmit for much shorter periods each day, and the average smart meter on CMP's system transmits for a total of approximately 4.4 seconds per day. *Boxer-Cook et al.*, Docket No. 2010-00345, Data Request ODR-01-29. For those meters that are in the highest one-percentile in terms of number of daily signals transmitted, *i.e.*, meters that have *more* than sixty descendants, testing demonstrated that the meters transmitted an average of approximately 35,000 signals per day. *Data Request DW 01-97*. At 4.26 milliseconds per signal, this is approximately 149 seconds, or 2.5 minutes per day. According to CMP, longer transmissions for software and firmware updates are expected to occur twice each year. *Exponent Testimony* at 4. However, due to programming and other constraints, in no event can a smart meter have more than 4,998 descendants or have a "duty cycle" (the percentage of time the smart meter can transmit) of more than 10%. *Exponent Study* at 11; *Exponent Testimony* at 4. Therefore, a smart meter cannot be sending an RF signal for more than 144 minutes each day (3 minutes out of any thirty minute period).

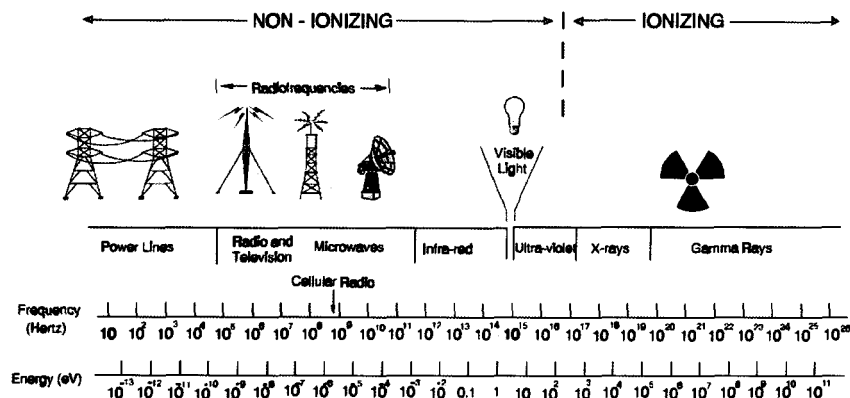
V. NATURE AND EFFECTS OF RF EMISSIONS; EXPOSURE LEVELS

According to the FCC, electromagnetic radiation "consists of waves of electric and magnetic energy moving together (*i.e.*, radiating) through space at the speed of light." *FCC, Office of Engineering and Technology*, "Frequently asked questions about the safety of radiofrequency (RF) and microwave emissions from transmitters and facilities regulated by the FCC," *available at* <http://transition.fcc.gov/oet/rfsafety/rf-faqs.html#Q1>. Signals within the electromagnetic spectrum are often referred to as electromagnetic frequencies or "EMF."¹⁶ The higher the frequency of an electromagnetic wave, the greater the energy associated with each photon of that wave. Rays with enough energy to strip electrons from atoms and molecules are referred to as

¹⁵ This is based on data collected by Trilliant, Inc., the provider of CMP's smart meters. Trilliant collected actual signal data from 1,100 randomly selected smart meters over a 13-day period and stratified the meters based on the number of beat signals transmitted.

¹⁶ A concern sometimes raised in the context of electric transmission and distribution is the EMF associated with power lines. However, unlike the EMF from smart meters which occur in what is generally considered the RF portion of the electromagnetic spectrum, the EMF associated with electricity on power lines occurs at a very low frequency (60 Hz, or 60 cycles per second, in the United States). Such low frequency EMF is often referred to as "extra-low frequency" (ELF) EMF.

"ionizing" radiation. X-rays and gamma-rays are examples of ionizing radiation and are known to cause biologic damage. Rays that do not contain sufficient energy to cause ionizing effects are referred to as "non-ionizing" radiation. RF signals fall within the non-ionizing portion of the electromagnetic spectrum. Many other common electronic devices, including cell phones, computers, cordless phones, and Wi-Fi routers, also operate at frequencies and power levels similar to those used by CMP's smart meters.



FCC, Office of Engineering and Technology, OET Bulletin 56, "Questions and Answers about Biological Effects and Potential Hazards of Radiofrequency Electromagnetic Fields" at 3 (Aug. 1999) (OET Bulletin 56).

RF signals are non-ionizing and, at sufficient strength, RF signals can cause tissue heating in the human body.¹⁷ The biological effects resulting from tissue heating are often referred to as "thermal" effects. Thermal effects are a known mechanism for biological damage. Many of the standards and guidelines developed by various organizations and countries are based on an assumption that potentially harmful biological effects occur at a measure of the rate at which the body absorbs RF energy (known as the "specific absorption rate" or "SAR") of 4 W/kg, as averaged over the whole-body. FCC, OET Bulletin 56 at 11. Different safety factors are applied to this value to obtain each agency's limits depending upon the frequency used by the device (the most restrictive limits occur in the frequency range of 30-300 MHz where whole-body absorption of RF energy by human beings is most efficient); whether the exposure is related to the general public ("uncontrolled") exposure or for occupational ("controlled") exposure; and the expected proximity to the human body of the device when in use.¹⁸ Other, *i.e.*, non-thermal, biological effects from RF emissions have also been described and are the topic of considerable ongoing research.

¹⁷ At frequencies below 3 kHz, RF signals can also cause induced voltage gradients and/or electric currents in the body. However, CMP's meters operate at frequencies of approximately 2.5 GHz.

¹⁸ 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

VI. RF EMISSION STANDARDS

The following table is a summary of some of the standards in place or proposed by governmental agencies and groups that are relevant to the frequencies used by CMP's smart meters.¹⁹

TABLE 1

<u>1 mW/cm²</u>		
United States (FCC) (30 minute avg)	· Romania	United States (FCC): 0.08 W/kg (whole body); 1.6 W/kg (partial body)
Canada (6 minute average)	· Slovakia	
Cyprus	· Spain	Health Canada: 0.4 W/kg (whole body)
Czech Republic	· Australia	8 W/kg (over 1g of body part)
Estonia	· Austria	20 W/kg (over any 10g of body part)
Finland	· Sweden	
France	· United Kingdom	International Commission on Non- ionizing Radiation (ICNIRC) (6 minute average)
Germany	· Recommendation Council of the European Union	.08 W/kg (whole body)
Hungary	· International Commission on Non-ionizing Radiation	2 W/kg (head and trunk)
Ireland	(ICNIRC) (6 minute average)	4 W/kg (limbs)
Luxembourg		
Malta		
Portugal		
<u>0.1 mW/cm²</u>		
Slovenia (certain instances)		
<u>0.06 – 0.07 mW/cm²</u>		
Greece		
<u>0.01 mW/cm²</u>		
Bulgaria		
Italy (certain instances)		
Lithuania		
Poland		
Russia		
<u>0.001 mW/cm²</u>		
ECOLOG-Institut ²⁰		

population/uncontrolled exposure limits apply to situations in which the general 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.

¹⁹ All limits have been converted to mW/cm² and W/kg for comparison purposes.

²⁰ In his reply brief, Mr. Friedman reports that the ECOLOG Institut recommended standard is 0.1 W/m², or 0.01 mW/cm². *Friedman Reply Brief* at 12, 16. Mr. Friedman further states that the BioInitiative Report recommended 0.01 mW/cm². *Friedman Reply*

<u>Other Standards</u>	
Seletun Statement: 0.00017 mW/cm^2	
BioInitiative (2012) ¹⁶ : $0.0000003 \text{ mW/cm}^2 - 0.0000006 \text{ mW/cm}^2$	

Data Request DW-01-065; Health Canada, Safety Code 6.

A. Federal Communications Commission

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 (42 U.S.C. § 4321 *et seq.*) (NEPA). NEPA establishes the basis for evaluating the effect of emissions 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.

On August 1, 1996, after reviewing several recommendations, the FCC adopted the National Council on Radiation Protection and Measurements (NCRP's) recommended Maximum Permissible Exposure (MPE) limits for field strength and power density (power in watts per unit area). FCC, OET Bulletin 65. Before the FCC published its rule, it received endorsements from the U.S. Environmental Protection Agency (EPA), from the FDA, and from the U.S. Occupational Safety and Health Administration. FCC, OET Bulletin 56. *Public Utility Commission of Texas, Infrastructure and reliability Division, Staff Report, "Health and RF EMF from Advanced Meters: An Overview of recent Investigations and Analyses," Project No. 40190 at 33 (Dec. 2012) (PUC TX Report).*

The FCC's MPE limits apply to FCC licensees and also to the use of RF emitting equipment used in license free bands. Devices such as smart meters operate in the unlicensed spectrum for which the FCC has pre-defined rules for both the hardware and the deployment methods of the transmitting radio to ensure compliance with MPE limits. Because of this, smart meters must be tested and evaluated in certified laboratories prior to sale to utility companies to ensure their compliance with the FCC's requirements, including RF exposure limits. Such evaluations are documented in

Brief at 16. These values appear to be in error. The ECOLOG Institut report recommends a limit of 0.01 W/m^2 or 0.001 mW/cm^2 . *ECOLOG-Institut, "Mobile Telecommunications and Health, Review of the current scientific research in view of precautionary health protection" at 37 (Apr. 2000).* The 2007 BioInitiative report recommended a limit of $0.1 \mu\text{W/cm}^2$ (or 0.0001 mW/cm^2). However, in 2012, the BioInitiative group issued a revised recommendation of $0.3 \text{ nW/cm}^2 - 0.6 \text{ nW/cm}^2$ (or $0.0000003 \text{ mW/cm}^2 - .0000006 \text{ mW/cm}^2$). *BioInitiative 2012, "Conclusions" (available at <http://www.bioinitiative.org/conclusions/>).*

equipment certification reports provided by the manufacturer to the FCC. The applicable MPE for CMP's 2.4 GHz smart meters for members of the public is 10 watts per square meter (or its equivalent 1 milliwatt per square centimeter (mW/cm²)) averaged over 30 minutes. 47 CFR § 1.1310.

For devices, such as smart meters, which are normally used at a distance of at least 20 cm from the body, the FCC allows devices to be evaluated based on either the "specific absorption rate" (SAR) or the "maximum permissible exposure" (MPE) power density, but notes that the MPE is the normal measure of exposure.²¹ FCC, OET Bulletin 65 at 15. The amount of RF exposure that a person is subjected to during the signal transmission is evaluated based on the following formula:²²

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

where:

- S = power density (in appropriate units, e.g., mW/cm²)
- P = power input to the antenna (in appropriate units, e.g., mW)
- G = power gain of the antenna
- R = distance to the antenna (in appropriate units, e.g., cm)

This formula demonstrates that the strength of the smart meter's RF signal drops off exponentially with increases in the distance from the transmitter. By way of example, if the power density (S) = 0.2 mW/cm² when the distance (R) = 10 cm, multiples of the distance would change the exposure as follows:

R (cm)	S (mW/cm ²)
10	0.2
10*2 = 20	0.2/(2 ²) = 0.05
10*3 = 30	0.2/(3 ²) = 0.022
10*4 = 40	0.2/(4 ²) = 0.0125

In addition, the duration of the signal is relevant to whether a device meets the FCC standard for exposure. While the FCC requires that devices like smart meters be

²¹ For devices normally used within 20 cm of the body, the FCC requires that the exposure be evaluated with respect to the "specific absorption rate" (SAR) limit which is a measure of the rate at which the body absorbs RF energy and is usually expressed in units of watts per kilogram (W/kg). FCC, OET Bulletin 56 at 13. Devices normally used at 20 cm or more away are far enough away from the RF emitter to be located in what is commonly referred to as the "far-field" zone of the radiation source, e.g., more than several wavelengths distance from a typical RF source, and therefore can be evaluated based on their MPE power density limit measured in mW/cm².

²² FCC, OET Bulletin 65 at 19. As noted in OET Bulletin 65, this equation is generally accurate in the "far-field" of an antenna but will over-predict power density in the near field, where it could be "considered a 'worst case' or conservative prediction."

tested for their peak, or maximum RF emission for compliance purposes, the exposure limits for the general population exposure are based on a power density limit of 10 watts per square meter averaged over a thirty minute time period.

Finally, we note that on March 27, 2013, the FCC released an Order on radio frequency exposure limits and policies requesting comments to determine whether its RF exposure limits and policies need to be reassessed. *FCC*, ET Docket No. 13-84, FCC 13-89, *Further Notice of Rulemaking and Notice of Inquiry* (Mar. 29, 2013) (Notice of Inquiry). The Notice of Inquiry is intended to open discussion on both the continued appropriateness of the current RF exposure limits and possible policy approaches regarding RF exposure. In the notice the FCC stated:

We continue to have confidence in the current exposure limits, and note that more recent international standards have a similar basis. At the same time, given the fact that much time has passed since the Commission last sought comment on exposure limits, as a matter of good government, we wish to develop a current record by opening a new docket with this Notice of Inquiry.

Notice of Inquiry, ¶ 205.

As of March 2014, Comments and Reply Comments have been submitted by interested citizens and industry groups in the *Inquiry* docket, but no further action or schedule has been set by the FCC.

VII. RELATIVE RF EXPOSURE LEVELS FROM COMMON DEVICES

The record in this proceeding demonstrates that CMP's smart meters result in RF exposure levels that are below the FCC limit and other RF standards, as well as other devices in prevalent use in today's society, such as cell phones.

The figures below summarize RF exposure levels from CMP's smart meters, other AMI network devices, and other common RF-emitting devices. The data derives from Dr. Shkolnikov's testimony and a study conducted by the Texas PUC. *PUC TX Report*. Similar exposure levels are also reported by the California Council on Science and Technology (CCST). *CCST, Final Report, "Health Impacts of Radiofrequency Exposure from Smart Meters"* (Apr. 2011) (CCST Report).

Table 2 below presents the information in tabular form, and Figure 1 in graphical form. Because the exposure levels vary by orders of magnitude, graphs in Figure 1 are presented using both a linear scale and logarithmic scale. In Figure 1 below, which uses a linear scale from 0.0 to 0.2 mW/cm², most of the devices shown have exposure levels that are relatively so small that they appear to be zero. In the expanded portion of Figure 1, each interval on the Y-axis represents a factor of 10, and the scale is from

10⁻⁷ (one ten-millionth) to 0.1mW/cm², which allows the exposure level information to be visible on the same graph, even given the differences in orders of magnitude.

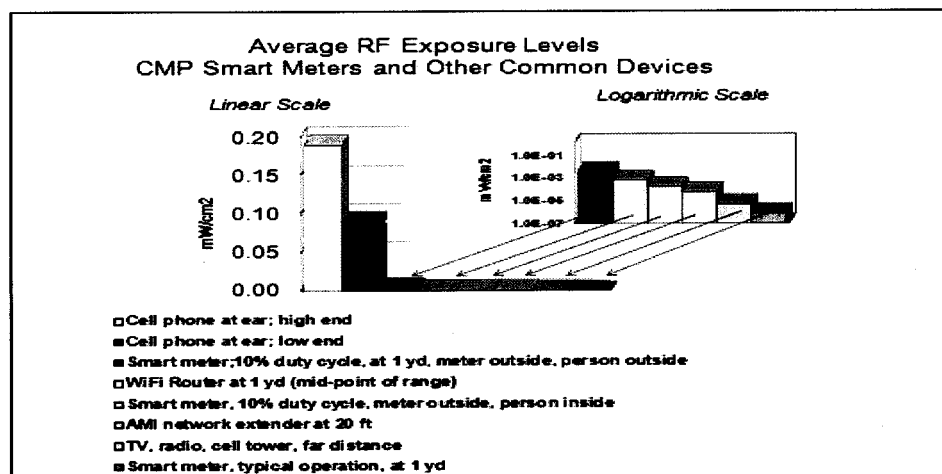
TABLE 2²³

RF Exposure Levels from CMP AMI and Other Common Devices

Source: ODR-01-29 and TX Study

Device	Location	Average Exposure (mW/cm ²)	Notes
FCC limit		1.000000	
Cell phone	At ear	0.190000	High end of range
Cell phone	At ear	0.090000	Low end of range
Smart meter @ 10% duty cycle	1 yard away, meter and person outside	0.003100	Max. operating time
WiFi router	1 yard away	0.000200 to 0.001000	Constant operation
Smart meter @ 10% duty cycle	1 yard away, meter outside, person inside	0.000150	Max. operating time
AMI network device	20 feet away	0.000054	
AMI network device	60 feet away	0.000006	
TV, radio, cell towers	Typical distances away	0.000005	
Smart meter @ typical operation	1 yard away, meter outside, person inside	0.0000008	

FIGURE 1



²³ Unless specifically noted, all of the exposure levels in Table 2 assume that there is no absorptive or reflective material between the device and the subject of the exposure. Any such material (e.g., the meter enclosure, exterior siding, insulation, drywall, etc.) would necessarily decrease the level of exposure for a given distance from the device.

VIII. POSITIONS OF THE PARTIES

A. Central Maine Power Company

CMP's position is that it has met its burden to demonstrate that its installation of smart meters and associated infrastructure constitutes a safe, reasonable, and adequate utility service. CMP states that this proceeding has generated substantial scientific data that goes well beyond what is needed for the Commission to fulfill its statutory obligation to determine whether or not CMP's smart meter deployment is an unreasonable utility practice. CMP argues that the overwhelming consensus within the scientific community and among public health policy-makers, regulatory agencies, and judicial bodies throughout the world, is that wireless smart meter technology does not pose a threat to public health.

Moreover, CMP states that the record evidence in this proceeding demonstrates that (1) the Maine CDC does not have health concerns associated with smart meters; (2) CMP's AMI system complies with the FCC RF safety standards, and the current FCC RF emission standards for smart meters are adequate; (3) CMP's smart meters comply with international RF emissions safety standards; (4) as confirmed by actual field measurements, the level of RF emissions from smart meters is orders of magnitude below other natural and manmade sources of RF; (5) public health policy-makers, who have looked specifically at smart meters have concluded that meters do not pose a public health risk; (6) the health data on other wireless technologies, primarily cell phone data, do not suggest health risks at the level of RF emissions from smart meters; and (7) CMP's smart meters emit RF that are below the levels recommended by Mr. Friedman's witnesses and more stringent standards for smart meters would not meaningfully reduce an individual's overall RF exposure.

In its April 11, 2014 exceptions to the Examiner's Report, CMP urged the Commission to adopt the Examiners' Report with two minor factual changes to the description of testimony and mathematical calculations.

B. Mr. Friedman

Mr. Friedman's position is that, during this investigation, CMP has provided no affirmative proof that its AMI system does not cause adverse health effects. Mr. Friedman emphasizes that it is CMP that has the burden to prove the safety of the level of RF radiation emitted, or, ultimately, the extent of the safety risk. The burden of resolving uncertainties, in Mr. Friedman's view, must fall on the party with the affirmative obligation to ensure safety, not on the individuals who are exposed to the risk. Moreover, Mr. Friedman argues that CMP has a heightened burden of proof because a person's right to "obtain safety" is paramount in that place where the person can and should best exercise the right – the privacy of their home. Mr. Friedman concludes that CMP's failure to resolve or explain the uncertainties in the science and to provide affirmative proof of safety compels a finding against CMP.

Mr. Friedman points to the testimony from the nine expert witnesses he presented, some of whom have conducted extensive original research and who are presented as among the most qualified experts in the world on the health effects of low-level RF radiation. Mr. Friedman states that the testimony confirms that low-level RF radiation creates health and safety risks to humans and that this conclusion is further supported by hundreds of scientific studies and by the sworn lay witness testimony of dozens of people who have suffered adverse health effects from exposure to RF radiation, including smart meter radiation. According to Mr. Friedman, the risk is clear and safety is not ensured.

Mr. Friedman also argues that the testimony of CMP's witnesses – that, based on field tests, CMP's smart meters are in compliance with FCC standards – is unreliable. Mr. Friedman similarly argues that the field tests of the OPA witnesses are likewise unreliable.

In his April 11, 2014 exceptions, Mr. Friedman urges the Commission to reject the Examiners' Report. According to Mr. Friedman, the Examiners' Report "fails to decide the discrete issue the Maine Law Court directed the Commission to resolve, whether CMP's smart meters pose a credible risk of harm . . . [and] thereby fails to satisfy the Commission's statutory mandate to ensure safety." Mr. Friedman argues that the Examiners introduced irrelevant factors into their analysis and relied on information not in the evidentiary record of the proceeding. Moreover, Mr. Friedman contends that in the Examiners' Report the Examiners "treat the statutory mandate to ensure all utility facilities be 'safe, reasonable and adequate' as one requirement instead of three, allowing the three requirements to be balanced or traded off in a collective determination of compliance, thereby avoiding a determination about safety as a separate and independent requirement."

Further, Mr. Friedman states that the Examiners' Report improperly places the burden on the Complainants to prove that smart meters are harmful, rather than placing the burden on CMP to prove that the meters are safe. Mr. Friedman also accuses the Examiners of not adequately supporting their conclusions, relying on evidence lacking the indicia of reliability, disregarding and dismissing un rebutted record evidence, and misreading record evidence.

All of the above, according to Mr. Friedman leads to the conclusion that the Commission must ultimately decide that "CMP has failed to prove there is no credible threat of harm from its smart meter technology," and that "safety cannot be ensured without remedial measures."

C. Ms. Wilkins

Ms. Wilkins's position is that CMP's evidence fails to satisfy its burden of proof. Ms. Wilkins states that the consultants of both CMP and the OPA that measured the RF emissions are inexperienced and not qualified to test emissions from smart meters to determine FCC compliance. Moreover, Ms. Wilkins argues that compliance with the

FCC's exposure guidelines will not protect from the long term, non-thermal adverse biological effects because the FCC guidelines were only designed to protect from thermal heating effects from RF exposures and do not protect people from long-term, chronic, non-thermal exposures to RF. Specifically, Ms. Wilkins states that it is peak power RF exposure levels from the smart meters, and not the thirty minute, time averaged, power densities used by CMP's consultants, which measure the true impact to human tissue. Therefore, in Ms. Wilkins's view, CMP's exposure testing report is not relevant to determining if the AMI system is safe.

Ms. Wilkins argues that the evidence and testimony provided in this case by Mr. Friedman's witnesses and relevant additional support from the record shows there are many undeniable cumulative, adverse biological effects which subject the persons exposed, especially children, to an unnecessary and indefensible increased risk of serious adverse health effects. These include: cancer; DNA damage; damage to human sperm, reproduction and pregnancy; and damage to the Brain Blood Barrier.

In her April 8, 2014 exceptions to the Examiners' Report, Ms. Wilkins accused the Commission Staff of "undue influence and bias" in reaching their conclusions. Ms. Wilkins argues that the Staff was "under extreme pressure to somehow redeem themselves, save their jobs, and save their reputations" and so necessarily made the findings in the Examiners' Report. Ms. Wilkins also states that the Staff purposely, and wrongly, excluded relevant evidence, ignored other relevant evidence, and ignored relevant witnesses.

Other than her accusations of bias, Ms. Wilkins did not have any substantive comments or exceptions regarding the Examiners' Report.

D. Ms. Foley-Ferguson

Ms. Foley-Ferguson states that the wireless smart meter rollouts in the United States represent the largest proliferation of constant EMF ever initiated and the cumulative effects of EMF have never been determined to be "safe." Ms. Foley-Ferguson further states that, until recently, exposure to EMF emitting devices has been by "choice" not by force, and that people remain exposed even if they do not have a smart meter. Accordingly, Ms. Foley-Ferguson argues that CMP's AMI system is a forced and coerced exposure by the utility to a known environmental stressor and carcinogen.

Ms. Foley-Ferguson argues that, based on scientific studies, the Commission cannot determine that the health and safety of Maine residents are not jeopardized by the adoption of CMP's AMI system. Accordingly, Ms. Foley-Ferguson states that the Commission should recognize that there are adverse health effects from smart meter RF emissions.

Ms. Foley-Ferguson did not file comments or exceptions to the Examiners' Report.

E. OPA

The OPA's position is that the Commission may base a determination that the CMP smart meter network constitutes safe, reasonable, and adequate facilities and service upon a finding that the smart meter network is compliant with FCC regulations. In addition, the OPA argues that a finding based upon a national standard would be consistent with the Legislature's requirement that smart grid deployment be consistent with applicable standards for reliability, safety, security and privacy and that takes into account the implementation of smart grid functions in other jurisdictions." 35-A M.R.S. §. 3143(3).

The OPA notes that, pursuant to FCC's rules, smart meters are tested and evaluated in certified laboratories prior to sale to utility companies to ensure their compliance with the FCC's RF exposure limits. Such evaluations are documented in equipment certification reports provided by the manufacturer to the FCC. Moreover, the OPA states that the FCC standard or similar standards for safety have been used in other jurisdictions as a basis to determine that smart meters do not pose a health risk. Finally, the OPA states that his office commissioned a study (a) to measure the maximum and average power output of a sample of smart meters and other system components of CMP's AMI system, and (b) to assess whether the signal intensities from the components of the system were in compliance with the FCC regulations that prescribe limits for safe exposure of humans. The measurements taken for the OPA Study showed that even when combined with other RF signals occurring in an urban setting, the aggregate level of RF emissions was, on average, roughly 20 times lower than the FCC standards.

On April 11, 2014, the OPA filed a letter stating that the Office would not be filing exceptions to the Examiner's Report.

IX. **DECISION**

As discussed in the concurring opinions below, we find that AMI, including the use of smart meters, as implemented and operated by CMP, does not present a credible threat of harm to the health and safety of CMP's customers and, based on the record of this proceeding is, therefore, safe. The Commission through these concurring opinions finds that the AMI meters and network do not present a credible threat to the health and safety of CMP's customers and are therefore safe based on the network configurations illustrated in this record in use in Maine. The concurring opinions below take a slightly different approach regarding customers with medical treatment recommendations to avoid the AMI meters. Commissioner Littell would have CMP provide an AMI meter with transmitter off as part of the safety determination while Commissioner Vannoy would not impose the requirement. Both Commissioner Littell and Commissioner Vannoy concur that this difference in approach does not vitiate their concurrence regarding the safety of the AMI meters and network in use in Maine.

X. OPINION OF COMMISSIONER LITTELL

A. Overview

Based on the record as a whole, including all testimony, studies and reports, I conclude that the smart meters deployed by CMP are not a credible threat to the health and safety of CMP's customers based on our current best level of scientific understanding. In addition to a finding of safety, I would concurrently adopt the low-cost and limited precautionary measures described below that would further ensure safe and reasonable service to Complainants if medically advised to limit exposures to radio frequency radiation (RF/EMF).

The record is clear that there is some credible evidence that there may be health effects associated with significant exposures to RF/EMF, but credible evidence of possible effect does not demonstrate the Law Court's requisite credible threat of harm to CMP's customers nor an unsafe utility service. In this case, Complainants' and CMP's evidence serves to illustrate that there is scientific disagreement particularly on the risks posed by cell phones, cordless phones and other devices used close to the human body. There is credible scientific evidence to support multiple perspectives on safety of cellular (also called "mobile") and cordless phones. I caution against using terms like "majority" of studies, "overwhelming number" and "weight of the evidence" for two reasons: those characterizations are inaccurate as to this record, and more significantly science is not a majority or head-count endeavor: a well conducted study or small number of well conducted studies can show that all the science before it was based on incorrect hypotheses or inaccurate assumptions. With that in mind, this Commission is to evaluate and resolve this evidence consistent with the public interest under our long-standing statutory mandate to assure safe, reasonable and adequate service and facilities. 35-A M.R.S. §§ 101, 301.

Regarding the credible evidence, the World Health Organization (WHO) is charged with assessing cancer risks through its agency the International Agency for Research of Cancer (IARC). The WHO/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. A subnational body like this Commission ignores a finding of potential effect by an authoritative international body at its peril. The WHO/IARC reclassification and research supporting that finding is credible.

However, this research and the WHO/IARC 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 smart meters installed on the outside of a building. For this reason, the cell phone exposure scenario is higher and different from exposures from a smart meter transmitter operated most often outside a building from the utility meter location. Due to distance and the presence of walls, RF/EMF exposure from AMI "smart meters" is typically two to four orders of magnitude below those of cell phones, cordless phones and other devices

used close to the human body. Thus, while the power levels and frequencies of RF/EMF as between smart meters and cellular phones are similar, the human exposure is markedly less from smart meters.

It is a basic principle of toxicology that the amount of exposure matters: measuring exposure and dosage often determines the level of safety. The lower exposure (and therefore risk) from smart meters on the outside of a house and repeaters on utility poles do not support a finding that the AMI meters are anything but safe based on the current science. I find the exposure levels from AMI meters to be safe given our current best level of scientific understanding of the credible risks posed by this technology. As discussed below, I would incorporate reasonable precautions for those with medical treatment recommendations to avoid such exposures.

B. Whether a Utility Service or Facility is Safe is an Appropriate Stand-Alone Inquiry

I agree with the Complainants that safe utility service is to be considered as a stand-alone standard. *Friedman Exceptions* at 3. This is consistent with the Law Court's ruling and the Commission's prior practice when, for instance, adequacy of service is questioned. The Law Court focused this Commission on the question of whether "smart meter technology is not a credible threat to the health and safety of CMP's customers" in light of the governing statutory requirement of the provision of "safe, reasonable and adequate service" in 35-A M.R.S. § 101. *Friedman*, 2012 ME 90, ¶10.

C. The Burden of Proof is on CMP

The burden of proof in this proceeding is on CMP. Complainants only need present enough evidence to initiate the investigation and complainants are not required to prove their case. *Hogan v. Hampden Tel. Co.*, 36 PUR 4th 485 (Me. PUC 1980); *MacMaster v. Gardiner Water Dist.*, 1998 Me. PUC Lexis 697 (Me. PUC 1998). The utility must prove its utility service is safe.

CMP must prove that the use of its smart meters – the Company's standard meter – is a safe utility service. The consistent use of "no clear and consistent evidence" and "no causal connection" in Exponent's reports is a veiled attempt to shift to the Complainants the burden of showing a definite causal link to human health impacts. This is a classic defense posture in a toxic tort case where the plaintiff carries the burden of proof. In this proceeding and under Maine law, once the complainants present enough evidence to initiate the investigation, the burden of proof concerning whether the utility is providing "safe, reasonable and adequate service" to customers then rests upon the utility. 35-A M.R.S. § 301.

However, it is also not reasonable to require CMP to prove a negative. Asking CMP to prove that the AMI meters pose no risk at all under an unlikely exposure scenario is not reasonable. Nor must the utility rebut every bit of evidence submitted in such a large case. *Central Maine Power Co. v. Pub. Utils. Comm'n*, 405 A.2d 153, 186

(1979) (even uncontradicted evidence may be weighed, critically examined and rejected). The determination of whether AMI meters are a safe utility service does not require the utility to investigate and rebut the health concerns of each customer. Such an examination might be invasive of these customers' privacy and it is not necessary in this case, particularly where over 9,000 CMP customers initially opted out and presently that number is roughly 8,000. The utility need not rebut every fact put in by complainants to carry its burden.

Thus, the production of *any* credible evidence that there is a possible risk does not mean that CMP's AMI meters are unsafe. Credible evidence of risk does not equate to a violation of CMP's obligation to provide safe electrical service nor to a credible threat of harm where that risk is neither likely to produce immediate nor imminent harm and is comparable to risks common in our society. There is always a risk that electrical service may cause a house fire when wiring is faulty or electrical service protections fail. The possibility of fire does not mean that the credible threat of fire poses an unreasonable safety situation arising from electrical utility service. In the context of providing electrical service, the risk of an electrical fire is mitigated through electrical codes and electrical system maintenance. Electrical codes are in fact a widespread and accepted precautionary mitigation measure to address the credible threat of electrical fires.

D. Safe Utility Practices Depend On the Purpose and Context of the Service and Facility as Well as Knowledge of the Effects and Alternatives to Fulfill the Same Service or Facility Function and Risk Mitigation

Safety in 1913, when the predecessor to Section 301 was included in the Commission's initial authorizing statute, meant regulating electrical service that could cause fires and electrocution. Later it came to also mean regulating natural gas that can cause explosions and fires. Later it came to mean regulating underground excavations where electrical, natural gas, telephone, cable and water services may result in the risk of loss of essential electrical, heat, communications and water service as well as the aforementioned fire, explosion, and electrocution risks.

In 1913, when these words were included in the Commission's mandate, the risks considered were primarily acute risks. The credible threats in 1913 were from a fire or electrocution from electrical service and flooding and water damage from water service. The threats of concern a century ago were of immediate bodily and property damage.

Scientific knowledge of risk, cultural norms, and societal expectations have changed. Accordingly, the Commission now considers certain chronic risks within its safe service and facilities mandate. For example, it is well-established – and has been for approximately forty years – that electrical and magnetic fields created by electrical lines pose an elevated threat of childhood leukemia. David O. Carpenter, *Human Health Effects of Nonionizing Electromagnetic Fields*, 6 *Patty's Toxicology* 113-114 (Eula Bingham & Barbara Cohrssen eds., 2012) (Carpenter, Health Effects of

Nonionizing EMF). The first study conducted in Denver, Colorado in 1979 showed that children living in proximity to power lines were more likely to develop childhood leukemia than children living in homes without elevated magnetic fields; this Denver study has been replicated with follow-up studies in Denver, Los Angeles, and Sweden all of which replicate the initial findings and substantial additional related studies. *Id.* Despite no biological mechanism identified and a lack of animal testing data, the WHO/IARC recognized that ELF is a potential carcinogen based on the strength of more than 30 positive epidemiological studies confirming the positive correlation between an increased risk of childhood leukemia and magnetic fields association with EMF. David Gee, *Late Lessons from Early Warnings: Towards realism and precaution with EMF?*, 16 *Pathophysiology* 217, 219 (2009); *International Agency for Research on Cancer, Non-Ionizing Radiation, Part 2: Radiofrequency Electromagnetic Fields, Monograph Volume 102* (May 2011); *World Health Organization, Extremely Low Frequency Fields Environmental Health Criteria Monograph No. 238*, at 9 (2007). The threshold for elevated risk from these studies is uncertain as is the biological mechanism(s) through which the increased incidence of childhood leukemia occurs. Gee at 219. While a threshold for safe exposure to EMF/ELF is not clear, it is clear that there is a consistent pattern of elevated risk of leukemia in children at magnetic field levels greater than 0.3 or 0.4 μ Tesla (3 or 4 milli-gaus). *Carpenter, Health Effects of Nonionizing EMF* at 114.

Thus, this Commission has, for years, regulated the EMF/ELF from high voltage transmission lines to ensure that those in the vicinity of these lines are protected by keeping exposures well below 0.3 or 0.4 μ Tesla (3 or 4 milli-gaus).²⁴ See also *Maine Public Utilities Commission, Report Related to LD 950, An Act to Establish the Electromagnetic Field Safety Act on Setback Requirements Associated with Transmission Lines*, Docket No. 2013-00402, Report at 6-7 (Nov. 30, 2013) (MPUC Report). In its Report, the Commission summarized a report issued by the WHO in 2007 which concluded, based on an extensive review of research on the health effects of extremely low frequency fields,²⁵ that consistent epidemiological evidence suggests that chronic low-intensity ELF magnetic field exposure is associated with an increased risk of childhood leukemia.²⁶ *MPUC Report* at 6. To be clear, I discuss the Maine PUC

²⁴ The Commission examines health impacts of transmission line siting as part of Certificate of Public Convenience and Necessity (CPCN) proceedings. Section 3132 of Title 35-A requires the Commission to consider public health and safety in determining public need for a proposed transmission line as well as the proximity of the proposed transmission line to inhabited dwellings.

²⁵ *WHO, Extremely Low Frequency Fields Environmental Health Criteria Monograph no. 238* (2007) (WHO ELF Report).

²⁶ It is important to note that the WHO ELF Report also concludes that there is inadequate evidence of an association between ELF magnetic field exposure and other childhood cancers, nor with any adult cancers including leukemia, nor with any other

Report not as an essential part of the reasoning or predicate for my decision but to illustrate recent actions at the Commission for handling similar concerns.²⁷ While the Commission is not strictly bound by precedent, it strives to reach consistent decisions and to reason by precedent much as a court does.

As more fully discussed below, the WHO ELF Report recommends the use of precautionary approaches for EMF, but cautions that

it is not recommended that the limit values in exposure guidelines be reduced to some arbitrary level in the name of precaution. Such practice undermines the scientific foundation on which the limits are based and is likely to be an expensive and not necessarily effective way of providing protection.²⁸

diseases or disorders. *WHO ELF Report* at 9-10, 357. And even for childhood leukemia, the WHO ELF Report states that

virtually all of the laboratory evidence and the mechanistic evidence fail to support a relationship between low-level ELF magnetic fields and changes in biological function or disease status. Thus, on balance, the evidence is not strong enough to be considered causal, but sufficiently strong to remain a concern.

Id. at 12. Thus, the Maine PUC Report does not recommend exposure limits based upon the epidemiological evidence alone, but does say precautionary measures could be warranted. *Id.* at 357.

²⁷ My opinion and recommendations are consistent with the Commission's EMF/ELF approach taken in these other Commission cases regarding EMF/ELF and summarized in the Maine PUC Report to the Legislature.

²⁸ The WHO ELF Report further states:

[o]nly the acute effects have been established and there are two international exposure limit guidelines (ICNIRP, 1998a; IEEE, 2002) designed to protect against these effects. As well as these established acute effects, there are uncertainties about chronic effects because of the limited evidence for a link between exposure to ELF magnetic fields and childhood leukemia. Therefore the use of precautionary approaches is warranted.

WHO ELF Report at 12.

WHO ELF Report at 12.

Thus, the costs of precautionary measures should be kept very low because benefits are hard to measure based on the weakness of the evidence of a link between exposure to ELF magnetic fields and childhood leukemia, and the difficulty in measuring impact on public health of such mitigation. *Id.*; *Maine PUC Report* at 8.

In 2010, in granting a CPCN for the Maine Power Reliability Program (MPRP), the Commission approved a stipulation that among other things set forth the following requirement addressing the safety of the MPRP project: "CMP will take all reasonable steps to mitigate EMF consistent with World Health Organization recommendations, including "reverse phasing" wherever practical." MPRP Stipulation at § V(E)(9), appended to *Central Maine Power Co. and Public Service of New Hampshire, Request for Certificate of Public Convenience and Necessity for the Maine Power Reliability Program Consisting of the Construction of Approximately 350 Miles of 345 kV and 115 kV Transmission Lines* (MPRP), Docket No. 2008-255, Order Approving Stipulation (June 10, 2010) (MPRP Order). The WHO recommendations suggest that governmental authorities mitigate high levels of EMF, particularly where low or no cost mitigation can be achieved.²⁹ Accordingly, this Commission, in cases involving MPRP landowner disputes regarding possible increased EMF exposure, required measurements of the EMF fields under different transmission configurations and examined whether the proposed EMF mitigation was low cost or no cost and whether it would materially reduce EMF levels. *Central Maine Power Company, Appeal of LDRT Decision Regarding Wanda and Mark Curtis*, Docket No. 2011-00504, Order (April 18, 2012) (Curtis Order); *Central Maine Power Company, Appeal of LDRT Decision Regarding Mary and David Fournier*, Docket No. 2011-00485, Order (April 30, 2012) (Fournier Order).

Consistent with the Commission's approach in the MPRP, the Curtis case, and the Fournier cases, the context and purpose of the service and facility require consideration. The type of utility facility or service defines the parameters of safety concerns. If there is a potential safety threat then the nature of the threat, the concentrations and strength of exposure, and the availability of alternatives and mitigation techniques are important in determining the safety of the utility service and facilities.

E. A Credible Threat to Human Health and Safety Does Not Mean Any Credible Evidence of Risk is Sufficient to Create a Credible Threat

The Law Court specifically charged the Commission with examining whether smart meter technology is a credible threat to the health and safety of CMP's customers. A credible threat to health and safety does not mean that *any* credible evidence of a risk or possible risk is sufficient to create a credible threat. If any credible evidence were to present a credible threat without considering the context, purpose and

²⁹ See *WHO ELF Report* at 13.

safety measures put in place, electrical service itself as well as natural gas and water service could pose a credible threat of harm. Credible synonyms include likely, probable, presumptive. *Merriam-Webster.com* (2014) (available at <http://www.merriam-webster.com/dictionary/credible>). Likewise, credible threat means a threat that is convincing; capable of persuading people that something will happen. *Oxford English Dictionary* (2014) (available at http://www.oxforddictionaries.com/us/definition/american_english/credible). It is one thing to make a finding that evidence is credible regarding potential harm and quite another to find there is a legally credible threat of harm – that a credible threat of harm is in fact credible: likely and probable to result in harm. Thus, the Law Court has ordered this Commission to determine whether CMP's smart meters are a likely and probable threat to its customers.³⁰

In a different legal context of examining what Article III standing requires for an injury-in-fact to be satisfied, the United States Court of Appeal for the Ninth Circuit considered how increased risk of harm and credible threat interplay. In a data breach case, *Krottner v. Starbucks Corporation*, 628 F.3d 1139 (9th Cir. 2010), the Court stated that

[a]lthough we have not previously determined whether an increased risk of identity theft constitutes an injury-in-fact, we have addressed future harm in other contexts, holding that "the possibility of future injury may be sufficient to confer standing on plaintiffs; threatened injury constitutes 'injury in fact.'" *Cent. Delta Water Agency*, 306 F.3d at 947. More specifically, [a] plaintiff may allege a future injury in order to comply with [the injury-in-fact] requirement, but only if he or she "is *immediately* in danger of sustaining some *direct* injury as the result of the challenged . . . conduct and the injury or threat of injury is both real and immediate, not conjectural or hypothetical." *Scott v. Pasadena Unified Sch. Dist.*, 306 F.3d 646, 656 (9th Cir.2002) (emphasis in *Scott*) (quoting *City of Los Angeles v. Lyons*, 461 U.S. 95, 102, 103 S.Ct. 1660, 75 L.Ed.2d 675 (1983)). Thus, in the context of environmental claims, a plaintiff may challenge governmental action that creates "a credible threat of harm" before the potential harm, or even a statutory violation, has

³⁰ None of the parties have pointed the Commission to any Maine Supreme Court precedent defining "credible threat" of harm. However, in a case involving a protection from abuse order and what was meant in a statute that speaks in terms of whether a defendant represents a credible threat to the physical safety of the plaintiff or minor child (19-A M.R.S. § 4007(1)), *L'Heureux v Michaud*, 2007 ME 149, 938 A.2d 801, the Law Court held that Section 4007 "does *not* state that a protection order can be issued based on a credible threat finding alone, nor does it define a 'credible threat.'" *Id.* ¶8 (emphasis in original). The Court concluded that credible threat language was meant to refer to federal firearms provisions, and to support "a firearms prohibition provision in an order based on a finding of abuse, or to which the parties have agreed." *Id.* ¶10.

occurred. See *Cent. Delta Walter Agency*, 306 F.3d at 948-50.

Id. at 1149.

The *Krottner* court then held:

If a plaintiff faces "a credible threat of harm," *Cent. Delta Walter Agency*, 306 F.3d at 950, and that harm is "both real and immediate, not conjectural or hypothetical," *Lyons*, 461 U.S. at 102 (internal quotation marks omitted), the plaintiff has met the injury-in-fact requirement for standing under Article III. Here, Plaintiffs-Appellants have alleged a credible threat of real and immediate harm stemming from the theft of a laptop containing their unencrypted personal data.

...

Were Plaintiffs-Appellants' allegations more conjectural or hypothetical—for example, if no laptop had been stolen, and Plaintiffs had sued based on the risk that it would be stolen at some point in the future—we would find the threat far less credible. On these facts, however, Plaintiffs-Appellants have sufficiently alleged an injury-in-fact for purposes of Article III standing.

Id. at 1143.

This 9th Circuit case addressed an entirely different threat – threat of identity theft. It nonetheless illustrates an analysis that increased risk of harm alone is not enough to constitute a credible threat of harm if not bounded in facts that are more than conjectural and hypothetical.

The statutory mandate to ensure provision of safe utility service and facilities 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. It is conceivable that the risk of a specific utility service or facility may outweigh its usefulness as we learn more about those risks and benefits. Such is the case with electrical transformers and equipment containing polychlorinated biphenyl ethers (PCBs), which performed very well as electrical equipment as an insulating liquid, but have been recognized over many decades to impose significant public health and environmental costs when the PCBs are leaked, released or spilled during maintenance. Due to widespread use, PCBs have been found in remote, seemingly pristine parts of the world such as the Arctic, and in the human food chain through animal feed and meat destined for human consumption. PCBs are now banned in new electrical equipment and existing

equipment is being phased out of service. The case of PCBs is illustrative because it shows how a seeming innovation of the early 20th century (use of PCB oil to replace more flammable electrical insulator oil) later became recognized as posing a credible threat to the public and, indeed, an unreasonable risk

F. The Commission is Mandated to Ensure the Safe Provision of Utility Service

A safe utility practice standard should limit both short-term (acute) and long-term (chronic) risks to those risks that are reasonable in light of the context and purpose of the service and facility. Regulators should also consider the magnitude of the risk (the concentrations and strength of exposure), the probability of harm (certainty based on science, engineering and medical knowledge), and the availability of alternatives to the service or facility and mitigation techniques to reduce the magnitude and likelihood of possible harm. The utility and Commission need to consider a broad range of reasonable operational scenarios and exposure scenarios that will be experienced in considering what utility practices are safe and what risk mitigation is required to meet the safety mandate. These standards of safety may change with time – indeed almost certainly will change – as technologies and scientific understanding advances.

I note my disagreement with both Mr. Friedman's and CMP's contentions on safety. Mr. Friedman defines safety as requiring "a place that is free of harm or danger." *Friedman Brief* at 6. The provision of electricity, gas and water service involve inherent risks. That is in fact why safety is in the Commission's mandate: to ensure there is a limit to reasonable risks and ensure safe utility service and facilities. CMP argues the Commission's mandate of safety in this case is limited to 35-A M.R.S. § 3143, An Act to Create a Smart Grid Policy in Maine, which concerns grid safety. *CMP Brief* at 1-2. Safety of the grid as addressed in that statute is a different matter from safety of the customers. CMP's argument that the Legislature limited Commission authority over safety in this provision is directly contrary to the Law Court's ruling in this case and is not well taken. The Commission has a clear mandate to ensure the provision of safe utility service and facilities.

The use of smart meter technologies is now becoming a common utility practice as indicated by the evidence in this case. However, it is not yet a standard utility practice outside Maine. Any suggestion that the use of smart meter technology is a standard utility practice in Maine because the Commission has approved for deployment to most utility customers, and thus a safe practice because it is a standard practice, is a tautology of little worth, especially in light of the Law Court's remand.³¹

³¹ I agree with Mr. Friedman that neither the promotion of state and federal energy policies nor consistency with generally accepted utility practices is an appropriate consideration. *Friedman Exceptions* at 4-5. Consistency at the federal policy level with general support for such infrastructure and observing that many other utilities are installing similar types of meters takes too broad a brush to determine whether a particular smart grid technology or practice is safe under the Law Court's decision.

The question presented by the Complainants is whether the Commission's approval was appropriately granted.

The Commission is primarily an economic regulator. Other state agencies have public health and environmental protection mandates as their primary mandate. Nonetheless, the safety of utility service is clearly within the Commission statutory mandate under Sections 101 and 301. There is a public and societal expectation that the Commission will ensure public safety in projects and facilities that come before us. In *Friedman*, the Law Court found that the Commission had erred in not addressing the safety of the AMI installations.

While the Commission is primarily an economic regulator, too much has been made in Commission Orders and the Examiners' Report of the lack of Commission expertise on RF or public health issues. This Commission is in a similar position to the Federal Communications Commission (FCC) itself in setting these standards. The FCC does not claim an expertise as a *de facto* health agency and considers the views of federal health and safety institutes and agencies that address RF exposure. In *the Matter of Reassessment of Federal Communications Commission Radiofrequency Exposure Limits and Policies, et al.*, ET Docket No. 13-84, et al., First Report and Order Further Notice of Proposed Rule Making and Notice of Inquiry, FCC 13-39, ¶ 215 (Mar. 29, 2013) (FCC Notice of Inquiry). The FCC is guided by the expertise of federal safety, health and environmental agencies and institutes that perform regular reviews of the scientific research subject to federal budgetary constraints. *Id.* Additionally, the Law Court stated that "the Commission is not precluded from considering the findings and conclusions of other state and federal agencies." *Friedman*, 2012 ME 90, ¶ 11 n.7.

In fact, the Commission, as discussed above, considers health effects from electro-magnetic emissions from high-voltage transmission or other electrical equipment which involves similar expertise and knowledge. While advanced degrees are helpful, regulators need not have PhDs in each area of specialized knowledge – such as medical, radio frequency, genotoxicity, engineering, law – to competently regulate in a specific area. By way of illustration, the Commission does not have sufficient engineering or design expertise to fully and safely design a natural gas distribution system but does have adequate staff expertise regarding natural gas distribution system safety components and standards. The Commission has a comparable duty to exercise and develop the same level of expertise regarding safety of electricity service. There is a distinction between health effects expertise and institutional competence at the Commission to address general questions of safety. The Commission need not have medical and public health professionals on staff to make a thorough and judicious examination on the safe provision of utility service. In short, as the Law Court indicated, the Commission can weigh evidence and rely on other scientific, public health, governmental and institutional expert bodies' findings, assessments, and studies.

G. The Commission's jurisdiction of safe utility services and facilities is not preempted

The FCC's exposure standard does not preempt the Commission's authority. CMP raised the issue of federal preemption, but has generally not pressed the matter. While the issue was presented to the Law Court, the Court did not address the issue of federal preemption in its July 12, 2012 decision. CMP raised the matter through a Motion on the Scope of Proceeding at the outset of the proceeding on remand. CMP's argument was that the proceeding should be limited to whether CMP's smart meters comply with FCC regulations.

In its Order denying the motion on scope in the Opt-Out Investigation, the Commission noted prior precedent that, as a general matter, it is reluctant to find that it is preempted from carrying out the direction of the Maine Legislature. *Maine Yankee Atomic Power Company Re: Decommissioning Financing Plan*, Docket No. 82-179 at 17 (Feb. 22, 1990) (Commission will find preemption only in the most obvious of circumstances). With regard to considering the safety of smart meters, the Commission explicitly found that it was not preempted by federal law from considering the health and safety issues regarding CMP's smart meter program. The Commission stated:

Based on the submissions of CMP and the Intervenors, there is no direct federal preemption and novel field preemption issues require a thorough legal and factual analysis. CMP's arguments do not make this showing. It is certainly not obvious that the Commission's authority under 35-A M.R.S.A. § 101 is preempted from conducting this proceeding on whether CMP's smart meter service is safe.

Order Denying Motion at 2.

The Commission also stated that the issue of whether it must apply the FCC's RF emission standards to smart meters should be explored in the proceeding. *Id.* CMP has presented no compelling argument or evidence that the Commission is limited to applying the FCC's RF emission standard or that the Commission is preempted from conducting this proceeding.

It is inconsistent with this Commission's precedent and prior rulings to now question whether there is support for preemption of the very safety mandate that has been in this Commission's mission for a century and forms part of the statutory basis of the Law Court's Order that the Commission consider the safety of the AMI meters and network. 35-A M.R.S. § 101. Additionally, the Maine Constitution states that all people are born with certain natural rights, which includes "pursuing and obtaining safety and happiness." Me. Const. art. I, § 1. I construe the Constitutional mandate similarly to the Commission's statutory mandate under 35-A M.R.S. §§ 101 and 301.

H. The FCC Guidelines may be valid but are out dated and should be reexamined

CMP's expert, Exponent, urges the Commission to adopt or follow the FCC's 1996 guidelines for RF exposure developed for cellular telephones. However, in an area of active scientific inquiry, the FCC's exposure standard established in 1996 is too outdated to rely upon. The FCC standard is somewhat consistent with the Institute of Electrical and Electronics Engineers' (IEEE) standard but less stringent than the International Commission on Non-Ionizing Radiation Protection (ICNIRP) and Canadian standards by averaging peaks over a longer period. The FCC standard should be examined in light of the science that motivated the WHO/IARC to reclassify RF radiation and more than a decade of scientific studies. Moreover, the U.S. EPA indicated that the FCC guidelines are not set to protect from non-thermal effects.

In the 18 years since the FCC established its guidelines, the safety of RF radiation exposure has continued to be a significant area of scientific study with substantial research developments. The FCC standard does not take into account almost two decades of research. Quite notably, the FCC standard does not consider the growing body of research on potential non-thermal effects of RF radiation. This scientific research led to WHO/IARC reclassifying RF radiation as a possible carcinogen among other notable developments. The WHO/IARC reclassification of RF/EMF includes parts of the electromagnetic spectrum used by smart meters as well as Wi-Fi, radio and TV towers as well as wireless phones. *Hardell Test.* at 16 (citing email from Dr. Baan at IARC dated Aug. 29, 2011).

For this reason, the FCC's safety standard for RF radiation exposure is out of date. The public would benefit if the FCC were to examine whether its current standard is sufficiently protective for thermal and non-thermal effects on the human body in light of both substantial changes in public exposure and more than a decade of scientific examination of the potential consequences of that exposure. Exponential growth in use of cellular telephones and smart phones, cordless telephones, home and work-based Wi-Fi systems, and other wireless communications have made exposure to RF radiation synonymous with modern life in developed countries. RF radiation exposure in modern society is omnipresent. Our knowledge is advancing concomitantly with the significant rise in use of these devices in addition to older devices such as telephones, radios, pagers and other forms of RF radiations from large, high-powered base station transmitting towers.

The Complainants note that the FCC does not set a safe peak exposure level. That is an issue the FCC may find appropriate to further examine. Nor does the FCC set a maximum instantaneous peak emissions level other than the power of the device; the FCC views the relevant power levels as the "maximum time-averaged power that takes into account the burst nature of transmission."

Accordingly, I am encouraged that the FCC and other federal agencies are now moving to consider whether the FCC's standard as well as the U.S. Food and Drug Administration's (FDA) standards provide adequate protection. The FCC initiated a

Notice of Inquiry on March 27, 2013. *FCC Notice of Inquiry*, ¶ 251. In the Notice of Inquiry the FCC stated:

We continue to have confidence in the current exposure limits, and note that more recent international standards have a similar basis. At the same time, given the fact that much time has passed since the Commission last sought comment on exposure limits, as a matter of good government, we wish to develop a current record by opening a new docket with this Notice of Inquiry.

Id. ¶ 205.

The Notice of Inquiry also contained substantial technical background on the FCC's current standards that were set based on thermal-effects. For example, the FCC notes that some devices may fail to comply with its current exposure limit when worn on the body. *Id.* ¶ 251.

I am also encouraged by the research priority being given to a number of issues raised by the Complainants, the National Research Council of the National Academies of Science (NRC), and the WHO. For wireless communication devices, the NRC has identified research gaps, research needs, and priorities (high and low) for dosimetry and exposure, epidemiology, human laboratory studies, biological mechanics, and *in vivo* and *in vitro* studies to understand how to accurately characterize any risks as well as the potential magnitude of such risks. *National Research Council, Identification of Research Needs Relating to Potential Biological or Adverse Health Effects of Wireless Communication Devices*, (2008). The WHO has set a number of research priorities for children who use cellphones or live near base stations or radio and TV towers, including epidemiological studies, animal studies, *in vitro* studies and dosimetry and exposure assessments – these WHO research priorities focus on both children and the higher exposures from cell phones and base stations. *WHO, Research Agenda for Radiofrequency Fields* (2010) (*available at* http://whqlibdoc.who.int/publications/2010/9789241599948_eng.pdf); *WHO, Electromagnetic Fields (EMF), Children's EMF Research Agenda* (*available at* <http://www.who.int/peh-emf/research/children/en/index4>). The NRC research priorities, and international research priorities will advance scientific and regulatory knowledge of the risks posed by various types, frequencies and strengths of RF radiation. Nonetheless, this Commission must decide this case based on the current status of the science.

ICNIRP and IEEE standards are more recent than the FCC's. Averaging time for ICNIRP is 6 minutes and IEEE is 30 minutes. *CMP Brief at 21*. It is significant that the IEEE standard roughly corresponds to the FCC's standard, while the ICNIRP is more stringent because it averages over a shorter time period giving less time to average out peak (or "burst") transmissions.

Because the FCC guidelines are similar to those in other jurisdictions and quite particularly similar to the ICNIRP and IEEE standards, the evidence of compliance with the FCC's standards as one of many lines of evidence and legal contention should be considered in the case. Were the FCC standard not outdated, it would be considered more authoritative as explained above. The FCC and other countries' exposure limits for the general public vary from 1 mW/cm² to as low as 0.01 mW/cm² is set forth in Table 1 on page 15 above. These are average exposure limits and generally do not address peak exposures

It is notable that many governmental average exposure levels for RF/EMF are similar to those set by the ICNIRP. Despite testimony that all existing safety standards are inadequate, it is not necessary to establish a specific safety standard beyond those in effect in multiple other jurisdictions. See, e.g., *Kumar Test.* at 3. The standards adopted by ICNIRP and IEEE and other jurisdictions in addition to the FCC provide relevant evidence under which to consider the relative safety of AMI smart meters.

The FCC's Maximum Permissible Exposure (MPE) limits for devices such as smart meters follow pre-defined rules for use of the unlicensed spectrum. To meet these MPE levels, smart meters are tested, evaluated, and certified by laboratories for compliance with the FCC's requirements such as RF exposures. Manufacturer equipment certifications document these evaluations. The MPE applied for CMP's smart meters for the public is 10 watts per square meter (or 1 milliwatt per square centimeter (mW/cm²) averaged over 30 minutes. 47 C.F.R. § 1.1310; *Examiners' Report* at 23. I return to these FCC test results below in Section X(K).

I. AMI Meter RF exposures are far below other commonly used consumer devices

CMP's evidence, taken together with the entire record, establishes that AMI 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. In fact, exposures are much lower than those from wireless cellular telephone exposure, of similar frequency and power levels. The primary difference is that cellular telephones are operated much closer to the human body within spaces such as homes, businesses and cars as well as nearly ubiquitously in public spaces. RF exposure is extensive in most homes and workplaces unless there is a specific effort to limit or eliminate RF. That does not prove it is safe, of course.

AMI meters operate on similar frequencies and power levels to cellular phones, cordless phones and Wi-Fi. Complainants and CMP agree on the basic lack of distinction between cellular phone and smart meter radiation in terms of quality and nature of radiation because cellular phones operate at similar although not identical frequencies within the electromagnetic spectrum as AMI meters. The relevant differences of exposure concern proximity to humans, the duration of use, and the extent of exposures, and not the basic physics of the RF emissions. Table 3 below

shows exposures from smart meters and other RF-emitting devices comparing exposure levels with what CMP experts call peak power at different distances:

TABLE 3
Residential RF/EMF Exposure Levels calculated on a Peak Basis

Technology	Peak Exposure (mW/cm ²)	Peak Power (W)	Frequency
Smart meter, 1 yard distance - Outside	0.031	1	2.4 GHz
Smart meter, 1 yard distance - Inside	0.0015	1	2.4 GHz
Access point 2.4 GHz, 20 feet away horizontally, same height	0.00042	1	2.4 GHz
Cell phone next to head	1.5 – 12	0.125 - 1	450 MHz, 480 MHz, 850 MHz, 900 MHz, 1800 MHz, 1900 MHz
Cordless phone next to head	0.05 – 1.2	0.004 – 0.1	900 MHz, 1.9 GHz, 2.4 GHz
Microwave over (1 foot away), 1 minute heating every half hour	0.14	1.6	2.4 GHz

Information in Table 3 extracted from Joint Testimony of Linda S. Erdreich, Ph.D., William H. Bailey, Ph.D., & Yakov Shkolnikov, Ph.D., Docket 2011-00262 at 28-29 (November 16, 2010).

The exposure from cellular phones near the body and head exceed AMI meter exposure by two to four orders of magnitude, though higher exposures from other devices do not prove safety. These relative exposure levels do establish relative frames of reference and suggests that, if there is a credible safety threat related to RF exposure from AMI meters, those concerns would be amplified for RF exposures from cellular phones, mobile PDAs, cordless phones, home and office Wi-Fi and other devices.

J. Complainants present credible studies and witnesses that RF radiation may cause possible non-thermal effects

Complainants have produced well known and respected experts. This testimony is generally consistent with the WHO/IARC reclassification decision, though some of Mr Friedman's witnesses would go farther than the WHO/IARC has done. The WHO/IARC determination and reclassification presents persuasive evidence of a possible risk. The WHO/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. Accordingly, the WHO/IARC reclassification is credible evidence of a possible risk from RF/EMF.

Dr. Lennart Hardell, a professor of oncology at Orebro University Hospital in Sweden, specializes in the epidemiological research of cancer risks related to exposure to toxins. He is a leading epidemiologist in the world on the subject of cancer risks associated with RF exposure from wireless phones. Dr. Hardell has been conducting research on environmental risk factors for cancer since the 1980s, has conducted research on disease risks associated with electromagnetic fields since the 1990s, and has published over 300 scientific articles in peer-reviewed journals, chapters in books and commentary. Dr. Hardell published an evaluation of cancer risks associated with exposure to extremely low frequency electromagnetic fields (ELF-EMF) in a peer-reviewed scientific journal in 1995, and he participated in and been the lead investigator and author of a large number of scientific studies on use of cellphones and cordless phones and the risk for certain malignant diseases (brain tumors, salivary gland tumors, testicular cancer, non-Hodgkin lymphoma, malignant melanoma). This has resulted in more than 80 publications on the subject. Dr. Hardell has also on numerous occasions been invited to participate in scientific meetings to present the results from his studies. In short, Dr. Hardell is a well-respected and highly regarded researcher in the field of low-level RF radiation. Dr. Hardell served as a member of the IARC Working Group in May of 2011. Based on the Working Group's exhaustive evaluation of the science, IARC issued its classification of RF as a possible human carcinogen. *Hardell Test.* at 1-2, and Exhibit. A.

In this proceeding, Dr. Hardell testified about the case control studies and meta-analyses performed by his research team. He also testified to his extensive knowledge of most of the peer-reviewed epidemiological studies that have been published since the 1990s and to his knowledge of laboratory studies showing genotoxic effects from low level RF exposures. *Hardell Hearing Test.* (Oct. 30, 2013). Dr. Hardell testified to his expert opinion and to evidence supporting a causal relationship between low-level RF exposure and forms of brain cancer. *Hardell Supp. Test* at 3 and Exhibit D; *Hardell Hearing Test.* Oct. 30, 2013 *Transcript* at 11, 21. For example, Dr. Hardell's research indicates a statistically significant increased risk for glioma per 100 hours of cumulative cell and cordless phone use. This is a statistical dose-response relationship. Data Request CMP-003-003.

Dr. Hardell believes the evidence is strong enough to make a causal linkage. He acknowledges that human exposures are much stronger from cellular phone usage than from smart meters. He nonetheless believes all sources of manmade RF should be reduced or eliminated based on his research.

Dr. Hardell's testimony is credible. His expertise is recognized by the international scientific community sufficiently to result in his appointment to the WHO/IARC committee evaluating RF for the international scientific community. However, it is important to note that WHO/IARC only partially accepted the view of causality of cancer in humans from RF radiation. The WHO/IARC committee on which

Dr. Hardell sits reclassified RF radiation as a possible – not a known – source of cancer. His research was persuasive enough along with much other work for the WHO/IARC to reclassify RF as a possible carcinogen but not as a known human carcinogen.

Dr. Darius Leszczynski also presented credible written testimony, particularly because he is careful to explain what the scientific research to date establishes and what it does not. Dr. Leszczynski, a member of the Working Group of the IARC/WHO that in May 2011 classified RF from cell phones as a possible carcinogen, is a research professor at the Radiation and Nuclear Safety Authority (radiation biology laboratory), Helsinki, Finland and adjunct professor of biochemistry at the University of Helsinki. Dr. Leszczynski and his research group have worked in the field of biological and health effects of cellular phone RF for the past 15 years, studying the biological and health effect of cellular phone RF using high-throughput screening techniques of proteomics to identify RF-affected proteins and genes. *Leszczynski Test.* at 2. Dr. Leszczynski has co-authored over 90 publications in peer-reviewed journals. *Id.* at 3.

Dr. Leszczynski testified to the Commission regarding the WHO/IARC's review of low-level RF/EMF for carcinogenicity by a group of 30 scientists selected from 14 countries. Dr. Leszczynski testified that RF was found to have "limited evidence in humans" of carcinogenicity and tumor-growth based on positive associations between glioma and acoustic neuroma³² from exposure to RF from wireless phones, particularly the results of the INTERPHONE study³³ and the Swedish Hardell group. *Leszczynski Test.* at 6-7. Dr. Leszczynski explains how IARC defines "limited evidence":

A positive association has been observed between exposure to the agent and cancer for which a causal interpretation is considered by the Working Group to be credible, but chance, bias or confounding could not be ruled out with reasonable confidence.

Id. at 7.

Dr. Leszczynski noted that while some members of the WHO/IARC working group disagreed with RF/EMF being classified as a possible carcinogen, their opinion focused on a study known as the Danish Cohort study. Dr. Leszczynski found their concerns unconvincing due to the serious design flaws of the Danish Cohort study. The Danish Cohort study only used time with a cellular phone subscription as exposure data so a person who spoke on the phone 5 minutes a month and a person using the phone

³² Glioma is a cancer. Acoustic neuroma is a non-cancerous tumor.

³³ The INTERPHONE study, for example, reported a statistically significant increased risk of 179% for acoustic neuroma for 1,640 cumulative hours of use with 5 or more years of cellphone use. *Morgan Test.* at 15. There are other non-peer reviewed indicators of significant increase in brain cancer or non-cancer tumors in the record which are not peer reviewed and not generally accepted as reliable scientific and therefore not relied upon in this decision. *Id.* at 16-20.

many hours a day would have been put in the same exposure group. Secondly, all corporate subscribers were excluded, thereby potentially excluding the heaviest users and most exposed users from the Danish study. Third, the cut-off time for exposure was also flawed as Dr. Leszczynski explained: the Danish Cohort study set the cut off for year 1995 with analysis for cancer induction done based on 2007 cancer registry data. So a person who took a cellular phone subscription after 1995 was considered non-exposed by the study design. Thus a person who subscribed in 1996 and developed brain cancer in 2006 would be counted as non-exposed. *Id.* at 8-9. Dr. Leszczynski's concerns with the Danish Cohort study, which were also shared by the WHO/IARC group in finding that the Danish Cohort study had methodological issues, are well supported and well founded.³⁴ For these reasons, Dr. Leszczynski's testimony is well taken.

Mr. Friedman notes properly that Exponent largely ignores the WHO/IARC classification. The WHO/IARC classification is significant within the public health community for carcinogenicity. IARC evaluates agents and classifies them into different groups depending on their carcinogenicity. The IARC notes that "categorization of an agent is a matter of scientific judgment that reflects the strength of the evidence derived from studies in humans and in experimental animals and from mechanistic and other relevant data." 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, Vol. 102 at 30 (2013). IARC classified radiofrequency electromagnetic fields as a Group 2B carcinogen. Group 2B categorization is used for agents that are found to be possibly carcinogenic to humans. *Id.* The majority of the members of the IARC working group found that there is limited evidence in humans and experimental animals for the carcinogenicity of radiofrequency radiation. *Id.* at 419. As stated above, limited evidence of carcinogenicity in humans is when a positive association has been observed between exposure to the agent and cancer for which a causal interpretation is considered by IARC to be credible, but chance, bias, or confounding could not be ruled out with reasonable confidence. *Id.* at 27. IARC is the authoritative international scientific body regarding classification of cancer risks so this classification carries great evidentiary weight. CMP's witnesses are unable to rebut the evidentiary value of the WHO/IARC evidence together with much of the testimony of Doctors Hardell and Leszczynski. See *Hardell Hearing Test.* (Oct. 30, 2013); *Hardell Test.*; *Leszczynski Test.*

However, the WHO/IARC classification is as a 2B potential carcinogen; it is not a WHO/IARC classification as a *known* carcinogen.³⁵ A causal relationship to RF

³⁴ I also note my general agreement with some of the concerns with the Advisory Group on Non-Ionizing Radiation (AGNIR) Report outlined in Dr. Leszczynski's testimony at 14-15.

³⁵ Known carcinogens are categorized as Group 1 carcinogens by the WHO/IARC when there is sufficient evidence of carcinogenicity in humans. *IARC Monograph Volume 102* at 29. Sometimes, though rarely, "an agent may be placed in this category when evidence of carcinogenicity in humans is less than sufficient but there is sufficient evidence of carcinogenicity in experimental animals and strong evidence in exposed

exposure has not been established. But that only means that the WHO/IARC has not classified RF as a known carcinogen and does not detract from the significance of the WHO/IARC 2B potential carcinogen classification. On the evidence in this case, there is scientific disagreement on whether RF should be classified as a known carcinogen. Drs. Hardell and Leszczynski believe so along with a number of Mr. Friedman's other witnesses, but the WHO/IARC does not go so far. Whether a substance is a known carcinogen or a 2B potential carcinogen, it may or may not pose a credible threat. The scientific classification as a known, potential, or non-carcinogen is not a *sine qua non* regarding whether a credible risk of harm exists. Context, exposure, usage and dose matter in making a credible risk of harm assessment.

Exponent's comparison to natural background and human body RF is not helpful. The natural RF characteristics are broadband ranging from 3 kHz to 300 GHz according to Exponent. In fact, the measurement devices used by Exponent in the field could not measure natural RF. *May 23, 2013 Tech. Conf. Tr.* at 36-37. Showing information on broadband and low levels of RF as naturally occurring is apparently intended to show that levels are somehow safe. But Exponent does not make the argument that naturally occurring levels are safe. Data Request Friedman-03-04 prepared by Exponent's Yakov Shkolnikov. Without making the argument that these natural levels are safe, this information is less than helpful. It is well known that a number of natural exposures ranging from sunlight to arsenic in drinking water and radon in buildings are both naturally occurring and pose human health risks. The information on low-level broadband natural RF presented here is not helpful.

Exponent's use of "weight of evidence" is particularly uninformative as it lacks scientific rigor and is non-transparent. This treatment of Dr. Shahin's studies is an example of how Exponent utilizes what it calls a "weight of the evidence" approach.³⁶

humans that the agent acts through a relevant mechanism of carcinogenicity." *Id.* at 29-30.

³⁶ Some recent studies by Dr. Shahin were introduced into the record that reported increases in oxidative stress in response to very low levels of RF, comparable to smart meter radiation. *Shahin et al.*, "2.45 GHz Microwave Irradiation-Induced Oxidative Stress Affects Implantation or Pregnancy in Mice, *Mus musculus*," *Appl Biochem Biotechnol* (pub. Online Jan. 22, 2013). Oxidative stress is studied because it can lead to genotoxicity (toxic reactions to genes). 2.45 GHz microwave irradiation-induced oxidative stress affects implantation or pregnancy in mice. *Id.* CMP argued that in applying a "weight of evidence" process, a 2009 review by the ICNIRP found there was insufficient evidence to conclude that low-level RF causes oxidative stress. *CMP Rebuttal Test.*, at 81-82. However, the recent studies by Shahin were conducted after the ICNIRP review and therefore, the 2009 ICNIRP could not have evaluated the Shahin studies. Shahin's research is in a line of recent scientific research advancing the body of knowledge of RF radiation. The efforts to discredit that research by Exponent through generalized weight of the evidence reference rather than addressing the substance of the study are not persuasive.

This "weight of the evidence" approach simply glosses over studies that an expert does not agree with rather than addressing the specifics of research or studies with rigor or explaining their own assumptions in any detail so it lacks transparency. It is particularly uninformative because Exponent then insists that Complainants' studies must address all uncertainties and provide complete explanations of the physical and biological mechanisms of causation tracing exposure to biological effect. This is an erroneous standard to force Complaints to "prove" that RF causes such harm, when by law and as previously discussed herein, it is CMP that has the burden of proof, not the Complainants.

Of course, even the same types of studies, animal studies for example, may not all be consistent. Results for animal tests can vary with slightly different study designs. Biological systems are complex and different study designs will yield different results; difficulties replicating studies are to be expected. As researchers vary those designs and attempt to replicate each other's' studies, more knowledge evolves. Different types of studies, animal studies and epidemiological studies tracking large human populations over time may show different results and that is not surprising either, as some biological mechanisms in lab rats are different than people and epidemiological studies cannot control for as many variables as laboratory research is able to. On the other hand, laboratory experiments are incapable of seeing population level effects. Further, laboratory experiments are severely limited by ethical requirements on conducting research on human subjects. Nonetheless, better research over time using different study methods will determine a higher level of certainty on questions of biological effects from likely higher levels of RF.

With a recognition that there is some credible evidence of potential harm, the next logical question is how to evaluate that risk of harm to determine if the risk of potential harm is being adequately managed to be "safe," and therefore, not a credible threat, *i.e.*, likely to cause damage or danger. What framework is appropriate to consider whether the risk is being adequately managed? In an article in the record, David Gee of the European Environmental Agency presents a framework to consider the difficulty measuring effects in complex biological systems that may result from forms of EMF, including multi-causality, thresholds, timing of dose, sensitive sub-populations, the sex, age, genetics and immune status of the host and cumulative exposures to EMF and other stressors, non-linear dose-response relationships, low dose effects, and the absence of entirely unexposed controls. David Gee, *Late Lessons from Early Warnings: Towards realism and precaution with EMF?*, 16 *Pathophysiology* (2009). Mr. Gee warns in particular of ignoring positive real world observations of biological effects, consistent with two of Hill's criteria (discussed below), on the basis of biological mechanisms for those effects not being understood:

In the context of expanding scientific knowledge, the "implausibility" of biological interactions may not be a robust basis on which to dismiss positive epidemiological or experimental observations, especially when the biological models being used are "simplistic."

Id. at 219. In simple language, Gee's framework suggests that, when we have indications of concern without the full knowledge base we would prefer to make decisions regarding safety, we ought not to dismiss such concerns easily or based on overly simplistic rationales.

When evidence of harm is neither definitely positive nor negative, consideration of the Hill criteria is important in assessing whether a particular agent may cause a particular effect. The Hill Criteria, first articulated in an address at the British Royal Society of Medicine by Austin Bradford Hill in 1965 and later published in the *Proceedings of the Royal Society of Medicine*, are well known and generally accepted as a useful framework in toxicology to assess unclear evidence of harm. The Hill Criteria consist of nine criteria that provide a framework for assessing whether there is adequate evidence of a causal relationship between an incidence and a consequence. The Hill Criteria are generally used in epidemiological studies to test whether a particular agent is the cause of a selected effect when it is difficult to control for all experimental variables (meaning that causative agents must be inferred from observational data). The Hill criteria include factors such as strength (how large is the effect?), consistency (has the same association been observed in others, in different populations, using a different method?), and biological gradient (is there a dose response?).

Dr. Hardell recommended using the Hill Criteria in his initial testimony. Dr. Hardell states on page 9 of his testimony, "Using the Hill criteria on use of wireless phones and brain tumor risk infers causation of the association found in epidemiological studies. Most of these criteria are fulfilled". In CMP's rebuttal testimony, the Company critiqued Dr. Hardell's application of the Hill Criteria as follows:

Q: Do the references made in the testimony of Drs. Hardell, Conrad, Leszczynski, and Mr. Morgan to Sir Bradford Hill's criteria for consideration of epidemiology studies constitute a scientific methodology?

A: No, alluding to Hill's criteria without providing a supporting review of the scientific evidence according to Hill's criteria does not constitute an adequate weight of evidence assessment. A similar failure to follow Hill's criteria to establish claims for health effects was mentioned in the 2012 Exponent Testimony.

CMP Rebuttal Test. at 24.

In his supplemental testimony, Hardell included a paper he co-authored (Exhibit D to Dr. Hardell's Supplemental Testimony) in which he specifically applied the Hill Criteria to cellular phones. Lennart Hardell and Michael Carlberg, *Using the Hill viewpoints from 1965 for evaluating strengths of evidence of the risk for brain tumors*

associated with use of mobile and cordless phones, De Gruyter – Rev Environ. Health (2013) (*Hardell and Carlberg*). Dr. Hardell states that his paper directly supports his "opinion that a causal association between low-level RF radiation and adverse health effects can be inferred from the science and that exposure to low-level RF radiation, including at levels and frequencies transmitted by smart meters, poses risks to human health." *Hardell Supp. Test.* at 4. On page 3 of his supplemental testimony, Dr. Hardell also states:

All nine issues on causation according to Hill were evaluated to assess the causal association between long-term wireless phone use and brain tumours, specifically acoustic neuroma and glioma. Epidemiological studies of long-term use and laboratory studies and data on the incidence of brain tumors were considered. We concluded that based on the Hill criteria glioma and acoustic neuroma should be considered to be caused by RF-EMF emissions from wireless phones, which should be regarded as carcinogenic to humans.

The Hardell paper applies the Hill Criteria and concludes that that the criteria are met with regard to cellular phones. CMP's critique of Complainants' use of the Hill Criteria relies on Lawrence Berkeley National Laboratory's (LBNL) application of the Hill Criteria along with arguing that some of Dr. Hardell's findings are directly inconsistent with the Hill Criteria. *CMP Rebuttal Test.* at 87-88. Dr. Hardell's application of the Hill Criteria goes significantly beyond Exponent's view that it is an "allusion to Hill's criteria." It is a significant and plausible application of the Hill criteria to use of wireless phones. Dr. Hardell particularly describes the increased exposure to the human brain from cell phones and cordless phones, ". . . especially to the temporal lobe on the same side where the phone is used, i.e. ipsilateral exposure." *Hardell and Carlberg* at 2. The study notes the Danish cohort study was evaluated as inconclusive due to methodological issues. *Id.* The paper then proceeds to carefully apply the Hill criteria and reach its conclusion that "glioma and acoustic neuroma are caused by RF-EMF from wireless phones." *Id.* at 9. This conclusion is supported by exposure groups involving cumulative use of cellular phones by two different studies. *Id.* at 8.

However, LBNL applied the criteria to both cellular phones and smart meters and found that, "based on our judgment, the Hill's criteria have not been satisfied for smart meters, regardless of how well they may or may not be satisfied for cell phones." *Roger Levy and Janie Page, Smart Grid Technical Advisory Project, Lawrence Berkeley National Laboratory, "Review of the April 12, 2012 American Academy of Environmental Medicine (AAEM) submittal to the Michigan Public Service Commission" (April 18, 2012) at 3 (Levy and Page).*³⁷ The LBNL review relies heavily on the lack of published, peer-reviewed scientific research meeting the nine Hill Criteria for smart meters and

³⁷ "This is due to significant technical differences between cell phones and smart meters and the absence of research that specifically addresses smart meter operating characteristics." *Levy and Page* at 3.

compares that to the similarly "limited evidence" and "limited coherence" of "some studies" for evaluation of RF exposure from cellular phones. *Id.* at 2. LBNL opines that "it is inappropriate to presume an effect when the sources differ in terms of their frequency, intensity, proximity to critical biological tissues, etc." *Id.* The LBNL memo concludes that "based on our judgment, the Hill's criteria have not been satisfied for smart meters, regardless of how well they may or may not be satisfied for cell phones." *Id.* at 3. It is notable that LBNL limited its opinion that the Hill Criteria are not satisfied by RF from smart meters, which highlights that there may or may not be a stronger case for cellular phone exposures causing harm, but in any case differentiates the possible effects from smart meters and cellular phones.

Based on this analysis, the LBNL and Hardell conclusions from application of the Hill Criteria actually are not inconsistent. Dr. Hardell finds no increased risk for brain tumors in subjects using the cellular phones in a car with an external antenna. *Hardell and Carlberg* at 1. In assessing the experimental criteria, Drs. Hardell and Carlberg assess the data on use in cars with external antenna and hands-free devices as follows:

However, especially in the 1980s, mobile phone use was common in cars, with fixed external antenna as the only mode of use. Such use has been assessed in the Hardell group studies and considered to be no exposure to RF-EMF. For the study period 1 January 1997-30 June 2000, among 1429 responding cases and 1470 controls, 73 cases and 90 controls had always used the mobile phone with fixed external antenna and 1 additional control had always used a hands-free device. This yield crude OR=0.8; 95% CI=0.6-1.1. Thus, this "experiment" showed that if the RF-EMF exposure from the mobile phone was protected, no increased risk was found.

Id. at 7.

In sum, when the antenna is not immediately next to the head, this assessment suggests that the data does not support the finding that there is increased risk of brain tumors. This supports the LBNL review of the Hill Criteria related to smart meters as presenting a different RF/EMF exposure that may in fact result in "no increased risk found," to borrow Doctors Hardell's and Carlberg's terminology.

CMP's own evidence tends to confirm that there is some risk from RF. A Dutch study by the Health Council of the Netherlands submitted by CMP reviews three other studies and concludes that "there are some weak and inconsistent indications for an association between prolonged and intensive use of a cellphone an increased incidence of gliomas." Health Council of the Netherlands, *Mobile phones and cancer* (June 3, 2013) at 34. But this review, which is not a study but a review only, finds evidence of acoustic neuroma from cellular phone use to be "inconsistent and do not really give an indication of an increased risk." *Id.* at 35. It concludes that there is no "clear and

consistent evidence for an increased risk for tumours in the brain" *Id.* at 35. This study and review is not especially informative or reliable but it illustrates that the argument is over the degree of risk. The existence of some risk is acknowledged in the utility's own evidence that show there is no dispute regarding whether there is any scientific evidence of a risk from RF. This question is whether the existing science suggests levels from smart meters are high enough to pose a credible risk of harm. The WHO/IARC reclassification and Dr. Hardell's and Dr. Leszczynski's testimony is more reliable and credible given the recognition in the scientific community, careful scientific approach and explanation of these sources and experts, along with IARC/WHO's status as the authoritative international authority on classifications for these purposes.

Moreover single-hit versus multiple hit or continuous exposure theory is well known in carcinogenesis. *Data Request CMP-003-012*. While there is support for the single-hit theory in more recent research, this is not something this Commission need resolve with respect to RF nor whether there is a threshold for cancer risk or not, or a level for cumulative or incremental exposures. *Friedman Brief* at 69-71; *Friedman Exceptions* at 7. Suffice it to say there is credible evidence to support a no safe threshold opinion as well as Exponent's view that there is a level below which effects cannot be detected. I would expect the scientific examination of this issue by experts and Laboratories to continue. This record is not sufficient to determine thresholds for cancer risk or levels of cumulative or incremental exposures particularly in a developing area of scientific inquiry and I decline to do so.

The record is sufficient to conclude that emissions of RF/EMF from smart meters, at the power levels and frequencies that are comparable to cellular phones but at a greater distance from the human body and most often separated by a structure, pose a lowered level of exposure and therefore lower risk than cellular phone and cordless phone exposures by three to four orders of magnitude and therefore are not a credible threat to health and safety.

K. Actual Testing of the Meters by Trilliant and Field Measurement Indicate RF Levels are Below all Governmental and International Standards and Well Below Other Forms of RF

Dr. Hardell cites an email from Dr. Baan with the email as an exhibit to his direct testimony. *Hardell Test.* at 16 (citing email from Dr. Baan of IARC dated Aug. 29, 2011). In answering an inquiry on the WHO/IARC reclassification, Dr. Baan states that the reclassification applies to the entire spectrum of RF/EMF including smart meters. Dr. Baan then includes a significant statement: "An important point is the radiation level. The exposure from cellular phones (personal exposure) is substantially higher and much more focused (usually on the brain) than exposures from radio/tv towers, antennas or Wi-Fi." *Id.* Dr. Baan's statement alludes to a principle of toxicology: the dose makes the poison – the concentration of exposure matters.

Devices emitting RF must be tested by the manufacturer to qualify for an FCC authorization. The manufacturer of CMP's smart meters, Trilliant, had the meters tested

to qualify for the FCC process for Grant of Equipment Authorization. This initial manufacturer testing of the meters requires dosage measurements of radiated power/radiation. This equipment testing showed FCC compliance even at 20 cm from the meter – an unrealistically high exposure scenario. At 3 feet, the peak signal strength would be two orders of magnitude below the FCC³⁸ and ICNIRP standard of 1.0 mW/cm². *Id.* At 3 feet, the average exposure would be five orders of magnitude (roughly 100,000 times) lower than the FCC and ICNIRP standard. Since most exposures would occur from a meter outside with an external wall and meter banking in between, there is an additional margin of safety as well from the barriers presented by the structure and meter backing, both of which reduce RF field strength. Even allowing for the outdated FCC standard and WHO/IARC reclassification, these measurements indicate a reasonable margin of safety for the vast majority of exposures from smart meters.

Moreover, actual field tests of the CMP AMI meters and other smart meters suggest RF exposures from smart meters are less than those from cellular phones and therefore exhibit a substantial margin of safety. The OPA conducted field tests of three smart meter sites plus two repeater sites. OPA's study would have picked up all sources of RF radiation. At one site with three smart meter banks, the OPA's consultant found an RF level of 13.4% of the FCC maximum exposure limit for the general population. Exponent conducted field testing of three smart meter sites which could not detect any RF. Notably, the OPA's measure is only one order of magnitude below the FCC limit rather than two to three orders of magnitude predicted by CMP's experts. This is likely attributable to multiple meters and other sources of RF, but this does point to the importance of fully assessing the impacts of large installations of meters.

Mr. Friedman rightly points out that these studies are far from perfect. Sites were selected to find maximum and lesser exposures rather than selected using a statistical sampling technique. There was no confirmation of meter transmission operating when testing occurred and peak active period may have been missed because OPA's consultants only measured a portion of the meters most active transmission period. Thus, worst case measurements were not made nor were peaks necessarily measured. For these reasons, the field tests are not definitive but they do nonetheless tend to confirm the initial equipment testing and calculations on exposure levels are not wildly off base.

Two additional field tests were conducted by the Vermont Department of Health and the Electrical Power Research Institute (EPRI). While these tests were on different meters operating at different power levels and frequencies, the results also tend to confirm that actual exposures are below all current governmental and international exposure standards. The EPRI study was done using careful scientific methods to look

³⁸ While I prefer to reference the more recent ICNIRP standard than the FCC, virtually all of the CMP's expert testimony by Exponent was presented in terms of the FCC standard. Staff spent considerable time looking at underlying data and the manufacturer testing to assess the underlying data on potential exposures.

at exposures from 7,000 smart meters located in a 20 acre area, so a dense meter configuration, and confirmed a finding of compliance with the FCC standard. The dense meter configuration tested by EPRI produced exposures higher than those shown in the Maine testing. The Vermont study also confirmed compliance with FCC limits.

Moreover, AMI meters generally, based on this record, comply with regulations in numerous other jurisdictions that are more up to date than the U.S., including the EU and 23 other countries. See Table 1 above. The British Columbia Utilities Commission explicitly reviewed the safety issues relating to thermal and non-thermal effects and approved a deployment of AMI meters last year. B.C. Utilities Commission, *In the Matter of FortisBC Inc.*, Decision relating to Certificate of Public Convenience and Necessity for the Advanced Metering Infrastructure Project (July 23, 2013).

The California Council on Science and Technology (CCST) found that AMI meters result in smaller levels of radio frequency exposure than many common household devices, such as cellular phones and microwave ovens. *California Council on Science and Technology*, Final Report, "Health Impacts of Radiofrequency Exposure from Smart Meters" at 1 (Apr. 2011). Additionally, the CCST found that to date, scientific studies have not identified negative health effects from potential non-thermal impacts of RF emissions such as those produced by smart meters. *Id.* at 4. Therefore, CCST found that not enough is currently known about potential non-thermal impacts of RF emissions to identify or recommend any additional standards beyond the FCC standards. *Id.* at 5.

The Maine Center for Disease Control (Maine CDC) issued a report on November 8, 2011, regarding health issues related to smart meters. *Maine CDC*, "Maine CDC Executive Summary of Review of Health Issues Related to Smart Meters" (Nov. 8, 2010) (Maine CDC Report). The report concluded "that studies to date give no consistent or convincing evidence of a causal relation between RF exposure in the range of frequencies and power used by smart meters and adverse health effects." *Maine CDC Report* at 3. The Maine CDC did not make a safety finding.

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." *NCI*, Cell Phones and Cancer Risk (June 18, 2012) (*available at* <http://www.cancer.gov/cancertopics/factsheet/Risk/cellphones>). 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 phone and cancer. The NCI notes that the 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. *Id.* The FDA like the NCI

focuses on animal and cell studies rather than the epidemiology that the WHO/IARC found persuasive. The FDA's statement that the majority of animal and cell studies fail to show a health problem provides some comfort with the caveat that new lines of research are being undertaken, replicated and examined, and there were credible studies to convince the WHO/IARC to reclassify RF/EMF as a potential carcinogen. Neither the NCI nor the FDA disagrees with the WHO/IARC reclassification.

Field tests of CMP's smart meters in operation tend to confirm laboratory testing and calculated RF exposure levels. Both the OPA and Exponent conducted field tests and the results of both studies support the conclusion that the exposure levels from CMP's smart meters and related equipment are below the ICNIRP, Canadian, FCC and other jurisdictions' limits. *Examiners' Report* at 38-39.

L. AMI meters are safe under average/normal/standard operating conditions

While a threat or hazard always exists at some level, the level of that threat varies depending on the conditions and exposure. Water can be toxic if consumed in sufficiently high dosage. The Complainants' expert Dr. Hardell submitted materials obtained directly from the WHO/IARC Responsible Officer that confirms in the case of RF/EMF, the toxicological principle that exposure level varies the level of threat or hazard.³⁹ In addition to the Dr. Baan email quoted above, Dr. Hardell submitted a second email from Dr. Baan, the IARC Responsible Officer for Monography 102 on RF-EMF, with his direct testimony. *Hardell Test*. Exhibit E (email from Dr. Baan at IARC dated March 30, 2012). In this email, Dr. Baan writes:

... the IARC Working Group did not want to restrict the overall evaluation to "RF-EMF from mobile phones" or to "RF-EMF from mobile phones that were used in the late 1990s" or to "RF-EMF from mobile phones that were used in the INTERPHONE study", [sic] since many other devices emit the same type of RF radiation, e.g., base-station antennas, radio/tv antennas, WiFi [sic] stations, smart meters, etc. Therefore all these fall under the same broad evaluation of "Radiofrequency Electromagnetic Fields". [sic] This is what the Working Group discussed and decided last year. Of course, because the exposure levels for many of these devices and exposure situations are so much lower than the exposure to someone who has a functioning cell

³⁹ "One of toxicology's central tenets is that the dose makes the poison. This notion was first attributed to sixteenth century philosopher-physician Paracelsus, who stated that [a]ll substances are poisonous—there is none which is not; the dose differentiates a poison from a remedy. Even water, in sufficient doses, can be toxic." *Borg-Warner Corporation v. Flores*, 232 S.W.3d 765, 770 (Tex. 2007) (internal citations and quotations omitted).

phone against her/his ear, the risk will be considerably less (although the hazard still exists).

Id.

The inclusion of RF from smart meters in the WHO/IARC reclassification is clear from this email, as is the recognition that exposure levels are "considerably less" though it cannot be said that no hazard exists. Drawing a conclusion on what threat or hazard constitutes an acceptably safe level of exposure – a credible risk of harm – is the task before this Commission.

It cannot be concluded that a zero exposure level is the only reasonable level of risk to allow for a positive safety finding. Man-made forms of RF/EMF are omnipresent in modern society from older radio/TV transmissions to modern wireless phones and Wi-Fi technologies. Based on the evidence reviewed herein and provided accommodations are made for those with medical treatment recommendations, CMP and analysis by other governmental and standards organizations in the record have established the relative safety of the AMI meters operating under typical parameters and that the meters do not constitute a credible threat to the health and safety of CMP's customers. I decline to disregard CMP's average/typical values as Mr. Friedman suggests and in fact rely upon that information to find that under the average/typical operating parameters the CMP meters meet a contemporary standard of safety. *Friedman Exceptions* at 20. If not, this Commission would establish an exposure standard of RF/EMF exposure that is between two and five orders of magnitude (roughly 100 to 100,000) times more stringent than currently in use for cellular phones and similar cordless and other household devices. There is some amount of risk to be sure ("the hazard still exists") but far less than most Americans knowingly and unknowingly experience virtually every day from devices found in the workplace, marketplace, homes and other public fora.

At an average duty cycle, CMP'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 its maximum 10% duty cycle though this standard involved averaging the exposure and ignores potential peak exposure impacts.

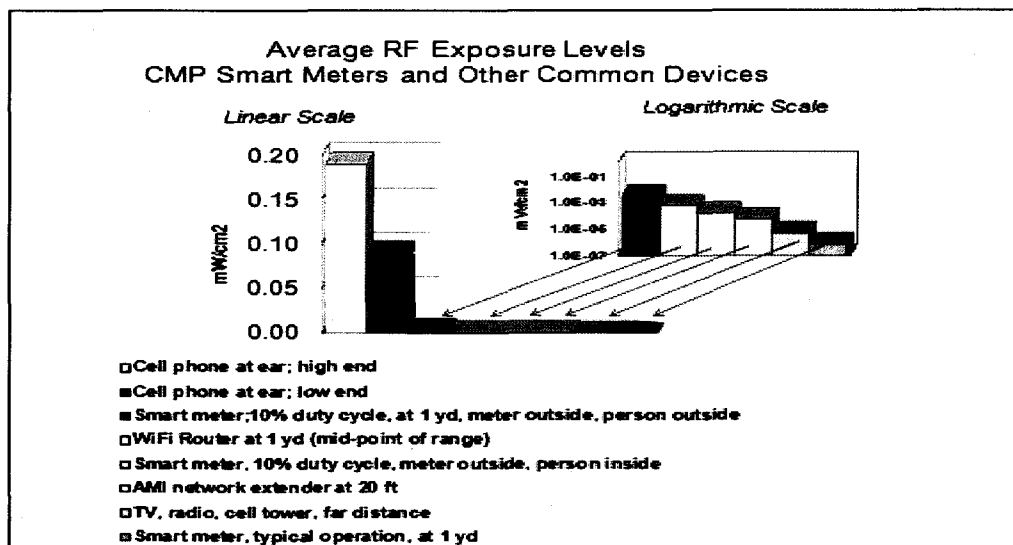
Comparisons of RF exposure levels of smart meters with other RF emitting devices are shown in Table 2 and Figure 1 below:

TABLE 2⁴⁰

RF Exposure Levels from CMP AMI and Other Common Devices
 Source: ODR-01-29 and TX Study

Device	Location	Average Exposure (mW/cm ²)	Notes
FCC limit		1.000000	
Cell phone	At ear	0.190000	High end of range
Cell phone	At ear	0.090000	Low end of range
Smart meter @ 10% duty cycle	1 yard away, meter and person outside	0.003100	Max. operating time
WiFi router	1 yard away	0.000200 to 0.001000	Constant operation
Smart meter @ 10% duty cycle	1 yard away, meter outside, person inside	0.000150	Max. operating time
AMI network device	20 feet away	0.000054	
AMI network device	60 feet away	0.000006	
TV, radio, cell towers	Typical distances away	0.000005	
Smart meter @ typical operation	1 yard away, meter outside, person inside	0.000008	

FIGURE 1⁴¹



Inside a building where people spend the majority of their time, the exposures are much less. A comparison of exposure levels in Table 2 above shows that a smart meter located outside a building under typical operation exposes a person inside a

⁴⁰ Table 2 is also found on page 19, above.

⁴¹ Figure 1 is also found on page 19, above.

building 1 yard away to an exposure level that is five to six orders of magnitude lower than a cellular phone located at a person's ear. This ignores the potential risk of peak or "burst" exposures, but does establish that when averaged as allowed by the FCC, smart meter exposures to RF in this configuration are roughly between 100,000 and 1 million times lower than a cell phone held at the ear in rough order of magnitude terms. For a repeater (AMI network device at 20 feet away), the exposure of a person is three to four orders of magnitude lower or roughly 1000 to 10,000 times lower than a person holding a cell phone at their ear. And for a repeater at 60 feet away, the exposure is four to five orders of magnitude lower or roughly 10,000 to 100,000 lower than a cell phone held at the ear. These are all averaged and not what Complainants refer to a peak (or "burst") emissions.

The differences in exposure are so great that Fig 1 must use a logarithmic scale to show the differences. The primary distinction that makes a difference is the distance, e.g., extent of exposure. "[E]ven at the maximum 10% duty cycle, CMP's smart meters meet the most restrictive governmental standards identified in Section VI of 0.01 mW/cm² provide a person was at least 17 inches from the meter during operation." *Examiners' Report* at 44. However, a hundred or more meters together operating at a maximum duty cycle may be close to the FCC standard and would exceed the lowest governmental standards, thus some reason for caution. "At the average duty cycle, CMP's meters would meet all of the referenced governmental standards even if a person stood only six inches from the meter for the full time that is operated." *Id.* However, at a maximum duty cycle, a person within 6 inches may receive a higher exposure though it is unrealistic to assume a person will be within 6 inches of a smart meter all of the time. From inside a building, the exposures would be even less. This is consistent with Exponent's testimony that CMP's smart meter mesh network and the supporting facilities are not a significant source of exposure, constituting "much less than 1%" of the FCC's exposure limit. Joint Testimony of Erdreich, Bailey, Shkolnikov, Docket No. 2010-00345 at 27 (Nov. 16, 2010). As indicated by the OPA's field measurements, however, I am not convinced the exposure is as low as Exponent calculates for multiple meters in dense urban installations.⁴² When OPA's field measurements are combined with the averaging of emissions allowed by the FCC, there is some reason for caution that burst or peak exposure are not as well studied in general nor illustrated on this record because the FCC standards allow for averaging.

M. Exponent has not proven the meters are safe under the worst case operating condition as described by Dr. Bailey

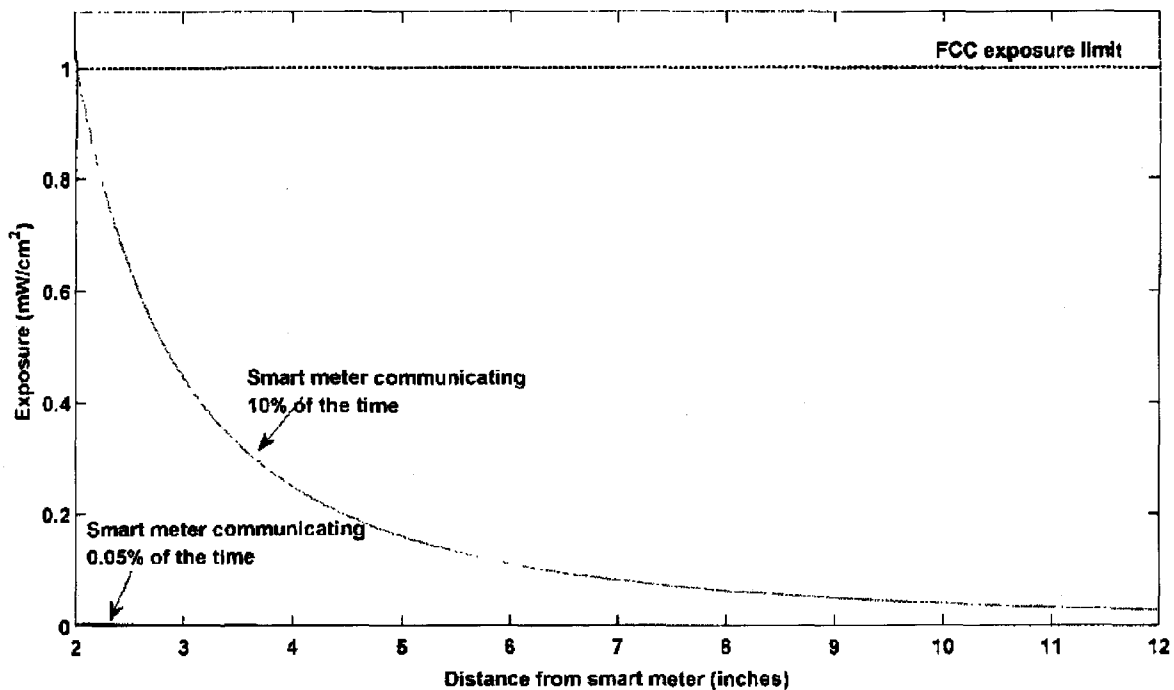
As a matter of evidence and burden of proof, Exponent has not provided sufficient measurements or assessments of levels for the worst case scenario that Dr. Bailey acknowledged on cross examination. The worst case for a bank of meters at 10% of duty cycle is also not addressed (with or without a number of descendants).

⁴² This concern is highlighted by the OPA consultant perhaps missing some or all of the peak level of transmission during the smart meters highest emissions period in the hours immediately after midnight.

CMP has not presented evidence or measurements to support full operations at 10% of the duty cycle with large banks in an urban environment. Exponent's expert identified a worst case exposure scenario, but failed to adequately address this worst case scenario. For our immediate purpose today, we are not aware that this is a current, or perhaps even likely, operational scenario for the meters as currently deployed. In any event, if CMP wishes to operate the AMI meters close to this so-called worst scenario, it should make a showing to the Commission that the RF levels are safe operated at 10% duty cycle in the largest bank configuration(s) that would occur in its service territory.

CMP's own filings illustrate the dramatic difference in exposure from a smart meter communicating 0.05% of the time and 10% of the time. Figure 2 below, presented by Exponent, shows that at 10% run time the exposure is higher and closer to the FCC exposure limit at 2 to 5 inches from a single meter than farther distances:

FIGURE 2
Power Density of a Smart Meter Decreases with Distance



Source: Joint Testimony of Erdreich, Bailey, Shkilnikov, Docket No. 2010-345, Fig. 2 at 27 (Nov. 16, 2010).

Figure 2 illustrates how the exposure in power density (in milliwatts per square centimeter) decreases substantially with distance from a single meter. Examining this figure, one can see that a single meter produces a power density just below 20 percent (0.2) of the current FCC exposure limit at 5 inches, thus ten meters would be near the

FCC limit and a dozen meters perhaps above the current FCC exposure limit at five inches if not protected by a wall and the back of the smart meter. Accordingly, a meter bank of several dozen meters in close proximity may exceed the FCC limit but evidence has not been submitted to the Commission on large installations of meter banks other than a conclusory letter from an FCC official and EPRI's study of another type of smart meter. The Commission needs clear evidence to show that the largest installations of meter banks in Maine produce RF/EMF levels that provide for safe service consistent with contemporary national and international safety standards for RF radiation.

CMP's smart meters have a peak power level of between 0.41 mW/cm^2 and 0.44 mW/cm^2 which is well below the ICNIRP, IEEE, FCC and most national limits of 1.0 mW/cm^2 – even without taking the duty cycle into account. Mr. Friedman, Ms. Wilkins and Ms. Foley-Ferguson correctly point out that those measurements and the FCC standard are based on averaged and not peak exposure. And further, the evidence on meters in multiple configurations shows that RF may approach the ICNIRP, IEEE and FCC limit. The OPA field test result of 13.4% for one area with multiple meters suggests that overall RF may be close enough to governmental standards to require additional showing on reasonable worst exposures for areas where a utility might deploy multiple banks of smart meters that may operate closer to the 10% duty cycle than today. Against the evidence in this record, the FCC's letter statement by Knapp alone is conclusory and insufficient without a further evidentiary showing. This is a sufficiency of evidence finding and not a finding of whether or not the meters are safe in dense urban environments.

For guidance to the parties should CMP decide to pursue such a showing, a well done study such as EPRI's with specific field design or in an area that CMP identifies as high-deployment may be one avenue to provide such additional evidence. The theoretical worse case of many banks of meters operated at or near a full 10% duty cycle is not an issue for CMP's current system on this record. So the safety issue is not litigated for higher exposures than CMP's average/typical exposures, nor is there evidentiary support for such measured exposures. For this reason, operation of these meters in the future at higher duty cycles near higher "worst case" exposure scenario is an issue remaining for another day and proceeding. The Commission is not aware of any such exposures in Maine, and CMP does not operate its current meters anywhere near the full 10% duty cycle in banks or alone. Although future studies, measurements and theoretical calculations may suffice, the evidence in the record of this proceeding is insufficient, on what has been described as a worst case multiple-meter operating condition, to draw any reasonable conclusion at this time.

N. Customer No-Cost Opt-Out Under Certain Conditions Represents a Low-Cost Mitigation Measure

The issues in the Opt-Out Orders are before us in this case because they were included in Mr. Friedman's complaint. The Law Court observed in its opinion that Mr. Friedman's complaint asserts that the fees for the opt-out are unjust. *Friedman*, 2012 ME 90 at ¶ 8. Further, the Law Court reversed and remanded the Commission's finding

that the Opt-Out Orders adequately addressed the safety issue. Because Mr. Freidman's complaint here raises the appropriateness of the Opt-Out Orders, the Opt-Out Orders and the Commission's lack of a safety finding are before the Commission because it is squarely raised in the 10-person complaint here.⁴³

What is appropriate, if anything, to address the testimony, statements and concerns of the Complainants on remedy given the evidence presented on safety. I observe that the description of the Complainants as "a small but vocal group tied to a nationwide crusade against RF wireless technology" is not persuasive. *CMP Brief* at 2. More than 8,000 of CMP's ratepayers appear to share Complainants' concerns. CMP's statements do not assist it in meeting its burden of proof and such labelling of concerned citizens and ratepayers is unnecessary. In fact, the concern of 8,000 to 9,000 CMP customers is evidence in itself which the Commission should weigh heavily. Likewise, one of the Complainant's bias filing against some of the Commission staff is not helpful to the extent it represents an *ad hominem* attack on Commission staff.

The testimony this Commission received in writing and in person expresses significant concerns and attributes health issues to these meters. In assessing the Complainants health concerns, it is possible that some of those complaining have a sensitivity that is clinically manifest. The Austrian Medical Association has produced a document for diagnosis and treatment of EMF-related health problems and illnesses but other medical organizations have not followed suit. *Guideline of the Austrian Medical Associate for the Diagnosis and Treatment of EMF-Related Health Problems and Illnesses (EMF syndrome)*, Consensus paper of the Austrian Medical Association's Working Group (March 3, 2012). I make no finding regarding the validity or not of EMF-syndrome and do not believe this Commission needs to do so. While the WHO has stated that studies have not shown that electromagnetic hypersensitivity (EHS) symptoms are attributable to EMF, it has also noted that those symptoms are nevertheless real and at times can be debilitating. WHO, "Electromagnetic Fields (EMF): Fact Sheets and Backgrounders (Dec. 2005) (*available at* <http://www.who.int/mediacentre/factsheets/fs296/en/index.html>). The same observations can be based on the testimony of CMP's customers, some of whom attest to symptoms that are real.

⁴³ The Court requires the Commission to examine whether it can make a finding that was absent from the original AMI approval, absent from the opt-out order arising from an earlier citizen complaint, and absent from our decision on this Complaint regarding safety. In this context of a later filed 10-person complaint, it is unclear of the extent to which the Court allows a collateral attack on a prior Commission approval of the AMI approval and the 10-person complaints resulting in the opt-out order. Further, it is unclear whether a final Commission Order can be reexamined by way of the 10-person complaint procedure.

As Dr. Hardell correctly notes:

The appropriate scientific response to inconsistencies is to perform further studies with a goal of resolving the inconsistencies with a better or more comprehensive theory. It is not appropriate to ignore or discard the inconsistent observations, unless there is reason to conclude that the experiment was poorly designed or carried out.

Data Request CMP-003-011.

In this proceeding, multiple witnesses who are Maine citizens and CMP customers have submitted testimony regarding their own experience with RF/EMF; these submissions are evidence. Appendix B to this Order is a summary of some but not all of those statements. I take the sworn testimony as representative of the concerns of the roughly 8,000 CMP customers who have opted-out. Some of these sworn statements and testimony are credible and some not. Particularly helpful is the testimony of Julie Tupper, Cynthia Krouse, Jack and Deborah Heffernan, and Joyce Flanagan, among others, who cite medical recommendations to avoid RF exposure. I note that medical opinions would be preferred from doctors or practitioners who can make treatment recommendations, but that does not mean that recommendations by non-doctors and non-practitioners have no credibility. On the other hand, there is lay testimony that symptoms exhibited become worse when a smart meter was removed and attributing those to a neighbor's smart meter, which is an example of not so credible testimony. In addition to approximately two dozen types of health impacts asserted by CMP customers submitted to the record in sworn form, the Commission is aware that over 8,000 CMP customers had adopted out for various reasons.⁴⁴

Further, the Commission has received expert evidence from treating physicians that patient symptoms are associated with AMI meters and other sources of RF in the home. *Rea Test*. The Commission has heard from an apparently well-respected former treating physician outside Maine, Dr. William J. Rea. Dr. Rea was a cardiovascular surgeon practicing in Ohio and Texas as well as an assistant professor of cardiovascular surgery at the University of Texas S.W. Medical School and Chief of Cardiovascular Surgery at Veteran's Hospital. *Id.* at 1. Dr. Rea has authored five medical textbooks and more than 150 peer reviewed research papers. *Id.* at 3.

⁴⁴ While some additional public comment is not sworn testimony, it is appropriate to recognize the public comment without considering or relying upon such statements as record evidence. The Commission has in this last session of the Legislature explained that record evidence must be sworn or affirmed but that the Commission notes public comments submitted without considering it in the evidentiary record for purposes of making decisions. The Commission has also made a clear effort in this case and others recently to explain to the public that their statements must be sworn or affirmed to be considered record evidence.

Dr. Rea has treated patients who complain of sensitivity to smart meters, and he recommends that those patients reduce exposures. Dr. Rea's clinical experience as well as his study of EMF sensitivity cause him to conclude that exposure to RF radiation does have health effects in some people. *Id.* at 3-7. We also heard evidence from a number of CMP customers who testify to the same effect. Dr. Rea specifically recommends treatment to include avoidance of smart meters for patients exhibiting such symptoms. *Id.* at 7.

It appears that some medical practitioners like Dr. Rea advise patients to avoid these exposures, perhaps without opining on medical cause. On balance, the public testimony together with the 8,000 opt-outs and testimony of Dr. Rea support a reasonable supposition that there may be symptoms for some people related to the installation of smart meters. It is a reasonable concern on the behalf of many CMP customers even if not capable of satisfying a more-probable-than-not burden of proof that smart meters cause their asserted health effects.

In addition to diagnosing medical conditions, doctors and medical practitioners clinically treat and understand symptoms. Symptoms are treated clinically even when medical science does not explain cause and effect and indeed when a condition cannot be diagnosed.⁴⁵ I am reluctant to utterly disregard evidence from many CMP ratepayers and some competent medical evidence from health care providers. As with other physician recommendations in the case of disconnection cases where customers need electricity for medical reasons, this Commission generally will accept medical opinions and recommendations of treating physicians as valid. See, e.g., Chapter 815, § 11 of the Commission Rules (physician's certification concerning a medical emergency justifying continuation of electricity service). There is no reason to vary from the Commission's practice established elsewhere in Commission rules where a treating

⁴⁵ It is a bit of a red herring to consider whether patients may or may not be able to consciously distinguish the presence of RF fields or whether electromagnetic field (EMF) hypersensitivity is a real medical condition or not. The research is mixed with some studies showing symptoms are not related to RF exposures and other studies showing 100% reproducible reactions to frequencies each individual is sensitive to. *LBNL Memo* at 4 (citations omitted), citing AAEM submission. The studies on conscious ability to distinguish RF fields are mixed, with the WHO concluding that "Well controlled double-blind studies have shown that symptoms were not correlated with EMF exposure." *LBNL Memo* at 5 (citations omitted), citing WHO, "Electromagnetic fields and public health," Electromagnetic hypersensitivity, Fact Sheet N 296, Dec. 2005 (available at <http://www.who.int/mediacentre/factsheets/fs296/en/>). There are documented disagreements as to reproducibility of studies showing people are consciously sensitive to EMF. *Id.* This proceeding, however, is not about, and no outcome hinges on, whether RF or EMF sensitivity is conscious or not and whether these sets of outcomes are valid or not. And the main impetus of Exponent's questioning whether EMF hypersensitivity is a real medical condition is to suggest that RF sensitivity cannot be conscious and thus must be psychological rather than a medical, physiochemical or genotoxic.

medical profession makes treatment recommendations. Indeed I find that it is an unreasonable utility practice for CMP to do so.

The involuntary nature of this risk is a consideration. Customers must accept meters as a condition of electrical service. Having no electrical service is not a practical or feasible decision for families and businesses in 21st century United States. This is different from one-hundred years ago when some farms in Maine had no electricity and could operate self-sufficiently. Now virtually every primary residence in Maine has electricity. These meters are now CMP's standard meter. The older analog electro-mechanical technology appears to be headed to obsolescence with utilities across the U.S. and Europe installing different versions of AMI technologies.

I do not agree with CMP's experts when they suggest that a causal relationship is necessary – essentially requiring a classification of AMI meters as a known carcinogen – for this Commission to take any measures to protect customer safety. This would shift the burden to the Complainants of proving causation of a safety risk which violates the Commission practice of putting the burden on the utility but also the governing statute which codifies an affirmative obligation on the utility to "furnish safe, reasonable and adequate facilities and service." 35-A M.R.S. § 301.

The shift of the burden to the Complainants in contravention of Section 301's affirmative utility safety obligation would be problematic because the lack of scientific proof of causality avoids any need on the Commission's part to consider any reasonable risk mitigation. This is not consistent with Commission practice in other cases. It is simply inaccurate to suggest that the lack of scientific "proof of causal relationship" means that no reasonable risk mitigation can be considered or required, particularly low or no cost risk mitigation measures.

Rather, I find in light of the WHO/IARC reclassification as a possible carcinogen and the evidence presented in this case that low-cost and no-cost risk mitigation measures are advisable. The Section 101 and Section 301 obligation on the utility and this Commission to provide safe service make it appropriate to consider low cost or no cost mitigation of risk. To be specific, it is appropriate to consider low cost or no cost mitigation of risk where there is some credible evidence of risk, but that credible evidence of a risk falls short of a likelihood of harm and short of a credible threat of harm to the health and safety of customers. Such consideration of reasonable risk mitigation is part of the safety determination under Sections 101 and 301.

Indeed, the Commission itself has adopted precisely such an approach to risk mitigation in the MPRP proceedings addressing EMF risk as discussed earlier in this opinion. In a number of abutter disputes regarding CMP's high-voltage transmission lines, the Commission considered health claims under an MPRP Stipulation that provided that "CMP will take all reasonable steps to mitigate EMF consistent with World Health Organization recommendations," which WHO recommendation is that governmental authorities mitigate high levels of EMF when mitigation is low or no cost. *MPRP Order; Curtis Order; Fournier Order.*

Neither causality nor quantified risk are pre-requisites for reasonable risk management measures. When science cannot produce a precise quantification of potential risks, costs, and damage, yet there is evidence of potential or possible harm, an agency charged with protecting safety can nonetheless move forward judiciously to determine respective obligations and rights in the context of a public interest standard. 35-A M.R.S. § 101 ("The purpose of this Title is to ensure that there is a regulatory system for public utilities in the State that is consistent with the public interest . . ."). Innovative technologies in the context of developing science, engineering and medical understanding may necessitate limited precautionary approaches to safety in light of uncertainty presented by scientific studies and new technology.

One example is a Hawaii decision that considered claims of water resource damages in the context of approvals for water withdrawal and water uses. The Hawaii Commission was operating under a similar public interest standard and found in a series of cases that a precautionary approach is advisable when the evidence even carefully weighed does not lend itself to an exact quantification of benefits and risks. The Hawaii Supreme Court upheld the Commission's action that it should estimate a sustainable yield figure including reasonable precautionary measures:

[T]he Commission may make reasonable precautionary presumptions or allowances in the public interest. The Commission may still act when public benefits and risks are not capable of exact quantification. At all times, however, the Commission should not hide behind scientific uncertainty, but should confront it as systematically and judiciously as possible—considering every offstream use in view of the cumulative potential harm to instream uses and values and the need for meaningful studies of stream flow requirements.

In the Matter of the Contested Case Hearing on the Water Use Permit Application Filed by Kukui (Molokai), Inc, 174 P.3d 320, 339 (Haw. 2007) (quoting *In re Water Use Permit Applications*, 94 Haw. 97, 159-60; 9 P.3d 409, 471 (2000)).

The Hawaii Supreme Court found that where the state of the science obscures exact calculation, it is nonetheless appropriate to engage in systematic and judicious examination of values, risks and potential harms at stake.

Therefore as part of the safety finding under Section 101 and Section 301, Commission precedent suggests it would be appropriate to mandate that CMP allow those customers with RF-related symptoms who submit documentation of a licensed doctor's or licensed medical practitioner's treatment recommendation to have such recommendation considered. This consideration would be in the same manner as the Commission does under Chapter 815 for physician certifications allowing continued electricity for medical reasons. Specifically, if limited RF/EMF exposure is recommended by a doctor or medical practitioners, I would address the pending Complaint by allowing for an AMI meter in a no transmit mode or turned off at the

ratepayer's primary residence at no cost. This would meet the statutory mandate of safe, reasonable and adequate utility service.

This new exception is limited to those with treatment recommendations from a medical practitioner allowed by law to prescribe medical treatments. This is generally licensed doctors and licensed medical practitioners and would not extend to some of the health care providers in this record such as nutritionists or acupuncturists who are not licensed to prescribe medical treatment. Thus as part of the safety finding, there is a low cost or no cost accommodations to recognize that there is some credible evidence of risk of chronic effects. I find it is not a reasonable utility practice for CMP to fail to provide sufficient risk mitigation and that CMP should provide an AMI meter with a transmitter turned off if recommended by a licensed doctor or medical practitioner. This is less cost to CMP and ratepayers to utilize the AMI-meter-with-transmitter-turned-off than an analogue meter and provide more system flexibility to turn meters on when requested.

I would therefore incorporate this reasonable low cost or no cost measure for those who submit documentation of a licensed doctor's or medical practitioner's treatment recommendation to have an AMI meter in a no transmit mode or turned off at their primary residence to qualify for a no-cost opt-out option.

Consistent with the Commission's safety mandate in Sections 101 and 301, I conclude that turning off transmitters is a reasonable medical accommodation pursuant to a doctor's or medical practitioner's treatment recommendations. The AMI meter is now CMP's standard meter and a non-transmitting option will address any medical issues identified by a treating physician or medical practitioner qualified to make such treatment recommendations.

X. OPINION OF COMMISSIONER VANNOY

A. Overview

The Legislature has charged the Commission with the responsibility of regulating the rates and operations of public utilities in Maine. As stated in 35-A M.R.S. § 101, the purpose of Commission regulation is as follows:

The purpose of this Title is to ensure that there is a regulatory system for public utilities in the State and for other entities subject to this Title that is consistent with the public interest and with other requirements of law.... The basic purpose of this regulatory system as it applies to public utilities subject to service regulation under this Title is to ensure safe, reasonable and adequate service, to assist in minimizing the cost of energy available to the State's consumers and to ensure that the rates of public utilities

subject to rate regulation are just and reasonable to customers and public utilities.

Maine law further requires that "every public utility shall furnish safe, reasonable and adequate facilities and service." 35-A M.R.S. § 301. In addition, with respect to smart grid technology implementation, the Commission has the specific statutory obligation to ensure that utilities meet applicable standards for reliability, safety and security. 35-A M.R.S. § 3143.

It is important to emphasize, however, that the Commission is neither a health nor a scientific agency, and it is clearly not the role of the Commission to resolve the scientific debate regarding potential health impacts of RF emissions. The Law Court specifically recognized the Commission's lack of technical expertise to conduct an independent investigation of these issues:

Although the Commission may not have the technical expertise necessary to conduct an independent investigation on this issue, the Commission's orders appear to recognize that other state and federal agencies do. As an administrative body authorized to conduct hearings and engage in fact-finding, the Commission is not precluded from considering the findings and conclusions of other state and federal agencies.

Friedman et al., 2012 ME 90, ¶ 11 n. 7.

Therefore, in my view, the Commission's role is to resolve the question as to whether CMP's installation and operation of wireless smart meters and the associated mesh network constitutes a safe, reasonable and adequate utility service.⁴⁶ In determining safety as the Court directed, we must answer the question as to whether the RF emissions of smart meters represent a credible risk of harm to CMP's customers. In making this determination, the Commission should review and give weight to all of the scientific and health information contained in the record before it.

In determining safety as the Law Court directed, the Commission must answer the question as to whether the RF transmissions of smart meters represent a credible threat of harm to CMP customers. However, the Commission should also review the matter in a broader context that includes an examination of the compliance of CMP's smart meters with all applicable federal or state regulations; determinations and conclusions by other state, federal, and international agencies on RF emissions

⁴⁶ In response to Mr. Friedman's Exceptions at 1-2, it should be emphasized that the Commission must find that the meters are "safe." The Commission may not balance safety against "reasonable" and "adequate" service.

generally and smart meters specifically; and the pervasiveness of RF emitting devices in the environment.

Finally, it is important to emphasize that the question of safety in this context is a public policy determination and not a scientific conclusion. The responsibility for determining "safety" lies with government agencies, not individual scientists.⁴⁷ The Legislature in its charge to the Commission to ensure "safe, reasonable and adequate" service could not have intended that the Commission ensure absolute safety with zero risk of harm; this is particularly true with regard to electricity which, by its very nature, has inherent safety risks. Safety is a relative and contextual term, 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 of the technology.

B. Legal Standards and Burden of Proof

As stated above, the question before the Commission in this proceeding is whether the installation and operation of CMP's smart meters constitutes safe, reasonable, and adequate utility facilities and service. It is CMP that has the burden to demonstrate compliance with this statutory directive. 35-A M.R.S. § 301. CMP must make this showing by a preponderance of the evidence. *Re: Request for Commission Investigation Into the Reduction of Services to the Residents of Jackman and Surrounding Communities*, Docket No. 1994-00462 (Sep. 1, 1995) (utility, in ten-person complaints, has the burden to prove by preponderance of evidence that its service is safe, reasonable and adequate).

Mr. Friedman argues that that the Commission should employ a heightened level of scrutiny in this proceeding because the issue involves the safety of Maine residents and, therefore, CMP must provide enough reliable scientific evidence to conclude with a high degree of certainty that there is no risk of harm and that safety is ensured. *Friedman Brief* at 7-8, 72. I agree that the issues before the Commission in this proceeding are of substantial importance. However, there is no basis in law for a heightened standard of proof and the utility's burden in this proceeding, as stated above, is to demonstrate by the preponderance of the evidence that the installation and operations of its smart meters constitute a safe, reasonable, and adequate utility practice. It is simply impossible for CMP or anyone else to "prove" with the degree of certainty apparently advocated by Mr. Friedman, Ms. Wilkins, and Ms. Foley-Ferguson that low-level RF emissions have no potential to cause harm under all circumstances. Science simply cannot prove a negative. Such a requirement or standard of proof logically would lead directly to prohibition of smart meter deployment with the implication that all RF emitting devices should be banned and could raise difficult questions with

⁴⁷ In this respect, I agree with the position of CMP's witnesses as expressed on Page 152 of their Rebuttal Testimony.

regard to other utility facilities and practices, for example, the operation of power lines and natural gas pipelines cannot be said have zero risk of harm to the public.⁴⁸

C. Compliance with RF Emission Standards

The evidence in this proceeding demonstrates that CMP's AMI network is in compliance with the FCC, Health Canada, and the International Commission on Non-Ionizing Radiation Protection (ICNIRP), as well as other governmental standards. As discussed in Section VI above, the FCC has the direct federal authority to promulgate rules regarding emissions and safety associated with RF devices and therefore compliance with FCC standards is of utmost importance in our review of the safety of CMP's smart meters.

1. FCC Smart Meter Certification

As discussed above, smart meters are required to be tested and evaluated in certified laboratories prior to sale to utility companies to ensure their compliance with the FCC's RF exposure limits. No party has contested the fact that, prior to CMP acquiring Trilliant's Smart Meter and Mesh system, the safety of that equipment was established through the FCC application process by Trilliant for the FCC Grant of Equipment Authorization. CMP has deployed only equipment that has been certified by the FCC for compliance with the appropriate safety levels.

For CMP's smart meters, the FCC compliance testing showed peak signal strength of between 0.41 mW/cm² and 0.45 mW/cm² at a distance of 20 cm, well below the FCC limit of 1.0 mW/cm² even without taking the duty cycle of the meters into account.⁴⁹ At a distance of 3 feet, the peak signal would be expected to have degraded to approximately 0.02 mW/cm², and at the average smart meter duty cycle, even if it all occurred in the same thirty minute period, the thirty-minute average exposure at three feet from the smart meter would be reduced to approximately 0.00005 mW/cm², approximately 20,000 times below the FCC standard. Even at the maximum duty cycle of 10%,⁵⁰ the exposure would be approximately 500 times below the FCC standard.⁵¹

⁴⁸ Several of Mr. Friedman's witness would not support an outright ban of RF emitting devices. See Section XI(G), below.

⁴⁹ Landis+Gyr FOCUS AX = 0.411842 mW/cm²; GE I-210 = 0.445379 mW/cm² (ODR-03-05, pages 8 and 49, respectively).

⁵⁰ The 10% duty cycle limitation is imposed to prevent signal interference and is not a function of human health concerns.

⁵¹ $S_{at\ 20cm} = 0.411842$, $S_{at\ 36in} = 0.411842 / (36in * 2.54cm/in / 20cm)^2 = 0.0197\ mW/cm^2$;
 $S_{at\ 20cm} = 0.445379$, $S_{at\ 36in} = 0.445379 / (36in * 2.54cm/in / 20cm)^2 = 0.0213\ mW/cm^2$;
 Average duty cycle at 4.4 seconds over 30 minutes = $4 / (30min * 60sec) = 0.24\%$. Thirty minute Avg S (at 0.24% duty cycle) = between $0.0197 * 0.0024 = 0.000048$ and

2. Field Tests of CMP Smart Meters

For purposes of this proceeding, both CMP and the OPA undertook and submitted the results of field measurement studies of the RF emissions of CMP's smart meter system as a means to confirm compliance with FCC standards. The results of both studies support the conclusion that the exposure levels from CMP's smart meters and related equipment are well below the FCC MPE limit.

CMP's study was undertaken by Exponent to validate its previously calculated RF exposure levels. The Exponent study involved measurements at three smart meter sites selected from a sample of 1,100 meters from which signaling frequency (*i.e.*, number of signals) data had been collected. Based on the signaling frequency data, Exponent selected three sites with smart meters considered to communicate at the low, typical and high points of the signaling frequency range. Exponent's measurements were all performed outside the residences at a distance of 3 feet from the smart meter. None of Exponent's measurements (recorded on a running, 30-minute average) exceeded the lower detection limit of its equipment of 0.00017 mW/cm^2 . It should also be noted, that these measurements would have included all RF sources (not just the subject meter) within the detection band of the equipment.

The OPA's study, (conducted by True North Associates and C2 Systems,) involved three smart meter sites, plus two repeater sites and one extender bridge site. Two of the three smart meter sites it chose were in densely populated parts of Portland, and the third was at a single-family home in a more rural area. Sites 1 and 2 were at three and nine smart meter banks, respectively. The two repeater sites were in densely populated parts of Portland and each had over 5,000 smart meters within a half mile distance. The extender bridge was in a commercial/residential part of Westbrook and listed as supporting over 2,000 smart meters. Unlike Exponent's configuration, the equipment measured both the maximum as well as the average exposures, based on the 6 minute average for occupational exposure. For the meter survey, the OPA's study measured two readings below the limit of reliability identified for the equipment it was using (at Sites 2 and 3) and one reading above that value (Site 1). The Site 1 reading was reported as 13.4% of the MPE for the general population. The OPA's study of the extender bridge and repeaters were reported to be less than 1% of the FCC general public MPE.

Mr. Friedman, Ms. Wilkins, and Ms. Foley-Ferguson argue that these studies do not provide any validation of FCC compliance, stating that the studies were fatally flawed for several reasons including: (1) the smart meters tested were not chosen from a statistically valid sample; (2) there is no proof that the smart meters were actually transmitting during the measurement periods; (3) the OPA study truncated measurement during the active period and may not actually have captured the most active part of that period; (4) the "worst case" smart meter configuration was not

$0.0213 \times 0.0024 = 0.000051$; Thirty minute Avg S (at 10% duty cycle) = between $0.0197 \times 0.1 = 0.00197 \text{ mW/cm}^2$ and $0.0213 \times 0.1 = 0.00213$.

measured; (5) the measurement equipment was not sensitive enough to detect the smart meter RF; (6) peak exposure was not measured; and (7) the tests do not address non-thermal exposures.

I acknowledge that Mr. Friedman, Ms. Wilkins, and Ms. Foley-Ferguson raise issues with respect to the degree of certainty provided by the studies. However, because the smart meters and related equipment were tested and determined to be compliant with FCC limits prior to being acquired and installed by CMP, the field studies, by themselves, are not determinative of FCC compliance. Notwithstanding their alleged flaws, I conclude that these field studies are informative in that they provide support for the conclusion that the RF emissions from CMP's smart meters are far below the FCC limits as the measurements indicate.

3. Other Field Studies

In addition to the CMP and OPA field studies, the record also includes a field study of smart meter RF emissions performed by the Electric Power Research Institute (EPRI) in 2010 and by the Vermont Department of Health in 2012. Both studies concluded that RF emissions from smart meters are well below regulatory limits set by the FCC.

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. *Electric Power Research Institute, "Radio-Frequency Exposure Levels from Smart Meters"* (Nov. 2010).

Although there are a number of differences between the meters used in the EPRI study and those used by CMP, the results are still useful to consider. The EPRI study meters operate at a different frequency than CMP's meters (the EPRI study used meters that operate from 902 to 928 MHz – CMP's meters operate at 2.45 GHz) and a different power level than CMP's meters (the EPRI study meters operate at 0.25 W – CMP's operate at approximately 1.0 W). However, while the power of the EPRI study meters was roughly 25% of the power of CMP's meters, in the study, the EPRI meters were operated continuously. CMP's meters are limited to operating no more than 10% of the time. In addition, because the EPRI study meters operate at a different frequency, there is a different FCC limit that applies.⁵² The FCC limit for the EPRI study

⁵² The frequency of the electromagnetic spectrum associated with the radio frequency transmission plays an important role in its biologic interaction. This is also true in considering ELF EMF. See *Data Request EXM-019-012*.

meters is the meter frequency divided by 1,500 or 0.60 – 0.62 mW/cm² (approximately 40% below the limit applicable to CMP's meters).

The Vermont Department of Health conducted a study of smart meters installed by Green Mountain Power. *Vermont Department of Health, "Radio Frequency Radiation and Health: Smart Meters"* (Feb. 10, 2012) (VDH Report). 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/cm² – 0.14 mW/cm² 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. Finally, the VDH Report examined the levels of RF during a remote connection and remote disconnection of the smart meter and found that the RF levels detected during this communication was similar to the levels detected during other normal operation.

4. Meter Banks

In response to particular concerns regarding banks of several smart meters, given the relative short duration of smart meter transmissions and necessary physical separation of meters, the FCC has indicated that even banks of units will be compliant with the FCC public exposure limits. As noted by the FCC:

Irrespective of duty cycle, 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. These conditions for compliance are required to be met before a Grant can be issued from the EA program and auditing and review of Grants is a routine function of the FCC laboratory.

Knapp Letter.

D. Adequacy of FCC Standards

Mr. Friedman, Ms. Wilkins, and Ms. Foley-Ferguson argue that the FCC's standards are not adequate on two basic grounds: 1) the FCC standards are based on average not peak exposures; and 2) the FCC standards are not designed to protect against non-thermal effects of RF emissions.

Mr. Friedman, Ms. Wilkins, and Ms. Foley-Ferguson are correct that the FCC does not set a peak limit for exposure. The exposure limits are set based on the average exposure over a certain time (6 minutes for occupational exposure and 30 minutes for the general population). However, to obtain an FCC ID, FCC compliance testing requires that the peak emissions be tested and reported. In general, the FCC

assumes that in most instances, it is not possible to have sufficient information or control regarding how long people are exposed in an "uncontrolled" environment so that averaging of exposure over the designated time period (30 minutes) is normally not appropriate. However, given the known duty cycles of smart meters, as noted in the earlier-referenced letter from Julius Knapp, for smart meters, the FCC views the relevant power as the "maximum time-averaged power that takes into account the burst nature of transmission." Nonetheless, as described in Section XI(C) above, CMP's smart meters have peak exposures between 0.41 mW/cm² and 0.44 mW/cm², well below the FCC limit of 1.0 mW/cm² even without taking the duty cycle into account.

Mr. Friedman, Ms. Wilkins, and Ms. Foley-Ferguson are also correct that the FCC standards were specifically designed to prevent harm associated with thermal effects of RF, and do not explicitly address other – *i.e.*, non-thermal – potentially harmful effects. However, on this point, I generally agree with the proposition that, with respect to non-thermal effects, there is currently insufficient scientific evidence that would support a causal relationship between RF emissions and negative health effects. For example, according to the PUC TX Study "Governmental 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." *TX PUC Study* at 62. Given this lack of scientific evidence on causal relationship, there is no basis to determine that additional standards should be applied, nor that the absence of standards related to non-thermal effects renders the FCC standards inadequate.

It should be emphasized that, even at the maximum 10% duty cycle, CMP's smart meters meet the most restrictive governmental standards identified in Section VI above of 0.01 mW/cm² provided a person was at least 17 inches from the meter during operation. At the average duty cycle, CMP's meters would meet all of the referenced governmental standards even if a person stood only six inches from the meter for the full time that it operated.⁵³ From inside a building, these exposures would be substantially less.⁵⁴

Finally, I note that the Commission is not aware that any state has acted to adopt state-specific RF emission standards for any RF emitting device, and it is unclear whether a state could take such action; arguably, states could be prevented from enacting any such standards by principles of federal preemption. In any event, I do not

⁵³ Some governmental standards use a 6 minute average rather than the FCC's 30 minute average. At 4.4 seconds per 6 minutes (or 1.22% duty cycle) and CMP's $S_{at\ 20cm} = 0.445379$, $S_{at\ 6in} = 0.445379 / (6in * 2.54cm/in / 20cm)^2 * 0.012 = 0.0093\ mW/cm^2$. At 10% duty cycle, CMP $S_{at\ 20cm} = 0.445379$, $S_{at\ 18in} = 0.445379 / (17in * 2.54cm/in / 20cm)^2 * 0.1 = 0.0096\ mW/cm^2$.

⁵⁴ See Section VII above, the EPRI study discussed in Section XI(C)(3) above, and the VDH Report discussed in Section XI(C)(3) above and Section XI(F)(4) below.

favor the creation of a state-specific standard in this case, and, further, the Commission, in my view, does not need to reach the preemption question.

E. Scientific Studies and Health Impacts

During the course of this proceeding, the parties and public witnesses put forward numerous scientific studies for admission into the evidentiary record. The Hearing Examiners admitted over one-hundred scientific studies into the record of this proceeding. The scientific studies submitted by the parties in this matter fall into several broad categories. Studies and articles were submitted regarding the "precautionary principle," industry bias in the examination of issues regarding EMF and RF, the effects of EMF and RF on animal health, and the effects of EMF and RF on human health. Most of the health related studies centered on the emissions from cellular telephones, and the vast majority of studies focused on the effects of RF emissions on animals, primarily rats and mice. Certain of these studies have shown evidence of a statistical association with potentially adverse biological effects from the RF exposure levels studied; in particular, some studies have shown evidence of a statistical association with cellular phone use and brain tumor risk. However, most studies have not shown such an association, and, as noted above, 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.

In addition, some scientific studies indicate the possibility of non-thermal biological impacts on animals from RF emissions and, possibly non-thermal biological impacts on human health from cell phone use. It should also be recognized that many individuals report a heightened sensitivity to RF emissions and attribute illness or other physical symptoms to RF exposure. Nevertheless, to date scientific studies have not identified or confirmed negative non-thermal biological impacts on human health from the RF emissions of smart meters.⁵⁵

1. The Precautionary Principle and the Hill Criteria

Generally speaking, the "precautionary principle" is an approach to scientific evidence and policy making that prescribes taking measures to forestall negative outcomes before they occur. *European Environment Agency, "Late Lessons from Early Warnings: The Precautionary Principle 1986-2000," Env. Issue Report No. 22 (2001).* Under the precautionary principle, actions to prevent such harms are usually taken "before there is strong proof of harm." *Id.* at 13.

Mr. Friedman, Ms. Wilkins, and Ms. Foley-Ferguson, while not addressing the "precautionary principle" directly in their briefs, submitted several treatises on the subject and urged the Commission to use a precautionary approach to determining permissible levels of RF emissions from smart meters. *E.g., Friedman Brief* at 54, 72;

⁵⁵ This conclusion is consistent with that of the Maine CDC and all other governmental agency reviews of health impacts from smart meters. See Section XI(F), below.

Wilkins Brief at 28, 61, 66. Based on this precautionary approach, Mr. Friedman and Ms. Wilkins state that the only appropriate remedy is the complete removal of all smart meters and related components. *Friedman Brief* at 72; *Wilkins Brief* at 73.

The OPA acknowledges that precautionary RF emission standards are an option, but states there is no conclusive scientific evidence suggesting that current FCC standards are inadequate. *OPA Brief* at 11.

CMP cites to several sources, including the Maine CDC, that suggest the precautionary approach to RF emissions from smart meters suggested by Mr. Friedman, Ms. Wilkins, and Ms. Foley-Ferguson in this matter are unnecessary and unreasonably low. *CMP Brief* at 37-38. However, CMP also states that if background levels of RF were eliminated, CMP's smart meters emissions would be twenty to forty times below the lowest suggested limit: the 2012 BioInitiative Report limit. *Id.*

I recognize the existence of the "precautionary principle" and do not disagree with the general conceptual framework that there are instances where preventative measures should be adopted even in the absence of conclusive evidence of actual harm. Based on the record in this case, however, I do not find that RF emissions from CMP's smart meters, at the specific frequency and power levels of those emissions, warrant the application of the "precautionary principle" in the form and with the remedies suggested by Mr. Friedman, Ms. Wilkins, and Ms. Foley-Ferguson – *i.e.*, the removal of all smart meters from CMP's service territory. It should be noted that the Commission's adoption of a means for customers to "opt-out" is, in essence, an application of the precautionary principle.

In parallel with the precautionary principle, there are a number of references to the application of the Bradford Hill Criteria in evaluating statistical associations in terms of causation. These evaluation criteria include such items as strength, consistency, temporality, exposure response, and physical plausibility. In essence, what Dr. Hill's criteria describe is a methodology to apply inductive reasoning to move from particulars (specific cases in an epidemiology study) to universals where the conclusion is causation, without waiting for a deductive scientific proof of causation.

In reaching the conclusion that smart meters are safe and do not pose a credible risk of harm, I have not applied a simple deductive causation standard. Even under an inductive causation standard such as Dr. Hill's criteria, the evidence does not support a finding that smart meters pose a health risk.

Evidence in the record on the Hill Criteria is centered on RF emissions from cell phones, and the primary evidence that points to statistical associations between brain tumors and cell phone use is the ongoing work and epidemiology studies of Dr. Hardell in Sweden. In examining the question of cell phone RF radiation, including studies by Dr. Hardell and others, the Health Council of the Netherlands applied the Hill Criteria – which, as mentioned above, are inductive in nature (strength, consistency, temporality, exposure response, physical plausibility) – and concluded: "Application of Bradford Hill

considerations to the available data is not supportive of a causal relation between the use of mobile phones and the occurrence of tumours in the head." *Health Council of the Netherlands, Mobile Phones and Cancer* at 119 (June 3, 2013).

Dr. Little, senior scientist at the Radiation Epidemiology Branch of the U.S. National Cancer Institute took the WHO IARC monograph reclassification of RF radiation as a class 2B carcinogen and examined the principle findings in light of actual occurrences of cancer in the U.S. Cancer Registry. Dr. Little's team concluded:

Raised risks of glioma with mobile phone use, as reported by one (Swedish) study forming the basis of the IARC's re-evaluation of mobile phone exposure, are not consistent with observed incidence trends in US population data, although the US data could be consistent with the modest excess risks in the Interphone study.

M.P. Little, et al., Mobile Phone Use and Glioma Risk: Comparison of Epidemiological Study Results with Incidence Trends in the United States, British Med. J. 2012; 344 (Jan. 3, 2012).

In sum, a review of the record evidence in this matter, and the use of the Bradford Hill Criteria, support the finding that smart meters are safe and do not pose a credible risk of harm.

2. Industry Bias

Mr. Friedman, Ms. Wilkins, and Ms. Foley-Ferguson put forward several articles discussing potential biases toward industry on the part of the scientists conducting research into RF emissions. The general conclusion of these articles is that because some science is funded by industry, or conducted by scientists who receive compensation from industry in one form or another, such science cannot be trusted as being an impartial look at the potential hazards of RF (or whatever the specific potential hazard may be). *E.g., Hardell, et al., Secret Ties to Industry and Conflicting Interests in Cancer Research, 50(3) Am. J. Indust. Med (Mar. 2006); and Hardell, et al., Letter to the Editor, 1-3 Int'l J. Epidemiology (2010).*

Mr. Friedman and Ms. Wilkins frequently argue that this bias is present in the testimony provided by CMP's expert witnesses in this proceeding, and that, accordingly, the Commission should question the reliability of those experts. *Wilkins Brief* at 5, 8, 36, 45, 63; *Friedman Brief* at 30-32. Mr. Friedman and Ms. Wilkins also argue that the scientific studies that are unfavorable to their view of the case are similarly affected by bias and the conclusions of those studies should be questioned by the Commission. *Wilkins Brief* at 34-39, 45 ("the CCST, LBNL, AGNIR, INCIRP, SCENIHR, Danish Cohort, Maine CDC, and Swedish Working Life reports should be disregarding [sic] by the PUC"); *Friedman Brief* at 17 ("the AGNIR review is neither comprehensive nor unbiased").

I do not deny that it is possible for scientific studies and the scientists who conduct them to be influenced by industry to such an extent that the conclusions reached by such studies and scientists should be either disregarded or regarded dubiously by policy makers. In this case, while Mr. Friedman, Ms. Wilkins, and Ms. Foley-Ferguson strongly suggest that such bias is present with CMP's expert witnesses and the studies that undermine Mr. Friedman's, Ms. Wilkins's, and Ms. Foley-Ferguson's positions, there is no evidence in this case that there is any actual bias at play. The mere association of an expert witness with a utility, or the fact that that a witness is compensated by a utility, does not render null and void that expert's opinion. Likewise, the fact a particular study was underwritten by industry or that a particular scientist has received compensation in one form or another from industry does not, in and of itself, render the study or scientist unreliable. Much more is needed than innuendo and assumption to prove bias. Accordingly, I decline to use bias as a reason to diminish the weight given to CMP's experts or the studies on which they rely in this matter.

3 Animal Studies

Mr. Friedman, Ms. Wilkins, and Ms. Foley-Ferguson have submitted many studies that address the impact of RF emissions, EMF, and microwaves on the specific organs, body parts, and biological systems (e.g., eye lenses and cornea, reproductive organs, brain, liver, kidney, blood, fertility, protein response, cellular stress) of several different animals (e.g., rats, mice, rabbits, insects).

While many of these studies suggest potential adverse impacts of RF emissions, EMF, or microwaves on animals at certain frequencies and power levels, none of these studies address the potential impact of RF at the frequency and power levels emitted by CMP's smart meters. Indeed, the exposure levels in the animal studies submitted by Mr. Friedman, Ms. Wilkins, and Ms. Foley-Ferguson are much greater, in many cases several orders of magnitude greater, than the RF exposure levels associated with CMP's smart meters, even emissions measured in extremely close proximity to the smart meter. At the typical proximity to smart meters for people or animals, the exposure levels are so attenuated it is impossible to conclude, based on the animal study evidence presented here, that there is a credible risk of human harm from the RF emissions of CMP's smart meters.

4. Human Studies

Mr. Friedman, Ms. Wilkins, and Ms. Foley-Ferguson have also put forward many studies that address the impact of RF emissions, EMF, and microwaves on the specific organs, body parts, and biological systems of humans. Most of the human studies involved the effects of RF emissions from cellular telephones.

Some of the studies have shown evidence of a statistical association with cell phone use and brain tumor risk, but most studies have not shown such an association. As with the animal studies, however, the RF exposure levels in the human studies are much greater—and particularly the studies involving very close proximity exposure to

cellular telephones, many orders of magnitude greater than the RF exposure levels associated with CMP's smart meters, even emissions measured in extremely close proximity to the smart meter. Moreover, even at the much higher exposures related to cellular phone use, there is no scientific consensus that this exposure is causal to harmful effects.

At the typical proximity to smart meters for people or animals, the exposure levels are so attenuated it is impossible to conclude, based on the human study evidence presented here, that there is a credible risk of harm from the RF emissions of CMP's smart meters.

5. World Health Association Classification of RF Emissions as Potentially Carcinogenic

The International Agency for Research on Cancer (IARC), an agency of the United Nations' World Health Organization (WHO), has classified radiofrequency electromagnetic fields as possibly carcinogenic to humans. IARC released its findings in 2013 in *IARC Monograph Volume 102, "Non-ionizing Radiation, Part 2: Radiofrequency Electromagnetic Fields."* The IARC concluded that there is limited evidence in both humans and animals for the carcinogenicity of radiofrequency radiation, and classified radiofrequency electromagnetic fields as "possibly carcinogenic to humans (Group 2B)."

A Class 2B classification means that RF EMF has been deemed as possibly carcinogenic to humans. RF EMF was designated as a class 2B carcinogen due to evidence associating glioma and acoustic neuroma, two types of brain cancer, with wireless telephone users. *Michigan Public Service Commission, Case No. U-17000, Report to the Commission at 10 (Jun. 29, 2012) (MPSC Report).* The WHO 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 when chance, bias or confounding cannot be ruled out with reasonable confidence.

VDH Report at 14 (quoting WHO Report).

Although the WHO's classification of RF emissions is an important consideration, its 2B classification was based on studies involving wireless phones, not smart meters. In addition, the IARC Group 2B classification is only a suggestion of a possible causal relationship with carcinogenic effects.⁵⁶ As shown in Section VII, above, while both wireless phones and smart meters emit RF, smart meters result in a substantially lower level of exposure to such emissions. Thus, and as discussed in Section XI(E)(1) above, the WHO classification does not change my conclusion that the existing science has not identified or confirmed negative health effects from RF emissions from smart meters.

6. Maine CDC

The Maine Center for Disease Control & Prevention (Maine CDC) is the agency in Maine charged with the responsibility to provide the leadership, expertise, information and tools to assure healthy conditions for all Maine people.⁵⁷ On November 8, 2010, the Maine CDC issued a report regarding health issues related to smart meters. *Maine CDC, "Maine CDC Executive Summary of Review of Health Issues Related to Smart Meters"* (Nov. 8, 2010) (Maine CDC Report). The Maine CDC reviewed materials submitted to the agency regarding smart meters, as well as health studies and assessments from government agencies and affiliated private and academic organizations including the World Health Organization, the FCC, the National Cancer Institute, the National Institutes of Health, and several Canadian and European agencies.

⁵⁶ 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. 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. *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, Vol. 102 at 30-31 (2013).*

⁵⁷ The Maine CDC website contains information regarding its role in ensuring and evaluating health issues impacting Maine citizens.
<http://www.maine.gov/dhhs/mecdc/about-us.shtml>

The Maine CDC Report concluded:

[O]ur review of these agency assessments and studies do not indicate any consistent or convincing evidence to support a concern for health effects related to the use of radiofrequency in the range of frequencies and power used by smart meters. They also do not indicate an association of EMF exposure and symptoms that have been described as electromagnetic sensitivity.

Maine CDC Report at 4.

7. Electromagnetic Hypersensitivity

Many individuals have reported a heightened sensitivity to RF and EMF and have reported numerous health impacts associated with the RF emissions from smart meters, including physical and cognitive difficulties. However, to date, there are no dependable scientific studies that confirm the existence of such hypersensitivity.

The WHO has issued documents on the topic of possible existence of individual electromagnetic hypersensitivity (EHS), a condition in which certain people seem to be especially susceptible to EMF, exhibiting a wide range of physical afflictions. The studies typically attempted to elicit symptoms under controlled laboratory conditions. The WHO concluded that the symptoms experienced by those who have been described as EHS were not correlated with EMF exposure, and therefore there was no scientific basis to link EHS symptoms to EMF exposure. WHO, "Electromagnetic Fields (EMF): Fact Sheets and Backgrounders" (*available at* <http://www.who.int/mediacentre/factsheets/fs296/en/index.html>). Accordingly, while I do not dispute that the individuals who report EHS may experience real symptoms, there is no evidence upon which to conclude that RF, and specifically RF from CMP's smart meters, is a cause of their symptoms. Moreover, as stated in Section XI(E)(6) above, the Maine CDC has concluded that studies have not indicated an association of EMF exposure and symptoms that have been described as electromagnetic sensitivity

F. Decisions of Health and Regulatory Agencies

As stated in Section XI(E)(6) above, the Maine CDC has concluded that there is no consistent or convincing evidence to support a concern for health effects related to the use of radiofrequency in the range of frequencies and power used by CMP's smart meters.⁵⁸ As the state agency in Maine with the responsibility and expertise to assess

⁵⁸ On November 5, 2012, the Commission informed the Maine CDC of this proceeding, and invited the Maine CDC to update or supplement its November 2010 report. The Maine CDC did not provide any further information in response to the Commission's November 5, 2012 letter.

public health concerns and risks, I place great weight on the Maine's CDC's assessment of the health and safety issues posed by CMP's smart meter program.⁵⁹

Moreover, I also place significant weight should be placed on the work and conclusions of other state health and regulatory agencies that have specifically considered the health impacts of utility smart meters.⁶⁰ Those assessments are discussed below.

1. California Council on Science and Technology

In April 2011, the California Council on Science and Technology (CCST) completed the CCST Report. The CCST is an independent, not-for-profit entity established by the California Legislature and is responsible for offering unbiased expert scientific advice to the state government on technology-related policy issues. The CCST compiled and assessed evidence to determine whether FCC standards for smart meters are sufficiently protective of public health and whether additional technology-specific standards are needed for smart meters to ensure adequate protection from adverse health effects. After evaluating the body of scientific literature and consultation with experts in radio and electromagnetic emissions regarding smart meters, CCST found that the FCC standards provide an adequate factor of safety against known RF health impacts of smart meters and other electronic devices in the same range of RF emissions. *CCST Report* at 7. Additionally, CCST found that there was no clear evidence that additional standards are needed because neither the scientific literature nor CCST's expert consultations support that there is a causal link between RF emissions and non-thermal health impacts. *Id.* at 8. Following the release of the CCST report, the Health Officer of the County of Santa Cruz Health Services Agency (Santa Cruz) issued a memorandum that was critical of the CCST report and concluded that there is no scientific data to determine if there is a safe RF exposure level regarding non-thermal effects. *Poki Stewart Namkung, M.D., M.P.H., Health Officer, County of*

⁵⁹ Ms. Wilkins, on page 3 of her Reply Brief, responds to CMP's reliance on the Maine CDC report by emphasizing e-mails in the record in which Dr. Dora Mills, the then Director of the Maine CDC, stated that she never said that "smart meters are safe." Such a statement is not surprising nor of any particular significance in that it is universally recognized that it is impossible to scientifically prove absolute safety. For example, the Lawrence Berkeley National Laboratory's Smart Grid Technical Advisory Project "Review of the January 13, 2012 County of Santa Cruz Health Services Agency memorandum: Health Risks Associated with Smart Meters" (April 12, 2012) states that while science can work to understand the cause of effects that are observed, it has never been able to declare anything completely safe.

⁶⁰ Ms. Wilkins, on page 3 of her post-hearing Brief, argues that the Commission should not rely on various government reports because they are not peer-reviewed. The issue of whether a document is peer-reviewed is taken into consideration when examining studies by scientists in academic journals, not when a governmental organization issues a report or a decision.

Santa Cruz Health Services Agency, "Health Risks Associated with Smart Meters" (Jan. 13, 2012). The Lawrence Berkeley National Laboratory's (LBNL) Smart Grid Technical Advisory Project examined Santa Cruz's memorandum and found its conclusion problematic. *Roger Levy and Janie Page, Smart Grid Technical Advisory Project, Lawrence Berkeley National Laboratory*, "Review of the January 13, 2012 County of Santa Cruz Health Services Agency memorandum: Health Risks Associated with Smart Meters" (April 12, 2012). LBNL questioned the Santa Cruz memo's accuracy, noting that the memo made statements that were technically and scientifically incorrect, that it did not provide a balanced review of the research, that many of the scientific sources used were not peer reviewed and that the memo relied extensively on one journal, denying itself exposure to a variety of sources. *Id.*

2. Michigan Public Service Commission

In June 2012, the Michigan Public Service Commission (MPSC) Staff issued a report after reviewing submitted comments, peer-reviewed scientific studies, and resources from other agencies. The MPSC Staff concluded that after reviewing the available literature and studies, the health risk from smart meters is insignificant. *MPSC Report* at 28. Additionally, the MPSC Staff concluded that federal health and safety regulations provide assurance that smart meters are a safe technology. *Id.*

3. Texas Public Utility Commission

In December 2012, the Staff of the Public Utility Commission of Texas reviewed the scientific research on the potential health effects of RF emitted by wireless devices including smart meters and released the PUC TX Report. The Texas Commission Staff concluded that decades of scientific research have not provided proof of biological effects from exposure to low-level RF signals from smart meters and that there was no credible evidence to suggest that smart meters emit harmful levels of RF.⁶¹ *PUC TX Report* at 62.

4. Vermont Department of Health

In February 2012, the Vermont Department of Health, in the VDH Report, concluded that the current regulatory standards for RF from smart meters are sufficient to protect public health. *VDH Report* at 1. The Department of Public Health made this conclusion after an extensive review of the available scientific literature and current FCC regulatory health protection standards.

⁶¹ In addition to assessing the RF associated with smart meters, the PUC TX Report also reviewed literature related to the ELF-EMF associated with smart meters. It referenced an Australian study that found that smart meters have lower ELF-EMF emissions than traditional analog electromechanical meters, as well as other common household appliances such as vacuum cleaners, hairdryers, power tools and fans. *PUC TX Report* at 46.

5. British Columbia Utilities Commission

In July 2013, the British Columbia Utilities Commission (BCUC) issued a decision in the Matter of FortisBC Inc., approving a Certificate of Public Convenience and Necessity (CPCN) for the AMI project of FortisBC. *In the Matter of FortisBC, Certificate of Public Convenience and Necessity for the Advanced Metering Infrastructure Project, Decision (Jul. 23, 2013) (FortisBC Decision)*. In approving the CPCN for the AMI project, the BCUC conducted an extensive public hearing process that included testimony from the public and scientific experts on smart meters.

The BCUC found that Safety Code 6, the code adopted by Health Canada that specifies Canada's radiofrequency exposure guidelines, provides an appropriate degree of precaution in setting limits on RF emissions and that the RF emissions from the smart meters are significantly below the levels set out in Safety Code 6.⁶² Safety Code 6 is similar to the FCC standards. The BCUC also stated that while some individuals may feel strongly that smart meters will have a negative impact on their health, the scientific evidence did not persuade the BCUC that there is a causal connection between RF emissions and the symptoms of electromagnetic hypersensitivity. *Id.* at 137.

6. Health Canada

In December 2011, Health Canada, the Canadian governmental department concerned with public health, concluded that exposure to RF energy from smart meters does not pose a public health risk. *Health Canada, "It's Your Health- Smart Meters"* (Dec. 2011).⁶³ Health Canada noted that unlike cellular phones, where the transmitter is close to the head and the RF energy that is absorbed is localized to one specific part of the body, the RF from smart meters is generally transmitted at a much greater distance from the body. Health Canada noted that this leads to very low RF exposure levels across the entire body, similar to exposure to AM or FM radio broadcast signals. Health Canada also found that because exposure levels were below both Safety Code 6 and international safety limits, it did not consider any precautionary measures necessary. Additionally, Health Canada found that even where multiple smart meters are together, the exposure level will still be well below Safety Code 6 due to the infrequent nature of transmission.

G. Voluntary Use of Technology

Mr. Friedman, Ms. Wilkins, and Ms. Foley-Ferguson argue that, because CMP has not met its burden to prove that smart meters are safe, they should be removed and

⁶² Health Canada is the department of the Canadian government responsible for public health. Health Canada's "Safety Code 6 (2009)" is a code that specifies Canada's radiofrequency exposure guidelines.

⁶³ <http://www.hc-sc.gc.ca/hl-vs/iyh-vsv/prod/meters-compteurs-eng.php>

replaced with analog or wired meters. However, Mr. Friedman's witnesses generally do not advocate a ban on the use of RF emitting technologies. Rather, the emphasis of Mr. Friedman's witnesses is the need for further scientific study, the need for customer information on potential safety risks, the mandatory nature of smart meters and the availability of alternatives to smart meters.

For example, Dr. Leszczynski stated:

I do not oppose the use of cell phones. Also, for any such action it is too late because this technology is omnipresent. However, the users should not be misled by statements that the current safety standards protect them from the effects of cell phone radiation. . . . Phones should have warning labels and ways of safe using cell phones, at the same time limiting exposures to radiation, should be actively promoted in the society. Smart meters is a new technology that is still not omnipresent and it would be prudent to stop implementing it at this stage. There are other methods to transfer information about the electricity usage. Smart meter radiation should be studied more before smart meters become omnipresent.

Data Request EXM-012-003.

Similarly, Mr. Morgan stated that CMP should be required to post warning signs on smart meters and notes that such warnings are required for other RF EMF emitters. *Morgan Test. at 26; Data Request EXM-004-009.*

Other of Mr. Friedman's witnesses draw a distinction between cell phones (and other RF emitting devices) and smart meters on the basis that the use of cell phones is "voluntary," while smart meter installations and exposure are "mandatory." For example, Dr. Hardell stated that "[e]xposure to RF-EMF from smart meters is without consent in contrast to the use of wireless phones that are used by the individual's own choice." *Hardell Test. at 29.* Dr. Carpenter stated that:

In the case of smart meters there is a clear and obvious alternative, which is to leave the analogue meters in place....I am not opposed to all wireless employment, but urge that steps be taken whenever possible to reduce human exposure.... In the case of wireless smart meters, there is no benefit to the home owner, only to the utility, and they should not be installed anywhere. At the very least individuals must be able to opt-out of wireless smart meters without having to pay a fee to avoid possible harm or having any fiscal liability, which many cannot afford. Individuals must be allowed to control their own environment.

*Data Request EXM-017-004.*⁶⁴

Dr. De-Kun Li stated that the "use of cell phones is a voluntary exposure . . . [g]iven that installation of smart meters is mandatory in most places, RF EMF exposure from smart meters is an 'involuntary exposure.'" *De-Kun Li Test.* at 6.

Finally, Mr. Friedman, Ms. Wilkins, and Ms. Foley-Ferguson express a concern that, even if individual customers can choose not to have a smart meter, they are still exposed to smart meter emissions from their neighbors and the mesh system.

In response, I interpret the views of Mr. Friedman's witnesses, as summarized above, as expressions of opinions about public policy based on individual assessments of the value and nature of particular technologies. Most would agree that cell phones, Wi-Fi and other commonly used RF emitting devices should not be banned, even given possible health effects, because of the usefulness and popularity of such devices. Although not highly valued by some, as described in Section IV above, wireless smart meters also provide public benefits that are relevant to the policy question. The consequence of prohibiting smart meters would be the loss of significant public benefits.

Moreover, I disagree with Mr. Friedman's witnesses with respect to their point that smart meters are fundamentally different than other devices – *e.g.*, cell phones – in terms of the voluntary nature and the availability of alternatives. Again, this assessment is a matter of public policy judgment. It is true that customers choose to use cell phones. It is also true that there is an alternative to cell phones: *i.e.*, wired phone service. In fact, there are currently non-RF alternatives to most, if not all, commonly used consumer RF emitting devices, including smart meters. CMP's customers have a choice not to have a smart meter on their premises through the opt-out program.⁶⁵ Moreover, as is true for smart meters, individuals are exposed to the RF emissions of other devices in their neighborhoods and communities, such as in most offices, libraries, retail stores, and restaurants. Finally, it is clear from the record that smart meters contribute a small fraction of the total RF to which the public is exposed in a typical environment, thus, eliminating smart meters would have a negligible effect on RF exposure levels.

⁶⁴ Dr. Hardell and Mr. Hart agree: Dr. Hardell stated that "The customer must have a choice not to have a smart meter installed with no cost." *Data Request EXM-014-002.* Mr. Hart stated: "An 'opt out' with associated fees has coercive or extortive effects on sensitive and non-sensitive populations alike and thus certainly has the effect of being a forced deployment." *Data Request EXM-011-001.*

⁶⁵ The issue of whether customers should have to pay to opt-out, in my view, is not before the Commission in this proceeding. Furthermore, the question posed to the Commission by the Law Court was whether smart meters posed a credible threat of harm to the public. The answer to this question is not dependent on the economic rate-making treatment of an opt-out provision.

XII. CONCLUSION

For all the reasons discussed above and based on the record in this proceeding, we conclude that CMP's installation and operation of its smart meter system poses no credible threat of harm to the public or CMP's customers and is therefore safe on this record, and is consistent with the Company's statutory obligation to furnish safe, reasonable and adequate facilities and service. However, we note that our decision is based on the current state of the science as reflected in that record. As referenced above, the WHO and National Research Council have identified a number of research priorities in the area of RF exposure that may yield in the future important findings regarding all RF/EMF emitting devices such as wireless smart meters. There are also inconsistencies in some areas of the research that could be resolved with further research. In the meantime, this Commission and regulators must make our best determinations based on the science available to us at the present time and the evidence in the record before us, recognizing that such science will continue to evolve.

XIII. ORDERING PARAGRAPH

In light of the foregoing, we,

ORDER

That the investigation opened regarding the complaint filed on July 29, 2011 by Ed Friedman and eighteen other persons pursuant to 35-A M.R.S. § 1302 is hereby concluded.

Dated at Hallowell, Maine this 19th Day of December, 2014

BY ORDER OF THE COMMISSION

/s/ Harry Lanphear

Harry Lanphear
Administrative Director

COMMISSIONERS VOTING FOR: Littell
 Vannoy

COMMISSIONERS NOT PARTICIPATING: Welch

NOTICE OF RIGHTS TO REVIEW OR APPEAL

5 M.R.S. § 9061 requires the Public Utilities Commission to give each party to an adjudicatory proceeding written notice of the party's rights to review or appeal of its decision made at the conclusion of the adjudicatory proceeding. The methods of review or appeal of PUC decisions at the conclusion of an adjudicatory proceeding are as follows:

1. Reconsideration of the Commission's Order may be requested under Section 11(D) of the Commission's Rules of Practice and Procedure (65-407 C.M.R.ch. 110) within **20** days of the date of the Order by filing a petition with the Commission stating the grounds upon which reconsideration is sought. Any petition not granted within **20** days from the date of filing is denied.
2. Appeal of a final decision of the Commission may be taken to the Law Court by filing, within **21** days of the date of the Order, a Notice of Appeal with the Administrative Director of the Commission, pursuant to 35-A M.R.S. § 1320(1)-(4) and the Maine Rules of Appellate Procedure.
3. Additional court review of constitutional issues or issues involving the justness or reasonableness of rates may be had by the filing of an appeal with the Law Court, pursuant to 35-A M.R.S. § 1320(5).

Note: The attachment of this Notice to a document does not indicate the Commission's view that the particular document may be subject to review or appeal. Similarly, the failure of the Commission to attach a copy of this Notice to a document does not indicate the Commission's view that the document is not subject to review or appeal.

APPENDIX A

1. Scientific Studies

CMS Item No. ¹	Description of Document
184	Part E, # 26 "Science for Precautionary Decision-Making" by Grandjean (Remainder of document excluded)
186	2007 BioInitiative Report, Section 22
187	Am. J. Pub. Health, March 2001, Vol. 91, No. 3, pp. 495-496, "200011 The Precautionary Principle and Human Health"
188	European Environment Agency, "Late Lessons from Early Warnings: The Precautionary Principle 1896-2000, Section 1 (Remainder of document excluded)
189	J. Pathophysiology 16 (2009) pp. 217-231, D. Gee "Late Lessons from Early Warnings: Towards Realism and Precaution with EMF"
191	Guideline of the Austrian Medical Association for the Diagnosis and Treatment of EMF-Related Health Problems and Illnesses
192	National Research Council, "Identification of research needs . . ."
223	J. Int'l Med. Research, 2010, 38: 729-736, Yu, et al., Non-thermal . . ."
224	2012 BioInitiative Report Section 18
225	Clin. Exp. Reprod. Med. 2012: 39(1): 1-9, Gye, et al., "Effect of electromagnetic field exposure . . ."
226	Cell Biochem. Biophys., Kesari, et al., Biophysical Evaluation of . . ."
227	J. of Andrology, Vol. 33, No. 3, Vignera, et al., Effects of the Exposure to Mobile Phones . . ."
228	ICEMS Monograph, "Non-thermal effects and mechanisms of . . ."
230	Repro. Bio. And Endocr. 2009, 7:114, Desai, Et al., "Pathophysiology of Cell Phone Radiation . . ."
232	Pathophysiology 16, (2009) 89-102, Reudiger, "Genotoxic Effects . . ."
233	J. Pathophysiology 16 (2009) pp.79-88, J.L. Phillips, et al. "Electromagnetic fields and DNA damage"
235	2012 BioInitiative Report Section 6
240	Scientific Reports 2:312, Aldad, et al., "Fetal Radiofrequency Radiation Exposure . . ."
241	2012 BioInitiative Report Section 19
242	Electromagnetic Biol. and Med, 31(1): 34-51, Gandhi, et al., "Exposure limits: the underestimation of absorbed . . ."
243	2012 BioInitiative Report (Supp.) Section 12
244	SCENIHR, "Research needs and methodology to address . . ."
245	WHO Research Agenda for Radiofrequency Fields
249	ECOLOG Institute, "Mobile Telecommunications and Health"
255	2012 BioInitiative Report Section 20
256	Occup. Med. 2003; 53:123-127, Hocking, et al., "Neurological effect of radiofrequency radiation"

¹ The CMS Item No. is the number shown in the "Item No." column in the case file for Docket No. 2011-00262 in the Commission's Case Management System (CMS). A lower case letter after the CMS Item No. indicates that there is more than one document filed under that number. The letter corresponds to the position in that item's filing list, from the top down. For example, 100c would be the third filing from the top of the list of filings in CMS Item No. 100.

258	2012 BiolInitiative Report (Supp.) Section 9
259	Lai, "Evidence for Effects on Neurology and Behavior"
260	2012 BiolInitiative Report Section 10
265	European Commission, "Possible health implications of . . ."
267	European Parliament, Written Declaration
272	Int'l. J. Neuroscience, 00, 1-7, McCarty, et al., "electromagnetic Hypersensitivity"
275	WHO, "Electromagnetic Hypersensitivity"
276	Fed. Reg., Vol. 67, No. 170, Sept. 3, 2002, Pg. 56353 (remainder of document excluded)
277	WHO Workshop on Hypersensitivity, Rapporteur's Report
287	2012 BiolInitiative Report (Supp.) Section 7
288	2007 BiolInitiative Report Section 7
290	App. Biochem Biotech., Shahin, et al., "2.45GHz Microwave Irradiation Induced . . ."
299f	Letter by Carpenter to CPUC regarding CCST study
301b	Sage Associates, Addendum, "Assessment of Radiofrequency . . ."
301c	Sage Associates, Addendum, Appendix D
301e	Sage Associates, "Assessment of Radiofrequency . . ."
304b	Electromagnetics 30:299-306, Dahmen, et al., "Blood Laboratory Findings . . ."
304d	Psychological Med. 38: 1781-1791, Landgrebe, et al., "Cognitive and neurobiological alterations. . ."
313	2012 BiolInitiative Report Section 8
315	Johansson, "Evidence for Effects on the Immune System"
323	2007 BiolInitiative Report Section 15
324	Clin. Exp. Reprod. Med. 2012; 39(1): 1-9, Gye, et al., "Effect of electromagnetic field exposure . . ."
326	Letter from EPA and EPA Comments to FCC
327	Oct 8, 1996 Letter from EPA (remainder of document excluded)
328	Letters from EPA
330	Letter from US DHHS and RF Guideline Issues
331	2012 BiolInitiative Report Section 16
332	European Parliament, "The Physiological and Environmental . . ."
333	2012 BiolInitiative Report (Supp.) Section 11
334	2012 BiolInitiative Report (Supp.) Section 12
335	Environ. Rev. 18:369-395, Levitt and Lai, "Biological Effects from . . ."
337	Intl J. Molecular Med. 12:67-72, Mild, et al., "Mobile Telephones. . ."
338	Int. J. Occup. Environ. Health 2010; 16:263-267, Khurana, et al., "Epidemiological Evidence . . ."
340a	2007 BiolInitiative Report Section 7
343a	Am. J. Indust. Med., Hardell, et al., "Secret Ties to Industry . . ."
343b	Int'l J. Epidemiology 202;1-3, Hardell, et al., Letter to the Editor
344d	Am. J. Pub. Health, Vol. 95, No. S1, Krinsky, "The Weight of Scientific Evidence . . ."
345b	Env. Health 2011, 10:59, Levis, et al., "Mobile Phones and . . ."
345b	Environ. Health 2011, 10:59, Levis, et al., "Mobile Phones and head tumors . . ."

346c	Int'l J. of Molecular Med. 12:67-72, Miid, et al., "Mobile Telephones and Cancer . . ."
347a	Int'l J. Epidemiology, Saracci and Samet, "Commentary: Call me . . ."
348c	Microwave News, Nov. 3, 2011, "The Danish Cohort Study"
352d	IEEE Trans. On Microwave Theory and Tech., Vol 57, No. 10, Adang, et al., "Results of a Long-Term . . ."
353d	Int'l J. Radiat. Biol., Vol. 86, No. 5, Panagopoulos, et al., "Bioeffects of Mobile Telephony . . ."
354c	Clinics 2009; 64(3):213-4, Narayanan, et al., "Spatial Memory . . ."
354d	Upsala J. of Med. Sci. 2010; 115:91-96, Narayanan, et al., "Effect of Radio-Frequency . . ."
355b	Int'l J. Radiat. Biol., Vol. 84, No. 6, Sinha, "Chronic Non-Thermal . . ."
356c	Biol. and Med. 4(4):202-216, Sivani and Sudarsanam, "impacts of Radio-Frequency . . ."
361	2012 BiolInitiative Report (Supp.) Section 15
363	Symposia Report, FASEB J. 7:272-281, Frey, "Electromagnetic field Interactions . . ."
365	Biochem J. 405; 559-568, Friedman, et al., "Mechanism of . . ."
379	Pathophysiology 16 (2009) 205-216, Blackman, "Cell Phone . . ."
388b	Int'l Archives Occup. Environ. Health 83:691-702, Gerner, et al., "increased Protein Synthesis . . ."
399a	Am. J. Indust. Med., Milham and Morgan, "A New Electromagnetic Exposure Metric . . ."
407	UN Rio Declaration on Environment and Development
450c	Science of the Total Environment, Genius and Lipp, "Electromagnetic Hypersensitivity . . ."
587b	Int'l J. Rad. Biol. 2013, Akar, et al., "Effects of low level electromagnetic field exposure at 2.45GHz on rat cornea"
587d	Current Eye Research 23:21-25, 2007; Balci, Devrim & Durak, "Effects of Mobile Phones on Oxidant/Antioxidant Balance . . ."
587e	Open Optham. J. 2008, 2, 102-106, Bormusov et al., "Non-Thermal Electromagnetic Radiation Damage to Lens Epithelium"
588c	Clinics 2012:67(7), AL-Damegh, "Rat testicular impairment induced by radiation from a conventional cellular telephone . . ."
588d	Computer Eng. and Intel. Sys. v4n3 2013, Bhat, "Effects of Electromagnetic Waves Emitted by Mobile Phones . . ."
588e	Mutation Res. 700 (2010), Chavadoula, Panagopoulos & Margaritis, "Comparison of biological effects between continuous . . ."
588f	Int'l J. Andrology 2010, Falzone et al., "The effect of pulsed 900-Nhz GSM mobile phone radiation on the acrosome reaction . . ."
588g	Int'l J. Andrology 2011, Gutschi et al., "Impact of cell phone use on men's semen parameters"
588j	Open Reprod. Sci. J. 2011, Hamada, Singh & Agarwal, "Cell Phones and their Impact on Male Fertility: Fact or Fiction"
588m	Toxic. And Indist. Health 27(5) 2011, Saygin et al., "Testicular apoptosis and histopathological changes induced by . . ."
589c	World J. Bio. Chem. 2012 February 26, Calabro et al., "Modulation of heat shock protein response in SH-Sy5y by mobile phone . . ."
589d	Eur. Rev. Med. Pharm. Sci 2013: 17, Ezz et al., "The effect of pulsed electromagnetic radiation from mobile phone on the levels . . ."
589e	Electromag. Bio. and Med., Early Online 1-12 2012, Fragopoulou et al., "Brain proteome response following whole body exposure . . ."
589h	Ind. J. Exp. Bio. v51 March 2013, Kesari et al., "Cell phone radiation exposure on

	brain and associated biological systems"
589i	PLOS One Aug. 2012 v7i8, Liu et al., "Exposure to 1950 MHz TD-SCDMA Electromagnetic Fields Affects the Apoptosis . . ."
589l	Eur. Rev. Med. Pharm. Sci 2011: 15, Noor et al., "Variations in amino acid neurotransmitters in some brain areas of adult male albino . . ."
590c	Electromag. Bio. Med., Sirav & Seyhan, "Effects of radiofrequency radiation exposure on blood-brain barrier permeability . . ."
590e	Coll. Anthropol. 35 (2011), Trosic et al., "Effect of Electromagnetic Radiofrequency Radiation on the Rats' Brain, Liver . . ."
590f	Biomed Environ Sci 2012 25(2), Zhao et al., "Relationship between Cognition Function and Hippocampus Structure . . ."
590g	Biomed Environ Sci 2013 26(2), Zhou et al., "Detrimental Effect of Electromagnetic Pulse Exposure on Permeability . . ."

2. Other Jurisdiction Studies and Reports

CMS Item No.	Description of Document
585	British Columbia Utility Commission Decision in the Matter of FortisBC Inc
599	Health Council of the Netherlands: "Mobile Phones and Cancer"
617	Vermont Department of Health: "Radio Frequency Radiation and Health: Smart Meters"
617	Public Utility Commission of Texas: "Health and RF EMF from Advanced Meters"
660a	California Council on Science and Technology: "Health Impacts of Radiofrequency Exposure from Smart Meters"
660b	Electric Power Research Institute: "An Investigation of Radiofrequency Fields Associated with the Itron Smart Meter"
660c	Electric Power Research Institute: "Characterization of Radiofrequency Emissions from Two Models of Wireless Smart Meters"
660d	FCC OET Bulletin 56 – Questions and Answers about Biological Effects and Potential Hazards of Radiofrequency Electromagnetic Fields
660e	FCC OET Bulletin 65 – Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields
660f	Lawrence Berkeley National Laboratory, Review of the April 12, 2012 American Academy of Environmental Medicine (AAEM) submittal to the Michigan Public Service Commission
660g	Lawrence Berkeley National Laboratory, Review of the January 13, 2012 County of Santa Cruz Health Services Agency memorandum: Health Risks Associated with Smart Meters
660h	Michigan Public Service Commission, U-17000 Report to the Commission
660i	Federal Communications Commission, Proposed Rulemaking and Notice of Inquiry in ET Docket No. 03-137 and ET Docket No. 13-84
660j	Federal Energy Regulatory Commission, Assessment of Demand Response & Advanced Metering: Staff Report
660k	IEEE Committee on Man and Radiation, Radiofrequency Safety and Utility Smart Meters, COMAR Technical Information Statement

APPENDIX B
Summaries of Citizen and Lay Testimony Submitted

I. Maine Lay Witness Testimony (All sworn testimony)

Julie Tupper – Scarborough, ME

- Claims to be EMF and RF sensitive to the point of daily discomfort in most public places
- Symptoms: heart palpitations, headache, dizziness, failing eyesight when around meters, body aches, restlessness, interrupted sleep, forgetfulness and shakiness
- Cannot work in an office due to wifi, cell phone, and smart meter proximity
- Is in pain when around iPhones and iPads, iPads make her dizzy and nauseated
- EMF from laptops causes arthritic-like joint pain
- Sensitive to cell towers, pain within ¼ mile of a tower
- Sensitive to wireless units in cars, busses, and planes, including her 2008 VW Passat, but not in her 2001 VW Beetle
- Must have manual pat-down at airport security
- No wireless in home, checks cell phone using speaker only
- Treated by Acupuncture Associates, Yarmouth; Integrated Manual Therapy Associates, Falmouth;
- Treated by Thea Fournier, Certified Nutritionist, N. Andover, MA
- All practitioners have recommended that she keep away from all devices that cause symptoms

Cynthia Krouse – North Yarmouth, ME

- Since smart meter installation has experienced decline in health
- Symptoms: headaches, fatigue, ringing in the ears, face numbness, tingling, burning of the head and face, anxiety, dizziness, nausea, weakness, muscle pain, joint pain, aching teeth
- Has developed a sensitivity to all wifi since smart meter installation
- Has developed fibromyalgia and fatigue since smart meter installation
- Is now hypersensitive and unable to work
- Has sought out and located a few doctors knowledgeable in the area of EMF/RF and all have diagnosed her with EMF Hypersensitivity and allergic reactions to electromagnetic radiation
- All doctors have recommended omitting the smart meter and avoiding wireless devices
- Currently engaged in a medical treatment protocol for EMF patients

Jack and Deborah Heffernan

- Ms. Heffernan has suffered from major health issues for past 14 years: two heart attacks, dissection of two arteries, emergency bypass surgery, ventricular tachycardia, heart transplant
- Doctors at Mass General told them that the smart meter is not without risk due to Ms. Heffernan's medical condition and impaired immune system
- Do not use cell phones except when travelling to Mass General
- After smart meter installation, Ms. Heffernan experienced dizziness and more fatigue than usual; symptoms abated after removal of smart meter

Donald Yeskoo – Wells, ME

- Wife diagnosed in 1983 with a brain tumor
- Does not want to risk any complications caused by radio waves from smart meters
- Remembers a story from many years ago about the effects of early warning radar systems on livestock

Leith Smith – Searsmont, ME

- Experienced sleep disruptions after smart meter installation, so did dog
- After removal, sleep returned to normal for both people and dog
- Aware of potential negative health effects of EMF
- Never notified health care provider

Janice Robbins – Hiram, ME

- Believes that electromagnetic radiation is dangerous to her health
- Has had cancer in the past and does not want to take any risks
- Has read articles that have convinced her of the potential risks from exposure to radio frequency radiation like smart meters
- Owns a microwave but rarely uses, uses cell phone infrequently, does not own a computer
- Suffers anxiety from the fear CMP will shut off her power for failure to pay the opt-out fee

Suzanne and Norman Renaud – Lewiston, ME

- Both Ms Renaud and daughter have an illness which affects their immune systems and has caused them to become electromagnetically sensitive
- Symptoms: insomnia, heart palpitations, extreme jitteriness, dizziness, nausea, digestive problems, bloating and swelling around rib cage, vertigo
- Symptoms result from use of computers, cell phones, speakers, x-rays, CT scans, MRIs
- Epstein-Barr virus symptoms were nonexistent before smart meter installation
- Neighbor with MS experienced an increase in symptoms after smart meter installation
- No medical treatment for RF or any medical diagnosis associated with RF

Paul Kroll – Yarmouth, ME

- Slowly over time noticed an impact from smart meter
- Symptoms: dizziness, fatigue, inability to focus, impact on sleep
- Felt relief from symptoms when smart meter removed
- Was diagnosed with a brain injury and had to retire early because of it
 - Implication is that brain injury occurred before smart meter installation
- Very sensitive to EMF, chemicals and other environmental factors
- Cannot wear hats or sunglasses due to impact on cognitive focus and endurance
- Impact from smart meter greater than other wireless devices
- Has not sought medical treatment for smart meter symptoms

Yonel Holland and Donna Delano

- Holland: Fiancé experienced headaches from April 2012 (smart meter installed in Feb. 2012) until emergency surgery to remove a glioblastoma tumor from brain
- Holland: Smart meter was three feet from fiancé's regular chair
- Delano: smart meter could have caused her death
- Not sure if smart meter was actual cause of the tumor
- No discussion with medical providers
- Headaches ended when smart meter removed
- Loss of memory, confusion, and headaches after smart meter installation

Laura Hannan – Scarborough, ME

- Concerned about smart meters, but concerns are not based on any diagnosed physical or medical conditions
- Concerned exposure to radiofrequency radiation over time could result in becoming sensitive
- Does not let daughter attend primary school that has wifi
- Chooses not to work in an office with wifi
- Experiences occasional dizziness when on a cell phone and insomnia when in the presence of wifi
- Has no wireless in home, avoids public places with wifi
- Also concerned about data security

Ray Giroux – Portland, ME

- Experienced gradually diminished energy and increase in headaches since smart meter installation
- Seldom uses computer, microwave, or cordless/cell phones
- No mention of a medical diagnosis or treatment for symptoms

Guillermo Diaz – Winterport, ME

- Wife developed acute hypersensitivity to smart meter
- Symptoms began with ringing in ears while watching television
- Eventually became unable to sleep well
- Mr. Diaz experienced ringing and pressure in both ears, had an inability to sleep for days and weeks, lost 11 pounds all after smart meter removed
- Wife has tingling and burning in both hands, hands and fingertips turn red or become covered in red blotches, suffers heart palpitations, has lost 10 pounds
- Wife also has Lyme Disease
- Symptoms became worse when smart meter was removed
- Believe symptoms caused by neighbor's meter
- Have covered entire living room with two layers of grounded aluminum and a 4'x8' sheet of corrugated metal outside the window which is also covered with grounded aluminum
- Symptoms worse during periods of clouds and rain
- Doctor did not diagnose smart meter issues
- Have received acupuncture treatments with acupuncturist recognizing the seriousness of their conditions, acupuncturist stated symptoms similar to acute toxicity
- Acupuncturist recommended minimizing time in the home and to stay out of toxic RF environment

Nancy Burns – Windham, ME

- Highly sensitive to EMF and other environmental toxins and allergens
- Had severe attack while in proximity of smart meter: vertigo, seizures, muscle paralysis, mental confusion, paranoia, headaches, back and leg pain, chest pain, blurred vision, rashes, panic attacks
- Does not use wifi or cell or cordless phones, limits use of microwave oven, TV, computer, and x-rays
- All conditions respond well to acupuncture, which she receives twice a week
- Symptoms improved after removal of smart meter

Marian Budzyna – Limerick, ME

- Licensed HAM radio operator
- Has made efforts to reduce exposure to RF for several years
- Does not use a cell phone, has no wifi in home, has taken measures to reduce dirty electricity, has remained minimally involved in HAM radio as a hobby
- Symptoms "The Hum" and physical vibrations in body, feelings of disorientation near florescent lights and operating fans, occasional heart palpitations, disturbed sleep
- Has not consulted a physician regarding EMF exposure because physicians are not trained in acoustics or radio frequencies
- Does not have a smart meter

Carol L. Brust – Brunswick, ME

- Symptoms: ringing in ears, racing pulse, severe headaches, only 3-4 hours sleep a night
- Had smart meter removed, believes symptoms caused by neighbor's smart meter
- Does not use cell phone, gets dizzy, unsteady around them
- Called doctor, doctor was unable to help, told her to move
- Has lost hearing in left ear because of smart meter
- Knows smart meters are the cause because she went to visit a friend in upstate New York and the ringing in her ears stopped

Autumn Brook – Bowdoin, ME

- Smart meters caused her to become physically sick
- Elderly family member died under unusual circumstances
- Son had rapid heartbeat and tightening in chest
- Smart meter aggravated elderly family member's Alzheimer's, died of brain bleeding caused by RF
- She developed insomnia, headaches, rapid pulse, dizziness, ringing in ears, vertigo, tingling and numbness in hands and feet after smart meter installation
- Mother-in-law developed digestive issues and insomnia, unexpectedly died of massive brain bleed
- Ms. Brook's heart condition worsened
- Has not consulted with doctor
- Symptoms reduced within two weeks of smart meter removal
- Current physician has ordered cardiac testing

Jeffrey Edelstein – E. Waterboro, ME

- Experienced adverse reaction to smart meter at location other than his home (another private residence): vertigo and tightness in throat
- Experience same symptoms when using cell phone at that location; has never experienced symptoms in other places
- Does experience headache after long cell phone calls and tingling and tightening of throat
- Does not generally use microwave ovens or cordless phones
- Has not contacted a physician regarding symptoms

Maine Public Witness Hearing Testimony (sworn)

Joyce Flanagan

- Testified that physicians have recommended that she not have a smart meter
- Stays away from as much EMF as possible

Kate MacKay

- Testified, both orally and in writing, that she opted out because she believes that smart meters are harmful to her health

Kristin Salvatore

- Testified, both orally and in writing, that she opted out due to concern about adverse health issues associated with smart meters

Norm Renaud

- Also included above in sworn Lay Witness testimony
- In oral public witness hearing testimony, described flu-like symptoms, nausea, dizziness, cognitive disabilities he ascribes to smart meters

Out-of-State Witness Testimony (Sworn)

Dafna Tachover – East Jewett, NY

- RF causes heart palpitations, chest pain, breathing difficulty, throat tightness, electric shock sensation in brain, intense pressure in head, cognitive impairment, intense neck pressure, sharp pain in ears, jumping eyes, eye pressure, tingling in feet and hands, severe weakness, memory problems, dizziness, nausea, inability to sleep
- Diagnosed with Hyperthyroidism and Electromagnetic Hyper Sensitivity
- Doctor recommended complete avoidance of exposure to EMF and RF
- Includes signed treatment recommendations by William J. Meggs, MD, PhD, FACMT

Jeromy Johnson – San Francisco, CA

- He and wife experienced headaches, disturbed sleep, fatigue, and tinnitus after SM installation
- Wife is medical doctor and holistic physician (no mention of credentials)
- Have spent thousands of dollars on alternative therapies because allopathic medicine does not know how to treat condition
- Received letter from Kaiser Permanente physician to give to utility to have SM removed
 - Mark Jung Chen MD
 - SM technology cannot be ruled out as a potential cause for symptoms
 - Not unreasonable to honor patient's request for SM removal to see if patient feels better
 - Second letter
 - Symptoms subsided after SM removal
 - Has symptoms when in homes with SMs
 - Patient appears to be part of the 3-5% of Californians who have become sensitive to wireless technologies
 - Recommends no SM in home
 - Analog meters are safest technology for patient

Cynthia Edwards – Ann Arbor, MI

- Testimony from Michigan PSC Smart Meter Case
- Testimony rejected by MPSC
- Has compromised immune and digestive system, irregular heartbeat, fatigue and sleep issues, also hypothyroidism (all not SM related)
- Doctor said it would not be safe to have SM on house
 - Doctor not identified, no medical documentation attached
- Above symptoms have worsened since SM installation

Donna Bervinchak – Lancaster, PA

- Had SM when living in CA
- SM made him unable to function or perform job
- Extreme pressure headache, shortness of breath, heart palpitations, trouble breathing, couldn't sleep, eat, or drink normally, broke out in hives, became extremely emotional, face numbness, lump in throat
- Doctor recommended he stay away from SM

Karen Strode – Ypsilanti, MI

- Testimony from Michigan PSC Smart Meter Case
- Testimony rejected by MPSC
- Diagnosed with EMF sensitivity
 - Gerald Natzke, D.O.
- Suffered from TMJ
- Lost singing voice
- Body aches
- Food allergies
- Visual impairment called vertical heterophoria that could have stemmed from being kicked in the head by a horse
- Facial tingling and burning and neck pain and throat clamping when in proximity to wifi and fluorescent lighting
- Nausea headache and malaise from smart meter
- Symptoms have been increasing in severity
- Doctors notations attached

Matthew Ben-Bassat – Dexter, MI

- Intense ringing in ears, agitated after smart meter installed
- Almost complete sleeplessness, intense insomnia, electrical shooting pains through different parts of the body, extreme nausea
- The further away from smart meters the better he feels
- Inside home a strong dull pressure at his occiput, wrapping around to the temple on left side of head, mood fluctuations
- Crushing excruciating pain in forearms when walking by banks of smart meters neck artery pulses and swells, numbness in fingers and toes, intense pain in heel and Achilles

Calista Woodbridge – Johns Island, SC

- Not long after smart meter installed had flu-like symptoms, fever, body aches, swollen and painful joints
- Spent six months lying in bed
- Rash all over torso and arms
- Headaches
- Constantly sick with colds and flu
- Developed extreme intolerance to chemicals
- Intestinal cramping, nausea, and fatigue from working on computer
- Early menopause
- Diagnosed with Toxic Encephalopathy and Neurologic EMF Related Encephalopathy
- Searing pain in brain if approached wi-fi router
- Doctor notes and prescriptions mentioned in testimony but not attached

Leslie Panzica-Glapa – Dexter, MI

- Problems sleeping after smart meter installed
- Vibrations throughout body, ringing in ears
- Diagnosed with hyperthyroidism prior to smart meter installation
- Also agitated when using cell phone

Rebecca Morr – Ann Arbor, MI

- Felt uncomfortable vibration in body after SM installed, buzzing sound in head
- Developed headaches
- Elevated blood pressure
- Symptoms did not go away when SM replaced with non-transmitting digital meter
- Lined walls with tinfoil and EMF shielding ordered off internet
- Received letter from doctor asking utility to remove SM

Cynthia Sue Larson – Berkeley, CA

- Nosebleeds after SM installation
- Also dizzy, ringing in ears, blurred vision, migraines, muscle spasms
- No mention of medical diagnosis or consultation with medical professional

Linda Kurtz – Ann Arbor, MI

- Experiences sleeplessness at parents' house in AZ
- Parents have SM
- Feels the wireless in airports
- SM in her home caused insomnia, heart palpitations, cognitive dysfunction, anxiety, head pressure, body pressure, headaches and incipient migraines, tinnitus
- No mention of diagnosis or medical consultation

Michele Hertz – Hastings on Hudson, NY

- After SM installation experienced sporadic and unusual heart palpitations, high pitched piercing sound in ear, painful pressure in ears, buzzing-pulsing sound, extreme agitation, interrupted sleep with nightmares of being attacked, increase in size of mole on back, jaw and teeth pain, pause in menstruation
- After SM removed immediate improvement, mole bled, dried up, and fell off, menstruation resumed but still not normal
- Doctor recommended not having SM and provided letters for utilities

Christine Felicijan – Orange, CA

- Mother has smart meter
- Has intense headaches, trouble sleeping and heard constant buzzing/humming sounds while at mother's house
- Also has symptoms because of SM in her neighborhood (she opts-out)
- Diagnosed with COPD and peripheral neuropathy

Richard Conrad – Waianae, HI

- Began to experience EHS symptoms 15 years ago when working with a data projector
- Experiences dizziness, skin burning, stiffness and pain, body aches, tinnitus, ADD, distorted hearing, peripheral neuropathy, chest pains, muscle cramping
- No mention of diagnosis or medical consultation

Health Care Provider Testimony –Unsworn attachments to Lay Witness testimony¹

Frank Gentile, Physical Therapist (Julie Tupper)

- Has observed that when his cell phone is on the treatment room during Ms. Tupper's therapy, she experiences an increase in muscle spasm activity and a decrease in range of motion. Removal of cell phone from treatment room resolves these symptoms

Thea Fournier, Certified Nutritionist (Julie Tupper)

- Sees clients from all over New England and the United States who have become highly reactive to environmental chemicals
- In the past 7 years has seen an increase in people who are extremely sensitive to the effects of wireless technology
- Recommended Ms. Tupper remove all wireless technology from her home, result was that joint/bone discomfort went away; symptoms returned, along with heart palpitations, nausea, interrupted sleep, eye pressure, hormonal changes, and headaches when smart meters installed in neighborhood
- Diagnosis of extreme sensitivity to EMF and microwave RF

Vicki Cohn Pollard, Acupuncturist (Bonnie and Guillermo Diaz)

- Acupuncture has ameliorated EMF related symptoms
- Treating Diazs for depleted pulse and low Qi energy
- Believes condition is directly stimulated by the high level EMFs encountered at home

¹ Because the letters, notes and recommendations of the health care providers are authenticated for purposes of this proceeding in the submitted testimony, Commissioner Littell would treat the health care provider information as supporting the credibility of the submitted and sworn lay testimony, noting, however, that the health care providers are neither medical doctors nor medical practitioners who can prescribe treatment.

Maureen Tsao, Acupuncturist (Nancy Burns)

- Ms. Burns has extreme sensitivity to the electromagnetic frequency of smart meters
- Has responded to treatment with moderate success but still sensitive and symptomatic when in proximity to smart meters
- Symptoms include dizziness, nausea, disorientation, ever, joint pain, vertigo

Out of State Medical Practitioners – Unsworn attachments to Lay Witness testimony²

William J. Meggs, MD, PhD, FACMT

- Professor, Brody School of Medicine, Greenville NC
- Licensed in NC
- Treating Physician for Dafna Tachover
 - Disability: Electromagnetic Field Sensitivity

Mark Jung Chen, MD

- The Permanente Medical Group, Inc.
- San Francisco, CA
- Treating physician for Jeromy Johnson

Toril H. Jelter, MD FAAP

- Diablo Integrated Wellness, Inc.
- Walnut Creek, CA
- Treating physician for Jeromy Johnson
 - Diagnosis: Electromagnetic Hypersensitivity

² Because the medical letters, notes and recommendations are authenticated for purposes of this proceeding in the submitted testimony, Commissioner Littell would treat the medical practitioner information as supporting the credibility of the submitted and sworn lay testimony.

Maine Public Comments (unsworn unless noted)³

Sean McCloy, M.D., MPH – Investigative Health Center of Maine (*submitted as a public comment and not as an attachment to testimony or on behalf on any particular patient)

- He sees previously healthy patients who are suffering various new medical conditions after installation of smart meters
- Majority were not aware that smart meter had been installed prior to onset of symptoms
- Recommends Commission familiarize itself with the precautionary principle

Tim Carlson

- Family having issues with insomnia, headaches, and diabetes beginning after CMP installed smart meter

Deborah Oliver (sworn)

- Does not have wifi, cordless phone, only have cell for emergencies
- Noticed loud annoying hum inside and outside house preventing them from falling asleep; continued for two weeks; began right after smart meter installation in neighborhood
- Do not have, and have not ever had, a smart meter on their house
- Body has undergone subtle changes since smart meter installation

Edward and Theresa Pimental

- Began having pain in chest after smart meter installation
- Doctor did not find any heart problem
- Had meter removed for health reasons

Clare Zall

- Son began experiencing crushing headaches and sleep disturbance when smart meter installed; Author of comment experienced same symptoms shortly after
- Doctor said to try removing the meter
- No issues since meter removal

Carolyn Mathews

- Had meter removed for health reasons

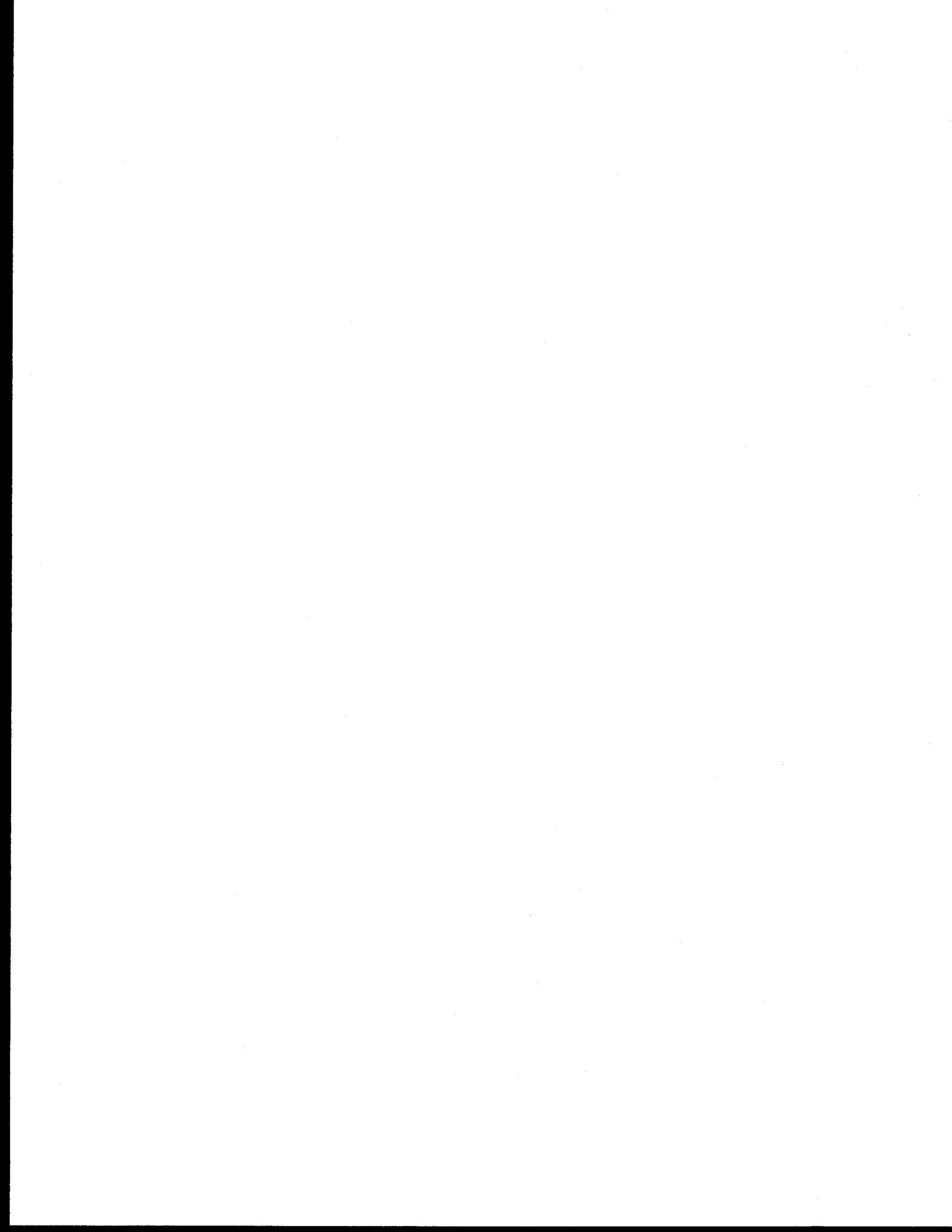
³ The Commission's consideration of unsworn public statements has been the subject of recent Legislative inquiry. Consistent with the Commission's indications to the Legislature on how the Commission handles such public statements, Commissioner Littell would note these unsworn statements while not relying upon them in any way as evidence in his decision.

Norma Moore

- Smart meter caused pain in finger joints
- Pain gone when smart meter removed



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Decision 14-12-078 December 18, 2014

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Application of Pacific Gas and Electric Company
for Approval of Modifications to its
SmartMeter™ Program and Increased Revenue
Requirements to Recover the Costs of the
Modifications (U39M).

Application 11-03-014
(Filed March 24, 2011)

And Related Matters.

Application 11-03-015
Application 11-07-020

DECISION REGARDING SMARTMETER OPT-OUT PROVISIONS

TABLE OF CONTENTS

Title	Page
DECISION REGARDING SMARTMETER OPT-OUT PROVISIONS.....	1
1. Background.....	4
2. Issues before the Commission.....	6
3. Cost and Cost Allocation	7
4. Utility Costs	8
4.1. PG&E Costs	8
4.1.1. PG&E's Proposed Costs	8
4.1.2. Intervenor Responses to PG&E and Discussion of Issues	11
4.1.3. Customer Operations Support Costs	11
4.1.4. Metering Costs.....	14
4.1.5. IT Costs	17
4.1.6. Conclusion.....	20
4.2. SCE Costs	20
4.2.1. SCE's Proposed Costs	20
4.2.2. Acquisition and Installation of Communication Network Equipment	21
4.2.3. Acquisition and Installation of Meters.....	22
4.2.4. Modification and Operation of Back Office Systems.....	22
4.2.5. Operations	23
4.2.6. Rate Design	25
4.2.7. Intervenor Responses to SCE.....	26
4.2.7.1. DRA	26
4.2.7.2. TURN	28
4.3. SDG&E Costs.....	31
4.3.1. SDG&E's Proposed Costs	31
4.3.2. Intervenor Responses	32
4.4. SoCalGas Costs	33
4.4.1. SoCalGas' Proposed Costs	33
4.4.2. Intervenor Responses to SoCalGas.....	35
4.5. Authorized Costs	37
4.6. Number of Opt-Out Options	37
4.7. Cost Responsibility and Allocation.....	38
4.8. Method for Assessing Fees.....	41
4.9. Opt-Out Fees for Single vs. Dual Commodities.....	44

TABLE OF CONTENTS
Cont'd.

Title	Page
4.10. Exit Fees.....	45
5. Remaining Issues Common to All Utilities.....	46
5.1. Recorded Costs vs. Forecast Ratemaking	46
5.2. Alternative Billing Arrangements.....	49
6. Community Opt-Out.....	51
6.1. Parties' Positions.....	52
6.2. Discussion.....	56
7. The ADA and Public Utilities Code § 453(b).....	59
7.1. Parties' Positions.....	60
7.2. ADA.....	64
7.3. Pub. Util. Code § 453 and Other State Laws.....	65
7.4. Discussion.....	65
8. Comments on Alternate Proposed Decision.....	68
9. Assignment of Proceeding.....	72
Findings of Fact.....	73
Conclusions of Law.....	75
ORDER.....	78

DECISION REGARDING SMARTMETER OPT-OUT PROVISIONS

Summary

This decision adopts fees and charges for residential customers in the service territories of Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), San Diego Gas & Electric Company (SDG&E), and Southern California Gas Company (SoCalGas) who do not wish to have a wireless smart meter.

This decision also grants authority for PG&E SCE, SDG&E, and SoCalGas to recover actual costs associated with providing the opt-out option up to the following amounts.

Pacific Gas and Electric Company	\$35.344 million
Southern California Edison Company	\$20.463 million
San Diego Gas & Electric Company	\$1.447 million
Southern California Gas Company	\$4.5 million

The utilities may therefore transfer the amounts from the memorandum accounts authorized in Decision (D.) 12-02-014, D.12-04-019, D.12-04-018 and D.14-02-019 to balancing accounts for recovery subject to restrictions specified in this decision.

In view of the utility overstatement of opt-out service revenue requirements in their initial proposals, we adopt a balancing account (*i.e.*, "recorded cost") approach to setting the revenue requirement for opt-out service until each utility's next general rate case (GRC). In their initial fee proposals for opt-out service, utilities significantly overestimated the number of opt-out customers. Since opt-out service costs are primarily based on the number of opt-out customers, the result was that utilities greatly overestimated

the costs for opt-out service. Using a balancing account treatment will protect ratepayers against a similar overestimation of uptake and revenue requirements.

We generally allocate opt-out service costs (*e.g.*, costs for manual meter reading) to residential opt-out customers, and authorize utilities to set their fees and charges for offering the opt-out service based on those costs. However, to mitigate bill impacts we set the opt-out fees and charges at the same levels we established as the interim fees as follows:

For Non-California Alternative Rates for Energy (CARE) Customers:

Initial Fee	\$75.00
Monthly Charge	\$10.00/month

For CARE Customers*:

Initial Fee	\$10.00
Monthly Charge	\$5.00/month

*Pursuant to D.12-02-014, PG&E Family Electric Rate Assistant customers will be eligible for discounts similar to CARE customers.

We limit the collection of the monthly charge from residential opt-out customers to three years from the date they choose to opt-out. The remaining portion of revenue requirements that exceed the revenues collected from the opt-out charges are to be allocated to the residential customer class as a whole.

Additionally, we direct PG&E, SCE, SDG&E and SoCalGas to revise their opt-out programs to provide for estimated monthly bills with a true-up (*i.e.*, meter read) every other month. We believe that bi-monthly meter reading will lower recurring meter reading costs, thus saving incremental costs.

We anticipate that over time, the opt-out service costs and participation levels will have stabilized there will be a need to re-assess whether the adopted fees and charges should be adjusted. Accordingly, on a going forward basis,

each utility shall include a summary of costs incurred and revenues collected associated with providing the opt-out option, starting in its next available GRC. This summary shall identify the portion of revenues collected from opt-out charges, the portion of revenue that was over or under collected, and subsequent allocation or refunds that will be made to the residential customer class. Each utility may propose adjustments to the opt-out charges and fees adopted in this decision as part of its GRC application.

This decision also determines that local governments may not collectively opt out of smart meter programs on behalf of residents in their jurisdiction. Similarly, multi-unit dwellings with homeowner and condominium associations may not collectively opt-out of smart meter programs on behalf of individual residents who are members of the association. Finally, this decision determines that charging an opt-out fee does not violate the Americans with Disabilities Act or Public Utilities Code Section 453(b).

Applications (A.) 11-03-014, A.11-03-015 and A.11-07-020 are closed.

1. Background

Between 2006 and 2010, the Commission authorized Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), San Diego Gas & Electric Company (SDG&E), and Southern California Gas Company (SoCalGas) to deploy Advanced Metering Infrastructure (AMI) systems. Among other things, the AMI program would replace analog meters with smart meters.¹

¹ See Decision (D.) 06-07-027, which authorized PG&E's AMI deployment; D.07-04-043, which authorized SDG&E's AMI deployment; D.08-09-039, which authorized SCE's AMI deployment; and D.10-04-027, which authorized SoCalGas' AMI deployment.

On February 1, 2012, the Commission issued D.12-02-014, which modified PG&E's SmartMeter Program to include an option for those residential customers who did not wish to have a wireless smart meter.² The Commission issued similar decisions for SDG&E in D.12-04-019, for SCE in D.12-04-018, and for SoCalGas in D.14-02-019.³ The Opt-Out Decisions adopted interim fees for those customers electing to opt-out of smart meter service and directed that a second phase be initiated to consider the associated cost and cost allocation issues from opting-out. The decisions also directed that the second phase consider whether the opt-out option should be extended to communities, such as to local governments or residents of apartment buildings or condominium complexes.

On April 24, 2012, the assigned Administrative Law Judge (ALJ) consolidated Applications (A.) 11-03-014, A.11-03-015, and A.11-07-020 for purposes of considering the issues identified in the Opt-Out Decisions. A prehearing conference was held on May 16, 2012. The assigned Commissioner issued a Ruling Amending Scope of Proceeding to Add a Second Phase (Scoping Memo) on June 8, 2012.

The Scoping Memo identified two issues that could be addressed through the filing of briefs - whether the Americans with Disabilities Act (ADA) or Pub. Util. Code § 453(b) limit the Commission's ability to adopt opt-out fees and whether permitting a community opt-out option would be lawful. The Scoping Memo also set evidentiary hearings to consider cost and cost allocation issues. In

² As used in this proceeding, a wireless smart meter is a digital electric or gas meter that transmits customer usage data through radio transmission.

³ This decision refers to D.12-02-014, D.12-04-018, D.12-04-019, and D.14-02-019, collectively, as the "Opt-Out Decisions."

light of the need to address the threshold issue whether a community opt-out option would be lawful, several parties subsequently requested and were granted a delay in submitting testimony on cost and cost allocation associated with a community opt-out option.⁴ Resolution of the threshold issue would determine the need for further consideration of cost issues related to a community opt-out option.

Evidentiary hearings were held November 5 - 9, 2012. Parties filed opening briefs on January 11, 2013, and reply briefs on January 25, 2013. In addition, five public participation hearings were held on December 13, 14, 17, 18, and 20, 2012. Further, the public had opportunity to comment on the opt-out option at Commission proceedings and by sending numerous letters and e-mails to the Commissioners, the Commission's Public Advisor's Office and the assigned ALJ.

Based on the Scoping Memo, the Commission had anticipated resolving the legal issues and the cost and cost allocation issues in separate decisions. We now find that it is more efficient to resolve all issues here.

2. Issues before the Commission

The Scoping Memo identified the following issues to be resolved:

1. Cost and cost allocation issues associated with offering an analog opt-out option.

⁴ Motion of the County of Marin, County of Santa Cruz, Town of Fairfax, City of Marina, City of Seaside, City of Capitola, City of Santa Cruz, Town of Ross for Clarification or, in the Alternative, of the Schedule for Filing of Intervenor Testimony Regarding Community Opt-Out Issues, filed August 27, 2012. This motion was granted by electronic ruling on September 28, 2012.

2. Whether the opt-out option should be extended to allow communities and local governments to opt out on behalf of their residents.
3. Whether the Americans with Disabilities Act or Pub. Util. Code § 453(b) limit the Commission's ability to adopt opt-out fees for those residential customers who are required to have an analog meter for medical reasons.

The Scoping Memo expressly excluded consideration of health and safety impacts of smart meters from this phase of the proceeding.⁵ Accordingly, we will not address the alleged health and safety impacts of smart meters here. Neither will we entertain renewed arguments that there should be no charges associated with opt-out programs. The items enumerated above, as further defined in the Scoping Memo, are addressed in this decision.

3. Cost and Cost Allocation

The Scoping Memo identified six sub-issues to address in determining who should bear responsibility for costs associated with opt-out service, as well as the appropriate fees and charges. They are:

- a. What are the utility costs associated with offering an analog meter opt-out option?
- b. Should more than one opt-out option be offered to customers who do not wish to have a wireless smart meter (*e.g.*, a digital, non-communicating meter)? Consideration of this issue will include determining whether different

⁵ "Phase 2 is to consider cost and cost allocation issues associated with providing an opt-out option and whether to expand the opt-out option to allow for a community opt-out option. Due to the narrow focus of this phase, it would be inappropriate to expand the scope to consider health issues." Scoping Memo at 3. Testimony and briefing concerning health and safety issues, or devoted to arguing against opt-out charges altogether, contribute nothing to this decision. We will bear this in mind when evaluating intervenor compensation claims.

fees should be assessed based on the type of opt-out meter selected by the customer and, if so, the level of these fees.

- c. Should all costs associated with the opt-out option be paid by only those customers electing the option, or should some portion of these costs be allocated to all ratepayers and/or to utility shareholders?
- d. What fees should be assessed on customers who elect the opt-out option and should the fees be assessed on a per-meter or per-location basis?
- e. Should there be different fees based on whether the customer is selecting to opt-out of a single commodity or two commodities?
- f. Should there be an "exit fee" imposed on customers who elect the opt-out option and return to a wireless smart meter?

4. Utility Costs

This section addresses each utility's cost proposals separately.⁶ Common issues across multiple utilities (*e.g.*, whether to charge "exit fees" for costs associated with exiting the opt-out program) are addressed in Sections 4.2 through 4.7 below.

4.1. PG&E Costs

4.1.1. PG&E's Proposed Costs

PG&E groups the costs it proposes to collect into the following categories: Customer Operations Support, Metering, and Information Technology (IT).⁷ PG&E proposes a total program cost of \$43.1 million for 2012 and 2013.⁸ PG&E

⁶ Aglet provided testimony on general costs and cost allocation. The Commission does recognize Aglet's participation and development of the record on the topic of Investor-owned Utilities (IOUs) costs associated with opt-outs.

⁷ Ex. PGE-1 at 1-6.

⁸ Ex. PGE-1 at 5-1.

uses these costs, less anticipated revenues from opt-out fees and charges, to derive a revenue requirement. PG&E forecasts 2012-2013 costs and revenue from residential customers and upon consolidating it in the Results of Operation calculation it estimates a revenue requirement of \$16.02 million. PG&E estimates revenues based on interim opt-out charges approved in D.12-02-014 to total \$7.74 million through December 31, 2013.⁹ PG&E proposes collecting the remaining portion of its revenue requirement, \$2.43 million in 2012 and \$5.86 million in 2013, from all its distribution customers.¹⁰

- Customer Operations Support costs for the opt-out program are \$6,450,064 in 2012 (generally based on actual costs through June 2012, forecast thereafter), and \$2,299,477 in 2013 (entirely forecast).¹¹ PG&E further subdivides the Customer Operations Support program costs into the following subcategories: Customer Communications, Customer Inquiries, Billing Operations, and Program Management. PG&E further breaks each subcategory down into capital costs and expense costs.
- Metering costs are \$8,008,183 in 2012 (generally based on actual costs through June 2012, forecast thereafter) and \$16,001,162 (entirely forecast) in 2013. PG&E further divides Metering costs into the following subcategories: Meter Purchases, Gas Module Removal, Meter Exchanges, and Meter Reading. PG&E further breaks each subcategory down into capital costs and expense costs.
- IT costs are \$8,227,168 for 2012 (generally based on actual costs through June 2012, forecast thereafter), and

⁹ Ex. PGE-1 at 5-6.

¹⁰ Ex. PGE-1 at 1-10; 6-2.

¹¹ Ex. PGE-1, at-2.

\$2,123,900 (entirely forecast) for 2013. PG&E further divides IT costs into the following subcategories: Customer Operations Support IT, Network IT, and Meter-Reading Devices. PG&E further breaks down each subcategory into capital costs and expense costs, though claimed IT costs are nearly all capital costs.¹²

From these costs, PG&E derives a Program Revenue Requirement. For 2012 through 2013, PG&E's requested Program Revenue Requirement is \$16,029,955.¹³ PG&E offsets this amount against estimated revenues from its proposed charges of \$7.4 million through December 31, 2013. PG&E proposes to record these revenues as electric energy charges and gas delivery charges.

PG&E proposes that the Commission maintain the same opt-out charges and fees that had been adopted in D.12-12-014.¹⁴ It explains that this will "keep things simple for customers, avoid confusing customers, and minimize re-billing issues."¹⁵ PG&E proposes to obtain the remaining \$8,249,246 from "all PG&E customers paying distribution costs," *e.g.*, commercial, industrial, and agricultural customers as well as residential customers.¹⁶

¹² For 2012 and 2013, respectively, PG&E asserts expenses of \$0.06 million and \$0.4 million, as against roughly \$8 million and \$2 million in asserted capital costs. Ex. PGE-1 at 4-2.

¹³ Ex. PGE-1, at 6-2. This is almost an order of magnitude less than the revenue requirement PG&E originally proposed in A.11-03-14. As described in D.12-02-014 at 4, "[PG&E's] revenue requirements to recover these costs are estimated to be \$113.4 million for the two-year period of 2012-2013." This striking drop in cost is apparently largely attributable to reduced program participation compared to what was initially forecast; 148,500 versus the most recent proposal's forecast of approximately 54,000 by 2014 (Ex. PGE-1 at 1-4).

¹⁴ Ex. PGE-1 at 5-1.

¹⁵ Ex. PGE-1 at 4-3.

¹⁶ Ex. PGE-1 at 5-5. *See also*, PGE-2, at 4-2, 4-6.

4.1.2. Intervenor Responses to PG&E and Discussion of Issues

Intervenors raise a multitude of arguments in response to PG&E's request. The Division of Ratepayer Advocates (DRA)¹⁷ and The Utility Reform Network (TURN) raised specific questions associated with PG&E's costs.

4.1.3. Customer Operations Support Costs

TURN contends that PG&E is already recovering Customer Operations Support costs by virtue of the settlement agreement in PG&E's last General Rate Case (GRC), and is in fact recovering more than it needs for costs within that category. Thus, according to TURN, PG&E does not need additional money to expand its support program to encompass the opt-out program: "Just because a cost is new to the utility, does not necessarily translate into an incremental cost that deserves incremental ratepayer funding."¹⁸

With respect to Customer Operations Support costs, TURN asserts that our inquiry should be "are the costs that form the basis of the current rates sufficient to cover the SOP costs being forecast in this proceeding?"¹⁹ In TURN's view, a cost is only incremental if it:

1. Does not fit into a pre-existing cost category, and
2. Is not funded sufficiently under a GRC settlement to cover both:
 - a) activities forecast in the last GRC, plus
 - b) costs associated with a new program.

¹⁷ The Division of Ratepayer Advocates (DRA) was renamed the Office of Ratepayer Advocates (ORA) effective September 26, 2013, pursuant to Senate Bill 96. However, for consistency and to avoid confusion, this Decision continues to refer to ORA by its former name, DRA.

¹⁸ Ex. TURN-1 at 2.

¹⁹ Ex. TURN-1 at 3.

Applying this test, TURN argues that the Commission should disallow all of PG&E's customer communications costs, except for \$796,250 in costs for a Commission-directed mailing.²⁰ TURN would also disallow \$1,239,604 for all costs for customer inquiries and enrollments. According to TURN, "PG&E has not sufficiently demonstrated the costs of Standard Operating Procedures, customer inquiry and enrollments cannot be recovered in existing rates."²¹ TURN would also disallow \$3.323 million in project management costs, which TURN characterizes as "arbitrary."²²

Moreover, according to TURN, "PG&E only classifies [customer communications] cost as incremental due to the actual volume of calls and not the nature or subject of the calls."²³ We believe that TURN misconstrues PG&E's testimony. PG&E had asserted it stopped tracking opt-out related calls because the calls dropped below a level that warranted tracking.²⁴ We read this to mean that PG&E did not want to bother tracking a *de minimis* expense, not as a concession of the broader point about how to classify costs as incremental.

We decline to adopt TURN's definition of incremental costs, as that would lead to an improper "cherry-picking" of the GRC settlement. Settlements reflect a balancing of different costs that may be only loosely related to the underlying costs for a particular cost category.²⁵ We find it as unreasonable for settling

²⁰ Ex. TURN-1 at 3-6.

²¹ Ex. TURN-1 at 5.

²² Ex. TURN-1 at 8.

²³ Ex. TURN-1 at 6 (citing Ex. PG&E-1, at 2-7.).

²⁴ See Ex. PGE-2 at 1-3.

²⁵ See D.11-05-018 ("It is generally recognized that when a utility files a GRC, expenditure estimates are based on plans and preliminary budgets developed at least two years in advance

Footnote continued on next page

parties to subsequently parse the settlement into individual cost categories, find the categories where the settlement proved unfavorable, then seek to add new (post-GRC) costs to the category to soak up any difference between the (lower than forecast) actual costs and the approved revenue requirement for the category. In this instance, we agree with PG&E that this proposal would improperly result in retroactive ratemaking, and is rejected.²⁶

In D.12-02-014, we stated that “customers electing the opt-option shall be responsible for costs associated with providing the option.”²⁷ We indicated we would approve incremental costs at a relatively granular level: *e.g.*, costs for the purchase of additional meters, trips to install analog meters, meter reading, etc. would be recoverable.²⁸ Accordingly, the proper inquiry for determining whether a cost is “associated with providing the [opt-out] option” is whether the IOUs would have undertaken the allegedly incremental activity, and so incurred the associated costs, absent the opt-out program. With respect to PG&E’s Customer Operations Support costs, we conclude that PG&E would not have incurred the claimed costs – *e.g.*, costs for mailers (which TURN does not

of when they will actually be incurred. When the utility finalizes its budget just prior to the year when costs will be incurred or adjusts the budget during the year, new programs or projects may come up, others may be cancelled, and there may be reprioritization. This process is expected and is necessary for the utility to manage its operations in a safe and reliable manner. ... However, the fact that this flexibility is available to the utility does not mean that everything the utility ends up doing is necessary or reasonable.” D.11-05-018 at 27-28, citing D.94-12-068). *See also*, PG&E Reply Brief at 5.

²⁶ PG&E Reply Brief at 5.

²⁷ This determination, however, does not mean that *only* opt-out customers should bear *all* such costs. As we stated in the next sentence in D.12-02-014, “whether some portion of these costs should also be allocated to all ratepayers or PG&E shareholders” would be considered in this phase of the proceeding. D.12-02-014 at 2.

²⁸ D.12-02-014 at 2.

challenge), customer service representative training, door hangers, and web page content supporting the opt-out program²⁹ – absent the Commission’s mandate to implement the opt-out program.

We find that the asserted project management costs of \$3.323 million are supported by the record. TURN asserts that the basis for PG&E’s asserted costs is the sum of three dollar figures from work-paper WP 2-4, Cell H10. PG&E explains in its rebuttal testimony that these costs are “a forecast composed of three components: two components are forecasts of contractor resources from two firms, while the third component is a forecast of PG&E’s employee labor.”³⁰ These staff and contractor resources “were not in place” prior to the 2011 GRC estimates being prepared, including the need to “manage the Opt-Out Program.”³¹ Accordingly, these costs are incremental and recoverable here.

4.1.4. Metering Costs

DRA asks the Commission to disallow PG&E’s “legacy meter purchase costs.”³² According to DRA, allowing PG&E to pass through the cost of purchasing analog meters for opt-out customers would “amount to double cost recovery”³³ because: (1) in D.11-05-018, the Commission authorized PG&E to accelerate depreciation of analog meter costs; (2) there are still legacy meter costs in rate-base; and, (3) “ratepayers will continue to pay for the associated costs

²⁹ Ex. PGE-1 at 2-3 - 2-10.

³⁰ Ex. PGE-2 at 1-6.

³¹ *Id.*

³² Ex. DRA-1 at 1-8.

³³ Ex. DRA-1 at 2-2.

through 2016.”³⁴ In DRA’s view, PG&E should re-use the analog meters that customers have already purchased, rather than buy new analog meters for opt-out customers. If PG&E does in fact need new analog meters, DRA contends that PG&E should get them for a better price.³⁵

DRA also asks the Commission to disallow “PG&E’s request for Wellington cost recovery relating to the DTC smart meter installation in cases where the customers ultimately do not opt out.” According to DRA, Wellington is “PG&E’s contractor to perform smart meter installations.”³⁶ Wellington is visiting “all 250,000 customers [that have asked to delay smart meter installation], not just those customers that have affirmatively opted out.”³⁷ According to DRA, “these costs should be considered part of PG&E’s smart meter deployment – especially since PG&E has been granted hundreds of millions of dollars in contingency allowances to cover potential cost overruns.”³⁸ TURN makes a similar request.³⁹ TURN points out that, “Unable-to-complete (UTC) meter installations have been a major stumbling block to completing PG&E’s SmartMeter deployment and are caused as much, if not more, by non-standard meter configurations, installation difficulties in heavy urban areas, and hard-to-reach rural areas.”⁴⁰ In sum, according to TURN, “most of those

³⁴ Ex. DRA-1 at 2-3.

³⁵ Ex. DRA-1 at 2-4.

³⁶ Ex. DRA-1 at 1-3.

³⁷ Ex. DRA-1 at 2-5.

³⁸ Ex. DRA-1 at 1-3.

³⁹ Ex. TURN-1 at 9.

⁴⁰ *Id.*

UTCs are the result of technical difficulties in completing 'non-standard' meter configurations . . . and not the [opt-out option]."⁴¹

DRA also contends that PG&E will need fewer meters than claimed, and that PG&E's installation costs are too high compared to other IOUs.⁴²

DRA has not provided any evidence that PG&E either could have refurbished analog meters for less than the cost of new meters, or could have bought new meters at a lower price. To the contrary, PG&E has demonstrated that refurbishing meters would have been prohibitively costly, and that it paid market price for new meters.⁴³ Thus, DRA's generalized concern that the price PG&E paid is too high, or that SCE, SDG&E, and SoCalGas found cheaper meter alternatives, is not a basis for disallowing PG&E's costs.⁴⁴

With respect to the UTC customer visits, the question is whether PG&E would have incurred the Wellington costs relating to UTC smart meter installations even in the absence of an opt-out program. The answer is yes. PG&E's own testimony demonstrates that PG&E representatives were making multiple trips to UTC customer locations prior to the availability of an opt-out option, and that they will continue to do so in response to issues with AMI unrelated to the opt-out program.⁴⁵ PG&E billed these trips to the SmartMeter

⁴¹ *Id.* at 9.

⁴² Ex. DRA-1 at 2-8.

⁴³ Ex. PGE-2 at 1-8.

⁴⁴ TURN recognizes the unsatisfactory nature of even *intra*-utility comparisons across proceedings in TURN's discussion of meter reading costs: "It is always more difficult for outside parties and the Commission to evaluate 'identical' utility cost recovery requests in two separate forums." Ex. TURN-1 at 16.

⁴⁵ Ex. PGE-2 at 2-2.

balancing account.⁴⁶ That some UTC customers may ultimately opt-out of the AMI program altogether does not warrant treating all UTC customer as if they are opt-outs and booking all UTC costs to the opt-out program. Accordingly, PG&E must exclude from the opt-out program revenue requirement expenses for trips to UTC customers. PG&E must continue to book costs for trips to UTC customers to the SmartMeter balancing account. TURN states that this “adjustment reduces PG&E’s total meter exchange costs from \$14.517 million to \$3.507 million.”⁴⁷ TURN states that this “adjustment reduces PG&E’s total meter exchange costs from \$14.517 million to \$3.507 million.”⁴⁸ PG&E’s direct testimony requested \$14.517 million in capital for its 2012-2013 meter exchange activities. However, in errata and rebuttal testimony PG&E lowered that forecast to \$9.718 million. To account for TURN’s adjustment, we reduce PG&E’s proposed Metering costs to \$2.358 million (that is, a reduction of \$7.36 million), using the same percentage adjustment as the \$3.507 million over \$14.517 million.

4.1.5. IT Costs

DRA proposes to reduce PG&E’s contingency costs by \$532,623.⁴⁹ DRA also challenges PG&E’s meter reading capital costs – primarily costs for hand-held meter readers – as excessive. According to DRA:

even without this opt-out proceeding before us, PG&E would be requesting some type of funding to support or extend its manual meter reading capability, and would thus would have to pay software and implementation fees. PG&E work-papers

⁴⁶ Ex. PGE-2 at 2-3.

⁴⁷ Ex. TURN-1 at 11.

⁴⁸ Ex. TURN-1 at 11.

⁴⁹ Ex. DRA-1 at 2A-1, 2A-5. Additionally, Aglet recommends elimination of a contingency altogether for all the utilities. Ex. Aglet 1 at 16.

also note, apparently supporting DRA's position, that expenses for training meter readers to use the new devices are assumed to be funded 100% by the GRA.⁵⁰

TURN also takes issue with PG&E's meter reading capital costs. TURN contends that PG&E has structured its request to fall across two proceedings so as to evade the level of review we would have applied had we reviewed the full cost of the hand-held meter reading devices in a single proceeding.⁵¹ TURN, like DRA, would have us defer consideration of the hand-held meter reader costs to PG&E's next GRC.⁵² TURN notes as well that PG&E is apparently buying 350 new handheld meter readers to support only 196 meter readers.⁵³

We find it implausible that, as PG&E asserts, PG&E needs approximately two of these \$2,895 devices per meter reader because "routine maintenance occurs at least once a year for each device and lasts two-to-three weeks per device."⁵⁴ SCE, like PG&E, proposes to purchase Itron meter reading devices, and makes no mention of needing almost two devices for each person reading meters.⁵⁵ Moreover, even if these devices require the asserted level of maintenance, PG&E has also failed to establish a connection between the asserted level of maintenance and the still-more extraordinary number of spares it has

⁵⁰ Ex. DRA-1 at 2A-7 (citing PG&E Work-papers: SmartMeter Opt-Out Phase 2 Testimony Work-papers Chapters 1-4.xls Tab WP 4-8).

⁵¹ Ex. TURN-1 at 16-17.

⁵² Ex. TURN-1 at 17.

⁵³ *Id.*

⁵⁴ Ex. PGE-2 at 3-13.

⁵⁵ We note that SCE, like PG&E, also uses hand-held meter-readers from Itron, but plans to purchase a number much closer to the number of field service representatives who will use the devices. See SCE-2, at 13. Though we are leery of comparing practices across utilities, this is at least some confirmation of the unreasonableness of PG&E's proposal.

purchased. Since analog opt-out meters will be read on a monthly basis, as explained below, and the duration of annual meter reader device maintenance is two to three weeks, it is reasonable for PG&E to set a maintenance schedule that does not interrupt its reading of opt-out meters. Therefore, we agree with TURN and DRA that the meter reader device purchase costs should be partially disallowed, and will allow recovery in this proceeding for the cost of only 200 units (one for each meter reader, and a few spares), not 340.

We note as well that many of these hand-held meter reader devices would be needed even in the absence of the opt-out option.⁵⁶ In the absence of any empirical basis for an alternative allocation, and with DRA's expressed lack of opposition, we find PG&E's proposal to split the capital costs of the new hand-held meter readers 50/50 between the Opt-Out program and current operations reasonable. This allocation should be uniform among all aspects of the capital expenses for the hand-held meter reader devices, including implementation software and training. We see no principled reason for a different allocation of software and training costs.

TURN takes issue with PG&E's proposed expenditures to automate opt-out enrollment. In TURN's view, the bulk of opt-out enrollments have already occurred, and so "it makes little sense to spend over \$2.6 million to automate the enrollment and field dispatch activities."⁵⁷ PG&E responds that "the SmartMeter Opt-Out Program will be in place for the foreseeable future. The Opt-Out Program Automated IT Project [that TURN challenges] will help prevent negative customer experiences resulting from potential clerical errors in

⁵⁶ Ex. PGE-2 at 3-14.

⁵⁷ Ex. TURN-1 at 14.

manually processing customer enrollments, billing or dispatching field orders for meter exchanges,” and will also facilitate tariff compliance. In other words, PG&E is asserting that even if the IT project is not cost-effective versus a manual alternative, it provides qualitative benefits that justify it. PG&E also alludes to dollar savings from the project,⁵⁸ though PG&E never goes so far as to assert the savings fully offset the project cost. On balance, we are persuaded that this expenditure was reasonable. As our decisions adopting advanced metering infrastructures for the utilities have demonstrated, we are generally supportive of efforts to automate meter reading functions. We are willing to accept marginally higher capital costs in order to better integrate opt-out customers into PG&E’s IT systems.

4.1.6. Conclusion

Based on the above, we are reducing the overall Program Costs requested by PG&E from \$43,110,000 to \$35,344,700, which reflects the disallowance of Meter and Hand Held Meter reading device costs. This reduction in Program Costs results in a lower revenue requirement that will be recorded in the balancing accounts.

4.2. SCE Costs

4.2.1. SCE’s Proposed Costs

SCE forecasts that 22,655 customers will participate in SCE’s opt-out program in 2012, 23,855 in 2013, and 25,055 in 2014.⁵⁹ SCE estimates the total

⁵⁸ Ex. PGE-2 at 3-7.

⁵⁹ Ex. SCE-1 at 7. These program participation numbers assume “the current program attributes and fees remain at the interim fee levels.” Should participation vary from the forecast, SCE proposes to adjust charges using balancing account treatment. *Id.*

2012-14 costs for its opt-out program at \$21.0 million.⁶⁰ SCE breaks its costs into four categories: acquisition and installation of communication network equipment, acquisition and installation of meters, modification and operation of back office systems, and operations.⁶¹

4.2.2. Acquisition and Installation of Communication Network Equipment

SCE subdivides the category of acquisition and installation of communication network equipment as follows: opt-out program impacts to the Edison SmartConnect network, acquisition of communication network equipment, and installation of communication network equipment. The acquisition and installation of communication network equipment costs reflect that SCE's SmartConnect network is a "mesh network."⁶² Mesh smart meter networks rely on each smart meter to not only capture and disseminate its own data, but to also serve as a relay for other smart meters. Removing smart meters through the opt-out program may materially impact the mesh, such that "as a result of the Opt-Out Program, SCE will require additional communicating devices, such as range extenders or cell relays."⁶³ SCE estimates, subject to various caveats,⁶⁴ that it will need to install "275 network communication

⁶⁰ Ex. SCE-1 at 10. Both the forecast number of program participants and the estimated program costs have dropped significantly from the initial numbers SCE provided in their November 2011 Technical Feasibility and Cost Information Proposal. That proposal forecast 61,000 program participants and \$64 million in costs. "Smart Meter Technological Feasibility and Cost Information Compliance Proposal," A.11-07-020, at 7-9 (November 28, 2011).

⁶¹ Ex. SCE-1 at 11.

⁶² *Id.*

⁶³ Ex. SCE-1 at 12.

⁶⁴ Ex. SCE-1 at 6-7. SCE notes repeatedly that the number and type of needed equipment will depend on how many customers opt out and on where those customers are located.

devices”⁶⁵ to mitigate opt-out program impacts on the SmartConnect network. SCE places costs from 2012 through 2014 at \$80,400 for operations and maintenance (O&M), and at \$1,402,800 for capital.⁶⁶

4.2.3. Acquisition and Installation of Meters

Acquisition and installation of meters involves procurement of legacy meters, meter testing, and meter installation. SCE estimates that “44% of its opt-out participants will” keep their legacy meter and 56% “will require the installation of an analog meter or the previous meter form.”⁶⁷ For new meters, SCE proposes to purchase and test refurbished meters.⁶⁸ SCE Field Service Representatives will install most meters; special circumstances will require “a field employee with a Meter Technician classification to install and remove.”⁶⁹ SCE estimates costs from 2012 through 2014 at \$1,123,600, all of it classed as O&M.⁷⁰

4.2.4. Modification and Operation of Back Office Systems

SCE identifies a number of IT systems associated with its opt-out program. The Network Management System (NMS) and the Meter Data Management System (MDMS) move meter data to back-office systems.⁷¹ SCE distinguishes the NMS and MDMS from what it characterizes as “the billing system and other

⁶⁵ *Id.*

⁶⁶ *Id.* at 14.

⁶⁷ *Id.*

⁶⁸ Ex. SCE-1 at 15.

⁶⁹ *Id.*

⁷⁰ *Id.*

⁷¹ Ex. SCE-1 at 16.

back-office systems.” SCE also identifies the Customer Service System, Edison SmartConnect Data Warehouse, Advantex, Meter Equipment System, and SCE.com.

SCE contends that the aforementioned systems “require changes to . . . provide opt-out customers the information and tools to achieve demand response benefits.”⁷² SCE does not explain why opt-out customers would want these “benefits,” and as SCE goes on to say the opt-out program changes assumptions about what use data customers want, which in turn “requires system modifications.”⁷³ The specific modifications SCE has in mind are broken into three phases, which we need not detail them here. SCE places costs from 2012 through 2014 at \$983,400 for O&M, and at \$4,212,700 for capital.⁷⁴

4.2.5. Operations

SCE defines “operations” as encompassing a number of sub-categories. They are: meter reading, work by the Customer Communications Organization (CCO), work by the Revenue Services Organization (RSO), and work by Customer Experience Management (CEM), as well as job skills training and project management.

SCE estimates CCO costs at \$800,000. These costs cover “training, handling customer inquiries, and associated phone costs.”

The RSO handles billing. SCE projects setup and ongoing processing of bills for opt-out customers will cost \$70,000 for 2012-2014, inclusive.

⁷² Ex. SCE-1 at 16.

⁷³ Ex. SCE-1 at 16.

⁷⁴ Ex. SCE-1 at 19.

CEM handles “customer outreach and market research for SCE’s customer-facing programs and services.”⁷⁵ As far as the opt-out program is concerned, CEM is responsible for providing customer notifications of the opt-out program, door hangers concerning meter switchouts where a meter exchange is required, and stickering of legacy meters.⁷⁶ SCE estimates these costs at \$0.5 million.⁷⁷

Notwithstanding the introduction of the opt-out program, SCE proposes to move ahead with a plan to “eliminate the meter reading job classification by 2013.”⁷⁸ “Any subsequent manual reads [will] be completed by [Field Service Representatives].”⁷⁹ According to SCE, “these costs are incremental to funding already requested from other funding sources (*i.e.*, 2012 GRC).”⁸⁰ SCE estimates costs for this cost subcategory at \$9.5 million for 2012-2014, inclusive.

SCE has folded the costs for contact of *all* customers on an “Opt-Out Delay” list, plus contact with “customer not previously on the Opt-Out Delay list” who have “not provided safe access to SCE for the installation of the Edison SmartConnect meter”⁸¹ into the revenue requirement for the opt-out program. This appears analogous to PG&E’s inclusion of costs related to UTC customers in PG&E’s revenue requirement for its opt-out program.

⁷⁵ Ex. SCE-1 at 23.

⁷⁶ Ex. SCE-1 at 23-24.

⁷⁷ Ex. SCE-1 at 24.

⁷⁸ Ex. SCE-1 at 20.

⁷⁹ Ex. SCE-1 at 20.

⁸⁰ Ex. SCE-1 at 20.

⁸¹ Ex. SCE-1 at 23.

Finally, SCE proposes to recover \$1.0 million for job skills training (divided 60/40 between capital and O&M), and \$0.6 million for program management (all allocated to O&M). SCE's total "Operations" costs from all subcategories for 2012 through 2014 (inclusive) amount to \$12,822,800 in O&M and \$363,700 in capital.

4.2.6. Rate Design

SCE, unlike PG&E, but like SDG&E and SoCalGas, proposes to allocate all identified costs for the opt-out program to program participants. SCE proposes balancing account treatment "so that no more or less than the reasonable revenue requirement associated with opting out are ultimately collected."⁸² SCE would "record the actual revenue requirement" in a balancing account. "Any resulting over-collection or under-collection will be addressed in SCE's 2015 GRC proceeding or other appropriate proceeding. . . . [T]he proposed operation of the balancing account mechanism will operate so that no more and no less than the actual revenue requirements associated with recorded opt-out activities are ultimately collected from those customers who elect to opt out."⁸³ SCE proposes that there be no further reasonableness review of opt-out program costs. Subsequent Commission review would look only at whether "all recorded costs are associated with opt-out activities."⁸⁴

⁸² Ex. SCE-1 at 6, 26.

⁸³ Ex. SCE-1 at 26.

⁸⁴ Ex. SCE-1 at 28.

SCE's proposed revenue requirement is \$20.776 million, which includes \$14.797 million in O&M expenses and \$5.979 million in capital expenditures over the 2012 through 2014 period.⁸⁵

Included in SCE's proposed revenue requirements -- in addition to the costs elaborated above - are (1) the under-collection that resulted from the below-cost interim rates we adopted in D.12-04-018,⁸⁶ and (2) "exit fees" that SCE contends reflect costs associated with transitioning opt-out customers (or the locations where they used to reside) back to smart meter service.

Based on its projected revenue requirement, SCE proposes the following set of fees:

	Initial	Monthly
Non-CARE	\$98	\$24
CARE	\$78	\$19

4.2.7. Intervenor Responses to SCE

4.2.7.1.DRA

DRA contends that "so-called exit cost, which basically restores smart meters back to a residence once the opt-out customers move, could easily be mixed up with GRC smart meter costs. It will be difficult to prevent duplicative costs."⁸⁷ Consequently, DRA objects to charging opt-out customers for the

⁸⁵ SCE's Opening Brief at 11.

⁸⁶ Ex. SCE-1 at 27 (SCE has tracked this amount in the Edison SmartConnect Opt-Out Memorandum Account (SOMA). SCE proposes to eliminate the SOMA).

⁸⁷ Ex. DRA-1 at 4-3.

underlying costs of returning back to smart meter service regardless of whether the exit fee is a separate charge or is rolled into the initial opt-out charge.⁸⁸

According to DRA, “based on SCE’s estimate, [rejecting exit fees] would result in an initial fee of \$78 instead of \$98.”⁸⁹ However, DRA does not state how SCE would recover the difference if the exit fee were not included in the initial charge.

DRA also contends that SCE “overstated field visit needs for 2012.” An erratum to SCE’s work-papers supports this position, and reduces “SCE’s initial fee costs by \$120,000, which should decrease SCE’s initial fee proposal per customer by \$5.”⁹⁰

DRA takes issue with SCE’s meter reading rate. DRA contends the rate is excessive; “more than 50% higher than SDG&E’s and double those of PG&E”⁹¹ DRA suggests that SCE reduce meter-reading frequency and share meter readers with SoCalGas to bring SCE’s (and SoCalGas’) rates down.⁹²

DRA offers a correction to the amount SCE seeks for testing exchanged meters. According to DRA, this correction reduces monthly fees “by \$0.13 per customer per month.”⁹³

DRA proposes to exclude “turn-off” costs from recovery.⁹⁴ These costs impact the monthly charge, but in DRA’s view are otherwise analogous to exit

⁸⁸ Ex. DRA-1 at 4-3.

⁸⁹ Ex. DRA-1 at 4-3 - 4-4.

⁹⁰ Ex. DRA-1 at 4-4.

⁹¹ Ex. DRA-1 at 4-5.

⁹² Ex. DRA-1 at 4-5 - 4-6.

⁹³ Ex. DRA-1 at 4-7 - 4-8.

⁹⁴ A smart meter is “turned off” when the radio transmission is disabled.

costs. DRA contends “turn-off” costs should be excluded from the opt-out revenue requirement (and hence rates) for the same reason as exit costs.⁹⁵

The combined effect of adopting DRA’s proposed disallowances would be to decrease SCE’s monthly fee “from its proposed \$24.06 per month to \$20.30 per month.”⁹⁶

With one exception, we reject DRA’s recommendations. As explained below, when a customer is served by two different utilities, the costs and complexities associated with harmonizing those activities do not appear to be worth the effort involved. Additionally, since we are setting a monthly fee of \$10 and adopting balancing account treatment to these program costs, SCE will track the costs in that account. We do agree with DRA, however, on excluding “turn-off” costs. Since this decision does not adopt an exit fee for the utilities, disallowing these costs are consistent with that determination. Should SCE determine that there are significant costs associated with turn-offs, SCE is free to request recovery in their GRC, consistent with the schedule adopted in this decision. SCE’s revenue requirement is reduced by \$312,900.

4.2.7.2.TURN

TURN takes issue first with SCE’s hand-held meter reader device costs. According to TURN, “Edison’s cost recovery request is unusually expensive on a per-unit basis and should be rejected.”⁹⁷ TURN’s argument regarding the per-unit cost rests on a misunderstanding of SCE’s proposal. TURN understood SCE’s intention to be to purchase devices only for the “23.6 incremental full-time

⁹⁵ Ex. DRA-1 at 4-8.

⁹⁶ Ex. DRA-1 at 4-8.

⁹⁷ Ex. TURN -1 at 19.

employees (FTE[s])”⁹⁸ that SCE identifies as necessary for the opt-out program. SCE clarifies in rebuttal testimony that the FTEs it identified do not translate to 23.6 new employees. Rather, the estimate reflects the total hours that all SCE Field Service Representatives⁹⁹ will devote to opt-out meter reading activities.¹⁰⁰ SCE will spread these FTE hours across all Field Service Representatives who read opt-out meters, not just 24 employees dedicated to meter reading for the opt-out program. SCE accordingly proposes to purchase hand held meter-readers for each Field Service Representative who will use them in the absence of dedicated meter-readers. We believe this approach is a reasonable one, and will not disallow these costs.

TURN further contends that “Edison already requested cost recovery for purchasing handheld meter reading devices in its 2012 [GRC].”¹⁰¹ According to TURN, “Edison has not demonstrated that its costs for hiring [23.6] meter reading FTEs is not already contained in its 2013 [GRC] requests.”¹⁰² This argument, like that relating to the cost of the meter reading devices, seems predicated on the expectation that SCE would hire dedicated meter readers for the opt-out program. TURN compared the efficiency of meter readers that SCE was allegedly planning to retain absent the opt-out program with the meter readers that TURN understood SCE was planning to hire for the opt-out program. TURN then projected the more efficient meter reading rate of the

⁹⁸ Ex. TURN-1 at 20.

⁹⁹ As previously discussed, SCE is eliminating the meter-reader job category. Field Service Representatives throughout SCE’s service territory are taking over meter-reading tasks.

¹⁰⁰ Ex. SCE-2 at 13.

¹⁰¹ Ex. TURN-1 at 19.

¹⁰² Ex. TURN-1 at 22.

retained meter readers onto the expected additional meter readers, and proposed disallowing costs for SCE's allegedly less-efficient proposal.¹⁰³

TURN challenges SCE's training costs for Customer Service Representatives (CSRs) as excessive. TURN notes that SCE has historically trained CSRs in a wider array of subjects for less money than SCE proposes to spend to train CSRs just on the opt-out program. TURN invites us to "summarily reject Edison's cost request and lower Edison's initial Standard Operating Procedure (SOP) fee by \$22.21 and its proposed monthly fee by \$0.02/customer/month."¹⁰⁴

Finally, TURN challenges SCE's CCO costs as excessive. TURN argues that the incremental number of customer calls CCOs will field as a result of the opt-out program are "not even within the margin of forecasting error" for SCE when set next to the total number of calls SCE's CCOs handle.¹⁰⁵ The number of calls may be small in a relative sense, but the forecast 2012 figure of 43,269 calls relating to the opt-out program is significant in an absolute sense, and has a quantifiable associated cost that is reasonably recoverable. We decline to disallow these costs. The 2013 and 2014 forecasts drop into the low hundreds of calls, and, while *de minimis*, there is still an associated cost that can be reasonably imputed to them.

¹⁰³ Ex. TURN-1 at 22.

¹⁰⁴ Ex. TURN-1 at 23.

¹⁰⁵ Ex. TURN-1 at 24.

4.3. SDG&E Costs

4.3.1. SDG&E's Proposed Costs

SDG&E estimates that 2,000 to 3,000 residential customers will opt out of smart meter service.¹⁰⁶ SDG&E identifies the following cost categories for rate recovery in connection with its opt-out program:

- IT system development (\$198,455);
- Field visits to replace smart devices and/or mark extant analog devices as "opt-out" (\$187,199.82);
- Customer Service Field management support (\$15,807.99);
- Electric Meter Shop Quality Assurance work (\$36,006.99);
- Purchase additional analog devices (\$61,802.00);
- Network enhancement and equipment (\$32,197.00);
- Back office support and communications (\$306,805.78); and,
- Manual meter reading (\$636,480.00).¹⁰⁷

In sum, SDG&E estimates the total costs for providing opt-out service through 2014 will be \$1,474,754.58. SDG&E derives from that the following rate proposal:

	Single commodity	Dual Commodity
Initial fee (Non-CARE)	\$157.83	\$189.25
Initial fee (CARE - 20% discount)	\$126.26	\$151.40
Monthly fee (Non-CARE)	\$12.80	\$13.30
Monthly fee (CARE - 20% discount)	\$10.24	\$10.64

¹⁰⁶ Ex. SDGE-2 at CS-4.

¹⁰⁷ Ex. SDGE-2 at CS-5.

SDG&E proposes to impose an exit fee on those opt-out customers who switch (or revert) to smart meter service, or who move from one location to another within SDG&E's service territory. The single commodity fee would be \$43.07. The dual commodity fee would be \$74.49.

4.3.2. Intervenor Responses

TURN takes no positions with respect to SDG&E's proposal.¹⁰⁸

DRA proposes to adjust only "meter exchange costs and exit fees."¹⁰⁹ As to meters, DRA contends that "SDG&E still has \$85 million for legacy meters in ratebase."¹¹⁰ According to DRA, "the Commission should deny the \$62,000 legacy-meter cost recovery here to prevent ratepayers from double-paying for the legacy meters."¹¹¹ SDG&E responds that the \$62,000 should not be attributed to only legacy meters. SDG&E notes that \$27,934 is attributable to the purchase of analog electric meters, with the remaining balance "allocated for gas meters and meter opt-out tags."¹¹² Furthermore, SDG&E notes that the status of rate treatment for its legacy meters was pending in their on-going GRC.

Both DRA and SDG&E agree that treatment of these costs is dependent upon the disposition of SDG&E's then-pending GRC.¹¹³ Since the submission of testimony and briefs, the Commission did issue a decision on SDG&E's GRC in D.13-05-010. In that decision, the Commission authorized recovery of SDG&E's

¹⁰⁸ "TURN did not have the time or the resources to be able to review the SOP proposals of the Sempra Utilities." Ex. TURN-1 at 27.

¹⁰⁹ Ex. DRA-1 at 5-3.

¹¹⁰ Ex. DRA-1 at 5-3.

¹¹¹ Ex. DRA-1 at 5-3.

¹¹² Ex. SDG&E-4 at CS-2.

¹¹³ DRA Opening Brief at 7-8.

request \$85 million for SDG&E's legacy meters.¹¹⁴ SDG&E's testimony notes that "[i]f the Commission allows for full recovery of SDG&E's legacy meters in A.10-12-005, the Commission can direct SDG&E to take necessary steps to remove the \$27,934 of incremental legacy meter costs from the proposed opt-out charges."¹¹⁵ Since D.13-05-010 granted SDG&E recovery of their legacy meters, this decision disallows \$27,934 from SDG&E's opt-out program costs.

As to exit fees, DRA contends the proposed fees are "unduly burdensome to customers."¹¹⁶ DRA expects the likely number of customers impacted by exit fees to be small, and so proposes to exclude "them from the Opt-Out Program for the current GRC cycle."¹¹⁷ Discussion of exit fees is addressed below.

4.4. SoCalGas Costs

4.4.1. SoCalGas' Proposed Costs

SoCalGas is in a unique position among the utilities – it has not yet begun to deploy smart meters.¹¹⁸ Therefore, at least for the initial wave of opt-outs, SoCalGas does not need to purchase or refurbish analog meters. In addition, SoCalGas does not expect that the forecast level of opt-out customers will "affect

¹¹⁴ D.13-05-010 at 913.

¹¹⁵ Ex. SDG&E-4 at CS-2.

¹¹⁶ Ex. DRA-1 at 5-4.

¹¹⁷ Ex. DRA-1 at 5-4.

¹¹⁸ Ex. SCG-1 at 2.

the configuration or functioning of the [smart meter] network,"¹¹⁹ which further reduces costs compared to other utilities.¹²⁰

SoCalGas divides its fees into initial and monthly fees. For purposes the initial fee, SoCalGas identifies the following cost categories: Account Set-up and Customer Communication (\$9), Remove Module and Tag Meter (\$32) or Inspect and Tag Meter,¹²¹ Information System Development, and Module Credit and Exit Fee.¹²² The Monthly Fee is a weighted average of the costs of Energy Technicians and Meter Readers to manually read opt-out customer meters.¹²³ In sum, SoCalGas proposes the following fee structure:

Fee	No Smart Meter Module	Module Installed
Initial (Non-CARE)	\$126	\$179
Monthly (Non-CARE)	\$24	\$24
Initial (CARE)	\$101	\$143
Monthly (CARE)	\$19	\$19

For its revenue requirement, SoCalGas provides an average, per customer cost which is spaced out from 2012 through 2017. Over the course of that time period,

¹¹⁹ Ex. SCG-1 at 5.

¹²⁰ For example, in PG&E, SCE, and SDG&E's next GRC, costs related to mesh network upgrades in response to smart meter opt-outs may be assessed; since SoCalGas does not use a mesh network, such costs are absent from its program costs.

¹²¹ Which fee would apply depends on whether the customer opts out before or after a smart meter module is installed. If no module is in place at the time of opt-out, the fee to inspect and tag applies. If a module is in place, the fee to remove it applies.

¹²² Ex. SCG-1 at 3.

¹²³ Ex. SCG-1 at 16 (Appendix A-6).

SoCalGas' opt-out cost estimate is \$29.88 million.¹²⁴ For the time period of 2012 through 2014, that cost estimate is \$5.9 million.

4.4.2. Intervenor Responses to SoCalGas

DRA fleshes out SoCalGas' proposal by identifying the total costs underlying SoCalGas' proposed fees. According to DRA, "SoCalGas provided DRA with estimates of the total costs of the Opt-Out Program through 2017. . . . the cost attributed to the initial fees is expected to be \$4.37 million, while the cost of monthly meter reading is expected to be \$25.5 million."¹²⁵

DRA proposes to reduce SoCalGas' proposed initial fee by (1) eliminating the exit fee, and (2) eliminating the fee to inspect and tag legacy meters. As noted previously, the exit fee issue is addressed separately, in connection with all utilities below, and therefore is not discussed here. As to the inspection and tagging, DRA proposes to have SoCalGas perform tagging and inspection while already on-site at an opt-out customer's premises, thereby avoiding the need for "an extra trip merely to tag meters."¹²⁶

DRA challenges various aspects of SoCalGas' meter reading fee. DRA compares SoCalGas' fee with that of the other utilities, and finds it almost triple "that of SDG&E and almost four times that of PG&E."¹²⁷ SoCalGas' meter reading time "is more than double that of all IOUs."¹²⁸ DRA further explains that SoCalGas' higher meter reading rate is because "SoCalGas blends a lower labor

¹²⁴ Ex. DRA-1 at 3-11.

¹²⁵ Ex. DRA-1 at 3-2.

¹²⁶ Ex. DRA-1 at 3-6.

¹²⁷ Ex. DRA-1 at 3-7.

¹²⁸ Ex. DRA-1 at 3-7.

rate of a meter reader with the higher wage of an energy technician.”¹²⁹ DRA proposes to use just the lower rate in establishing an opt-out fee.¹³⁰ Thus, DRA proposes that SoCalGas maintain a part-time meter reading staff to support the opt-out program.¹³¹ DRA also proposes a variety of alternatives to monthly meter reads, which we address generically for all utilities elsewhere in this decision.¹³² Finally, DRA argues that cost recovery should be limited to the years 2012 through 2014.¹³³

SoCalGas argues that its meter reader costs are reasonable and notes that upon completion of AMI deployment, SoCalGas “does not expect to retain a meter reading work force,” and that its own employees will be used for opt-out meter reading.¹³⁴ As such, SoCalGas believes its costs and monthly fee is appropriate for those customers on opt-out.

We reject DRA’s proposal to reduce SoCalGas’ proposed initial fee of \$126 by \$24. As discussed below, the initial fee for all IOUs shall be set at \$75. While we do not disagree with SoCalGas that tagging a meter to identify it as serving an opt-out customer can help reduce confusion for future visits by SoCalGas, we are persuaded by DRA that these costs may be lowered by reducing the number of visits necessary to inspect and tag a meter. Since the Commission adopts a \$75 initial fee for all IOUs, SoCalGas can track these

¹²⁹ Ex. DRA-1 at 3-7.

¹³⁰ Ex. DRA-1 at 3-8.

¹³¹ DRA Opening Brief at 21-22.

¹³² DRA Opening Brief at 21.

¹³³ Ex. DRA-1 at 3-4.

¹³⁴ Ex. SDG&E-2 at 3-4.

inspection and tagging costs as part of their balancing account and in the next available GRC, consistent with this decision, may seek recovery of these costs, if it so chooses.

Additionally, we share DRA's concern regarding the high meter reading costs of SoCalGas compared to the other utilities. DRA proposes to reduce SoCalGas' revenue requirement for the years 2012-2014 from \$5.9 million to \$2.9 million. We agree with DRA that costs in this proceeding are limited to the years 2012-2014, so we will not opine on the total program costs through 2017. Furthermore, based on the discussion above, we will reduce SoCalGas' cost estimates for the years 2012-2104 to \$4.5 million. This reduction is tied to lowering of allowable costs to the meter tagging program and a reduction in meter reading costs. As discussed below, the Commission adopts a balancing account treatment for these costs, which are to be reviewed in a future GRC.

4.5. Authorized Costs

Based on our discussion above, we authorize PG&E SCE, SDG&E, and SoCalGas to recover the actual costs for providing the opt-out option, capped as follows:

Pacific Gas and Electric Company	\$35.344 million
Southern California Edison Company	\$20.463 million
San Diego Gas & Electric Company	\$1.447 million
Southern California Gas Company	\$4.5 million

4.6. Number of Opt-Out Options

The Scoping Memo asked parties to brief whether more than one opt-out option (*e.g.*, offering both an analog meter and a digital, non-communicating

meter) should be offered. In a rare show of unanimity, all IOUs¹³⁵ and intervenors agree that the only opt-out option should be an all-analog meter. We see no reason to require the IOUs to offer multiple meter types. Expanding the range of options would only increase program costs while providing a service in which no one seems interested. We affirm the finding in D.12-02-014 that an analog meter is the only option available to those who opt-out of smart meter service.

4.7. Cost Responsibility and Allocation

The IOUs,¹³⁶ with the exception of PG&E,¹³⁷ argue in favor of imposing all costs associated with the opt-out program on opt-out customers. Those supporting this approach contend that costs should be borne by those who cause them. In this case, that means opt-out customers. TURN recommends that any resulting under-collections should be allocated to the relevant utility AMI balancing accounts.¹³⁸ Aglet Consumer Alliance (Aglet) presents the most cogent counter-argument, and one with which we agree: “Overall energy costs per residential customer are typically around \$100 per month. Depending on the Commission’s chosen cost allocation, *a customer’s decision to opt out could substantially increase energy bills in the near term.*”¹³⁹

¹³⁵ Ex. SCE-1 at 4.

¹³⁶ See, e.g., Ex. SCE-1 at 4 (Table I-1); Ex. SoCalGas-1 at 6-7; Ex. SDG&E-2 at CF-2.

¹³⁷ As discussed previously, PG&E proposes to allocate costs not recovered from the opt-out fees across distribution customers.

¹³⁹ Ex. Aglet 1 at 6, 24.

Thus, we conclude that while it would be appropriate for opt-out customers to pay the costs associated with the opt-out option, we must balance the appropriate allocation of costs with the need to set fees at a level that do not unreasonably deter customers from electing this option. Consequently, we believe that it is necessary to cap the fees to be imposed on opt-out customers.

We agree with Aglet that setting a cap on fees is appropriate in this instance, especially when fees are set on a per meter basis, as described below, and when considering potential bill impacts on CARE customers and non-CARE customers on fixed incomes. In addition to making opt-out service more accessible than it might otherwise be, adopting a maximum amount for opt-out fees is not necessarily inconsistent with cost-causation principles. As Aglet notes, since the opt-out option was not offered prior to the installation of SmartMeters, it would be “unfair to assign very high opt out charges to customers that never wanted smart meters in the first place.”¹⁴⁰

Two parties suggested caps: Aglet proposes “an initial charge of \$30 plus a monthly charge of \$3,”¹⁴¹ and PG&E proposes to maintain fees at the levels we established on an interim basis in D.12-02-014. We conclude that maintaining a fee cap at the fee levels set in D.12-02-014 strikes a reasonable balance between requiring opt-out customers to pay for costs of the service and maintaining service affordability. As discussed above, the proposed opt-out fees and charges proposed by SCE, SDG&E and SoCalGas, which reflect updated forecasts of costs and customer participation levels, are significantly higher than the interim fees. Accordingly, opt-out customers should bear the incremental costs associated

¹⁴⁰ Ex. Aglet 1 at 26.

¹⁴¹ Ex. Aglet 1 at 24.

with offering an opt-out option up to a cap. The opt-out charges and fees are capped for each utility as follows:

For Non-CARE Customers:

Initial Fee	\$75.00
Monthly Charge	\$10.00/month

For CARE Customers*:

Initial Fee	\$10.00
Monthly Charge	\$5.00/month

*Pursuant to D.12-02-014, PG&E FERA customers will be eligible for discounts similar to CARE customers.

The monthly charges will be collected for three years from the time a residential customer chooses to opt-out of the smart meter program. We find the three year period to be reasonable, as it is a sufficient duration for the utility to recover a portion of the utilities incremental costs in setting up services associated with accommodating the request of the opt-out customer and to integrate the meter reading function in its normal operations in order to further reduce the incremental expense of supporting opt-out service. Beyond this period it may be difficult to separate the incremental expense from the ongoing operational costs. For simplicity we limit the collection of monthly charges for three years from the time a residential customer chooses to opt-out of the smart meter program. We expect, consistent with IOU forecasts that opt-out program start-up costs will decline significantly after 2014. However, should a utility determine that there is a need to adjust the opt-out charge or monthly fees to account for over- or under-collections, it may submit a proposal to do so as part of its GRC application filing.

“Exit costs,” which appear in various forms in all utility proposals, require a separate discussion. Exit costs, also referred to as “exit fees,” are the costs associated with returning an opt-out customer’s meter to standard service which

in this instance means utility service that is measured through a smart meter. The IOU proposals for recovering these costs range from embedding the costs in the initial fee (*i.e.*, SCE and SoCalGas) to recovering costs from *all* customers who pay distribution rates, rather than just from opt-out customers (*i.e.*, PG&E). Socializing these costs removes a deterrent to opt-out customers returning to standard service. As Aglet notes, "exit fees are meant to recover the costs of installing smart meters, and the costs of all other smart meter installations are recovered from a broad set of customers"¹⁴² We agree with intervenors that no exit fee shall be assessed upon opt-out customers. However, if a utility determines that costs associated with re-installing a smart meter proves to be higher than expected, that utility can seek to recover those incremental costs from opt-out customers as part of their next GRC application, as described above.

4.8. Method for Assessing Fees

Parties have proposed various approaches for determining what fees should be assessed on customers who elect the opt-out option. PG&E "proposes that the Commission maintain the same residential customer opt-out charges it approved on an interim basis in Decision 12-02-014."¹⁴³ PG&E would spread any undercollection "to all PG&E customers paying distribution costs."¹⁴⁴ PG&E

¹⁴² Ex. Aglet 1 at 20.

¹⁴³ Ex. PGE-1 at 5-1: "Charges are set at \$75 up-front and \$10 monthly for non-CARE/FERA customers, and \$10 up-front and \$5 monthly for CARE/FERA customers. Currently, these charges apply per location, and single commodity customers pay the same up-front charge as dual commodity customers. PG&E proposes to maintain this same approach to maintain continuity in the Program. PG&E is not proposing an 'exit charge.'"

¹⁴⁴ Ex. PGE-1 at 5-2.

would track opt-out program revenues and costs in a memorandum account (the SOMA), and pass any net costs through to all distribution customers. TURN recommends that any resulting under-collections should be allocated to the relevant utility AMI balancing accounts.¹⁴⁵ DRA does not take a position on how the opt-out costs should be allocated.¹⁴⁶ CLECA opposes PG&E's proposal noting that non-residential customers should not be burdened with paying for costs associated with a residential customer opt-out program.¹⁴⁷ We agree. The opt-out option is not available to non-residential customers and the record in this proceeding does not have sufficient evidence that non-participants should bear any portion of the costs associated with the opt-out option.

However, as Aglet suggests recovery of utility costs from customers that cause the costs is a useful ratemaking principle, but it is not the only factor the Commission should consider in determining how to allocate opt-out costs in this proceeding. There are other factors, for example fairness, consistency, rate stability, ability to pay, distribution of benefits, and administrative efficiency.¹⁴⁸ We further agree with Aglet that allocation of opt-out program costs to a broad customer base would be consistent with the Commission's adopted cost allocation for utility smart meter programs as a whole.¹⁴⁹

Opt-out service costs are primarily based on forecasted number of opt-out customers, the result is that utilities greatly overestimated the costs for opt-out

¹⁴⁵ Opening Brief at 4

¹⁴⁶ Opening Brief at 1.

¹⁴⁷ Ex. CLECA-1 at 3.

¹⁴⁸ Opening Brief at 11.

¹⁴⁹ Opening Brief at 14.

service. For example, as described in D.12-02-014 at 4, “[PG&E’s] revenue requirements to recover these costs are estimated to be \$113.4 million for the two-year period of 2012-2013.” However, in Phase 2 of this proceeding, PG&E revised its cost estimates and is seeking a revenue requirement of \$16,029, 955.¹⁵⁰ The reduction in revenue requirement is largely attributable to reduced program costs, which has resulted from lower participation compared to initial forecast; 148,500 customer opt-outs versus the most recent proposal’s forecast of approximately 54,000 by 2014. As stated above, we expect, consistent with IOU forecasts that opt-out numbers will stabilize and program start-up costs will decline significantly after 2014.

By allocating the under-collected portion of the opt-out program revenue requirements across a large customer base, we will reduce the bill impact on the small number of customers who choose to opt-out of the smart meter program, and because only the under collected portion of the incremental costs are being spread over a large customer base, the average tariff impact on the residential customers is expected to be nominal. In the long-run, as utilities are able to recover under-collections from the residential customer class, there may not be a need for further increases in opt-out fee or charge. Therefore, we conclude that residual program costs not collected from opt-out customers should be allocated to the residential customer class as a whole.

We next consider whether the opt-out fees should be assessed on a per meter or per location basis. SCE recommends that fees be charged on a per location basis since “a customer with two electric meters at one premise would

¹⁵⁰ Ex. PGE-1, at 6-2.

be charged a single opt-out fee.”¹⁵¹ PG&E also agrees that fees should be charged on a per location basis.¹⁵² SoCalGas notes that meters are typically associated with a single account, and that in situations where there are multiple meters serving multiple accounts, opt-out fees should apply to each account.¹⁵³ DRA also agrees that fees should be assessed on a per location basis.¹⁵⁴ In the face of such unanimity, we direct that fees should be assessed on a per location basis.

4.9. Opt-Out Fees for Single vs. Dual Commodities

In this decision, as explained above, we set fees on a per-utility basis. The two utilities that provide both electric and gas service (dual commodity utilities), PG&E and SDG&E, provide similar answers to this question. PG&E notes that its proposed opt out fee applies regardless of whether the customer opts out of either or both of the electric and gas smart meters.¹⁵⁵ SDG&E states that they provide both electric and gas service to 60% of their customer base, and the remaining 40% receive either electricity or gas service only from SDG&E.¹⁵⁶ According to SDG&E, opt-out fees are the same regardless of whether the customer opts out of either electric or gas AMI or both, but SDG&E does state that this situation currently does “not cover all costs associated with SDG&E[’s]

¹⁵¹ Ex. SCE-1 at 9.

¹⁵² Ex. PGE-1 at 5-5.

¹⁵³ Ex. SoCalGas-1 at 7.

¹⁵⁴ Ex. DRA-1 at 1-10.

¹⁵⁵ Ex. PG&E-1 at 5-5.

¹⁵⁶ Ex. SDG&E-1 at CS-20.

opt-out program. This is true regardless of whether the residential customer opts out of one commodity or two commodities.”¹⁵⁷

On the other hand, DRA “supports applying different fees to a customer” opting-out of single or dual commodity smart meter, noting that the “costs of exchanging meters are different for one versus two meters.”¹⁵⁸ As explained above, the fees we adopt in this decision apply regardless of whether the customer opts-out of an electric smart meter or a gas smart meter or both. Should PG&E or SDG&E determine that there are substantial cost differences associated with customers choosing to opt-out of both an electric and gas smart meter versus only an electric or gas meter, they are free to propose alternative fee proposals in an upcoming GRC, consistent with the direction of this decision.

For those customers served by two utilities, such as SCE customers who also take gas service from SoCalGas, they will pay opt-out fees and charges to each utility that serves them. As described below, the costs of alternative meter reading practices where one utility reads the meter on behalf of two utilities is likely to increase the overall costs of the opt-out program.

4.10. Exit Fees

Of the IOUs, only PG&E declines to propose an exit fee.¹⁵⁹ The other IOUs propose an exit fee, but implement them in different ways. SCE, SDG&E and SoCalGas propose exit fees for opt-out customers to cover the costs for re-installing the smart meter.¹⁶⁰ DRA opposes the use of an exit fee and

¹⁵⁷ Ex. SDG&E-1 at CS-21.

¹⁵⁸ Ex. DRA-1 at 1-10.

¹⁵⁹ Ex. PG&E-1 at 5-5.

¹⁶⁰ Ex. SCE-1 at 10; Ex. SDG&E-1 at CS-22; Ex. SoCalGas-1 at 8-9.

recommends “that this issue be reassessed in the coming GRC.”¹⁶¹ Aglet also opposes exit fees, arguing that “[e]xit fees are meant to recover the costs of installing smart meters, and the costs of all other smart meter installations are recovered from a broad set of customers.”¹⁶²

We decline to impose any exit fees, whether up front or when an opt-out customer ceases taking opt-out service from a utility. It is in everyone’s interest to promote moving to smart meters. Accordingly, we do not wish to emplace any barriers to moving to smart meters, such as exit fees. However, as noted above, as utilities continue to have experience with this opt-out program, these costs and fees can be re-evaluated in each utility’s respective GRC. The utility bears the responsibility of showing their actual costs and reinstated benefits to support an addition of any exit fee.

5. Remaining Issues Common to All Utilities

5.1. Recorded Costs vs. Forecast Ratemaking

The utilities have proposed different ratemaking alternatives. SCE proposes “to record the costs and revenues from the Opt-Out Program in a balancing account mechanism so that no more or less than the reasonable revenue requirement associated with opting out are ultimately collected from those customers who elect to opt out.”¹⁶³ SCE proposes as part of its cost recovery proposal to “[l]imit reasonableness review of the SOBA to ensure all

¹⁶¹ Ex. DRA-1 at 1-11.

¹⁶² Ex. Aglet-1 at 20.

¹⁶³ Ex. SCE-1 at 6.

recorded entries to the account are stated correctly and are consistent with Commission decisions.”¹⁶⁴

PG&E similarly proposes use of a balancing account. PG&E “proposes that revenue requirements associated with incremental costs . . . continue to be recorded monthly into the SmartMeter Opt-Out Memorandum Accounts (SOMA-E and SOMA-G).”

Aglet frames our choices as follows, and offers a proposal of its own:

Forecast test year ratemaking as authorized in GRCs; recorded cost ratemaking as the utilities propose; recorded cost ratemaking with cost caps or price guidelines as the Commission has approved for certain resource costs and fuel-related expenses; or some other ratemaking system.¹⁶⁵

Aglet advocates “recorded cost ratemaking, but with assignment of 10% of program costs to shareholders.”¹⁶⁶ Aglet regards balancing account (recorded costs) ratemaking as giving “utilities no incentive to control costs. Instead it gives them blank checks to spend ratepayer money on any expense or capital project, whether it is needed or not.”¹⁶⁷

DRA supports the use of a “one way balancing account” as a means to protect ratepayers by returning funds unspent by the utility and ensuring that excess funds are not recoverable through rates.¹⁶⁸ DRA also proposes an Advice

¹⁶⁴ Ex. SCE-1 at 34.

¹⁶⁵ Ex. Aglet-1 at 9.

¹⁶⁶ Ex. Aglet-1 at 9.

¹⁶⁷ Ex. Aglet-1 at 9.

¹⁶⁸ DRA Opening Brief at 36.

Letter process for the IOUs to describe the accounting methods to implement the balancing account.¹⁶⁹

TURN is also supportive of a one-way balancing account for rate recovery.¹⁷⁰

We approve balancing account ratemaking treatment. The history of the opt-out programs demonstrates that the greatest danger to non-participating customers is that utilities may overestimate program participation, and significantly overstate revenue requirements. We need look no further than the initial estimates utilities provided for program costs as compared with the actual costs for 2011 and 2012 to see this phenomenon in action. As discussed previously, PG&E had originally estimated opt-out program costs based on a participation rate of 145,800, but subsequently reduced its costs substantially to reflect a revised participation rate of 54,000.¹⁷¹

We are sensitive to the concerns Aglet raises with balancing account treatment. PG&E's excess expenditures for hand-held meter reader devices provide an example what can happen when utilities book costs without Commission review. Notably, however, the total impact of these expenditures is in the thousands of dollars, as compared with the millions of dollars associated with overestimating forecast revenue requirements. In addition, customers have remedies available for excessive or improper expenditures. Similarly, intervenors have various recourses if they become aware of such excesses going

¹⁶⁹ DRA Opening Brief at 37.

¹⁷⁰ TURN Opening Brief at v.

¹⁷¹ See, Ex. PG&E-1 at 1-4 and 6-2.

forward. Therefore, we do not see the need to adopt Aglet's proposal to assign 10% of program costs to shareholders.

5.2. Alternative Billing Arrangements

TURN, DRA, and Aglet propose that the utilities offer alternatives to monthly meter reads and/or monthly billing for opt-out customers. These proposals reflect the belief that the main driver for monthly fees is meter reading costs. These parties contend that by reducing the number of meter reads, or pool meter reads for customers served by multiple utilities, the monthly fees will go down. Thus, these parties have proposed that customers be offered the opportunity to read their own meters or be offered levelized bill plans, with periodic true-ups.

Parties further propose that a single meter reader be utilized for customers served by more than one utility. We are not persuaded that most of the alternative billing arrangements for opt-out customers proposed by parties is warranted. Some proposals would entail additional utility expenses and/or complexity that seem likely to offset any putative savings (*e.g.*, requiring SoCalGas and electric utilities to coordinate on meter reads, so that a meter reader from one utility reads both utilities' meters).¹⁷² Other proposals, such as permitting e-mailing photographs of meters in lieu of meter reads conducted by utility employees, are also rife with the potential for billing error, or even fraud.

However, we are persuaded that less frequent meter reading may provide cost savings to opt-out customers. TURN argues that the relatively large monthly

¹⁷² This particular option would be extremely cumbersome due to the significant overlap between SoCalGas and many other electric utilities, including municipal utilities. Ex. SoCalGas-2 at 7.

fees reflected in the utilities' estimates can be attributed to fact that "meter readers will no longer read all customers within a contiguous route."¹⁷³ TURN contends that decreasing the frequency of meter reads would decrease overall costs. As support, it notes that SCE had calculated that its monthly costs would decrease from \$25/month to \$19/month if its meters were read on a quarterly, rather than monthly, basis.¹⁷⁴

SCE states that it does not currently perform bi-monthly or quarterly meter reads for its customers and argues that this option should not be authorized unless further feasibility studies and risk assessment are performed.¹⁷⁵ It contends that before such an option could be implemented, there must be consideration of issues such as "delayed true-up bills if SCE is unable to read the meter during the scheduled bi-monthly/quarterly reads, customer satisfaction issues if estimated bills are inaccurate (resulting in high quarterly true-up bills), and impacts on cash flow."¹⁷⁶

TURN disagrees with SCE's arguments. It notes that the utilities are authorized to estimate and backbill residential customers for up to three months for any billing error, and for an unlimited amount of time for any physical access problem on the customers' premises.¹⁷⁷ It further argues that "customer dissatisfaction" would not be an issue if customers were informed in advance that estimated bills, with periodic true-ups, would result in lower monthly fees.

¹⁷³ TURN Opening Brief at 25.

¹⁷⁴ TURN Opening Brief at 24, 26.

¹⁷⁵ SCE Opening Brief at 5.

¹⁷⁶ SCE Opening Brief at 5.

¹⁷⁷ TURN Opening Brief at 26.

It suggests that in those instances, customers would make an affirmative choice to have estimated bills.

Although SCE raises legitimate concerns, we do not find that they are sufficient to reject adopting TURN's proposal absent further study and analysis. As TURN notes, the utilities already estimate bills when there are missing meter reads or for customers on levelized payment plans.¹⁷⁸ Further, customer dissatisfaction could be reduced if the customer were informed and understood the process. Based on the above, we adopt TURN's recommendation that the utilities modify their opt-out procedures to allow for bi-monthly (every two months) meter reading of the opt-out customers' meters with estimated bills for the interim period. However, we make no changes to the opt-out fees and charges adopted in this decision at this time, as there is no evidence in the record to determine the extent to which costs would be reduced as a result of less frequent meter reads. Rather, we believe that any cost savings will be reflected in future adjustments to the opt-out charges and fees.

6. Community Opt-Out

The Opt-Out Decisions allowed individual residential ratepayers to not have a wireless smart meter installed in their location. Several parties have requested that the opt-out option be extended to allow local governments or boards of multi-unit dwellings (*e.g.*, apartments or condominium complexes) to exercise the option. The Scoping Memo raised the following questions with respect to whether such an option would be lawful and, if so, should be adopted:

¹⁷⁸ Opening Comments of The Utility Reform Network on the Proposed Decision Regarding Smartmeter Opt-Out Provisions (TURN Opening Comments), filed November 18, 2014, at 4-5.

1. Can the Commission delegate its authority to allow local governments or communities to determine what type of electric or gas meter can be installed within the government or community's defined boundaries? If so, are there any limitations?
2. For relocation of banks of meters, there is already a tariff regarding relocation. Will need to comply with terms of the tariff for relocation, including payment of costs to move meters. This is an additional cost borne by just those customers in the community.
3. How should the term "community" be defined for purposes of allowing an opt-out option?
 - a. Would the proposed definition require modifications to existing utility tariffs?
 - b. Would the proposed definition conflict with existing contractual relationships or property rights?
4. If a local government (town or county) is able to select a community opt-out option on behalf of everyone within its jurisdiction and the opt-out includes an opt-out fee to be paid by those represented by the local government, would this fee constitute a tax?

Additionally, parties were asked how non-residential customers, or residential customers who wished to have a wireless smart meter, would be accommodated if a community opt-out option is adopted. Opening Briefs were submitted on July 18, 2012, and Reply Briefs were submitted on July 30, 2012.

6.1. Parties' Positions

In response to the Scoping Memo's question "[w]hether there are any limitations to the Commission delegating authority to allow local governments or communities to determine what type of electric or gas meter can be installed within the government or community's defined boundaries," Counties argue that allowing local governments to opt-out would not require a delegation of

Commission authority.¹⁷⁹ Rather, Counties argue that the Commission “can and should work collaboratively with local governments or other entities that obtain community opt-out rights” and ensure that the Commission will “retain its broad jurisdiction over” a community opt-out program.¹⁸⁰

In support of delegation of decisions regarding meters to local governments, Counties cites General Order (GO) 159-A, governing the process for approving transmitting sites for cellular carriers, which “acknowledges that the public interest can be served by the involvement of local governments in decisions concerning construction of cellular radio transmitting facilities.”¹⁸¹ Counties requests a similarly designed delegation program be implemented here.¹⁸²

PG&E and Utility Consumers Action Network (UCAN) argue that both the California Constitution and the Public Utilities Code prohibit the Commission from delegating authority over public utilities to allow local governments or communities to determine the type of electric or gas meter installed within the government or community’s defined boundaries.¹⁸³ Additionally, the utilities note that the Commission retains exclusive authority over regulation of public utility services and rates, and may not delegate this authority to local governments or communities.¹⁸⁴ Further, the utilities and UCAN argue the

¹⁷⁹ Counties Opening Brief at 18-19.

¹⁸⁰ Counties Opening Brief at 18.

¹⁸¹ Counties Opening Brief at 19.

¹⁸² Counties Opening Brief at 19-20.

¹⁸³ PG&E Opening Brief at 2; UCAN Opening Brief at 4.

¹⁸⁴ PG&E Opening Brief at 2; SDG&E and SoCalGas Opening Brief at 13.

Commission has authority over public utilities' infrastructure, including electric or gas metering equipment.¹⁸⁵

SDG&E and SoCalGas acknowledge that the Public Utilities Code recognizes that municipalities retain certain municipal powers.¹⁸⁶ They urge, however, that local governments only retain those powers to the extent they do not conflict with general law.¹⁸⁷ Similarly, SCE claims that delegating authority to local governments to determine the types of meters to be installed would violate the doctrine of separation of powers because the Commission retains exclusive regulatory power over this matter.¹⁸⁸

SDG&E and SoCalGas claim that the Commission cannot delegate its responsibility to make fundamental policy decisions pertaining to recoverable costs, program rules, regulations, and policies, including delegating authority to allow local governments or communities to determine what type of electric or gas meter can be installed within the government or community's defined boundaries.¹⁸⁹

¹⁸⁵ SDG&E and SoCalGas Opening Brief at 12; UCAN Opening Brief at 4.

¹⁸⁶ SDG&E and SoCalGas Opening Brief at 11. *See* California Constitution, Article XI, Section 7, "A county or city may make and enforce within its limits all local, police, sanitary, and other ordinances and regulations not in conflict with general laws." *See also*, Public Utilities Code Section 2902, "This chapter shall not be construed to authorize any municipal corporation to surrender to the [PUC] its powers of control to supervise and regulate the relationship between a public utility and the general public in matters affecting the health, convenience, and safety of the general public, including matters such as the use and repair of public streets by any public utility, on, under, or above any public streets, and the speed of common carriers operating within the limits of the municipal corporation."

¹⁸⁷ SDG&E and SoCalGas Opening Brief at 12.

¹⁸⁸ SCE Opening Brief at 6-7.

¹⁸⁹ SDG&E and SoCalGas Opening Brief at 13.

SCE also argues that community opt-out negates the right of individual customers to have a smart meter.¹⁹⁰ SCE asserts that the smart meter system operates effectively when each customer funds its fair share of costs associated with smart meters and has the right to enjoy smart meter benefits, such as “dynamic pricing, demand response programs, and near real-time consumption data.”¹⁹¹ SCE claims that the community opt-out program has adverse consequences on individuals because opting to not have a smart meter requires each customer to bear additional costs, and bearing these additional costs should be the individual’s choice.¹⁹²

The utilities point out that there is no feasible definition of community. PG&E argues that even if the Commission could delegate authority over IOUs to local governments, any definition of “community” would conflict with existing tariffs and utility services rights.¹⁹³ Existing tariff and customer contracts, along with Pub. Util. Code § 453, “prohibit public utilities from maintaining or establishing any unreasonable difference in services or facilities to customers, including between localities.”¹⁹⁴ SDG&E and SoCalGas add that any definition of “community” restricts individual choice, “on its most basic level, and would extract certain property rights and monetary demands by the government from

¹⁹⁰ SCE Opening Brief at 8.

¹⁹¹ SCE Opening Brief at 8.

¹⁹² SCE Opening Brief at 8.

¹⁹³ PG&E Opening Brief at 3.

¹⁹⁴ PG&E Opening Brief at 3.

an individual or entity, with no apparent benefit to every payer, and without balance of relationship between perceived risk and perceived benefit.”¹⁹⁵

The utilities also argue that an opt-out fee assessed by a local government on behalf of everyone within its jurisdiction would constitute a tax. SDG&E and SoCalGas add that Proposition 26 defines a “tax” as “any levy, any exaction and certain charges imposed in a state statute or by a local government that result in a taxpayer paying a higher tax.”¹⁹⁶ SDG&E and SoCalGas then contest that not every customer within a local government’s community opt-out area will benefit from the fee, therefore an opt-out fee is not a “true regulatory charge imposed for a specific government service benefitting the payer.”¹⁹⁷ Moreover, PG&E asserts that a court could construe the fees as a tax on local residents, and the tax would be required to comply with local government tax rules concerning adoption and collection of taxes.¹⁹⁸

6.2. Discussion

As a practical matter, a key threshold question raised by the Scoping Memo¹⁹⁹ is whether the Commission may properly delegate its authority to select gas and electric metering equipment choice to local authorities. Article XII, Section 3 of the California Constitution grants the California Legislature “exclusive control over the PUC’s regulation of public utilities.” Section 8 of Article XII of the California Constitution states “a city, county or other public

¹⁹⁵ SDG&E and SoCalGas Opening Brief at 14

¹⁹⁶ SDG&E and SoCalGas Opening Brief at 15.

¹⁹⁷ SDG&E and SoCalGas Opening Brief at 15-16.

¹⁹⁸ PG&E Brief at 3-4.

¹⁹⁹ See Scoping Memo at 6.

body may not regulate matters over which the Legislature grants regulatory power to the Commission." Thus, the Commission holds the power to regulate public utilities, and this authority may not be delegated to another entity or public agency without statutory authorization. As a result of this finding, the Commission need not address the remainder of the comments.

The Legislature also granted the Commission authority over a public utility's infrastructure, including the installation of electric or gas metering equipment.²⁰⁰ "When the Legislature has clearly expressed its intention of allowing one public body or official to exercise a specified discretionary power, the power is in the nature of a public trust and may not be exercised by others in the absence of statutory authorization."²⁰¹ This principle is tempered by the rule that legislative power may properly be delegated so long as it is channeled by a sufficient standard.²⁰²

The Counties' analogy between the Commission's authority over energy procurement and the construction of cellular towers and related infrastructure is inapposite. Section 1 of GO 159-A makes clear that the initial role of local governments is to resolve issues regarding the location and permitting of potential cellular installations, pursuant to several sections of the Public Utilities Code.²⁰³ Only after local authorities have approved an installation does the Commission maintain a list of cellular infrastructure locations through tariff

²⁰⁰ Public Utilities Code Section 761.

²⁰¹ *Bagley v. City of Manhattan Beach* (1976) 18 Cal.3d 22 at 24-25.

²⁰² *Kern v. PG&E* (1980) 108 Cal. App. 3d 418, 422, citing *Kugler v. Yocum* (1968) 69 Cal.2d 371 at 375-376.

²⁰³ GO 159-A is available at <http://docs.cpuc.ca.gov/PUBLISHED/Graphics/611.PDF>.

filings.²⁰⁴ Conversely, authority over statewide energy procurement, equipment and the reliability of the grid is entrusted to the Commission.²⁰⁵ Thus, the processes for installation of cellular telephone towers are not legally analogous to California's energy supply structure.

Further, California has adopted a variety of laws directed towards modernizing the electric grid to increase the state's reliance upon renewable resources and customer demand response for the benefit of California electric consumers. Pub. Util. Code § 8367 requires the Commission to annually report to the Legislature on "the plans and deployment of smart grid technologies by the state's electrical corporations, and the costs and benefits to ratepayers."²⁰⁶ The Legislature further found that Net Energy Metering, a program available to residential, small commercial and large customers that install renewable energy generation systems and facilitated by advanced electric meters, is a way to encourage substantial private investment in renewable energy resources, stimulate in-state economic growth, reduce demand for electricity during peak consumption periods, help stabilize California's energy supply infrastructure,

²⁰⁴ *Id.* at Section 1. Even under this process that is deferential to local authorities, the Commission retains the authority to "preempt local government determination when there is a clear conflict with the Commission's goals and/or statewide interests." Section II(B).

²⁰⁵ See e.g., Pub. Util. Code § 454.5, which provides a detailed guide of considerations that the Commission is instructed by the Legislature to undertake in developing long-term energy supply plans for the state and each of the large IOUs; including reliance on a diverse portfolio of resources such as Demand Response for a reliable energy supply.

²⁰⁶ Pub. Util. Code § 8360 declares it a policy of the state to develop smart grid, including the ability to "[p]rovide consumers with timely information and control options." Pub. Util. Code § 8360 (h). Additionally, Pub. Util. Code § 8366 directs the Commission to consider how smart grid technology can be deployed to support "new advanced metering initiatives," meeting AB 32, energy efficiency, and demand response goals, modernizing aging utility infrastructure, and planning and meeting future energy needs of the state.

enhance the continued diversification of California's energy resource mix, reduce interconnection and administrative costs for electricity suppliers [*i.e.*, participating customers], and encourage conservation and efficiency.²⁰⁷

Additionally, Pub. Util. Code § 2827 specifically allows for time-of-use rates, which are facilitated by smart metering infrastructure, to assist in the conservation of energy, use of renewable resources and support the reliability of the electric grid.²⁰⁸ Thus, the installation of smart meters supports and is necessary for several statewide policies and goals, requiring Commission preemption of contrary local regulations.

Counties observe that the "Commission has not yet specified the definition of a 'community' for the purposes of such opt-out plans" This observation clarifies one of the key reasons that the Commission declines to permit community opt-out to be determined by local government entities or entities such as condominium and other multi-unit dwellings. The vast majority of jurisdictional utility customers have not elected to opt out of smart meter use. As such, we do not find that local governments and entities, such as condominium or other multi-unit dwellings should be allowed to exercise the opt-out option on behalf of individual resident. Since we find that a community opt-out option may not be offered, there is no need for further consideration of cost issues related to a community opt-out option.

7. The ADA and Public Utilities Code § 453(b)

Although the scope of this second phase does not consider the alleged health impacts of smart meters, the Scoping Memo asked for briefing on whether

²⁰⁷ Pub. Util. Code § 2827(a).

²⁰⁸ Pub. Util. Code § 2827(h)(2)(B).

the ADA or Pub. Util. Code § 453(b) limit the Commission's ability to adopt opt-out fees for those residential customers who elect to have an analog meter for medical reasons.

7.1. Parties' Positions

Various parties filed opening comments, including: the Center for Electrosmog Prevention (CEP); the Peoples (*sic.*) Initiative Foundation (PIF); the County of Marin, County of Santa Cruz, Town of Fairfax, City of Marina, City of Seaside, City of Capitola, City of Santa Cruz, Town of Ross and the Alliance for Human and Environmental Health ("Counties"); Wilner and Associates (Wilner); the EMF Safety Network (Network); the Center for Accessible Technology (CforAT); UCAN; Southern Californians for Wired Solutions to Smart Meters²⁰⁹ (SCWSM); and Stop Smart Meters Irvine²¹⁰ (SSMI). These parties urged that an opt-out fee for wireless smart meters violates the ADA, Pub. Util. Code § 453(b) and various other legal prohibitions.²¹¹

CforAT provides the most thorough legal analysis supporting the position that the ADA and/or California anti-discrimination laws limit the Commission's ability to adopt opt-out fees for those residential customers who elect to have an analog meter for medical reasons. "Title II of the ADA applies to public entities, and prohibits discrimination by forbidding people with disabilities from being 'excluded from participation in or be[ing] denied the benefits of the services,

²⁰⁹ SCWSM filed its brief three days out of time, and moved for permission to file out of time.

²¹⁰ SSMI requested and was granted permission to file its brief out of time.

²¹¹ See *e.g.*, Opening Brief of the Country of Marin, County of Santa Cruz, Town of Fairfax, City of Marina, City of Seaside, City of Capitola, City of Santa Cruz, Town of Ross and the Alliance for Human and Environmental Health (Counties Brief), filed July 16, 2012, at 10-17.

programs, or activities of a public entity.”²¹² Thus, Title II of the ADA, applies to public entities and prohibits activity that would deny the “full and equal enjoyment of the goods, services, facilities, privileges, advantages, or accommodations of any place of public accommodation” to people with disabilities.²¹³ Further, Title III of the ADA prohibits activity that would deny the “full and equal enjoyment of the goods, services, facilities, privileges, advantages, or accommodations of any place of public accommodation” to people with disabilities.²¹⁴

CforAT further argues that the ADA prohibits surcharges for providing disabled individuals with access to public accommodations and requires a public accommodation “to modify standard practices and procedures when necessary to provide access, and to provide auxiliary aids and services to the extent necessary to ensure that a person is not denied service due to a disability.”²¹⁵ Additionally, CforAT contends that Title II of the ADA “generally requires public entities to ensure that their programs, services and activities are accessible to people with disabilities.”²¹⁶ CforAT argues that a public utility would fall into category F of the articulated categories that constitute public accommodations, as “an electric utility’s local offices [] are open to the public for purposes such as paying bills are ‘service establishments’.”²¹⁷ Further, CforAT argues that there is

²¹² See CforAT Revised Opening Brief at 4, citing 42 U.S.C. § 12132.

²¹³ 42 U.S.C. § 12182.

²¹⁴ CforAT Brief at 4 (citing 42 U.S.C. § 12182).

²¹⁵ CforAT Brief at 4.

²¹⁶ CforAT Brief at 5.

²¹⁷ CforAT Brief at 6-7. Category F consists of service establishments, including: “a Laundromat, dry-cleaner, bank, barber shop, beauty shop, travel service, shoe repair service,

Footnote continued on next page

“a nexus between the service offered and the entity offering the service, based on the placement of a wireless smart meter at the customer’s residence.”²¹⁸ CforAT therefore contends that since the Federal Courts have found that “the ADA applies to services of a public accommodation accessed in private residences,” “entities that provide services in the home may qualify as places of public accommodation.”²¹⁹

Counties argue that Title II of the ADA “has been interpreted to apply to a state or city program that appears to affect all citizens similarly – but in fact adversely affects the disabled.”²²⁰ Thus, it argues that charging opt-out fees to an individual who opts out of smart meter use to reduce the impact of a generally applicable charge in order to reduce or remedy the additional adverse effects that arise because of smart meter use would constitute discrimination.

The IOUs argue that the opt-out program neither violates the ADA nor Pub. Util. Code § 453(b). PG&E contends that no court has ever found radio frequency (“RF”) sensitivity to be a disability under the ADA, “nor are there any cases finding that RF sensitivity exacerbated an existing ADA-recognized

funeral parlor, gas station, office of an accountant or lawyer, pharmacy, insurance office, professional office of a health care provider, hospital, or other service establishment.”

²¹⁸ CforAT Brief at 8.

²¹⁹ CforAT Brief at 8 (citing *Nt'l Assoc. of the Deaf v. Netflix, Inc. (Netflix)* (D. Mass., 2012) 869 F.Supp. 2d 196, 202.

²²⁰ Counties’ Brief at 11, citing *Heather K. v. City of Mallard* 946 F. Supp. 1373 (N.D. Iowa 1996) and *Crowder v. Ketagawa* 81 F.3d 1480 (9th Cir. 1996).

disability.”²²¹ PG&E adds that the ADA does not apply to the charges or services that PG&E provides to residential customers for utility service.²²²

SDG&E and SoCalGas argue that Title III of the ADA does not apply to the provision of public utilities for two reasons. First, the non-exhaustive list of entities the ADA does not specifically cover includes public utilities. Moreover, the United States Department of Justice (DOJ) has opined on at least two occasions that the provision of service by public utilities is not generally covered by the ADA, as supported by two Opinion Letters issued by the DOJ to government officials.²²³ SDG&E and SoCalGas further argue that even if the ADA applied to the provision of public utilities, the DOJ’s Title III Technical Assistance Manual clarifies that “a public accommodation may not place a surcharge *only* on particular individuals with disabilities or groups of individuals with disabilities to cover these expenses.”²²⁴ SDG&E and SoCalGas finally argue that Title III allows surcharges where they are necessary for the provision of the services being offered.²²⁵ Here, they explain, a surcharge is appropriate and necessary to provide the installation of a traditional meter and the continued employment of meter readers to visit the locations of such meters to read usage.²²⁶

²²¹ Pacific Gas and Electric Company’s Brief on Questions Presented by Assigned Commissioner’s Ruling (PG&E Brief), filed July 16, 2012, at 5.

²²² PG&E Brief at 5.

²²³ Opening Brief of San Diego Gas & Electric Company and Southern California Gas Company (SDG&E and SoCalGas Brief), filed July 16, 2012, at 4-5 and Attachments A and B.

²²⁴ Department of Justice, *Title III Technical Assistance Manual*, § III-4.1400.

²²⁵ SDG&E and SoCalGas Brief at 6, citing 42 U.S.C. § 12182(b)(2)(A)(i) and 28 C.F.R. § 36.301(a).

²²⁶ SDG&E and SoCalGas Brief at 6.

Moreover, the utilities propose that Title III does not prohibit imposition of surcharges in all cases, and may be imposed when “necessary for the provision of the goods, services, facilities, privileges, advantages, or accommodations being offered.”²²⁷ The utilities urge opt-out fees assessed by the utilities are necessary for providing services requested by individual opt-out customers, which includes costs the utilities will incur by “employing meter readers who must visit individual opt-out residences to determine the amount of power utilized during each billing period.”²²⁸

7.2. ADA

Title II of the ADA states that “no qualified individual with a disability shall, by reason of such disability, be excluded from participation in or be denied the benefits of the services, programs, or activities of a public entity, or be subjected to discrimination by any such entity.”²²⁹ “Disability” is defined as “a physical or mental impairment that substantially limits one or more of the major life activities” of an individual.²³⁰ Under the ADA, a qualified individual with a disability means “an individual with a disability who, with or without reasonable modifications to rules, policies, or practices, the removal of architectural, communication, or transportation barriers, or the provision of auxiliary aids and services, meets the essential eligibility requirements for the receipt of services or the participation in programs or activities provided by a

²²⁷ SDG&E and SoCalGas Brief at 6.

²²⁸ SDG&E and SoCalGas Brief at 6.

²²⁹ 42 U.S.C. § 12132.

²³⁰ 42 U.S.C. § 12102(1)(A).

public entity.”²³¹ This section also states that a “public entity” includes, “any state or local government,” and “any department, agency, [or] special purpose district.”²³²

Federal regulation implementing Title III of the ADA prohibits a public entity from placing a surcharge on a “particular individual with a disability or any group of individuals with disabilities to cover the costs of measures, such as the provision of auxiliary aids or program accessibility, that are required to provide that individual or group with the nondiscriminatory treatment required by the Act or this part.”²³³

7.3. Pub. Util. Code § 453 and Other State Laws

Pub. Util. Code §453 provides protections similar to the ADA for those with medical conditions. Specifically, Pub. Util. Code § 453(b) states that “No public utility shall prejudice, disadvantage, or require different rates or deposit amounts from a person because of . . . medical condition . . . or any characteristic listed or defined in Section 11135 of the Government Code.”

7.4. Discussion

There is no dispute that the Commission is subject to Title II of the ADA. However, we do not find that the IOU’s provision of an opt-out service falls within the scope of Title III of the ADA. First, public utilities are not within the enumerated categories of public entities. Indeed, CforAT concedes it “has been unable to locate any authority definitely addressing the extent to which an IOU providing electrical service to a customer at a customer’s residence (using a

²³¹ 42 U.S.C. § 12131(2).

²³² 42 U.S.C. §12131-12165.

²³³ 28 C.F.R. § 36.301(c).

meter located at or near such residence) is a public accommodation subject to the provisions of the ADA.”²³⁴ Second, CforAT’s argument that placement of a meter at a person’s residence provides the necessary nexus to bring the opt-out service under the ADA overreads the holding by the *Netflix* court. As CforAT states “[t]he extent to which services that are not offered to a customer at a public, physical facility are subject to Title III of the ADA is unclear.”²³⁵ Here, residential electric service is offered only at a customer’s location, not in a public, physical facility.

We agree that it is unclear that an RF-enabled electric or gas meter is a public, physical facility subject to the ADA. However, parties have not cited to any legal authority regarding the applicability of ADA and/or state anti-discrimination law to the subject of exposure to smart meter RF/EMF emanations. On the contrary, no court or agency has found that RF sensitivity is a “disability” or “physiological disorder” subject to the ADA. Further, as discussed by SDG&E and SoCalGas, “the Commission has directed the utilities to impose the opt-out fee equally on all customers regardless of disability status[.]”²³⁶ Thus, individuals and/or groups that claim adverse effects from RF sensitivity are not subject to a surcharge for their choice to use a wired electric and/or gas meter that is not equally applied to other utility customers.²³⁷

²³⁴ CforAT Brief at 6.

²³⁵ CforAT Brief at 7.

²³⁶ SDG&E and SoCalGas Brief at 6.

²³⁷ Existing IOU electric and gas rules allow for relocation of utility equipment, which includes the meter, for a certain cost. See PG&E Electric Rule 16 (F)(2)(b), SCE Electric Rule 16 (F)(2)(b), SDG&E Electric Rule 16 (F)(2)(b), and SoCalGas Gas Rule 21 (F)(2)(b).

Given the legal authority presented, we have no basis to conclude that the ADA limits the Commission's ability to adopt fees and charges for all customers who elect to opt-out of having a wireless smart meter at their location. However, there may be a need to reconsider this issue in the future should a court or agency determine that RF sensitivity can trigger ADA requirements.²³⁸

Similarly, the opt-out fees do not violate Pub. Util. Code § 453(b)'s prohibition on different rates based on "medical condition" or any "characteristic" listed in Gov. Code § 11135.²³⁹ Under Gov. Code § 11135, "disability" means any mental or physical disability as defined specifically in Gov. Code § 12926, and RF sensitivity is not included in any of the extensive definitions.²⁴⁰ Since RF sensitivity is not a recognized disability, the ADA, Pub. Util. Code 453(b), and supporting regulations do not limit the Commission's ability to adopt opt-out service charges and fees for all opt-out customers. However, as noted above, there may be a need to reconsider this issue in the future should a court or agency determine that RF sensitivity can trigger ADA requirements.

Finally, the opt-out fees are not based on any customer's medical condition; they are based solely on whether a customer chooses an analog meter

²³⁸ The FCC has an open proceeding seeking comment on new proposals "regarding compliance with [FCC] guidelines for human exposure to RF electromagnetic fields" (First Report and Order Further Notice of Proposed Rule Making and Notice of Inquiry adopted on March 27, 2013 in ET Docket Nos. 03-137 and 13-84.) such analysis may provide relevant evidence regarding safe levels of RF/EMF exposure.

²³⁹ PG&E Brief at 3.

²⁴⁰ Cal. Govt. Code § 11135(c)(1); Cal Govt. Code § 12926(i), (j), (l). Gov. Code § 12926, subd. (j) defines mental disability and subd. (m) defines mental and physical disability, while subd. (n) states that the definition of "disability" under the ADA would apply if it resulted in a broader protection of civil rights.

or a wireless meter, without regard to the reason for doing so.²⁴¹ Moreover, a complainant alleging discrimination under Pub. Util. Code § 453 must show not only that different allocations apply to different groups of customers, but rather that the process is unreasonable or unfair.²⁴² Here, opt-out fees are assessed to recover costs associated with providing opt-out customers with a different service from the service provided to the majority of utility customers.²⁴³ Consequently, even if RF sensitivity were found to trigger ADA requirements, a complainant would still need to make the necessary showing that the process is unreasonable and unfair before there is a finding that opt-out charges and fees are in violation of Pub. Util. Code § 453. We therefore maintain opt-out fees as discussed elsewhere in this decision.

8. Comments on Alternate Proposed Decision

The alternate proposed decision of Commissioner Peevey was mailed to the parties in accordance with Section 311 of the Public Utilities Code and comments were allowed under Rule 14.3 of the Commission's Rules of Practice and Procedure. Comments were filed on November 18, 2014 by PG&E, SCE, SDG&E, SoCalGas, TURN, DRA, Aglet, CforAT, CARE, SCWSSM, CEP, Jeromy Johnson, PIF, EON and Network. Reply comments were filed on November 24, 2014, by PG&E, SCE, SoCalGas, TURN, DRA, Aglet, and Network. We have revised the decision, as necessary, in response to comments and reply comments.

²⁴¹ SDG&E and SoCalGas Brief at 7. *See also* D.12-02-014 at 16 ("Eligibility to opt out of receiving a wireless SmartMeter is not predicated on whether the meter has affected the customer's health. Rather, as has been stated by the ALJ, a customer shall be allowed to opt out of a wireless SmartMeter for any reason, or for no reason.").

²⁴² SDG&E and SoCalGas Brief at 7, citing *Wannenmacher v. Del Oro Water Company*, 1993 Cal. PUC LEXIS 620 (Cal. PUC 1993).

²⁴³ SDG&E and SoCalGas Brief at 7-8.

In their comments and reply comments Aglet, TURN, PG&E, SDG&E, SoCalGas and SCE seek clarity with regards to ordering paragraphs on balancing account treatment. All the above parties proposed similar changes to add further clarity on the ratemaking proposal. We adopt Aglet's revision with some modification. The revisions authorize the utilities to create balancing accounts to record the amount of revenues collected from opt-out customers as compared to the recorded costs of opt-out service.

In its comments and reply comments TURN contends that the record amply supports bimonthly meter reading as a means to lower costs.²⁴⁴ This request is opposed by PG&E and SCE, and supported by DRA. Upon reconsideration, we have revised the final decision to allow for bimonthly meter reading.

PG&E asks the Commission to revise the disallowance on PG&E's position for unable-to-complete (UTC) meters from \$11 million to \$6.2 million. Based on these numbers PG&E is requesting that revenue requirement be adjusted from \$11.789 million to \$15.076 million.²⁴⁵ TURN notes in its reply comments that PG&E's rebuttal and errata testimony did lower its capital cost forecast from \$14.517 million to \$9.718 million. However, TURN contends PG&E's calculation of the disallowed costs stating that the percentage of disallowance should be

²⁴⁴ Opening Comments of The Utility Reform Network on the Proposed Decision Regarding Smartmeter Opt-Out Provisions, filed November 18, 2014, at 4.

²⁴⁵ Opening Comments of Pacific Gas and Electric Company on Proposed and Alternate Proposed Decisions Regarding Smart Meter Opt-Out Provisions, filed November 18, 2014, at 1-3.

applied to the revised meter exchange capital cost forecast.²⁴⁶ The result is a \$7.36 million disallowance as oppose to \$6.2 million proposed by PG&E in its comments. We agree with TURN and revise the disallowance from \$11 million to \$7.36 million. We reject PG&E's requested change as all these calculations are based on forecasted numbers. Moreover, we are allowing PG&E to recover its costs in subsequent GRC's once it has made a showing of actual incurred costs. Since PG&E shall file opt-out revenues collected to match their actual costs; we do not see a significant need to revisit the revenue requirement calculations.

As a result of our clarification that we are setting a cost cap and not a revenue requirement, we correct this decision to reflect PG&E's cost cap of \$35.344 million, rather than the \$11.789 million revenue requirement that had been contained in the proposed decision. There are no changes to the amounts adopted for SCE, SDG&E or SoCalGas.

In its comments, SCE states that the Commission should allow recovery of incremental costs associated with billing system modifications to separately track every opt-out customer's start and end date if the alternate decision is adopted. The decision opines on this matter later in the section. SCE is also asking that it be allowed to continue to record exit-related costs and recover them from nonparticipating customers.²⁴⁷ In addition it's seeking to transfer its year-end 2014 Edison SmartConnect® Opt-Out Memorandum Account (SOMA) balance to the Base Revenue Requirement Balancing Account (BRRBA) on January 1, 2015,

²⁴⁶ Reply Comments of The Utility Reform Network on the Proposed Decision Regarding Smartmeter Opt-Out Provisions, Filed November 24, 2014, at 4.

²⁴⁷ *Southern California Edison Company's Opening Comments on Proposed Decision and Alternate Proposed Decision Regarding Smart Meter Opt-Out Provisions (SCE Opening Comments)*, filed November 18, 2014, at 5.

which would allow recovery prior to its 2018 GRC. It also seeks to adjust the smart meter opt-out fees and charges as part of its current 2015 GRC proceeding (A.13-11-003).²⁴⁸ We reject these requests. SCE's GRC proceeding is almost coming to a close and adding issues this late does not seem fair for all parties to respond on new issues, especially when the amount in question is not substantial that warrants expedient recovery and safety from any uncertainty in cost recovery. In its reply comments SCE further explains its position on exit fee and request that it is allowed to record these costs in balancing account and recover them from non-participating customers in its 2018 GRC. With regards to exit fee costs, the Commission has declined to impose exit fees. SCE shall exclude from the balancing account the exit fee costs. If SCE continues to have experience with this opt-out program, these costs and fees can be re-evaluated in its next GRC. SCE shall bear the responsibility of showing its actual costs and reinstated benefits to support an addition of any exit fee. We also reject its request to adjust fee in the 2015 GRC.

In its comments, SCE requests that the decision be modified to remove the discount for Family Electric Rate Assistance (FERA) customers consistent with the fee structure adopted for SCE in D.12-04-018, which set the interim fee structure and assessed a discount to CARE customers only.²⁴⁹ We accept that modification and make appropriate revisions in the decision.

In its comments SDG&E is requesting to divide the 2012-2014 program costs of \$1,474,754.58 by 3, so that it can specifically have an annual revenue

²⁴⁸ SCE Opening Comments at 7.

²⁴⁹ SCE Opening Comments at 6.

requirement of \$491,584.86.²⁵⁰ We reject this modification because forecasted revenue requirement may then be used as a measure or a cap to achieve recorded costs in balancing account. Moreover, revised language in the ordering paragraphs orders the utilities to recover the costs of opt-out service through recorded cost ratemaking. SDG&E further notes that ordering paragraph 9 should be revised to allow for transfer of balances in existing authorized memorandum accounts to balancing accounts, otherwise, SDG&E contends that it would have to wait until 2019 and their next GRC proceeding to clear these costs.²⁵¹ As opined above in the SCE case, the decision denies this request and asks utilities to recover cost recovery in their next GRC cycle.

CforAT, CEP, SCWSSM, Network, Jeromy Johnson and PIF raise various arguments regarding the proposed decision's determinations concerning whether the ADA or Pub. Util. Code § 453(b) limits the Commission's ability to adopt fees and charges for all customers who elect to participate in the opt-out option. We have considered these arguments and revised this discussion accordingly.

9. Assignment of Proceeding

Michael Peevey is the assigned Commissioner and Amy Yip-Kikugawa is the assigned Administrative Law Judge in this proceeding.

²⁵⁰ Comments of San Diego Gas & Electric Company on Proposed Decision and Alternate Proposed Decision (SDG&E Opening Comments), filed November 18, 2014, at 2.

²⁵¹ SDG&E Opening Comments at 3.

Findings of Fact

1. D.12-02-014, D.12-04-019, D.12-04-018 and D.14-02-019 adopted interim fees and charges for residential customers who elected to opt out of having a wireless smart meter installed in their location.
2. PG&E's proposed costs for providing an opt-out option include costs for customer operations support, metering, and information technology.
3. PG&E has provided evidence that refurbishing meters would be prohibitively costly and that it paid market price for new meters.
4. PG&E representatives were making multiple trips to UTC customer locations prior to the availability of an opt-out option and will continue to do so in response to issues with AMI unrelated to the opt-out option.
5. SCE's proposed costs for providing an opt-out option include costs for impacts to the Edison SmartConnect network, acquisition of communication network equipment and installation of communication network equipment.
6. Notwithstanding the opt-out option, SCE proposes to eliminate the meter reading job classification by 2013 and have subsequent manual reads completed by Field Service Representatives.
7. PG&E proposed that the Commission maintain the same residential customer opt-out charges it approved on an interim basis in D.12-02-014.
8. PG&E proposed that the remaining portion of revenue requirements that exceed the revenues collected from the Program's customer opt-out charges be allocated to all PG&E customers paying distribution costs.
9. SCE, SDG&E and SoCalGas proposes to allocate all identified costs for providing the opt-out option to those residential customers selecting this option.
10. TURN recommends that any resulting under-collections should be allocated to the relevant utility AMI balancing accounts.

11. PG&E's forecast of participants was reduced from 148,500 customers in Phase I of the proceeding to 54,000 in Phase 2, of the proceeding.

12. SCE, SDG&E and SoCalGas proposes to impose an exit fee on opt-out customers who revert back to standard smart meter service or who move from one location to another within its service territory.

13. D.13-05-010 granted SDG&E full recovery for their legacy meters.

14. All parties agree that the only opt-out option should be an all-analog meter.

15. The purpose of exit fees is to recover the cost of installing a smart meter.

16. The opt-out option is not available to non-residential customers and the record in this proceeding does not have sufficient evidence that non-participants should bear any portion of the costs associated with the opt-out option.

17. Many of the proposals for alternatives to monthly meter reads for opt-out customers entail additional utility expenses and/or complexity.

18. Pre-smart meter service almost universally involved monthly meter reads and monthly billing.

19. Estimated meter reads and levelized payment plans for customer bills are routinely used by the IOUs.

20. Adopting bi-monthly meter reading may result in lower recurring meter reading costs. Pursuant to Article XII, Sections 3 and 8 of the California Constitution, the Commission cannot delegate its authority to regulate public utilities to another entity or public agency without statutory authorization.

21. The Legislature has granted the Commission authority over a public utility's infrastructure, including the installation of electric or gas metering equipment.

- Residential electric service is offered only at a customer's location, not in a public, physical facility.

- It is unclear that an RF-enabled electric or gas meter is a public, physical facility subject to the ADA.
- The opt-out fees and charges are imposed on all customers, regardless of disability status.
- Opt-out fees and charges are assessed to recover costs associated with providing opt-out customers with a different service from the standard service established for utility customers.
- RF sensitivity is not defined as a characteristic protected under Gov. Code § 11135.

Conclusions of Law

1. TURN's definition of incremental costs would lead to an improper "cherry-picking" of PG&E's general rate case settlement and would result in retroactive ratemaking.
2. In determining whether a cost is associated with providing the opt-out option, one must determine whether the IOU would have incurred the cost but for the opt-out option.
3. PG&E's Customer Operations Support costs were incurred to provide the opt-out option.
4. PG&E's proposed \$3.323 million project management costs are supported by the record.
5. PG&E's proposed Metering costs should be reduced by \$7.36 million to exclude expenses for trips to UTC customers.
6. It is implausible that PG&E needs approximately two handheld meter reader devices per meter reader because of routine maintenance.
7. PG&E's meter reader device purchase costs should be reduced.
8. PG&E should be allowed to recover the cost of 200 meter reader devices.

9. PG&E's proposal to split the capital costs of the new hand-held meter readers 50/50 between the opt-out option and current operations is reasonable.

10. PG&E's opt-out revenue requirement should be decreased to reflect the disallowance of costs of trips to UTC smart meter installations and the costs of excessive hand-held meter reading devices.

11. SCE's opt-out program revenue requirements should be decreased by \$312,900 to disallow costs associated with meter "turn-offs."

12. SDG&E's opt-out program revenue requirement should be decreased by \$27,934 to account for the recovery of legacy meter costs authorized in

D.13-05-010.

13. SoCalGas' estimated opt-out program costs should be decreased to disallow costs in excess of \$4.5 million for the years 2012-2014.

14. A rate cap on opt-out fees and charges should be established to ensure that customers are not unreasonably deterred from electing this option.

15. The opt-out fees adopted in D.12-01-014 strike a reasonable balance between requiring opt-out customers to pay for costs for electing this option and maintaining service affordability.

16. The initial opt-out fee should be set at \$75 for Non-CARE customers and \$10 for CARE customers.

17. The monthly opt-out cost should be set at \$10 for Non-CARE customers and \$5 for CARE customers.

18. The collection of the monthly charge from opt-out customers should be limited to three years from the date they choose to opt-out.

19. The remaining portion of revenue requirements that exceed the revenues collected from the opt-out charges are to be allocated to the residential customer class as a whole.

20. Each utility should collect opt-out fees and charges on a per location, not per meter, basis.

21. For dual commodity utilities, the opt-out fees and charges should be imposed regardless of whether the customer opts-out of an electric smart meter, a gas smart meter, or both.

22. For customers served by two utilities, separate opt-out fees and charges shall be paid to each utility that serves them.

23. Exit fees should not be assessed upon opt-out customers.

24. The utilities should offer bi-monthly meter reading with estimated bills and levelized payment plans to customers selecting the opt-out option.

25. Local governments and entities such as condominiums and other multi-unit dwellings should not be allowed to exercise the opt-out option on behalf of individual resident.

26. Since a community opt-out option may not be offered, there is no need for further consideration of cost issues related to a community opt-out option.

27. The opt-out fees and charges are not an impermissible surcharge required only of persons who opt-out for medical reasons.

28. No court or agency has found that RF sensitivity is a "disability" or "psychological disorder" subject to the ADA.

29. The IOU's provision of an opt-out service does not fall within the scope of Title III of the ADA.

30. The opt-out fees and charges do not violate the ADA.

31. The opt-out fees and charges do not violate Pub. Util. Code § 453(b).

32. Applications 11-03-014, 11-03-015 and 11-07-020 should be closed.

O R D E R

IT IS ORDERED that:

1. Pacific Gas and Electric Company is authorized to recover the costs of opt-out service through recorded cost ratemaking, with the exception ordered herein.

2. Pacific Gas and Electric Company shall establish the following fees for residential customers selecting the opt-out option;

For Non-California Alternative Rates for Energy (CARE) and Non-Family Electric Rate Assistance (FERA) Customers:

Initial Fee \$75.00
Monthly Charge \$10.00/month

For CARE and FERA Customers:

Initial Fee \$10.00
Monthly Charge \$5.00/month

3. Pacific Gas and Electric Company shall collect the monthly charge from residential customers who opt-out of the program for a period of three years from the date the customer chooses to opt-out.

4. Pacific Gas and Electric Company is authorized to allocate the portion of revenue requirements that exceed the revenues collected from the opt-out charges to the residential customer class as a whole.

5. Pacific Gas and Electric Company (PG&E) is authorized to file a Tier 1 Advice Letters to create electric and gas balancing accounts to record the amount of revenues collected from opt-out customers as compared to the recorded costs of opt-out service. PG&E shall exclude from the balancing account: revenue requirements for trips to unable-to-complete smart meter installations; and costs of hand-held meter reading devices in excess of 200 devices. PG&E shall propose

any future adjustments to the opt-out charge or monthly fees to account for over- or under-collections as part of its GRC application filing.

6. Pacific Gas and Electric Company shall include a summary of costs incurred and revenues collected associated with providing the opt-out option, starting in its next available General Rate Case. This summary shall identify the portion of revenues collected from opt-out charges, the portion of revenue that was over or under collected, and subsequent allocation or refunds that will be made to the residential customer class.

7. Southern California Edison Company is authorized to recover the costs of opt-out service through recorded cost ratemaking, with the exception ordered herein.

8. Southern California Edison Company shall establish the following fees for residential customers selecting the opt-out option;

For Non-California Alternative Rates for Energy (CARE) Customers:

Initial Fee	\$75.00
Monthly Charge	\$10.00/month

For CARE Customers:

Initial Fee	\$10.00
Monthly Charge	\$5.00/month

9. Southern California Edison Company shall collect the monthly charge from residential customers who opt-out of the program for a period of three years from the date the customer chooses to opt-out.

10. Southern California Edison Company is authorized to allocate the portion of revenue requirements that exceed the revenues collected from the opt-out charges to the residential customer class as a whole.

11. Southern California Edison Company (SCE) is authorized to file a Tier 1 Advice Letter to create a balancing account to record the amount of revenues

collected from opt-out customers as compared to the recorded costs of opt-out service. SCE shall exclude from the balancing account the "exit-fee" costs. SCE shall propose any future adjustments to the opt-out charge or monthly fees to account for over- or under-collections as part of its GRC application filing.

12. Southern California Edison Company shall include a summary of costs incurred and revenues collected associated with providing the opt-out option, starting in its next available General Rate Case. This summary shall identify the portion of revenues collected from opt-out charges, the portion of revenue that was over or under collected, and subsequent allocation or refunds that will be made to the residential customer class.

13. San Diego Gas & Electric Company is authorized to recover the costs of opt-out service through recorded cost ratemaking, with the exception ordered herein.

14. San Diego Gas & Electric Company shall establish the following fees for residential customers selecting the opt-out option;

For Non-California Alternative Rates for Energy Customers:

Initial Fee	\$75.00
Monthly Charge	\$10.00/month

For CARE Customers:

Initial Fee	\$10.00
Monthly Charge	\$5.00/month

15. San Diego Gas & Electric Company shall collect the monthly charge from residential customers who opt-out of the program for a period of three years from the date the customer chooses to opt-out.

16. San Diego Gas & Electric Company is authorized to allocate the portion of revenue requirements that exceed the revenues collected from the opt-out charges to the residential customer class as a whole.

17. San Diego Gas & Electric Company (SDG&E) is authorized to file a Tier 1 Advice Letters to create electric and gas balancing accounts to record the amount of revenues collected from opt-out customers as compared to recorded costs of opt-out service. SDG&E shall exclude from the electric balancing account \$27,934 attributable to the purchase of analog meter electric meters. SDG&E shall propose any future adjustments to the opt-out charge or monthly fees to account for over- or under-collections as part of its GRC application filing.

18. San Diego Gas & Electric Company shall include a summary of costs incurred and revenues collected associated with providing the opt-out option, starting in its next available General Rate Case. This summary shall identify the portion of revenues collected from opt-out charges, the portion of revenue that was over or under collected, and subsequent allocation or refunds that will be made to the residential customer class.

19. Southern California Gas Company is authorized to recover the costs of opt-out service through recorded cost ratemaking, with the exception ordered herein.

20. Southern California Gas Company shall establish the following fees for residential customers selecting the opt-out option;

For Non-California Alternative Rates for Energy (CARE) Customers:

Initial Fee	\$75.00
Monthly Charge	\$10.00/month

For CARE Customers:

Initial Fee	\$10.00
Monthly Charge	\$5.00/month

21. Southern California Gas Company shall collect the monthly charge from residential customers who opt-out of the program for a period of three years from the date the customer chooses to opt-out.

22. Southern California Gas Company is authorized to allocate the portion of revenue requirements that exceed the revenues collected from the opt-out charges to the residential customer class as a whole.

23. Southern California Gas Company (SoCalGas) is authorized to file a Tier 1 Advice Letter to create a balancing account to record the amount of revenues collected from opt-out customers as compared to the recorded costs of opt-out service. SoCalGas shall exclude from the balancing account all costs in excess of \$4.5 million for the years 2012-2014. SoCal Gas shall propose any future adjustments to the opt-out charge or monthly fees to account for over- or under-collections as part of its GRC application filing.

24. Southern California Gas Company shall include a summary of costs incurred and revenues collected associated with providing the opt-out option, starting in its next available General Rate Case. This summary shall identify the portion of revenues collected from opt-out charges, the portion of revenue that was over or under collected, and subsequent allocation or refunds that will be made to the residential customer class.

25. Pacific Gas and Electric Company, Southern California Edison Company, San Diego Gas & Electric Company and Southern California Gas Company shall implement bi-monthly (every two months) meter reading bill plan for customers who elect the smart meter opt-out option.

A.11-03-014 et al. COM/MP1/sbf/dc3

26. Applications 11-03-014, 11-03-015 and 11-07-020 are closed.

This order is effective today.

Dated December 18, 2014, at San Francisco, California.

MICHAEL R. PEEVEY

President

MICHEL PETER FLORIO

CATHERINE J.K. SANDOVAL

CARLA J. PETERMAN

MICHAEL PICKER

Commissioners