BEFORE THE MINNESOTA OFFICE OF ADMINISTRATIVE HEARINGS
600 North Robert Street
St. Paul, MN 55101

FOR THE MINNESOTA PUBLIC UTILITIES COMMISSION
121 Seventh Place East Suite 350
St. Paul, MN 55101-2147

IN THE MATTER OF THE FURTHER INVESTIGATION INTO ENVIRONMENTAL AND SOCIOECONOMIC COSTS UNDER MINN. STAT. § 216B.2422, SUBD. 3	MPUC DOCKET NO. E999/CI-14-643 OAH DOCKET NO. 80-2500-31888

REPLY BRIEF OF DOCTORS FOR A HEALTHY ENVIRONMENT

Pursuant to Minn. Rule 1400.7100 and the Prehearing Orders issued in this matter, the Minnesota Public Health Association, Twin Cities Medical Society, Dr. Bruce Snyder, Dr. Phil Murray and Dr. Michael Menzel (collectively, "Doctors for a Healthy Environment") hereby submit the following Reply Brief in reply to the Initial Briefs filed by Peabody Energy Corp. ("Peabody") and the Minnesota Large Industrial Group ("MLIG").

BACKGROUND

By its order of October 15, 2014, the Public Utilities Commission referred this matter to the Office of Administrative Hearings for a contested case hearing to determine appropriate "externality" values for CO_2, SO_2, NOx, and PM2.5 under Minn. Stat. § 216B.2422, subd. 3. The matter was bifurcated into two phases and an evidentiary hearing on the CO_2 phase was held September 24-30, 2015. At issue in the CO_2 phase is whether the Federal Social Cost of Carbon (FSCC) is reasonable and the best available measure to determine the environmental cost of CO_2 under Minn. Stat. § 216B.2422, subd. 3 and, if not, what measure is better supported by the evidence."

In its initial brief, Peabody makes a number of assertions regarding the health impacts of global climate change that are unsupported by the medical literature. They argue:

- "Medical impacts such as respiratory disorders will be lessened by any warming";[1]
- CO_2 does not cause asthma;
- the IAMs do not take into account the health benefits of mild warming;
- the AR5 finds uncertain health effects of air quality due to climate change;
- mild warming will reduce asthma; and
- cold is a greater health threat than heat.

As explained below and in DHE's Initial Brief on CO_2 Externality Values, these claims have no support in the medical or climate change literature.

DHE also offers this brief in reply to arguments made by MLIG in its Initial Brief. MLIG argued that DHE "failed to produce admissible foundational evidence to support adoption of the FSCC,"[2] because DHE's witness Dr. Rom "was neither qualified to opine about the reliability, practicability, or appropriateness of the FSCC for application in the Minnesota regulatory context." Aside from this claim, MLIG also disputes Dr. Rom's argument that "heat has outweighed coal [sic] in mortality,"[3] apparently objecting on the grounds that Dr. Rom is not an expert on DICE, PAGE, or FUND.

DISCUSSION

To support its contention that the Commission should not adopt the FSCC, Peabody argues that increases in atmospheric CO_2 and the resultant rise in average global temperatures

[1] Peabody's Initial Br. at 68.
[2] MLIG's Post-Hearing Br. at 14.
[3] Id. at 13.

will decrease certain respiratory disorders and cold-related deaths.[4] This argument heavily relies on misinterpretations of scientific studies, misrepresentations of opposing parties' arguments, and unsupported assumptions that unspecified adaptive technologies will become globally ubiquitous and resolve many of the human health problems resulting from climate change. Most fundamentally, however, this argument simply does not reflect the current medical understanding of the epidemiological effects of global climate change.

I. Peabody's Arguments on the Health Impacts of Global Climate Change

A. Cold Is Not a Worse Threat to Human Health than Heat

As it addresses this issue in more detail, DHE hereby incorporates by reference its Initial Brief on CO_2 Externality Values filed in this matter on November 24, 2015. As noted there, Peabody and its experts continuously misunderstand the significance of the medical literature on temperature-related mortality and morbidity. It is universally acknowledged that warmer temperatures may alleviate cold-related mortality to some extent, but the literature is consistent and unanimous that the *NET* effect of warmer temperatures will be a rise in temperature-related mortality, as the increases in heat-related deaths will vastly outnumber the decreases in cold-related deaths.[5] Peabody simply refuses to acknowledge this key aspect of the medical literature, and their argument is therefore fundamentally based on a poor understanding of the science.

Peabody cites Professor Happer and Dr. Bezdek to assert that cold is "by far" the worse threat to human health, based on data from mid-high latitude locations demonstrating more deaths related to cold temperatures than hot temperatures.[6] Dr. Bezdek lists 47 articles in Exhibit 231, Compendium of Scientific Literature on Climate Change, that he claims demonstrate that "Humans Would Flourish In A Moderately Warmer Climate, and Adaptation Will Increase the

[4] Peabody's Initial Br. at 68-69.
[5] *See, e.g.,* DHE's Initial Br. at 11-18.
[6] Peabody's Initial Br. at 69.

Benefits Even More."[7] Not only do these articles focus on areas with moderate climates, but Dr. Bezdek either misinterprets or ignores findings contrary to his theory that humans will thrive in a warmer climate. For example, while the Vardoulakis et al. study did find that cold-related mortality in the United Kingdom is expected to decrease due to global warming from 61 to approximately 42 deaths per 100,000 people per year, it also found that "in England and Wales, the annual mean heat-related mortality was estimated to increase overall by approximately 90% between the 2020s and 2050s."[8] Furthermore, in the five Australian cities studied, "the annual mean heat-related mortality is projected to increase overall by approximately 70% between the 2020s and 2050s."[9] The study ultimately concluded that "health protection from hot weather will become increasingly necessary."[10]

Other studies that Dr. Bezdek cites as demonstrating that humans will thrive are limited by their own conclusions or cannot be used to support general claims of the net benefit of future warming on humans. For example, one study found that "[i]n the context of climate change, substantial reductions in cold-related mortality are very likely in *mid-latitudinal regions*," a conclusion that inherently does not apply to other climates.[11] Another study concluded that "cooling was the ultimate cause, and cooling driven economic downturn was the direct cause, of

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[7] Ex. 231, Bezdek Compendium of Scientific Literature on Climate Change at 107-114.
[8] *Id.* at 113 (citing S. Vardoulakis et al., *Comparative Assessment of the Effects of Climate Change Heat- and Cold-Related Mortality in the United Kingdom and Australia*, 122 Environmental Health Perspectives 1285, 1288 (2014), http://ehp.niehs.nih.gov/1307524).
[9] *Id.* (quoting S. Vardoulakis et al., *Comparative Assessment of the Effects of Climate Change Heat- and Cold-Related Mortality in the United Kingdom and Australia*, 122 Environmental Health Perspectives 1285, 1288 (2014), http://ehp.niehs.nih.gov/1307524).
[10] *Id.* (quoting S. Vardoulakis et al., *Comparative Assessment of the Effects of Climate Change Heat- and Cold-Related Mortality in the United Kingdom and Australia*, 122 Environmental Health Perspectives 1285, 1285 (2014), http://ehp.niehs.nih.gov/1307524).
[11] Ex. 231, Bezdek Compendium of Scientific Literature on Climate Change at 108 (emphasis added) (citing J. Kysely et al., *Comparison of Hot and Cold Spell Effects on Cardiovascular Mortality in Individual Population Groups in the Czech Republic*, 49 Climate Research 113 (2011), http://www.int-res.com/articles/cr_oa/c049p113.pdf).

large-scale human crises in preindustrial Europe and the Northern Hemisphere."[12] Bezdek extrapolates this to be proof that future warming will have the opposite effect, but that assertion is not based in fact or supported by any evidence.

As explained in some detail in DHE's Initial Brief, despite Peabody's continued insistence to the opposite, *every* study that offers a conclusion on the *net* effects of temperature-related mortality due to climate change has concluded that mortality will *increase*, not decrease, even if cold-related deaths decline somewhat.

B. Peabody's Argument that Warming Will Improve Health Depends on Misstatements of the Positions of FSCC Proponents and Misinterpretations of Science

Peabody prefaces its claim that global warming will have a net positive impact on human health with an argument that CO_2 does not directly cause respiratory illness.[13] However, Peabody's assertion that FSCC proponents portray CO_2 as a direct cause of respiratory illness is incorrect. Based on this misunderstanding of the argument, Peabody argues that without direct causality, CO_2 should not be treated as a common pollutant.[14] In response to Dr. Rom, Peabody cites Professor Happer's demonstration of the CO_2 levels inside the Public Utilities Commission hearing room, and the fact that the room's inhabitants were still breathing, as "proof" of the harmlessness of CO_2.[15] This argument is not relevant, except as evidence of Peabody's pattern of misconstruing and misunderstanding scientific literature. No one is arguing that CO_2 directly causes asthma or respiratory issues. The issue is not whether CO_2 or temperature directly causes asthma. Rather, the science shows that increases in CO_2 and temperature indirectly cause

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[12] *Id.* (citing D.D. Lang et al., *The Causality Analysis of Climate Change and Large-Scale Human Crisis*, 108 Proceedings of the National Academy of Sciences USA 17296 (2011), http://www.pnas.org/content/108/42/17296.full.pdf).
[13] Peabody's Initial Br. on CO_2 at 68.
[14] *Id.*
[15] *Id.*; Ex. 202, Happer Direct Report at 2.

respiratory diseases through interaction with surface ozone, $PM_{2.5}$, and environmental factors such as increased pollen and microbe count.

Peabody attempts to dispute these indirect effects of CO_2 and temperature increases on respiratory illness by rejecting the fact that climate change will lead to increases in surface ozone.[16] Peabody argues that the IPCC's Fifth Assessment Report demonstrates air quality uncertainty because it found "high confidence that globally, warming decreases background surface ozone."[17] However, that statement is taken out of context and misrepresents the actual findings. The next sentence in the report acknowledges that "[h]igh CH_4 levels (as in RCP8.5) can offset this decrease, *raising* background surface ozone by year 2100 on average by about 8 ppb (25% of current levels) relative to scenarios with small CH_4 changes."[18] Thus, contrary to Peabody's assertion, a decrease in surface ozone due to increased temperature would not be actualized. Further contrary to Peabody's position, the Fifth Assessment Report finds that "locally higher surface temperatures in polluted regions will trigger regional feedbacks in chemistry and local emissions that will increase peak levels of ozone and $PM_{2.5}$."[19] This is consistent with the fact that emissions, not climate or temperature change, are the primary focus of the Fifth Assessment Report ozone air quality models.[20]

C. Asthma and Climate Change

DHE will not duplicate the arguments contained in its Initial Brief, but simply notes that, as explained in that brief,[21] Peabody's claim that warmer temperatures will alleviate asthma is a

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[16] Peabody's Initial Br. on CO_2 at 68-69 (quoting IPCC's Fifth Assessment Report at 22).
[17] *Id.*
[18] IPCC's Fifth Assessment Report at 22 (emphasis added). Although the externality cost of CH_4 is not at issue in this proceeding, CH_4 is a greenhouse gas like CO_2, and increases in atmospheric CH_4 contribute to warming. Ex. 800, Hanemann Direct Attachment 1 at 12.
[19] *Id.*
[20] *Id.*
[21] DHE's Initial Br. at 13-14.

profound distortion of the medical literature. It is based on studies cited by Dr. Happer indicating that growing up on a farm is associated with less asthma.[22] Needless to say, Dr. Happer's understanding of the medical literature on climate change and asthma reflects his lack of training as an actual medical professional.

D. Peabody's Assertion that Available Adaptation and Mitigation Measures Are Undervalued in the IAMs Is Neither Sufficiently Identified nor Practical, and Ignores Technological, Economic, and Social Realities

Citing Professor Mendelsohn's surrebuttal testimony, Peabody asserts that "the IAMs as they were used by the IWG overestimate adverse human health effects by undercounting the benefits of mild warming and both adaptation and mitigation that will take place."[23] Professor Mendelsohn asserts that humans will adapt to address increases in temperature resulting from climate change through the adoption of technology.[24] Mendelsohn suggests that cooling systems can become widespread across the world similar to what happened in Europe following a 2003 heat wave that killed tens of thousands of people.[25] Specifically, Mendelsohn asserts that the widespread adoption of cooling technology could become especially important in low-latitude developing countries where rising incomes would allow consumers in these countries to purchase cooling systems.[26] That air conditioning and other cooling technology are available to consumers is an assumption dependent upon a myriad of unknown and uncontrollable conditions. For this example, it is dependent on the continuity of rising income streams, the availability of air conditioning in that market, the availability of a sufficient supply of mined materials, and the existence of sufficient energy infrastructure in place to handle the electricity demands of cooling. Peabody has not demonstrated that cooling technology will become cheaper or more readily

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[22] See Ex. 206, Happer Surrebuttal at 23, fn 37.
[23] Peabody's Initial Br. on CO_2 at 68.
[24] Ex. 220, Mendelsohn Surrebuttal at 20:15-21:2.
[25] *Id.*
[26] *Id.*

accessible; Peabody merely states that cooling technology can be used to mitigate heat-based mortality. However, there are far too many variables to assume that the entire world is capable of purchasing cooling technology which itself requires increased energy to operate.

Dr. Mendelsohn casually dismisses vector borne disease risk as being readily reduced by public health measures.[27] He claims that "[m]ost of these public health measures will be put in place simply because vulnerable countries will be wealthier."[28] However, these conclusions appear to be incompatible with the World Bank report he cites, which stated that "vector-borne diseases are increasing their geographic spread and are reappearing in Eastern Europe and Central Asia."[29] Additionally, the World Bank report notes that Dengue Fever's range is expanding and that climate change is expected to double the rate of people at risk, as increased temperature and humidity will allow disease-carrying mosquitoes to expand their range.[30] Dr. Mendelsohn acknowledges that rising temperatures will increase the risk of vector-borne diseases, but he relies on assumptions that unspecified public health measures will become ubiquitous, and asserts therefore that these risks are negligible. Because it depends on such significant, unsupported assumptions, Peabody's argument that the benefits of adaptation and mitigation in response to climate change are undervalued in the IAMs is not supported by the evidence.

II. MLIG's Assertion That DHE Has Not Provided Admissible Foundational Evidence

In its Initial Post-Hearing brief, MLIG argued that DHE "failed to produce admissible foundational evidence to support adoption of the FSCC."[31] MLIG based that argument on its inaccurate opinion that Dr. Rom was not "qualified to opine about the reliability, practicability,

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[27] *Id.* at 21:2-4 (citing World Bank, World Development Report 2010: Development and Climate Change).
[28] *Id.* at 21:3-4.
[29] World Bank, World Development Report 2010: Development and Climate Change 95-97.
[30] *Id.*
[31] MLIG's Post-Hearing Br. at 14.

or appropriateness" of the FSCC, and on its mistaken contention that each party must produce sufficient evidence to satisfy the burden of proof on its own, independent of evidence produced by the other parties.[32] This is an argument relating to "the qualifications a witness or the admissibility of . . . the witness' prefiled testimony," and as such, MLIG is precluded from raising that issue in its post-hearing brief. Furthermore, even if the argument had not been waived, DHE has met the applicable standard and provided foundational evidence to support the adoption of the FSCC.

A. MLIG Waived the Right to Object to Dr. Rom's Qualifications and the Admissibility of His Testimony

MLIG contends that Dr. Rom's testimony is not "sufficient foundational evidence to support FSCC" because Dr. Rom "has no training to allow him to provide an expert opinion" on the causal connection between CO_2 levels and forest fires or the relationship between forest fires and water use for irrigation, and because he is not trained in economics, modeling, or meteorology.[33] MLIG essentially is arguing that because Dr. Rom is not specifically trained in all of the many areas relevant to the decision, his testimony is not "admissible foundational evidence."

The prehearing orders in this case establish that "objections by any party relative to the qualifications of a witness or the admissibility of any portion of a witness' prefiled testimony . . . shall be considered waived unless the objecting party states its objection by motion made to the ALJ, and serves a copy of such objections on the parties, no later than ten working days before the hearing."[34] MLIG now attempts to argue that DHE failed to produce admissible foundational evidence by calling into question Dr. Rom's professional qualifications. Because

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[32] *Id.*
[33] *Id.* at 12-13.
[34] First Prehearing Order dated December 9, 2014, at 7, ¶ 29.

MLIG failed to make these objections prior to the hearing, those arguments have been waived and cannot be raised now. Their attempt to do so at this stage is a rather transparent sandbagging effort. MLIG had the opportunity to argue that all witnesses to this case should be qualified as experts in IAM methodologies, but it chose not to do so (sensibly so, as many of the experts supported by MLIG would not have survived such scrutiny). This argument should be summarily rejected.

B. Dr. Rom's Testimony Is Admissible Foundational Evidence to Support Adoption of the FSCC

1. Dr. Rom Is An Expert In Valuing the Economic Damages of Public Health Impacts

Dr. Rom holds an M.D. and a Master's Degree in Public Health, and testified to his expertise in the area of air pollution and its harmful effects on the public.[35] He has not only practiced medicine for decades[36] but also conducted research "in the area of human responses to air pollutants and environmental background conditions, such as temperature."[37] His experience in public health is specifically tailored to the study of the economic impacts of health problems. This is the very sort of model at issue in this proceeding. The IAMs that form the foundation of the FSCC are not climate models, and understanding them does not require sophisticated training in the physical sciences. Rather, the models assign an economic estimate to a physical component, a technique that is ubiquitous in the field of public health. As an expert in public and environmental health, this is the very sort of model with which Dr. Rom has extensive experience, including publications in major peer-reviewed journals. One such model is BenMAP, the Environmental Benefits Mapping and Analysis Program, a model that Dr. Rom used as an

[35] Ex. 500, Rom Rebuttal at 3.
[36] *Id.* at 4.
[37] *Id.*

author of an article published in Environmental Health Perspectives.[38] BenMAP shares certain methodological similarities with the IAMs, and Dr. Rom's expertise in modeling health impacts is directly relevant to his understanding of the models addressed in his testimony. He may not have run the IAM himself, but he is certainly capable of understanding how the model is constructed and how it arrives at a certain estimate. He is also, therefore, capable of understanding the secondary literature on those IAMs and assessing the completeness of the IAMs' accounting of health impacts. This expertise is the foundation for his opinion about the reasonableness of those models and the FSCC.

Dr. Rom has not specifically published on the economic value of the pollutant at issue here – CO_2 – but he has published on models that assign economic values to other health impacts. Although it is true that the IAMs assign an economic value to much more than just public health impacts, Dr. Rom's experience in valuing public health impacts certainly qualifies him as an expert capable of understanding the methodologies of the IAMs. If MLIG had any objection in this regard they did not note it at the time Dr. Rom's testimony was filed.

2. Dr. Rom's Testimony Was Offered in Rebuttal to Specific Contentions Made by Witnesses to this Case

As stated in his testimony, Dr. Rom was specifically rebutting certain statements to the effect that cold is a greater health threat than heat, and that human health in general would flourish in an environment warmed by climate change. Dr. Rom explained that these contentions were dangerously unfounded, and could only be the views of someone trained in a field other than environmental medicine. He went on to explain that climate change in fact represents the

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[38] *See* Exhibit 500, Rom Rebuttal at 60 (citing Berman JD, Fann N, Hollingsworth JW, Pinkerton KE, Rom WN, Szema AM, Breysse PN, White RH, and Curriero FC. Health Benefits from Large Scale Ozone Reduction in the United States. Environ Health Persp 2012; 120: 1404-1410. Doi:10.1289/ehp.1104851).

greatest health threat of the 21st century, and that the FSCC unfortunately does not account for all of these health impacts. He concluded that although the FSCC was reasonable, it should be viewed as a best case scenario, as it is likely an underestimate of the true damages of climate change.

Dr. Rom's testimony was properly admitted as a rebuttal to these claims. His testimony was also admitted for his conclusion that the FSCC was reasonable, if likely an underestimate. Dr. Rom is not an expert in many climate change impacts (sea level rise, drought, etc.). He is, however, undisputedly an expert in the public health impacts of climate change, including the economic valuation of those impacts. As such, he is qualified to offer evidence in this case that the FSCC may not take those impacts fully into account. MLIG does not dispute this. They merely dispute that Dr. Rom can offer an opinion on the reasonableness of the FSCC in general. Their understanding of the evidentiary requirements on this issue is simply mistaken. Dr. Rom need not be an expert in sea level rise or drought to be qualified to opine that the FSCC is likely to be an underestimate. If this standard were to be applied to all of the witnesses in this case – that only PhD economists were qualified to opine on the FSCC's reasonableness – the ALJs would be tasked with the enormous burden of striking the testimony of multiple witnesses. In an issue as complicated as the one presented by this case, there is no single person on the planet who is an expert in *every* component of valuing CO_2. Some experts are trained in the physical sciences, some are trained in economics. Both of these experts may have expert opinions in this case, even though the fundamental question incorporates some issues outside their area of expertise.

3. MLIG Conflates the Burden of Proof with Evidentiary Admissability

Even if MLIG had not waived this argument, the argument would fail because MLIG has not shown that Dr. Rom's testimony is not admissible foundational evidence. MLIG conflates the standard of admissibility and the burden of proof, citing burden of proof requirements to argue

that Dr. Rom's testimony is not "admissible foundational evidence."[39] However, burden of proof and admissibility of evidence are separate inquiries. Regarding the admissibility of evidence in a contested case hearing, the Minnesota Administrative Rules provide:

> The judge may admit all evidence which possesses probative value, including hearsay, if it is the type of evidence on which reasonable, prudent persons are accustomed to rely in the conduct of their serious affairs. . . . Evidence which is incompetent, irrelevant, immaterial, or unduly repetitious shall be excluded.[40]

In contrast, burden of proof requirements concern evidence that has already been admitted into the record, and have no bearing on admissibility.[41] The individual piece of evidence in question here, Dr. Rom's testimony, need only meet the admissibility standard for a contested case hearing: It must have probative value and be "the type of evidence on which reasonable, prudent persons are accustomed to rely," and it must not be incompetent, irrelevant, immaterial, or unduly repetitious.[42]

MLIG argues that Dr. Rom's testimony is not admissible foundational evidence because Dr. Rom is not trained as an expert in every one of the many areas of study relevant to the decision.[43] However, MLIG has failed to demonstrate that Dr. Rom's qualifications fall below the standard required to admit his testimony, i.e., that it is incompetent or that reasonable and prudent persons would not rely on it.[44] Dr. Rom holds an M.D. and a Master's Degree in Public Health, and testified to his expertise in the area of air pollution and its harmful effects on the public.[45] He has not only practiced medicine for decades[46] but also conducted research "in the

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[39] MLIG's Post-Hearing Br. on CO_2 at 14 (citing Order Regarding Burdens of Proof Dated March 27, 2015).
[40] Minn. Rules Part 1400.7300, subp. 1.
[41] *See* Minn. Rules Part 1400.7300.
[42] Minn. Rules Part 1400.7300, subp. 1.
[43] MLIG's Post-Hearing Br. on CO_2 at 11-14 (stating that Doctors for a Healthy Environment "did not introduce admissible foundational evidence," but going on to explain only that the party "failed to meet its burden of proof" because Dr. Rom's area of expertise does not encompass certain points).
[44] *See* Minn. Rules Part 1400.7300, subp. 1.
[45] Ex. 500, Rom Rebuttal at 3.

area of human responses to air pollutants and environmental background conditions, such as temperature."[47]

Some of the issues Dr. Rom spoke to included information regarding environmental economic cost estimates and climatology models. He could not personally claim these as his own expertise, as he testified, but the information he used was taken from peer-reviewed and government issued studies.[48] Of course, Dr. Rom cannot be an expert in all related fields, but he used these sources as support for the opinions he has issued before the Public Utilities Commission in his own areas of expertise. Using contributory sources to supplement and support one's own expert knowledge does not preclude admissibility of evidence in a contested case hearing under Minnesota Administrative Rules.[49] Indeed, if it were then vast swathes of witness testimony in this matter would have to be excluded as incompetent, yet MLIG has only made this objection to witnesses supportive of the FSCC. Dr. Rom testified that his "conclusions about the health impacts of global climate change, however, are based on [his] first hand experience and professional training as an expert in environmental health, as well as on [his] review of the medical literature on the subject."[50] As an expert in public health, medicine, and the impacts of climate change on the human population, his testimony fits well within the range required for admissibility in a contested case hearing.

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[46] *Id.* at 4.
[47] *Id.*
[48] Ex. 500, Rom Rebuttal (citing, e.g., U.S. EPA, Climate Change in the United States: Benefits of Global Action (June 22, 2015); U.S. EPA, Regulatory Impact Analysis for the Proposed Carbon Pollution Guidelines for Existing Power Plants and Emission Standards for Modified and Reconstructed Power Plants (June 2, 2014); Peter Howard, Omitted Damages: What's Missing from the Social Cost of Carbon. Cost of Carbon Project (March 13, 2014)).
[49] Minn. Rules Part 1400.7300, subp. 1.
[50] Ex. 500, Rom Rebuttal at 20.

MLIG incorrectly implies that the admissibility of evidence depends on meeting the burden of proof.[51] This is inaccurate, as explained above. A piece of evidence need not support the adoption of the FSCC by a preponderance of the evidence on its own in order to qualify as admissible foundational evidence. Furthermore, MLIG's representation of the applicable burden of proof is also inaccurate. To meet the burden of proof in this proceeding, a proponent of any environmental cost value only must show by a preponderance of the evidence that the proposed value is "reasonable and the best available measure to determine the environmental cost of CO_2."[52] Contrary to MLIG's apparent misunderstanding, nowhere in the orders or in the administrative rules does it state that each party must satisfy its burden of proof based solely on the evidence that individual party personally submitted. Rather, a preponderance of the evidence can be found considering all of the evidence together.[53] MLIG's argument that Doctors for a Healthy Environment did not produce admissible foundational evidence misrepresents both the standard to admit a piece of evidence and the burden of proof a party must meet to show that the Commission should adopt the FSCC. Based on the actual applicable standards, DHE has successfully introduced admissible foundational evidence to support adoption of the FSCC.

CONCLUSION

For the foregoing reasons, DHE has established, through expert testimony, that the FSCC is reasonable and the best available estimate of damages attributable to CO_2, but that this estimate is most likely to be an underestimate due to undercounting public health impacts, and should be accorded corresponding weight in regulatory proceedings. MLIG's and Peabody's

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[51] MLIG's Post-Hearing Br. on CO_2 at 11-14.
[52] Order Regarding Burdens of Proof Dated March 27, 2015, at 2.
[53] *See Matter of Quantification of Environmental Costs*, 578 N.W.2d 794, 800 (Minn. Ct. App. 1998) (concluding that the record supported the ALJ's decision to set CO_2 externality values based on a preponderance of eight separate pieces of evidence, despite the fact that some of the expert testimony relied upon was based on assumptions, speculations, and uncertain data).

suggestions to the contrary are based on either 1) untimely objections to witness qualifications or 2) elementary misunderstandings of the medical literature on climate change and public health. The unanimous consensus of public health professionals is that climate change poses the "biggest global health threat of the 21st century."[54] One cannot successfully challenge that consensus opinion by offering the testimony of physicists and economists opining on epidemiology and public health, paid for by industries with enormous vested financial interests in maintaining high levels of CO_2 emissions.

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Respectfully submitted,

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[54] Ex. 500, Rom Rebuttal at 6.