What Can the Westminster Standards Tell Us About the Global Warming Controversy?

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Introduction

The advertised schedule for this conference had me speaking on "Calvinist Resistance Theory and the Development of Limited Government and the Rule of Law." Instead, I'm speaking on "What Can the Westminster Standards Tell Us About the Global Warming Controversy?" That's quite a switch! What happened? Well, my role as national spokesman for the Interfaith Stewardship Alliance, printed information about which has been made available for you here, has consumed much of my life outside the classroom and the family in the last year, and a couple of months ago I asked President O'Neil if I might be permitted to switch to this topic. Having read and endorsed a major paper on global warming that I co-authored for the Interfaith Stewardship Alliance, Jerry approved, so here we are.

I hope you won't consider it bait and switch. If you're tempted to do so, just think of it this way. The Calvinist resistance theorists of the sixteenth and seventeenth centuries were political thinkers opposed to the reigning political paradigm of the day, royal absolutism, and defending civil and religious liberties, limited government, and the rule of law. Today I stand before you as a representative of a another group that opposes a reigning paradigm of our day–a paradigm with scientific, economic, political, ethical, and even theological implications that threaten liberty by promoting expanding government and the breakdown of the rule of law.

As just one illustration of that last point, let me remind you of the news that the United States Supreme Court this week agreed to review a case in which several states and other plaintiffs are suing the federal Environmental Protection Agency in an effort to force it to define carbon dioxide as a pollutant and so to begin regulating its emission under the Clean Air Act. Now, there are three grounds on which courts can rule at law: statutory law, regulatory law, and tort law. The claim that carbon dioxide causes anyone harm such that recovery through litigation is justified is extremely dubious, since carbon dioxide is essential to all life, and enhanced carbon dioxide benefits plant

life, on which all animal life depends. Furthermore, to hold the EPA accountable for whatever theoretical harm is claimed is ludicrous, in that the EPA in all its activities emits only an infinitesimally small fraction of all human-emitted carbon dioxide, and all human-emitted carbon dioxide is itself dwarfed by what is naturally emitted. Tort law as basis for the suit is therefore absurd. That leaves statutory and regulatory law. But no federal statute, and no federal regulatory law, defines carbon dioxide as a pollutant, and Congress has refused, despite pressure, to act to define it as such.

What this means is that plaintiffs in the case, as radicals on the Left have done over and over, having failed to achieve their policy goals through the political process, are trying to get the courts to impose their policy for them. This is one more in a long series of efforts that undermine the rule of law.

Now perhaps you see why someone who did his Ph.D. on the political thought of a Covenanter lawyer and resistance theory of the seventeenth century might find the global warming debate interesting enough to warrant his pouring a great deal of his time and effort into it for the last eight months, and indeed to have read heavily on it for seventeen years. Permit me, then, to proceed.

I. It may seem strange to ask what a 370-year-old religious confession can tell us about a scientific and political controversy that erupted less than thirty years ago, but if we think so, perhaps that indicates how prone we are to approaching issues superficially. I believe the *Westminster Confession of Faith* and its accompanying *Larger Catechism* and *Shorter Catechism* can teach us much of relevance to the global warming debate, mainly at the level of first principles.
   A. The *Confession*, 4.1-2a, tells us, "It pleased God the Father, Son, and Holy Ghost, for the manifestation of the glory of his eternal power, wisdom, and goodness, in the beginning, to create, or make of nothing, the world, and all things therein whether visible or invisible, in the space of six days; and all very good. After God had made all other creatures, he created man, male and female, with reasonable and immortal souls, endued with knowledge, righteousness, and true holiness, after his own image; having the law of God written in their hearts, and power to fulfill it: and yet under a possibility of transgressing, being left to the liberty of their own will, which was subject unto change." Let me draw just a few inferences from this.
      1. The creation displays God's "power, wisdom, and goodness." When we consider a claim that a very minor perturbation of Earth's vast and enormously complex climate system could devastate the creatures for which God made it, I believe this part of the *Confession* suggests that such a claim should be met with considerable skepticism. We ought to expect not that Earth is extremely fragile but that, even more than any other system designed by a good engineer, it is meant to withstand some shocks.
      2. "God created man, male and female, after His own image, in knowledge, righteousness, and holiness, with dominion over the creatures," as *Shorter Catechism* 10 tells us. This implies two things:
         a. that man, who is the image of God, reflects God. The immediate context of Genesis 1:26-28, where we first read of God's making man in His image, what we learn most about God is that He is creative. "In the beginning, God created the Heavens

and the Earth." By His wisdom He created a tremendous variety of things, nonliving and living, and He made the living things to multiply after their kinds. At the apex of all His creatures He made man, and man, too, He made to multiply. But He also made man for another purpose:

b. to subdue the Earth and to rule over the fish of the sea, the birds of the sky, the cattle, and every living thing that moves on the Earth (Genesis 1:28). It is part of the original mandate of the Creator to His highest creature that that creature should rule the Earth. I could go in many directions from this, as I have done in my book *Where Garden Meets Wilderness*. I could note that God first placed man in the Garden of Eden, distinct from the rest of the Earth, and that it was there that God spoke this blessing and mandate to him, which implies that even before the fall the rest of the Earth was, by comparison with the Garden, not what God destined it to be, and that He intended man to have a hand in transforming wilderness into garden. I could note that, because God cursed the ground after Adam and Eve sinned (Genesis 3:17), and because God intends that Christ as the Last Adam will through His atoning death and vindicating resurrection and the redemption and transformation of His elect seed deliver the creation from the curse (Romans 8:19-21), mankind has a God-given role in reversing the effects of that curse. But for the present topic let me simply point out that this implies that for man to rule the Earth is not, as most environmentalists hold, a crime but a God-given task. We are to be stewards, granted dominion over the Earth to subdue and rule it for God's glory, reflecting His image in knowledge, righteousness, holiness, and creativity in the process.

B. The *Confession*, 5.1-2, tells us, "God the great Creator of all things doth uphold, direct, dispose, and govern all creatures, actions, and things, from the greatest even to the least, by his most wise and holy providence, according to his infallible foreknowledge, and the free and immutable counsel of his own will, to the praise of the glory of his wisdom, power, justice, goodness, and mercy. Although, in relation to the foreknowledge and decree of God, the first Cause, all things come to pass immutably, and infallibly; yet, by the same providence, he ordereth them to fall out, according to the nature of second causes, either necessarily, freely, or contingently." Again, it would be possible to infer many things from this, but let me just raise a couple that are relevant to the global warming debate.

1. The providence of God should be a great comfort to all who trust in Him. He teaches us in Scripture that He guards His own. Whatever might be happening in the world around us, therefore, the children of God have no need to be alarmed. They ought not to be caught up in fear-driven hysteria. "God is our refuge and strength, a very present help in trouble. Therefore will not we fear, though the earth be removed, and though the mountains be carried into the midst of the sea, though the waters thereof roar and be troubled" (Psalm 46:1-3)–and, we might add, though they rise or fall. Without ever determining the magnitude of global warming or its effects, we Christians already know that we need not be afraid. This should equip us to look at evidence more soberly than do those who lack this confidence.
2. At the same time, our belief in divine providence is no excuse for inaction. The *Confession* tells us that God has ordained that things "fall out, according to the nature

of second causes, either necessarily, freely, or contingently." If we are convinced that something presents a serious risk, we ought to find ways either to prevent it or to reduce its harm. At the same time that this suggests that, if global warming really is a danger, we ought to do what we can to prevent or reduce it or to prepare to minimize its harm, it also requires that we carefully weigh other risks, including those that might be embodied in various proposed responses to global warming.

C. The *Confession*, 6.1, tells us, "Our first parents, being seduced by the subtlety and temptation of Satan, sinned, in eating the forbidden fruit." As we have already seen, Scripture tells us that God cursed the ground because of our sin, and indeed at one juncture God went so far as to wipe out nearly all life on Earth, saving, aside from creatures that live in water, only those aboard the ark with Noah. But after the great flood, God made a covenant with the Earth, that "the waters shall no more become a flood to destroy all flesh" (Genesis 9:15). Now, it would be possible, if we didn't know the character of God, to read this very narrowly, as if God meant, "I'll never destroy the Earth again with a flood–but I might destroy it with a comet or nuclear winter or global warming." But that would be quite inconsistent with what we know of God. His covenant with the Earth was no narrowly construed promise. Rather, the one way He had already destroyed all flesh was by a flood, so He promised not to do that again; but the promise should be read more broadly, as entailing that He would no longer destroy all flesh, period, by whatever means. This implies that such claims as theoretical quantum physicist and cosmologist Stephen Hawking, made within the past week, that global warming could turn Earth into another Venus, too hot to sustain any life, are inherently unlikely.

D. It would be possible to look at many other elements of the *Confession* and catechisms, but let me conclude this part of the talk by reference to the *Shorter Catechism*'s treatment of two of the Ten Commandments.

   1. In questions 68-69, it tells us that the Sixth Commandment "requireth all lawful endeavors to preserve our own life, and the life of others," and "forbiddeth the taking away of our own life, or the life of our neighbor, unjustly, or whatsoever tendeth thereunto." This means that we do have a responsibility to foresee, as far as we are able, the risks to which we subject others by our actions, and to minimize those risks. If indeed human-induced global warming threatens others' lives, we have a responsibility to minimize the risk–whether by reducing or preventing the warming, or by some other means.
   2. In questions 74-75, the *Catechism* tells us that the Eighth Commandment "requireth the lawful procuring and furthering the wealth and outward estate of ourselves and others" and "forbiddeth whatsoever doth, or may, unjustly hinder our own, or our neighbor's, wealth and outward estate." Not only the life, then, but also the "wealth and outward estate" of ourselves and our neighbors ought to be protected and indeed furthered. To the extent that global warming threatens those, we should reduce the risks, again either by preventing or reducing the warming or by enabling people to adapt to it in a way that protects their wealth and outward estate.

E. Having given some attention to these first principles–and I confess that they are too few, and the time is far too little, but time presses–let us try to apply them to our understanding

of global warming. Here we must add to first principles some careful attention to both fact and theory.

II. Recently eighty-six evangelical pastors, college presidents, mission heads, and other leaders signed "Climate Change: An Evangelical Call to Action," under the auspices of the Evangelical Climate Initiative. The document calls on the federal government to pass national legislation requiring sufficient reductions in carbon dioxide emissions to fight global warming and argues that these are necessary to protect the poor from its harmful effects. In light of all this, many people are puzzled by the Interfaith Stewardship Alliance's opposition to such calls. Do we not *care* about the prospect of catastrophic global warming? Do we not *care* that with rising temperatures the polar ice caps will melt, and the sea will inundate low island countries and coastal regions? Do we not *care* that the world's poor might be most hurt by these things?
   A. Yes, we care. But we also believe, with economist Walter Williams, that "truly compassionate policy requires dispassionate analysis." That is the very motive for our opposing drastic steps to prevent global warming. In short, we have the same motive proclaimed by the Evangelical Climate Initiative in its "Call to Action."
   B. But motive and reason are not the same thing. It matters little how well we mean, if what we do actually harms those we intend to help. That is why we take the positions we do. In **"A Call to Truth, Prudence, and Protection of the Poor: An Evangelical Response to Global Warming,"** a document available to you here at this conference, we present extensive evidence and argument against the extent, the significance, and perhaps the existence of the much-touted scientific consensus on catastrophic human-induced global warming. (I must here pause to thank my co-authors of that paper for their contribution to this lecture, much of which is drawn from it. They are Dr. Roy Spencer, climatologist at the University of Alabama, Huntsville; Dr. Ross McKitrick, environmental economist at the University of Guelph, Ontario; and Paul Driessen, Esq., energy analyst and ethicist with the Congress of Racial Equality.) Further, good science–like truth–is not about counting votes but about empirical evidence and valid arguments. Therefore we also present data, arguments, and sources favoring a different perspective:
      1. Foreseeable global warming will have moderate and mixed (not only harmful but also helpful), not catastrophic, consequences for humanity–including the poor–and the rest of the world's inhabitants.
      2. Natural causes may account for a large part, perhaps the majority, of the global warming in both the last thirty and the last one hundred fifty years, which together constitute an episode in the natural rising and falling cycles of global average temperature. Human emissions of carbon dioxide and other greenhouse gases are probably a minor and possibly an insignificant contributor to its causes.
      3. Reducing carbon dioxide emissions would have at most an insignificant impact on the quantity and duration of global warming and would not significantly reduce alleged harmful effects.
      4. Government-mandated carbon dioxide emissions reductions not only would not significantly curtail global warming or reduce its harmful effects but also would cause greater harm than good to humanity–especially the poor–while offering virtually no

benefit to the rest of the world's inhabitants.

C. In light of all the above, the most prudent response is not to try (almost certainly unsuccessfully and at enormous cost) to prevent or reduce whatever slight warming might really occur. It is instead to prepare to adapt by fostering means that will effectively protect humanity–especially the poor–not only from whatever harms might be anticipated from global warming but also from harms that might be fostered by other types of catastrophes, natural or manmade. We believe the harm caused by mandated reductions in energy consumption in the quixotic quest to reduce global warming will far exceed its benefits. Reducing energy consumption will require significantly increasing the costs of energy–whether through taxation or by restricting supplies. Because energy is a vital component in producing all goods and services people need, raising its costs means raising other prices, too. For wealthy people, this might require some adjustments in consumption patterns–inconvenient and disappointing, perhaps, but not devastating. But for the world's two billion or more poor people, who can barely afford sufficient food, clothing, and shelter to sustain life, and who are without electricity and the refrigeration, cooking, light, heat, and air conditioning it can provide, it can mean the difference between life and death.

D. In the remaining time, let me try to support these claims.

III. There are really three main categories of debate over global warming: (1) How much of it is driven by human activity, burning fossil fuels and so releasing heat-trapping carbon dioxide into the atmosphere? (2) How much will temperature rise, and what will be the impacts both of the temperature change and of heightened CO_2? And (3) what is our wisest response? Let us look at these in order.

A. Most people who are sounding the alarm about global warming and urging that we do something to prevent or reduce it believe that human activity is the major cause of global warming. Is this true? It is *possible*, under some assumptions, to attribute *all* recent globally averaged warming to mankind. But our knowledge of climate history also reveals substantial natural variability. The mechanisms driving natural climate variations are too poorly understood to be included accurately in computer climate models. Hence, the models risk overstating human influence.

1. Many cite the Executive Summary of the *Third Assessment Report* (2001) of the Intergovernmental Panel on Climate Change (IPCC) as attributing "*most* of the warming" (emphasis added) to human activities. However, the Executive Summary does not reflect the depth of scientific uncertainty embodied in the report and was written by government negotiators, not the scientific panel itself. Indeed, the wording of the conclusion supplied by the scientific panel at the close of scientific review did not attribute "most" warming to humans. Instead it emphasized the existing uncertainties: "From the body of evidence since IPCC (1996), we conclude that there has been *a discernible* human influence on global climate. Studies are beginning to separate the contributions to observed climate change attributable to individual external influences, both anthropogenic and natural. This work suggests that anthropogenic greenhouse gases are *a substantial* contributor to the observed warming, especially over the past 30 years. However, the accuracy of these estimates continues to be limited by *uncertainties*

in estimates of internal variability, natural and anthropogenic forcing, and the climate response to external forcing."[1] While much valuable scientific research is reflected by the IPCC's reports, their executive summaries have been so politicized as to prompt MIT climate scientist and IPCC participant Richard Lindzen to testify before the United States Senate, "I personally witnessed coauthors forced to assert their 'green' credentials in defense of their statements."[2]

2. Further, a number of studies support the conclusion that natural causes–e.g. fluctuations in solar output,[3] changes in cloud forcing,[4] and precipitation microphysics[5]–could outweigh human CO_2 emissions as causes of the current global warmth.[6] Other studies find that rising CO_2 follows rather than leads warming and thus is not its cause but might be its effect.[7] In addition, other human activities (e.g., land use conversion for agriculture and cities, particulate pollution) cause regional climatic changes that go largely unmentioned. Thus the human-induced part of the warming trend is only partly driven by CO_2 and other manmade greenhouse gases. Recently sixty topic-qualified

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[1]Government and Expert Review Draft, IPCC Working Group 1 Third Assessment Report, 5, emphases added. The "IPCC is as much a collection of government bureaucrats as it is of working scientists. . . . only about 33 percent of the 200+ 'lead authors' are in fact climate scientists. Consequently, the 'consensus' that these documents achieve is in fact determined by a majority opinion that is not necessarily formally trained in the subject matter." Patrick J. Michaels, *Meltdown: The Predictable Distortion of Global Warming by Scientists, Politicians, and the Media* (Washington: Cato Institute, 2004), 22.

[2]"Testimony of Richard S. Lindzen before the Senate Environment and Public Works Committee on 2 May 2001," online at http://epw.senate.gov/107th/lin_0502.htm.

[3]The IPCC attributes the whole warming of the first half of the twentieth century–about 0.5° C–to solar variability. John T. Houghton, *et al*., *Climate Change 2001: The Scientific Basis. Contribution of Working Group 1 to the Third Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge: Cambridge University Press, 2001), 697.

[4]A discussion of cloud variations as a cause of natural climate variability is contained in Climate Research Committee, Board on Atmospheric Sciences and Climate, Commission on Geosciences, Environment, and Resources of the National Research Council, "Natural Climate Variability On Decade-to-Century Time Scales" (Washington, D.C.: National Academy Press, 1995), online at: http://darwin.nap.edu/books/0309054494/html.

[5]The precipitation efficiency uncertainties in climate modeling (and thus our theoretical understanding of how these things can be involved in natural climate fluctuations) are discussed in N. O. Renno, K. A. Emanuel, and P. H. Stone, "Radiative-convective model with an explicit hydrologic cycle 1. Formulation and sensitivity to model parameters," *Journal of Geophysical Research* 99 (July 10, 1994), 14,429-14,441. The end of the abstract says: "The cumulus convection schemes currently in use in general circulation models bypass the microphysical processes by making arbitrary moistening assumptions. We suggest they are inadequate for climate change studies."

[6]Such natural causes–especially fluctuations in solar energy output, changes in earth's orbit and tilt (The Marian Koshland Science Museum of the National Academy of Sciences explains and illustrates these well in "Global Warming Facts & Our Future" at http://www.koshland-science-museum.org/exhibitgcc/causes08.jsp.), and other long and (geologically) short cycles–certainly outweigh human CO_2 emissions as causes of climate change in history. See, e.g., S. Fred Singer and Dennis T. Avery, "The Physical Evidence of Earth's Unstoppable 1,500-Year Climate Cycle" (Dallas: National Center for Policy Analysis, NCPA Policy Report No. 279, 2005).

[7]Robert H. Essenhigh, "Does CO_2 really drive global warming?" *Chemical Innovation* 31:5 (May 2001), 44-46; online at http://www.pubs.acs.org/subscribe/journals/ci/31/special/may01_viewpoint.html; H. Fischer, *et al.*, "Ice core record of atmospheric CO_2 around the last three glacial terminations," *Science* 283, (1999): 1712-1714; U. Siegenthaler, et al., "Stable carbon cycle-climate relationship during the late Pleistocene," *Science* 310:5752 (November 25, 2005), 1313-1317.

scientists asserted that "global climate changes all the time due to natural causes and the human impact still remains impossible to distinguish from this natural noise," and that "observational evidence does not support today's computer climate models, so there is little reason to trust model predictions of the future."[8]

3. In the face of alarms about human-induced global warming, we should ask: *How much* of current global warming is man-made versus natural? *How much* future warming can we reasonably expect? *What changes* in human behavior that affect climate may be anticipated, under *what conditions*? *What difference* will such changes make to the world's climate? And what would it actually take *to fix the alleged problem*?

B. Catastrophic climate scenarios critically depend on the extremely unlikely assumption that global average temperature would rise 6° C (10.8° F) or more in response to doubled CO_2.

1. But more credible estimates of climate sensitivity to doubled CO_2 have been in the range of 1.5° to 4.5° C (2.7° to 8.1° F)–the IPCC's reports indicating that the most probable magnitude of change is at the lower end of that range.
2. Researchers using several independent lines of evidence asserted the "claim that climate sensitivity actually has as much as a 5% chance of exceeding 4.5° C is not a position that we would care to defend with any vigour, since even if it is hard to formally rule it out, we are unaware of any significant evidence in favour of such a high value."[9]
3. It is very unlikely that warming in that range would cause catastrophic consequences. Why? Among other reasons, because, at least according to the computer climate models on which the alarms are based, CO_2-induced warming will occur mostly in winter, mostly in polar regions, and mostly at night. But in polar regions, where winter night temperatures range far below freezing, an increase of 5.4° F is hardly likely to cause significant melting of polar ice caps or other problems. The amount of warming in any given locale would be well within the range of historic local variation.
4. Nonetheless many people still claim that global warming will have catastrophic impacts. Let us examine those impacts one-by-one:
   a. **"sea level rise":** Contrary to visions of seawater inundating vast areas, model-average results from a mid-range scenario of the IPCC (a scenario that itself probably exaggerates warming) suggest a rise by A.D. 2100 of only about 0.387 meter (15.24 inches, or 1.27 feet).[10] The rate of rise would be only 1.524 inches per

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[8]Letter to Canadian Prime Minister Stephen Harper, published as "Open Kyoto to debate: Sixty scientists call on Harper to revisit the science of global warming," *Financial Post*, April 6, 2006, at http://www.canada.com/nationalpost/financialpost/story.html?id=3711460e-bd5a-475d-a6be-4db87559d605. A complete list of signers of this letter is in the Appendix of this paper.

[9]J. D. Annan and J. C. Hargreaves, "Using multiple observationally-based constraints to estimate climate sensitivity," *Geophysical Research Letters*, vol. 33, L06704, doi:10.1029/2005GL025259, 2006, online at http://www.agu.org/pubs/crossref/2006/2005GL025259.shtml; prepublication draft at http://www.jamstec.go.jp/frcgc/research/d5/jdannan/GRL_sensitivity.pdf. See also G. Hegerl, et al., "Climate sensitivity constrained by temperature reconstructions over the past seven centuries," *Nature* 440 (April 20, 2006): 1029-1032.

[10]Sarah C. B. Raper and Roger J. Braithwaite, "Low sea level rise projections from mountain glaciers and ice caps under global warming," *Nature* 439 (January 19, 2006), 311-313; abstract online at http://www.nature.com/nature/journal/v439/n7074/abs/nature04448.html. Similarly, Indur M. Goklany writes, "In the IPCC's First Assessment Report , the estimated SLR between 1990 and 2100 was pegged at between 0.31 and 1.10 m

decade, to which the few coastal settlements actually threatened could readily adapt by building dikes. Further, sea level has risen for centuries, since long before earth began to recover from the Little Ice Age (about 1550-1850) and long before fossil fuel burning could possibly have contributed to global warming. Through the twentieth century it rose about 0.18 meter (7.08 inches), and there is no reason to think the natural forces driving that rise will cease.[11] Even assuming that the IPCC's projection of twenty-first century sea level rise is correct, then, only about half of that rise would be attributable to current global warming–and, in turn, only a fraction of that to human-induced warming. Further, "Of the costs to the Netherlands, Bangladesh and various Pacific islands [i.e., the places at greatest risk], the costs of adapting to the changes in sea level are trivial compared with the costs of a global limitation of CO_2 emissions to prevent global warming."[12]

b. **"more frequent heat waves":** Though there is reason to doubt this prediction, its significance arises only from its impact on health and mortality. Heat-related death rates decline as people learn how, and become better able to afford, to protect themselves from excessive heat.[13] For example, while a heat wave in Chicago in 1995 caused about 700 heat-related deaths, a nearly identical one only four years later caused only about 100, because of better advance warning from weather forecasters and protective steps.[14] Further, those who warn of more frequent heat waves should even more fervently herald less frequent severe cold snaps. The death rate from severe cold is nearly ten times as high as that from severe heat,[15] implying that global warming (assuming that it reduces cold snaps as much as it increases heat waves) should prevent more deaths from cold than it causes from heat.

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with a best estimate of 0.66 m (FAR Scientific Assessment, page 277), and the Third Assessment Report's estimates were between 0.09 and 0.88 m with a 'central value' of 0.48m (TAR Scientific Assessment, page 671). Recently Church and White (2006) came out with an estimate of between 0.28 and 0.34 m." Indur M. Goklany, "Comments to the Stern Review on the Economics of Climate Change," March 17, 2006, at http://members.cox.net/goklany/Stern%202.pdf, p. 4, citing John A. Church and Neil J. White, "A 20th century acceleration in global sea-level rise," *Geophysical Research Letters*, vol. 33 (January 6, 2006), L01602, doi:10.1029/2005GL024826, abstract online at http://www.agu.org/pubs/crossref/2006/2005GL024826.shtml.

[11]B. C. Douglas and W. R. Peltier, *Physics Today*, March, 2002, 35-40; compare Church and White (2006), which estimates sea level rise from January 1870 to December 2004 of 0.195 m (4.21 inches), i.e., 0.015 m (0.31 inch) per decade.

[12]Deepak Lal, "Ecological Imperialism: The Prospective Costs of Kyoto for the Third World," in *The Costs of Kyoto: Climate Change Policy and Its Implications*, ed. Jonathan H. Adler (Washington: Competitive Enterprise Institute, 1997), 83-90, at 85-6. An implication of this is that economic development is an important step to protecting against heat waves, with or without global warming; a further implication is that because energy is a crucial component of economic development, affordable energy is necessary to protect against heat waves.

[13]R. E. Davis, *et al.*, "Decadal changes in heat-related human mortality in the eastern United States," *International Journal of Biometeorology* 47:166-75.

[14]M. A. Palecki, S. A. Changnon, and K. E. Kunkel, "The nature and impacts of the July 1999 heat wave in the midwestern United States: Learning from the lessons of 1995," *Bulletin of the American Meteorological Society* 82:1353-1367.

[15]W. R. Keatinge, *et al.*, "Heat related mortality in warm and cold regions of Europe: observational study," *British Medical Journal* 321:670-673.

c. **"more frequent . . . droughts, and extreme weather events such as torrential rains and floods":** Actual projections assuming IPCC-forecast global warming call for more frequent droughts in some places, less frequent droughts in others, more frequent wet periods in some places, and less frequent wet periods in others. It is not possible, at the present state of the science, to be sure whether there will be a net increase of either droughts or wet periods globally or in most locales. However, while worldwide data are insufficient to justify any generalizations, we do know that there is no statistical correlation between global average temperature and droughts in the southwestern United States or even the United States as a whole,[16] a fact that puts the model forecasts into doubt. Further, in an increasingly wealthy world, the ability to distribute water and agricultural products efficiently will continue to improve, making societies more and more resilient to droughts–which will continue to occur with or without human influence on climate.

d. **"increased tropical diseases in now-temperate regions":** Since the mosquitoes that carry *Plasmodium falciparum* (the malaria-causing parasite) require winter temperatures above about 61° to 64° F to survive, it seems intuitively likely that expanding the regions with winter lows above that range would result in increasing malaria rates. However, even in very cold climates there are places sheltered from cold in which the mosquitos can hibernate. Thus, malaria was common throughout Europe and even into the Arctic Circle even during the Little Ice Age and continued common through the end of World War II in Finland, Poland, Russia, around the Black Sea, and in thirty-six of the United States, including all northern border states from Washington through New York.[17] It is not temperatures that are most important for malaria control but elimination of suitable breeding grounds and the use of pesticides to lower the population of malarial mosquitoes and keep them out of homes. The IPCC suggested on the basis of mathematical models that by the 2080s global warming could put about 2-4 percent more people at risk for malaria. What this means is that 96 to 98 percent of people at risk of malaria would be at risk because of non-climate change related factors. In other words, the impacts of climate change on malaria, at least through 2085, will be trivial compared to non-climate change related factors.[18] The IPCC also noted that most of those newly at risk would be in middle- or high-income countries where infrastructure and health services would make infection and death or serious disability unlikely.[19] "Thus, the

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[16]O. W. Frauenfeld and R. E. Davis, "Midlatitude circulation patterns associated with decadal and interannual Pacific Ocean variability," *Geophysical Research Letters* 29, DOI: 10.1029/2002GL015743; Michaels, *Meltdown*, 138-142.

[17]Paul Reiter, "From Shakespeare to Defoe: malaria in England in the Little Ice Age," *Emerging Infectious Diseases* 6(1):1-10, at www.cdc.gov/ncidod/eid/vol6no1/reiter.htm.

[18]I. M. Goklany and D. King, "Climate Change and Malaria," *Science* 306:5693 (October 2004), 55-57.

[19]J. J. McCarthy, *et al*., *Climate Change 2001: Impacts, Adaptation, and Vulnerability: Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge: Cambridge University Press, 2001), 9.7.1.1. Cited in Bjørn Lomborg, *The Skeptical Environmentalist: Measuring the Real State of the World*, rev. ed. (Cambridge: Cambridge University Press, 2001), 292.

global study of *actual* malaria transmission shows 'remarkably few changes, even under the most extreme scenarios.'"[20] The resurgence of malaria in some African and Asian countries correlates not with changing temperatures but with the banning of DDT and shifts to less effective disease control methods, and it costs over a million premature deaths annually.

e. **"hurricanes that are more intense":** The recent upswing in numbers and intensity of Atlantic hurricanes makes some people more receptive to claims that global warming might have such an effect. However, the National Oceanic and Atmospheric Administration (NOAA) concluded in a study announced in November 2005 that "the tropical multi-decadal signal is causing the increased Atlantic hurricane activity since 1995, and is not related to greenhouse warming."[21] More specifically, claims of linkages between global warming and hurricane impacts are premature for three reasons. First, no connection has been established between greenhouse gas emissions and the observed behavior of hurricanes (Houghton et al. 2001; Walsh 2004). . . . Second, the peer-reviewed literature reflects that a scientific consensus exists that any future changes in hurricane intensities will likely be small in the context of observed variability (Knutson and Tuleya 2004; Henderson-Sellers et al. 1998), while the scientific problem of tropical cyclogenesis is so far from being solved that little can be said about possible changes in frequency. And third, under the assumptions of the IPCC, expected future damages to society of its projected changes in the behavior of hurricanes are dwarfed by the influence of its own projections of growing wealth and population (Pielke et al. 2000).[22] We have been in a cyclical lull in Atlantic hurricane activity for several decades, during which our coastlines have seen rapid growth in population and infrastructure. It is thus the presence of more property in harm's way, not a historically unprecedented increase in frequency or intensity of hurricanes, that explains rising economic losses from hurricanes. The National Hurricane Center has warned that we were overdue for a return to greater activity, similar to what occurred in the 1930s to the 1950s. Emphasis on a possible human connection distracts from the very real issue that people need to be prepared for

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[20]Lomborg, *Skeptical Environmentalist*, 292, citing David J. Rogers and Sarah E. Randolph, "The Global Spread of Malaria in a Future, Warmer World," *Science* 289(5485):1763-6. See also S. I. Hay, *et al*., "Climate change and the resurgence of malaria in the East African highlands," *Nature* 415:905-09, which concluded that there was no correlation between malaria transmission and temperature variation.

[21]"NOAA attributes recent increase in hurricane activity to naturally occurring multi-decadal climate variability," *NOAA Magazine Online*, Story 184, at http://www.magazine.noaa.gov/stories/mag184.htm.

[22]R. A. Pielke Jr., *et al*., "Hurricanes and Global Warming," *Bulletin of the American Meteorological Society*, November 2005, 1571-75, citing IPCC's *Climate Change 2001*; K. Walsh, "Tropical cyclones and climate change: Unresolved issues," *Climate Research* (2004) 27:78-83; T. R. Knutson and R. E. Tuleya, "Impact of CO_2-induced warming on simulated hurricane intensity and precipitation: Sensitivity to the choice of climate model and convective parameterization," *Journal of Climate* (2004) 17:3477-95; A. Henderson-Sellers, *et al*., "Tropical cyclones and global climate change: A post-IPCC assessment," *Bulletin of the American Meteorological Society* (1998), 79:9-38; R. A. Pielke Jr. and D. Sarewitz, "Turning the big knob: Energy policy as a means to reduce weather impacts," *Energy and Environment* (2000) 11:255-76.

increased hurricane activity, whether or not hurricanes' frequency, intensity, or duration are affected by manmade greenhouse gases.

f. **"reduction in agricultural output, especially in poor countries":** Observational evidence and computer models yield little confidence in forecasts of the impact of global warming on agricultural production, whether in poor countries or elsewhere.[23] However, rising CO_2–presumably what drives global warming–enhances agricultural yield. For every doubling of atmospheric CO_2 concentration, there is an average 35 percent increase in plant growth efficiency. Plants grow better in warmer and colder temperatures and in drier and wetter conditions, and they are more resistant to diseases and pests. Consequently their ranges and yields increase.[24] Agricultural productivity worldwide and in developing countries has never been higher than it is today.[25] Three likely results of rising CO_2 are shrinking deserts, lower food prices, and reduced demand for agricultural land to feed the world's population, the latter resulting in reduced pressure on habitat and consequently on species survival. These benefits would be reduced or forgone if we reduced atmospheric CO_2.

5. In sum, claims that human-induced global warming is not only real but also bound to become catastrophic either misread the IPCC's reports or, following the example of the media and politicians, uncritically rely on its Summary for Policy Makers. The Summary, as already noted, does not reflect the scientific uncertainty contained in the body of the report, was not agreed to by the vast majority of IPCC scientists, and was politically driven. Claims of dangerous or catastrophic global warming are founded primarily on outlier models that present far more extreme scenarios than the vast majority. These outlier models can neither predict even one year into the future nor reconstruct one year into the past. They produce scenarios with no basis in actual evidence. They are based on grossly unrealistic assumptions about future energy use, dominant energy types, pollution levels, economic development, and other factors that do not reflect current facts or likely future situations.[26] Mainstream media generally report on worst-case scenarios and assume that warming will be catastrophic and will bring devastating harm but no benefits. The ECI's statement follows that model.
6. There is evidence that the current warming period, from the mid-1800s to the present and likely to continue for a century or more, is driven largely by natural causes. Major

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[23]Lauren Sacks and Cynthia Rosenzweig, "Climate Change and Food Security," at http://www.climate.org/topics/agricul/index.shtml.

[24]Many studies have been published demonstrating the benefits of rising CO_2 to agriculture. Much of the work has been done by scientists at the Center for the Study of Carbon Dioxide and Global Change, http://www.co2science.org/scripts/CO2ScienceB2C/Index.jsp, which has links to many articles by both its own scientists and others.

[25]I. M. Goklany, "Potential Consequences of Increasing Atmospheric CO_2 Concentration Compared to Other Environmental Problems," *Technology* 7 Suppl. 1 (2000), 189-213.

[26]IPCC, SRES. See I. M. Goklany, "Is a Richer-but-warmer World Better than Poorer-but-cooler Worlds?" 25th Annual North American Conference of the US Association for Energy Economics/International Association of Energy Economics, September 21-23, 2005.

global and regional climate changes of equal or greater magnitude–the Roman and Medieval Warm Periods, the Little Ice Age, and civilization-killing droughts in the Yucatan and the American southwest, not to mention the ice ages and interglacial periods–are known to have occurred in the complete absence of significant human impact.

C. Finally, what is our wisest response to global warming?
   1. The most widely promoted response to global warming is the Kyoto Protocol, an international treaty (signed by the Clinton administration, never ratified by the Senate, and repudiated by the Bush administration) requiring severe reductions in carbon dioxide emissions in an effort to reduce global warming. Compliance with the Protocol would cost the world economy from $300 billion to $1 trillion per year.[27] (To give you some sense of proportion, for only about $250 billion, spent only once, drinking water purification and sewage sanitation could be provided for the roughly two billion people in the world who lack them.) Over the fifty years from 2001 through 2050, that means $17 to $50 trillion. Yet full compliance would reduce global warming by less than 0.2° F by 2050[28]–an amount so tiny as to disappear in annual fluctuation and with no significant impact on consequences.
   2. As a result, its supporters also say Kyoto is just a first step–that we shall need many, perhaps forty, more such treaties,[29] each more costly than the last, to prevent catastrophic global warming. It is impossible to calculate with any confidence the actual amount that would cost the world economy, but since initial emissions cuts would be

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[27]Bjørn Lomborg, "Should we implement the Kyoto Protocol? No–We risk burdening the global community with a cost much higher than that of global warming," at www.spiked-online.com/articles/00000002D2C3.htm. More specifically, with no emissions trading, the combined annual cost of compliance in the year 2010 to the United States, the European Union, Japan, Canada, Australia, and New Zealand alone would be around $350 billion; with emissions trading within two blocks of that group, about $240 billion; with unrestricted trading within all Annex I countries, slightly over $150 billion; and with global trading, about $75 billion. Lomborg, *Skeptical Environmentalist*, 303, Figure 158, citing John P. Weyant and Jennifer N. Hill, "Introduction and overview," *The Energy Journal*, Kyoto Special Issue [1999], vii-xliv, at xxxiii-xxxiv, and Bureau of Economic Analysis, *Price Indexes for Gross Domestic Product and Gross Domestic Purchases* (www.bea.doc.gov/bea/dn/st3.csv) and *Selected NIPA Tables showing advance estimates for the fourth quarter of 2000* (www.bea.doc.gov/bea/dn/dpga.txt), both 2001.

[28]Calculations of the range of temperature reduction from compliance with Kyoto differ but are all very low. E.g.: (1) "the Kyoto Protocol . . ., if adhered to by every signatory (including the United States)[,] would only reduce surface temperature by 0.07° C (.13° F) in fifty years" (Michaels, *Meltdown*, 19). (2) "Global mean reductions [in warming by 2100] for the three scenarios are small, 0.08-0.28°C" [i.e., 0.14-0.5° F] (T. M. L. Wigley, "The Kyoto Protocol: CO2, CH4 and Climate Implications," *Geophysical Research Letters*, vol. 25 [July 1998], 2285-88, at 2287).

[29]Wigley writes: "For B=CONST, the expected global-mean warming to 2100 is reduced by [Kyoto compliance by] 0.10-0.21°C depending on the climate sensitivity (close to 7% in all cases). For NOMORE, the reduction in warming is 4%, while for the B= -1% case it is approximately 14%. The rate of slow-down in temperature rise is small, with no sign of any approach to climate stabilization. *The Protocol, therefore, . . . can be considered only as a first and relatively small step towards stabilizing the climate*" (Wigley, "The Kyoto Protocol," 2287-88, emphasis added). National Center for Atmospheric Research scientist Jerry Mahlman says elimination of human-induced warming would require "forty successful Kyotos" (Tim Appenzeller and Dennis Dimick, "The Heat Is On," *National Geographic*, September 2004, 11). David Malakoff cites other climate scientists as saying thirty (David Malakoff, "Thirty Kyotos Needed to Control Warming," *Science*, December 19, 1997, 2048).

cheapest, and every deeper level of cuts afterward would be more costly, it would stand to reason that compliance with forty levels of Kyoto-type agreements would reduce global economic production not by $300 billion to $1 trillion per year but by $12 trillion to over $40 trillion per year, or 27 to 91 percent of gross world product. As Lindzen put it:

> Should a catastrophic scenario prove correct, Kyoto will not prevent it. If we view Kyoto as an insurance policy, it is a policy where the premium appears to exceed the potential damages, and where the coverage extends to only a small fraction of the potential damages. Does anyone really want this? I suspect not.[30]

Moreover, we still must determine how harmful CO_2 emissions are and, thus, the benefits of reducing them. But, as we have seen, many scientists, especially agriculturalists, believe that CO_2 should not be classed as a pollutant at all because of its benefits to plant growth. Even assuming that CO_2 is a pollutant, it is simply impossible at the present state of the science to estimate with any reasonable degree of confidence how much harm–and benefit–is done by each ton emitted, and the balance between the two.

3. Church leaders, evangelicals in particular, are concerned about climate change primarily because they fear its potential impacts on the world's poor, especially in the tropics. However, forecasts of things like precipitation and temperature change over long time horizons in particular regions are simply not possible. If the aim is to help the poor, what matters from the policy point of view is supporting the development process by which countries acquire greater ability to deal with adverse economic, climatic, and social conditions, regardless of cause. Put simply, poor countries need income growth, trade liberalization, and secure supplies of reliable, low-cost electricity. Rather than focusing on theoretically possible changes in climate, which varies tremendously anyway with El Niño, La Niña, and other natural cycles, we should emphasize policies–such as affordable and abundant energy–that will help the poor prosper, thus making them less susceptible to the vagaries of weather and other threats in the first place. The harms caused by mandatory CO_2 emissions reductions will almost certainly outweigh the benefits, especially to the poor, for whom the marginal increases in prices will be a much greater burden than for the rich.
4. The world's poor are much better served by enhancing their wealth through economic development than by whatever minute reductions might be achieved in future global warming by reducing CO_2 emissions.[31] It is difficult to imagine how it could possibly

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[30]"Testimony of Richard S. Lindzen before the Senate Environment and Public Works Committee on 2 May 2001," online at http://epw.senate.gov/107th/lin_0502.htm.

[31]See, as examples of studies supporting such conclusions, the following papers by environmental policy analyst Indur M. Goklany: "Comments to the Stern Review on the Economics of Climate Change," March 17, 2006, at http://members.cox.net/goklany/Stern%202.pdf; "Evidence for the Stern Review on the Economics of Climate Change," December 9, 2005, http://members.cox.net/goklany/Goklany-%20Evidence%20for%20Stern%20Review.pdf; "Integrated Strategies to Reduce Vulnerability and Advance Adaptation, Mitigation, and Sustainable Development," http://members.cox.net/igoklany/Goklany-Integrating_A&M_preprint.pdf; "A Climate Policy for the Short and Medium Term: Stabilization or Adaptation?", *Energy & Environment* 16:3&4 (2005),

be that, as the Evangelical Climate Initiative claims, "*The basic task for all of the world's inhabitants* [emphasis added] is to find ways now to begin to reduce the carbon dioxide emissions from the burning of fossil fuels that are the primary cause of human-induced climate change." Millions of poor people in developing countries die every year because they lack clean water and indoor plumbing, electricity (forcing them to burn wood and dung for cooking and heating and to live without refrigeration and air conditioning), sewage treatment, jobs, access to affordable medical care, and adequate nutrition–not to mention just and orderly legal and economic systems. Not only will the policies proposed by the ECI not solve any of these real, present, and vast problems, but instead they will slow down and in some cases prevent their being solved–all for the sake of responding to speculative and likely exaggerated risks far in the future, through measures that would be ineffective anyway.

5. It is immoral and harmful to Earth's poorest citizens to deny them the benefits of abundant, reliable, affordable electricity and other forms of energy (for homes, cars, airplanes, and factories) merely because it is produced by using fossil fuels. Foreseeable forms of renewable energy (other than hydroelectric) won't provide *reliable, affordable* electricity at least for many years, in amounts that are adequate and necessary for modern hospitals, factories, homes, communities and nations. To tell poor families, communities, and nations that they can't develop hydroelectric or nuclear energy either, because some people disapprove of them, is unconscionable.
6. We agree that it is wise to pursue increasing energy efficiency through the development of new technologies. But a program that can only be done by government mandate, like that promoted by the ECI, is by definition not a program that the market deems cost effective. We believe the market is a better judge of cost effectiveness than bureaucrats and politicians. What are needed are *prudent* policies that reflect actual risks, costs, and benefits; an honest evaluation of sound scientific, economic, and technological data; and unbiased application of moral, ethical, and theological principles.
7. Many environmentalists argue that developed and developing nations alike must stop using fossil fuels. They thus oppose coal and natural gas-fired electrical generating plants. But because they also oppose hydroelectric and nuclear facilities, they leave developing countries no alternatives to more expensive, presently less efficient energy technologies like solar and wind (technologies that do not represent the required base load or dependable power source needed by societies for energy security).[32] The very

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http://members.cox.net/igoklany/EEv16_Stab_or_Adaptation.pdf; "Evidence to the House of Lords Select Committee on Economic Affairs on Aspects of the Economics of Climate Change," *Energy & Environment* 16:3&4 (2005), http://members.cox.net/igoklany/EEv16-3+4_GoklanyHoL_Evidence.pdf.

[32]"Renewable sources of energy–hydroelectric, solar, wind, geothermal and biomass–have high capital investment requirements and significant, if usually unacknowledged, environmental consequences. For most renewables, the energy they collect is extremely dilute, requiring large areas of land and masses of collectors to concentrate. Manufacturing solar collectors, pouring concrete for fields of windmills, drowning square miles of land behind dams damages and pollutes." E.g., a 1,000-megawatt wind farm (about the capacity of a medium-sized conventional power plant) would occupy 2,000 square miles "and even with substantial subsidies and uncharged pollution externalities would produce electricity at double or triple the cost of fossil fuels." At that ratio, wind farms sufficient to generate the 604,000

fact that such higher-cost technologies are not widely used in rich countries testifies that they cannot be widely used in poor ones. Fossil fuels, then, should be seen as a proper stage in energy development, far safer than burning wood and dung (smoke from which claims 1.6 million lives per year),[33] and a means of enabling the economic growth that eventually can make even cleaner technologies affordable.

8. Stopping or reversing economic development in the world's poor countries–which drastic restrictions on fossil fuel use would cause–would keep poor nations impoverished. It would perpetuate what South Africa's Leon Louw calls "human game preserves" where Western tourists can see "cute indigenous people at one with their environment and the wildlife." But what climate activist–indeed, what signer of "Climate Change: An Evangelical Call to Action"–would willingly, for even a month, live in a mud hut in malaria-infested rural Africa under the indigenous conditions their policy prescription would perpetuate? Who among them would be glad to drink the locals' contaminated water, eat their paltry, mold-infested food, breathe the smoke from their wood and dung fires, live twenty-four hours a day, seven days a week, three hundred sixty-five days a year without lights, air conditioning, and refrigeration? Who among them would work all day in the fields amid swarms of diseased mosquitoes and tsetse flies–and swelter under bed nets, trying to sleep when the temperature in the hut is 90° F and inside the bed net 100°–all without bug spray, pesticides, and anti-malaria pills? Who among them would be prepared to walk twenty miles to the nearest clinic, carrying their sick or dying child with them, when they inevitably come down with the fever, chills, and convulsions of acute malaria? That way of life–or rather, death–is the real, though unintended, impact of mandated reductions in carbon dioxide emissions to fight global warming.
9. Responsible discussion of a proposed policy to deal with any problem requires comparing its costs and benefits with those of alternative policies to deal not just with the same problem but also with other problems. Every prescription is likely to have both positive and negative consequences–for different aspects of the environment, different species, different regions, and different groups of people. Therefore we commend the approach used by the Copenhagen Consensus, and we hope our evangelical brothers and sisters, and all who are concerned not just about global warming but about other threats to human and planetary well being, will study it carefully.[34]

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megawatts the United States consumes would occupy a third of the country's total land area. Richard Rhodes and Denis Beller, "The Need for Nuclear Power," *Foreign Affairs* 79:1 (January/February 2000), 30-44; citing here from annotated version at http://www.nci.org/conf/rhodes/index.htm.

[33]The Intermediate Technology Development Group, citing United Nations and International Energy Agency data. Smoke from wood and dung fires thus kills more people than malaria and almost as many as unsafe drinking water and lack of sanitation. Most of its victims are women and children. Alex Kirby, "Indoor smoke 'kills millions'," BBC News, November 28, 2003, online at http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/3244214.stm.

[34]Bjørn Lomborg, *Global Crises, Global Solutions* (Cambridge: Cambridge University Press, 2004); http://www.copenhagenconsensus.com/Default.aspx?ID=675. In the process, studies by specialists and respondents were submitted to eight expert economists, including three Nobel Laureates, who then prioritized major problems facing

Conclusion

Sixteen years ago, the *Oxford Declaration on Christian Faith and Economics* made this crucial point:

> We deplore economic systems based on policies, laws, and regulations whose effect is to favour privileged minorities and to exclude the poor from fully legitimate activities. Such systems are not only inefficient, but are immoral as well in that participating in and benefitting from the formal economy depends on conferred privilege of those who have access and influence to public and private institutions rather than on inventiveness and hard work. Actions need to be taken by public and private institutions to reduce and simplify the requirements and costs of participating in the national economy.[35]

Today we stand with the Oxford Declaration in deploring policies, laws, and regulations whose effect is to favor the already wealthy at the expense of the still poor, excluding them from legitimate development of and legitimate participation in advanced economies and all the benefits they deliver such as lower infant and child mortality rates, longer life expectancy, lower disease rates, more and better education, transportation, communication, and all the other things the already wealthy take for granted. Therefore we at the Interfaith Stewardship Alliance pledge to oppose quixotic attempts to reduce global warming. Instead, constrained by the love of Jesus Christ for the least of these (Matthew 25:45), and by the evidence presented above, we vow to teach and act on the truths communicated here for the benefit of all our neighbors. We invite you to join us by endorsing "A Call to Truth, Prudence, and Protection of the Poor: An Evangelical Response to Global Warming."

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mankind and alternative solutions to them and then ranked them from most to least effective. The alternatives were divided into four categories of cost-effectiveness–Very Good, Good, Fair, and Bad–and listed in descending order of cost effectiveness (how many people would experience how much benefit at what cost) within each category. The results (*Global Crises, Global Solutions*, 606) were: **Very Good**: 1. Communicable diseases: control of HIV/AIDS. 2. Malnutrition and hunger: providing micronutrients. 3. Subsidies and trade: trade liberalization. 4. Communicable diseases: control of malaria. **Good**: 5. Malnutrition and hunger: development of new agricultural technologies. 6. Sanitation and water: community-managed water supply and sanitation. 7. Sanitation and water: small-scale water technology for livelihoods. 8. Sanitation and water: research on water productivity in food production. 9. Governance and corruption: lowering the cost of starting a new business. **Fair**: 10. Migration: lowering barriers to migration for skilled workers. 11. Malnutrition and hunger: improving infant and child nutrition. 12. Communicable diseases: scaled-up basic health services. 13. Malnutrition and hunger: reducing the prevalence of low birth weight. **Bad**: 14. Migration: guest worker programs for the unskilled. 15. Climate change: optimal carbon tax. 16. Climate change: Kyoto Protocol. 17. Climate change: value-at-risk carbon tax. **Of the seventeen options, the three worst all had to do with attempting to reduce global warming.**

[35]*Oxford Declaration on Christian Faith and Economics* (1990), 47; published online at http://www.casi.org.nz/statements/decoxcfe.htm.