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3 HEARING ON ``THE CLIMATE CRISIS: NATIONAL SECURITY, PUBLIC

4 HEALTH, AND ECONOMIC THREATS''

5 THURSDAY, FEBRUARY 12, 2009

6 House of Representatives,

7 Subcommittee on Energy and Environment

8 Committee on Energy and Commerce

9 Washington, D.C.

10 The subcommittee met, pursuant to call, at 10:05 a.m.,
11 in Room 2123 of the Rayburn House Office Building, Hon.
12 Edward Markey (chairman) presiding.

13 Members present: Representatives Markey, Doyle, Inslee,
14 Butterfield, Melancon, Matsui, McNerney, Welch, Dingell,
15 Boucher, Pallone, Engel, Green, Capps, Harman, Gonzalez,
16 Baldwin, Matheson, Barrow, Waxman (ex officio), Upton, Hall,
17 Stearns, Whitfield, Shimkus, Pitts, Burgess, Scalise, and
18 Barton (ex officio).

19 Also present: Representative Christensen.

20 Staff present: Dave Rapallo, General Counsel; Melissa
21 Bez, Professional Staff; Joel Beauvais, Counsel; Alexandra
22 Teitz, Senior Counsel, Environment and Energy; Matt Weiner,
23 Clerk; Caren Auchman, Communications Associate; Jeff Baran,
24 Counsel, Amanda Mertens Campbell, Minority Counsel; Andrea
25 Spring, Minority Professional Staff; Peter Spencer, Minority
26 Professional Staff; and Garrett Golding, Minority Legislative
27 Analyst.

|
28 Mr. {Markey.} Good morning, and welcome to the
29 Subcommittee on Energy and Environment and this very
30 important opening hearing.

31 We stand at a critical moment in history. The country
32 is facing some of the deepest, most complex challenges it has
33 ever confronted: an economy in peril, a broken energy
34 system, a climate in crisis. These problems are inseparable
35 and so are the solutions. We now have a choice to make. We
36 can continue to sit on our hands, allowing our children and
37 grandchildren to inherit a planetary catastrophe or we can
38 take action to unleash a technology revolution that will
39 revive our economy while protecting our national and
40 environmental security.

41 Today's hearing is the first of many the subcommittee
42 will hold in the coming weeks as we work with Chairman Waxman
43 and Ranking Members Barton and Upton to pass a comprehensive
44 climate and energy piece of legislation out of committee by
45 Memorial Day. We begin this process by hearing from a
46 distinguished panel about the grave threats that global
47 warming poses to national and global security, public health
48 and economic growth. These witnesses are here in part to
49 purge whatever complacency remains after 8 years of climate
50 policy founded on denial, obfuscation and delay. The

51 American people are ready for bold action and they expect
52 Congress to pass legislation that will create jobs, save
53 consumers money and protect the planet. There is now a
54 robust scientific consensus that global warming is happening,
55 that manmade greenhouse gas emissions are largely
56 responsible, and that if we fail to dramatically reduce those
57 emissions starting now, catastrophic impacts will result.

58 This leads to the real question in this debate: Can we
59 afford not to act? The human and economic costs of continued
60 delay are staggering, whether it is villages falling into the
61 sea in Alaska, flooding in the Midwest, droughts becoming
62 harder, longer and more frequent in the south or crop failure
63 and water scarcity feeding a genocide in Sudan. We now that
64 changes brought on or exacerbated by human-induced climate
65 change are happening. These impacts will threaten national
66 and global security, endanger public health and damage the
67 American economy.

68 In last year's National Intelligence Assessment, the
69 heart of our national security establishment, called the
70 climate crisis a threat to American security. Public health
71 professionals have told us that global warming is already
72 causing tens of thousands of deaths annually in the
73 developing world and poses a serious threat to public health
74 here at home.

75 Our economy is also in grave danger. If left unchecked,
76 global warming will cost the United States trillions of
77 dollars in coming years. Recent studies suggest that by
78 2050, our Nation could face at least half a trillion dollars
79 in damages every year due to climate change, a 1.5 percent
80 cut in GDP. Global GDP could fall as much as 20 percent.

81 The costs of inaction are not limited to the impacts of
82 global warming. They also include the price of lost
83 opportunity. American was once the world's leader in
84 renewable energy technologies but we are now losing those
85 jobs to our overseas competitors. If we are laggards instead
86 of leaders in the fight against global warming, we will miss
87 out on the greatest economic opportunity of our time. Three
88 point six million Americans have lost their jobs since the
89 beginning of the current recession and climate legislation
90 offers them new hope.

91 In less than 300 days, the attention of the world will
92 turn to Copenhagen, site of the negotiations that we hope
93 will produce a plan forward for the global community to
94 address climate change. The House of Representatives is now
95 taking its first steps down the path towards a responsible
96 policy on climate. As we put our domestic house in order, we
97 can return the United States to its rightful place of
98 leadership in solving the most pressing problems facing the

99 world.

100 That completes the opening statement of the chair.

101 [The prepared statement of Mr. Markey follows:]

102 ***** COMMITTEE INSERT *****

|
103 Mr. {Markey.} We now turn and recognize the ranking
104 member of the subcommittee, the gentleman from Michigan, Mr.
105 Upton.

106 Mr. {Upton.} Well, thank you, Mr. Chairman.

107 Today's hearing does touch on a number of important
108 aspects of the climate change debate, and I have said at
109 nearly every climate change hearing that for me I don't
110 dispute the science. Right or wrong, the debate over the
111 modeling and science appears to be over. We have got to get
112 past that and look at our policy options and consequences of
113 the actions that we need to take to address that issue.
114 Whatever policy we deploy has to have real environmental
115 impact, meaning a tangible change in global temperature, not
116 just arbitrary reductions in CO2 emissions. I want to know
117 if the United States cuts emissions and China does not, how
118 much will that impact global temperatures? With the ever-
119 increasing emissions of the developing world even if the
120 United States reduces its emissions to zero, there would be
121 no change in global temperature. Our climate change policies
122 must be linked to a realistic reduction in those
123 temperatures. Cap-and-trade legislation that we have seen so
124 far, specifically legislation that was voted down in the
125 Senate last year, and legislation introduced last Congress by

126 the full committee chair would create economic opportunities
127 for China and India and it would also create a national
128 security threat, I think, for this country.

129 There is an analysis that is going to be released in the
130 coming weeks by the National Commission on Energy Policy. It
131 should be noted that the head of that group was also a top
132 energy and climate advisor to President Obama during his
133 campaign. They found that many energy-intensive businesses
134 would fall far below a financial tipping point if Congress
135 were to pass climate legislation similar to the bill that
136 failed in the Senate last year. These companies would go
137 offshore, creating economic opportunities for China and India
138 while making the environment, not to mention our economy,
139 worse. Furthermore, if we lost those key industries and
140 their many jobs, I think we would be on a weaker national
141 security footing.

142 History has shown that the United States is stronger
143 with a robust manufacturing and industrial base. The jobs
144 and industries that will bear the greatest cost of climate
145 legislation are the very same industries that we need to keep
146 in America to remain a power on the world stage. What
147 happens to our national security when we don't manufacture
148 much? What happens when we order all the steel and aluminum
149 from China? If we take the wrong legislative path dealing

150 with climate change, we run the real risk of permanently
151 destroying our manufacturing and defense supply chains. I
152 find it ironic that while the big issue of today is a
153 stimulus package to revive our economy, we are also getting
154 ready to go down a legislative path that by all accounts will
155 reduce GDP, send jobs overseas and make energy more
156 expensive. Let us be honest. By design, that is how cap-
157 and-trade works.

158 Just last year, Members of this Congress were proposing
159 legislation that would include residential electricity prices
160 by 28 percent by the year 2015, over 40 percent by the year
161 2020, reduce our GDP in 2015 by 2.3 percent, or \$402 billion,
162 and by 2050 by a 6 percent figure with a dollar amount a
163 staggering \$3 trillion. Michigan already is one of the
164 hardest hit States in our weak economy. We would be
165 disproportionately impacted. NAM did a detailed analysis of
166 the impact on my home State of Michigan and the impact on
167 jobs. The primary cause of job losses in Michigan would be
168 the lower industrial output due to higher energy prices, the
169 high cost of compliance and greater competition from overseas
170 manufacturers with lower energy costs. Most energy prices
171 would rise under the proposals, particularly for coal and oil
172 and natural gas. If we end up with legislation that looks
173 like anything that we saw last year, doing an \$800 billion

174 stimulus this week won't be enough. We are going to send 3
175 million jobs overseas in the next 6 years and raise nearly
176 \$2,000 per household in additional costs. That stimulus
177 package isn't going to be nearly enough to soften the blow.

178 I do believe that we have to do work to address climate
179 change. I don't dispute the science. But our response must
180 be to protect the economy. It has got to be tied to
181 international action and it must have a tangible
182 environmental benefit. Most importantly, I think we need to
183 focus on all of the above. That includes conservation, that
184 includes renewable resources and yes, that includes nuclear,
185 which has, as we know, no emissions of CO2. That is what we
186 need to do to create jobs and I think to have a measured
187 impact on improving our economy and doing it in the right,
188 smart way, and I yield back my time.

189 [The prepared statement of Mr. Upton follows:]

190 ***** COMMITTEE INSERT *****

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191 Mr. {Markey.} The gentleman's time has expired. The
192 chair recognizes the chairman of the full committee, the
193 gentleman from California, Mr. Waxman.

194 The {Chairman.} Thank you very much, Mr. Chairman, for
195 recognizing me and for holding this hearing.

196 As the Energy and Commerce Committee develops
197 legislation to reduce greenhouse gas emissions, we are going
198 to spend a considerable amount of time examining the
199 potential costs of different approaches. We will have
200 detailed government analysis and other assessments to project
201 the possible effects of various proposals on electricity
202 rates, gas prices, economic growth and a host of other
203 indicators, but what I hope we will not do is have an
204 analysis of all of this compared to the analysis that we will
205 hear about today if we do nothing. We are going to consider
206 a different set of costs if we do nothing, the impact of
207 these costs on our national security, public health and the
208 global economy.

209 With global warming comes rising sea levels, severe
210 droughts, increasingly intense storms and more-frequent fires
211 and the loss of agricultural land. These effects harm people
212 and they impose huge costs on the economy. Human health will
213 also suffer, even if we make significant improvements to our

214 public health systems. For example, as heat waves increase
215 in frequency and severity, more people will get sick, more
216 people will die from heat-related illnesses, and as we saw
217 with Hurricane Katrina, extreme weather events are harder on
218 the sick than on the healthy and they cause additional health
219 problems. With these and many other effects of global
220 warming, the most vulnerable among us will be the hardest hit
221 and this alone is a reason to act.

222 But when military experts examine global warming, they
223 see additional costs that also demand action. In 2007, a
224 board of 11 retired admirals and general reviewed the risks
225 from climate change around the globe. Some of these retired
226 military officials had not viewed climate change as a threat
227 prior to this review but based on their review, the entire
228 board came to this conclusion: Climate change acts as a
229 threat multiplier for instability in some of the most
230 volatile regions of the world. They warned of large
231 populations moving in search of resources and weakened and
232 failing governments which would foster conditions for
233 internal conflicts, extremism and movement toward increased
234 authoritarianism and radical ideologies. Retired General
235 Anthony Zinni, former commander in chief of the U.S. Central
236 Command, put it this way: ``We will pay for climate change
237 one way or another. We will pay to reduce greenhouse gas

238 emissions today or we will pay the price later in military
239 terms, and that will involve human lives. There will be a
240 human toll. There is no way out of this that does not have
241 real costs attached to it. That has to hit home.''

242 I look forward to exploring these issues further with
243 today's witnesses. I also look forward to working with you,
244 Mr. Chairman, and all the members of our committee as we
245 develop legislation over the coming months. Doing nothing is
246 not an option that anybody should look at without feeling a
247 sense of alarm.

248 I yield back my time.

249 [The prepared statement of Mr. Waxman follows:]

250 ***** COMMITTEE INSERT *****

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251 Mr. {Markey.} The gentleman's time has expired. The
252 chair recognizes the gentleman from Florida for 2 minutes,
253 Mr. Stearns.

254 Mr. {Stearns.} Thank you, Mr. Chairman.

255 In light of the dire warnings that you have outlined,
256 you know, I really think what we need to do is innovate
257 rather than regulate our way out of this energy dilemma. At
258 a time when we are trying to stimulate our economy and avoid
259 entering what we think is a prolonged recession, possibly a
260 depression, there is all this talk about, Mr. Chairman, you
261 bringing an energy bill here before Memorial Day, and I
262 assume this energy bill would be patterned after the
263 Lieberman-Warner bill, which would include cap-and-trade and
264 a lot of the other highly regulatory measures. So I want us
265 to be careful here in light of the economy that we don't want
266 to destroy American jobs.

267 As pointed out by the ranking member from Michigan,
268 China has already surpassed the United States as the leading
269 greenhouse gas emitter and India is not far behind. With
270 equivalent efforts to limit these gases among China and India
271 alone, the United States stands to lose many hundreds of
272 thousands of jobs to these countries, which will profit from
273 unilateral action taken by the United States. If we simply

274 go ahead and do this without a cooperative effort with India
275 and China, we will be hurting our workers today.

276 Now, according to one leading think tank, if legislation
277 similar to the Lieberman-Warner bill is enacted, they are
278 talking about annual job losses that would exceed 500,000
279 before 2030 and could approach 1 million jobs lost. In my
280 home State of Florida alone, we are projected to lose about
281 300,000 jobs by the year 2030 if this similar type of
282 Lieberman-Warner bill is passed before this committee.

283 Aside from losing these very desperately needed jobs to
284 other countries, American families obviously would suffer
285 under a cap-and-trade system. Now, the Charles River
286 Associates International, its headquarters in Boston,
287 Massachusetts, the chairman's hometown, they stated that if
288 we implemented that type of bill, that the number of people
289 that would go on unemployment would increase, subsequently
290 into some type of welfare, and they project losses of \$4 to
291 \$6 trillion, so I think we have to be cautious, Mr. Chairman,
292 and I need to again say we need to innovate rather than
293 regulate. Thank you.

294 [The prepared statement of Mr. Stearns follows:]

295 ***** COMMITTEE INSERT *****

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296 Mr. {Markey.} The gentleman's time has expired. The
297 chair recognizes the chairman emeritus of the committee, the
298 gentleman from Michigan, for 5 minutes.

299 Mr. {Dingell.} Mr. Chairman, I thank you for your
300 courtesy and I thank you for holding this hearing today.

301 As I said at the last climate change hearing held by the
302 full committee, global climate change is the most serious
303 environmental issue confronting this Nation. What we will
304 hear today and we have heard in the subcommittee hearing last
305 summer, however, is that this issue is not just an
306 environmental matter. Instead, it poses a major threat to
307 our national security and to the public health as well.

308 We often hear about the costs of addressing climate
309 change, and to be very clear, there will be significant
310 monetary costs. Anybody who thinks otherwise is fooling
311 themselves. But we must also make it clear that there is
312 great cost to inaction. That we understand both the cost of
313 action and the cost of inaction is of the utmost importance
314 in designing fair and balanced climate change legislation.

315 Now, I will not pretend that this is going to be an easy
316 task nor can I assure you that it will not be. To start
317 with, putting a dollar value on inflation is difficult. How
318 do you value the effect of the storms that might happen or

319 the value of potential species extinction? This is not easy
320 to say as to how we should act. On the contrary, the
321 scientific evidence is in and it is clear: We have no choice
322 but to act. That is why I along with Representative Boucher
323 released a draft last year of a bill to address climate
324 change. It was an interesting piece of work, and
325 interestingly enough, it embodied provisions which were
326 supported by all parts of those involved in the controversy
327 by the environmentalists and by business and industry, and it
328 was a document which I think would be fairly easy for
329 everyone to come to some kind of agreement on.

330 Our witnesses today will tell us that our failure to act
331 could put the planet and the country at risk or even risk of
332 graver and greater consequences. Today's hearing will help
333 us to understand potential security and the costs of those
334 consequences. I hope as we go about the consideration of
335 these questions we will take a look at the draft that Mr.
336 Boucher and I released last year and that this will be one of
337 the documents which we will consider as we go about the
338 business of drafting legislation on this very important
339 question.

340 Thank you, Mr. Chairman.

341 [The prepared statement of Mr. Dingell follows:]

342 ***** COMMITTEE INSERT *****

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343 Mr. {Markey.} The gentleman's time has expired. The
344 chair recognizes the gentleman from Kentucky, Mr. Whitfield.

345 Mr. {Whitfield.} Thank you very much, Mr. Chairman, and
346 we appreciate this hearing today.

347 Kevin Trenberth, who was one of the lead authors of the
348 United Nations' 2007 Intergovernmental Panel on Climate
349 Change, stated in a blog that he has on Nature's journal that
350 in fact there are no predictions by the Intergovernmental
351 Panel on Climate Change and there never have been. The
352 science is not done because we do not have reliable or
353 reasonable predictions of climate. And so when we talk about
354 the cost of not acting, I think it is particularly
355 speculative. But when we talk about the cost of acting,
356 there certainly is more reliable evidence of exactly the cost
357 of acting, particularly when you are talking about
358 implementing a cap-and-trade system. We can easily go to
359 Europe and determine the cost of acting in Europe. We know
360 that emissions have actually increased since the cap-and-
361 trade system was implemented in Europe. We also know that
362 there have been significant job losses, and we also know that
363 using a model based on the Lieberman-Warner bill, as my
364 friend from Florida stated, the prediction is that throughout
365 the United States by the year 2030 there would be 1 million

366 people without jobs primarily because the job loss would be
367 caused by lower industrial output because of higher energy
368 costs. And when you have countries like China, India and
369 others that are relying more and more on coal production
370 because of the low cost of coal, America is going to become
371 even less competitive.

372 And so as we talk today about impact on national
373 security, the economy and public health, I hope that we have
374 some very strong scientific and economic evidence of the cost
375 of inaction. I don't have any time left.

376 [The prepared statement of Mr. Whitfield follows:]

377 ***** COMMITTEE INSERT *****

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378 Mr. {Markey.} The gentleman's time has expired. The
379 chair recognizes the gentleman from Pennsylvania, Mr. Doyle.

380 Mr. {Doyle.} Thank you, Mr. Chairman. I want to start
381 my remarks by thanking you for having this important hearing
382 today.

383 Mr. Chairman, at a time when our Nation is facing the
384 worst economic crisis in generations, hearings like this one
385 are very important. We must fully understand not only the
386 cost we incur as we attempt to stimulate our economy today
387 but what costs our Nation will face if we do not use this
388 opportunity to address climate change as we rebuild our
389 economy.

390 As I have said before, the question of whether climate
391 change is happening and if the actions of mankind are having
392 an effect on its progression is over. While there are a few
393 scientists out there that still cast doubt, it can be said
394 that the overwhelming opinion in the scientific community is
395 that this crisis is very real, mankind is in part responsible
396 and there are actions we can take now to slow and reverse
397 this very dangerous trend. However, this hearing is not
398 about if climate change is real, this hearing is about the
399 cost of action and the cost of inaction.

400 As many of our witnesses will also testify to, I believe

401 that doing nothing is no longer an option as there are very
402 real costs that will happen if the United States continues to
403 lag behind other nations as they move forward to address this
404 truly global problem. President Obama stated earlier this
405 week that the country that figures out how to make cheaper
406 energy that is also clean will win the economic competition
407 in the future. Regardless of how any member of this
408 committee feels regarding the science of global warming, I
409 would hope that every member here would agree with the
410 President's statement. I don't care if you are joining the
411 climate discussion because you feel there is a profound
412 environmental threat or if you are joining the climate
413 discussion because you see economic advantages for the United
414 States, it is critical that we all work to ensure that we
415 position our nation to be the world's leader in the
416 production of cheap and clean energy.

417 Like the dot.com boom of the 1990s, the energy
418 revolution will provide jobs, the trade and economic growth
419 that our citizens deeply desire. It is critical that this
420 committee act this year and put our Nation back on a path for
421 the production, distribution and sale of not only cheap
422 energy but all the technology that will be required to
423 produce it.

424 With that, I yield back, Mr. Chairman.

425 [The prepared statement of Mr. Doyle follows:]

426 ***** COMMITTEE INSERT *****

|
427 Mr. {Markey.} I thank the gentleman. The chair
428 recognizes the gentleman from Illinois, Mr. Shimkus.

429 Mr. {Shimkus.} Thank you, Mr. Chairman. Ryan, just put
430 this up.

431 [Slide.]

432 This is a Peabody Mine #10 in Kincaid, Illinois, prior
433 to the Clean Air Act. It was an efficient operation with a
434 power plant just across the street. These are the workers
435 who were employed at this mine. They are the faces of the
436 middle class. They are the faces of the United Mine Workers.
437 They are the faces of the unemployed.

438 I attended a rally at the Christian County Fairgrounds
439 which attacked the company for their closure of this mine.
440 The real culprit was legislation passed by this government in
441 the Clean Air Act. I will fight to keep this from happening
442 to my mineworkers again, and I yield back my time.

443 [The prepared statement of Mr. Shimkus follows:]

444 ***** COMMITTEE INSERT *****

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445 Mr. {Markey.} The gentleman's time has expired. The
446 chair recognizes the gentleman from Texas, Mr. Gonzalez.

447 Mr. {Gonzalez.} I will waive.

448 [The prepared statement of Mr. Gonzalez follows:]

449 ***** COMMITTEE INSERT *****

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450 Mr. {Markey.} The chair recognizes the gentleman from
451 Utah, Mr. Matheson.

452 Mr. {Matheson.} I will waive.

453 [The prepared statement of Mr. Matheson follows:]

454 ***** COMMITTEE INSERT *****

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455 Mr. {Markey.} The chair recognizes the gentleman from
456 North Carolina, Mr. Butterfield.

457 Mr. {Butterfield.} Thank you very much, Mr. Chairman,
458 for convening this hearing and thank you for your leadership,
459 not only on this committee but on this very issue that we are
460 talking about. You have been talking about it for so long,
461 long before I came to this Congress, and I just thank you so
462 much.

463 As with most disasters, Mr. Chairman, the effects of
464 climate change will be most significantly experienced by low-
465 income people both in our country and abroad. Any climate
466 effect that strains essential resources such as water, food
467 and shelter is multiplied on poor people who already live on
468 tight margins. For this and other reasons, the cost of
469 inaction on climate change rises exponentially for the poor
470 of this country as well as those living in developing regions
471 around the world. James Lyons testified before the
472 subcommittee last year that people living in developing
473 countries are 20 times more likely to be affected by climate
474 change disasters. Drought, disease and severe weather events
475 are typically exacerbated in these developing areas as
476 compared to more-developed regions.

477 The consequences of domestic climate change for the poor

478 could include chronic illnesses and the loss of property,
479 yes, the loss of property and livelihood. As temperatures
480 rise, air quality drops and asthma cases rise. Numerous
481 studies have shown a clear link between poverty and increased
482 susceptibility to asthma, and people of color are three times
483 likelier to suffer from asthma-related conditions. Much of
484 my district in North Carolina includes low-lying and coastal
485 lands. A recent University of Maryland study projected an
486 18-inch rise in sea level by 2080, which would cause over
487 \$2.8 billion in property losses in just four of my counties.
488 Bertie County, one of my poorest countries, would lose an
489 estimated \$9 million in property. That does not sound like a
490 lot to my friends from urban area but it is indeed in a rural
491 area. Inaction would affect their homes, their businesses
492 and the lives that they have built with their families.
493 We must act in this Congress, but as we push forward in
494 developing policy that would set scientifically based targets
495 for greenhouse gas reductions, we must be sure to remember
496 the needs of low-income people both here in this country and
497 around the world.

498 Thank you, Mr. Chairman. I yield back.

499 [The prepared statement of Mr. Butterfield follows:]

500 ***** COMMITTEE INSERT *****

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501 Mr. {Markey.} The gentleman's time has expired. The
502 chair recognizes the gentleman from Louisiana, Mr. Scalise.

503 Mr. {Scalise.} Thank you, Mr. Chairman. I appreciate
504 the opportunity to discuss the effects of sweeping climate
505 change legislation. I certainly look forward to hearing the
506 testimony from our panel today.

507 I would note that for thousands of years, climate and
508 temperature cycles of the Earth have been in effect and this
509 Congress must not hastily pass sweeping climate change
510 legislation without regard to its negative economic impact.
511 At a time when our economy is struggling and when we must
512 make bold efforts to become energy independent for national
513 security and other reasons, it is our job to carefully weigh
514 the costs and benefits of each proposal we will face before
515 this subcommittee. I remain concerned that we have focused
516 too little on the effect of sweeping climate change and what
517 it would have on our economy as well as the historical record
518 throughout our history.

519 As Congress considers radical policy changes here in
520 Washington, we are already seeing some of the negative
521 effects take place by decisions that private firms are making
522 today. There is a major steel manufacturing plant in this
523 country that is currently making a decision between building

524 a \$2 billion plant. Right now their choices are between
525 Louisiana, near my district, or Brazil. What they have said,
526 according to the CEO of the company, imminent U.S. policy
527 changes dealing with climate change are negatively affecting
528 their decision to build a major plant here in the United
529 States which would create 700 good jobs. Those are 700 jobs
530 that because of the decisions that are being discussed here
531 if we make negative policy changes that are radical, they
532 would run those 700 jobs out of this country and send them to
533 Brazil.

534 Becoming more energy efficient is a good thing but I
535 urge caution in proceeding in a radical fashion that could
536 produce dire consequences to our economy without yielding any
537 benefits to our environment.

538 Thank you, and I look forward to hearing from our panel.

539 [The prepared statement of Mr. Scalise follows:]

540 ***** COMMITTEE INSERT *****

|
541 Mr. {Markey.} The gentleman's time has expired. The
542 chair recognizes the gentlelady from California, Ms. Harman.

543 Ms. {Harman.} Thank you, Mr. Chairman, and my thanks to
544 you and also to the chairman of the full committee, Mr.
545 Waxman, for your work on the stimulus package that we will
546 vote on tomorrow. There are sections in it on health and
547 energy that are absolutely critical and that obviously owe a
548 lot to the work of this committee. I just want to say as a
549 Californian how much I appreciate the effort to increase the
550 share of FMAP payments that will go to counties and cities.

551 Mr. Chairman, to paraphrase our new President, leaders
552 must be able to do more than one thing at a time. That means
553 fixing the economy and beginning to solve perhaps the most
554 pressing public policy challenge of this generation, global
555 climate change. I recognize, and we have just heard it, and
556 that there are a few on this committee who still doubt the
557 science of climate change and its implications but I am not
558 one of them. The climate is changing more radically and more
559 quickly than we once believed and the consequences of
560 inaction will be catastrophic.

561 I want to acknowledge the work of some of the witnesses
562 before us. A few years back, Jim Woolsey helped to arrange a
563 simulation in my Congressional district called Oil Shock

564 Wave. I think he played the president, and I was secretary
565 of defense and former California Governor Pete Wilson was
566 secretary of state, and whatever firepower we brought to
567 that, we couldn't solve the implications of shockingly high
568 oil prices on the U.S. economy, and we have actually now a
569 few months back seen what happens with that. So I want to
570 thank him for his work on that, and as you will hear in a
571 minute, his work on the implications on the electric grid and
572 other things of some of these issues.

573 And as for General Sullivan, you will remember that we
574 had a big fight in Congress adding a section to the
575 intelligence authorization bill a few years ago to require a
576 national intelligence estimate on the effects of climate
577 change on our national security. Many people laughed about
578 that. Well, I don't think it is a laughing matter, and I
579 think we have learned that famine and drought produce the
580 perfect conditions for recruiting terrorists and I worry
581 about that a lot.

582 So let me just close by saying if we worry about jobs,
583 let us get this right and build the jobs of the future and
584 keep America secure. Thank you, Mr. Chairman.

585 [The prepared statement of Ms. Harman follows:]

586 ***** COMMITTEE INSERT *****

|
587 Mr. {Markey.} The gentlelady's time has expired. The
588 chair recognizes the ranking member of the full committee,
589 the gentleman from Texas, for 5 minutes.

590 Mr. {Barton.} Thank you, Mr. Chairman. It is good to
591 finally engage in the debate. Global warming or climate
592 change is certainly an issue that we have walked around the
593 edges of in this Congress for the last several sessions, and
594 I think it is an important issue and I think it is good to
595 have these witnesses and the ones that are going to appear
596 after them to begin the information-gathering process.

597 I am, I don't think it is a surprise, a skeptic that
598 mankind is causing the climate to change. I do agree that
599 the climate is changing. That is self-evident. I just have
600 a problem because I am a registered professional engineer.
601 When I look at all the evidence of the past climate change
602 cycles to see what is different about this one, that somehow
603 mankind is the cause, the supposed expert IPCC models, unless
604 they miraculously improved them in the past 3 to 4 months,
605 don't do a very good job of even predicting the past. Half
606 the time they get the degree of change and the direction
607 wrong. Now, maybe they have changed some in the last 6
608 months and maybe some of these witnesses can educate me on
609 that.

610 We understand that global warming is a theory and it may
611 even be a practical theory, but I am not yet ready to accept
612 that it is a theology. Some of the more fervent global
613 warming advocates do take it as a theology or a
614 pseudoreligion. When you try to debate with them the facts
615 of the case, they get very intensely upset.

616 Global warming advocates believe that humanity's CO2
617 emissions harm the earth by raising the global temperature,
618 and they say that only draconian action led by the United
619 States will save the planet. The U.S. cap-and-trade group
620 that testified at the full committee several weeks ago
621 supports a proposal that would cut CO2 emissions by 80
622 percent in the United States by the year 2050. Again, I can
623 stand to be corrected but my understanding, if we cut our CO2
624 emissions by 80 percent, we are back to levels that we last
625 experienced in the United States around World War I when we
626 had about 120 million people in this country and over half of
627 those lived on farms, and the per capita income was in the
628 hundreds of dollars per person instead of the tens of
629 thousand of dollars per person that it is today.

630 If we do what the advocates say we should do, the
631 econometric models, which I believe are more accurate, almost
632 guarantee a 2 to 3 percent GDP negative growth, in other
633 words, a contraction of GDP on an annual basis. You want to

634 talk about launching another Great Depression, let us do some
635 of the things that require that kind of a contraction.

636 Instead of heading back to the Bronze Age, I think we
637 should look to the future for solutions. I think it is
638 possible on a bipartisan basis to do things that actually
639 further the science, further the research into carbon capture
640 and conversion, accelerate the use of existing technologies
641 like nuclear power, some of the alternative energy sources
642 that we know are zero emissions, wind power, new hydropower,
643 things like that. We can have a bipartisan solution, a
644 bipartisan proposal on those kinds of things.

645 No poor country values its environment more than it
646 values its people's ability to make a living. One of the
647 problems we are going to have, it is one thing to ask an
648 industrialized society to do with a little bit less, but it
649 is another thing entirely to ask an evolving society to not
650 do at all. If you go to some of the countries in Africa and
651 Asia, some of the former European Soviet Union satellites in
652 eastern Europe and ask them to just not have what we have
653 taken for granted in this country for the last 50 years, I
654 think we are going to get a rude awakening. They are just
655 not going to do it. If the choice is wash your clothes in
656 the ditch or put electricity that is generated by a coal-
657 fired power plant so that you can actually buy a washing

658 machine, most people are going to build a coal-fired power
659 plant.

660 So again, that is why we need to do things like Mr.
661 Boucher's bill on CO2 research for conversion and capture and
662 do some of the things that I have already alluded to.

663 I see that my time is about to--in fact, it has expired,
664 Mr. Chairman. I appreciate you giving me that notice.
665 Suffice it to say that I am very involved in this debate. I
666 appreciate the process where are going to do the hearings
667 before we move a bill. That is somewhat unique in this
668 Congress, and I appreciate you doing that. I look forward to
669 the debate.

670 [The prepared statement of Mr. Barton follows:]

671 ***** COMMITTEE INSERT *****

|
672 Mr. {Markey.} I thank the gentleman very much. The
673 chair recognizes the gentlelady from California, Ms. Matsui.

674 Ms. {Matsui.} Thank you, Mr. Chairman, for calling
675 today's hearing. I applaud your leadership and vision on
676 this critical and pressing issue. I look forward to working
677 with you and with all the members on the committee to craft
678 responsible solutions to the problem of climate change. I
679 would also like to thank today's panelists for sharing their
680 expertise with us.

681 Climate change is a problem that demands action and
682 demands action now. My hometown of Sacramento is a perfect
683 illustration of why we need to solve climate change as soon
684 as possible. In Sacramento we live at the confluence of two
685 great rivers. We also live at the foot of the Sierra Nevada
686 Mountain range. We have learned to manage the winter rains
687 that test our levies and we learned to manage the spring
688 snowmelt that flows down from the Sierras each year. But
689 global warming threatens to upset this finely tuned balance.
690 This year we are having a major drought. In recent years,
691 extreme amounts of rain have strained our infrastructure.
692 Behind these changing climatic patterns is a constant threat
693 of flooding. Protecting my hometown from flooding is my top
694 priority. This makes addressing climate change that much

695 more urgent for me. Nearly half a million people, 110,000
696 structures, the capital of the State of California and up to
697 \$58 billion are at risk from flooding in Sacramento.

698 Unless we take action now, our way of life in Sacramento
699 and California and across the country will be changed
700 forever. I look forward to hearing from each of today's
701 witness of how we can advance solutions to global warming
702 that keep people safe and help us avoid disaster here at
703 home.

704 Thank you again for your leadership on this issue, Mr.
705 Chairman, and with that I yield back the balance of my time.

706 [The prepared statement of Ms. Matsui follows:]

707 ***** COMMITTEE INSERT *****

|
708 Mr. {Markey.} The gentlelady's time has expired. The
709 chair recognizes the gentleman from Texas, Mr. Burgess.

710 Mr. {Burgess.} Thank you, Mr. Chairman. I appreciate
711 you holding the hearing today titled ``The Climate Crisis:
712 National Security, Public Health, and Economic Threats.'' In
713 fact, the title kind of invokes what columnist George Will
714 spoke about last Sunday: The only thing we have to fear is
715 insufficiency of fear.

716 If I were to list the top 100 national security threats
717 facing our country today and rank them from one to 100, I
718 would be hard pressed to put climate change in the top tier,
719 the top 50 or perhaps even in the top 75. Now, there may be
720 a national security threat but so are birds flying about the
721 Hudson River. Scaring people into feeling better about
722 paying more for their energy consumption under the guise of
723 potential greater national security is a hard sell. People
724 in my district know that as a Nation we have got greater
725 domestic security concerns and especially now greater
726 economic concerns to address before we try to tackle the
727 weather and beach erosion.

728 We simply do not know the future or what technology may
729 exist in the future but we do know that the technology that
730 we will need to dramatically change the way we deliver and

731 consume energy will require a strong and growing economy.
732 Strong and growing economies have obligations to protect
733 their national security. I would also argue that the needs
734 of challenged societies do not hinge on the exploitation of
735 natural resources but rather on the lack of affordable
736 resources, given the needs of their people. Strong and
737 growing economies have the financial resources to provide
738 additional aid to people in need. Strong and growing
739 economies can protect themselves more easily and adapt to
740 changes and mitigate the effects of natural disasters. Let
741 us ensure that our ability and the ability of developing
742 economies to prosper are not put at future risk by the way we
743 choose to address the issue of human contributions to what we
744 now know as climate change.

745 I thank you for the consideration, Mr. Chairman. I will
746 yield back the balance of my time.

747 [The prepared statement of Mr. Burgess follows:]

748 ***** COMMITTEE INSERT *****

|
749 Mr. {Markey.} The gentleman's time has expired. The
750 chair recognizes the gentleman from Washington State, Mr.
751 Inslee, for an opening statement.

752 Mr. {Inslee.} Thank you, Mr. Chairman.

753 I would like to make two points. First, in response to
754 Mr. Barton's entreaty that we follow science rather than
755 theology, I think all of us have to be willing to accept new
756 science, and I want to say that I have been wrong on this
757 issue of global warming now for several years. I have been
758 advocating action for this and I have been wrong. I based my
759 earlier positions on this climate change report of 2007, the
760 physical science basis consensus product of a couple thousand
761 of the world's best scientists including, I believe Nobel
762 Prize winner Dr. Chu, the film, ``An Inconvenient Truth'' and
763 a lot of other things I have read. All of those things were
764 wrong. They grossly understated the threat that we are
765 facing today. Because during the last 12 months we have had
766 an avalanche of information scientifically to indicate our
767 previous projections grossly understated the pace and depth
768 and scope of this threat.

769 While we previously thought the Arctic would be around
770 in 50 years, it is gone now virtually in the summer. While
771 we previously said that glaciers in Glacier National Park

772 would be around in decades, they are essentially going much
773 more rapidly. While we previously thought ocean
774 acidification would take 70 years to make it impossible for
775 coral reefs to exist, they are now rapidly approaching that
776 level right now off the coast of the State of Washington.

777 This is a much deeper problem than we thought it was 12
778 months ago and that is why it demands urgent action, and it
779 demands action tomorrow when we vote on the economic recovery
780 bill, which is the largest investment in innovation,
781 creativity and job creation in green-collar jobs in American
782 history, \$90 billion to do exactly what my Republican friends
783 say they believe in, which is innovation, and I entreat them
784 to vote for the largest investment in innovation at A123
785 Battery Company with lithium ion batteries, at the Ostra
786 solar concentrated solar thermal plant, at Magna Drive in
787 Bellevue, Washington, at Detroit's GM, where we want to make
788 electric cars. I hope they will vote with us tomorrow to
789 innovate our way out of this problem. Thank you.

790 [The prepared statement of Mr. Inslee follows:]

791 ***** COMMITTEE INSERT *****

|
792 Mr. {Markey.} The gentleman's time has expired. The
793 chair recognizes the gentleman from Pennsylvania, Mr. Pitts.

794 Mr. {Pitts.} Thank you, Mr. Chairman, for holding this
795 hearing. I believe that it is of the utmost importance to
796 protect our environment and our atmosphere. However, we need
797 to ensure that our solutions don't create new problems. The
798 massive federal regulations that will ensue from an
799 overarching broad climate change piece of legislation could
800 dramatically hurt national security and our economy. The
801 U.S. military is the country's largest consumer of oil, and
802 90 percent of the Federal Government energy cost comes from
803 the military. The military has acknowledged the need to
804 decrease their dependency on oil and they have taken
805 proactive steps towards this by turning to hybrid electric
806 engines, nuclear-powered ships, alternative fuels and
807 geothermal, wind and solar energy.

808 According to a Heritage Foundation analysis, the EPA
809 could regulate greenhouse gas emissions from numerous types
810 of engines including those installed in military tanks,
811 trucks, helicopters, ships and aircraft. Therefore, it is
812 imperative that greenhouse gas emissions regulations must not
813 hamper our Nation's ability to train and equip our troops by
814 placing restrictions on our military that will be overly

815 cumbersome.

816 In a time of serious economic downturn, we should be
817 careful about advocating a regulatory policy that will raise
818 the cost of energy and further burden businesses and
819 consumers. Instead, we need to make sure our economy is
820 vibrant, and we can do this by ensuring there is enough
821 investment capital to advance alternative and energy-
822 efficient technologies. I urge the committee to consider
823 potential negative effects that overly stringent climate
824 change legislation may have on our Nation's armed forces and
825 the economy. Now is not the time to debilitate the economy
826 or the military's ability to prepare for and engage in
827 conflicts around the globe.

828 Again, thank you, Mr. Chairman, for the hearing. I look
829 forward to hearing the testimony of our witnesses, and I
830 yield back.

831 [The prepared statement of Mr. Pitts follows:]

832 ***** COMMITTEE INSERT *****

|
833 Mr. {Markey.} The gentleman's time has expired. The
834 chair recognizes the gentleman from New Jersey, Mr. Pallone.

835 Mr. {Pallone.} Thank you, Mr. Chairman.

836 Everyone here understands the serious threat that global
837 climate change represents to the world. The fourth
838 assessment report of the Intergovernmental panel on Climate
839 Change, IPCC, predicted serious risks and damages to species,
840 ecosystems and human infrastructure if action is not taken to
841 reduce emissions.

842 I want to focus on the public health issues related to
843 global warming. First, let me clear, global warming has very
844 real and devastating effects on public health. According to
845 the IPCC, climate change contributes to the global burden of
846 disease, premature death and other adverse health impacts.
847 Furthermore, the World Health Organization has stated that
848 climate change is a significant and emerging threat to public
849 health. The Organization estimates that changes in earth's
850 climate may have caused at least 5 million cases of illness
851 and more than 150,000 deaths in the year 2000.

852 As a member from New Jersey, air quality issues are a
853 particular concern for me. The EPA designates New Jersey as
854 a nonattainment area, meaning New Jersey has ozone levels
855 higher than allowed under the EPA's 8-Hour Ozone National Air

856 Quality Standard. These higher concentrations of ground
857 ozone cause serious consequences for people with
858 cardiorespiratory problems. Reducing global warming
859 pollution will substantially reduce particulate matter, which
860 would significantly benefit people living in nonattainment
861 areas.

862 The goal of this hearing is to determine how best to
863 manage the effects of global warming and how to craft an
864 aggressive policy to lower greenhouse gas emissions. Through
865 Chairman Markey's leadership in the Select Committee on
866 Global Warming, we know we need aggressive action. Congress
867 must pass legislation that will set the necessary short- and
868 long-term emission targets that are certain and enforceable.
869 We can't afford to wait another year to act.

870 Thank you, Mr. Chairman.

871 [The prepared statement of Mr. Pallone follows:]

872 ***** COMMITTEE INSERT *****

|
873 Mr. {Markey.} The gentleman's time has expired. The
874 chair recognizes the gentleman from Georgia, Mr. Barrow.

875 Mr. {Barrow.} Thank you. I will waive an opening.

876 [The prepared statement of Mr. Barrow follows:]

877 ***** COMMITTEE INSERT *****

|
878 Mr. {Markey.} The gentleman waives. The chair
879 recognizes the gentlelady from Wisconsin, Ms. Baldwin.

880 Ms. {Baldwin.} Thank you, Mr. Chairman.

881 We know that climate change comes with a very large
882 price tag and the costs are not just measured in dollars.
883 Our emissions have put our environment, social structure and
884 national security at risk, and if we fail to act
885 comprehensively, the impacts will be felt through the loss of
886 human life, health, species extinction and loss of ecosystems
887 and social conflict.

888 As Members of Congress, especially as Members of the
889 people's House, we are generally prone to crafting and
890 passing legislation that provides immediate or near-term
891 relief to our constituents just as we doing with the recovery
892 package this week. However, it is a seeming challenge for us
893 to enact consequential legislation that may raise costs in
894 the near term with benefits that aren't reaped for perhaps a
895 generation, maybe more than a generation to come, legislation
896 that will have benefits that some of us won't even live to
897 see. Yet this is exactly the predicament that we now find
898 ourselves in. Do we make the investment now to avoid the
899 worst impacts of climate change? According to Lord Nicholas
900 Stern, who this subcommittee heard from last than a year ago,

901 the cost of acting today is about 1 percent of global GDP
902 each year. However, if we wait and leave this issue to a
903 future generation and watch the costs and risks rise, the
904 cost of inaction rises up to 20 percent of global GDP each
905 year. I am of the opinion that the risks are too great for
906 us to fail to act in the very near term.

907 I have seen firsthand the intense rain, flooding and
908 devastation that people in my district and across the upper
909 Midwest area experiencing as the result of intense rainfall
910 last year. We lost homes, businesses and farmland, not to
911 mention millions of dollars in lost productivity. I can only
912 hope that we will do everything in our power to ensure that
913 these 100-year events do not become the norm in the future.

914 Mr. Chairman, the scientific community has come together
915 on this issue. It is high time that we do. I yield back the
916 balance of my time.

917 [The prepared statement of Ms. Baldwin follows:]

918 ***** COMMITTEE INSERT *****

|
919 Mr. {Markey.} The gentlelady's time has expired. The
920 chair recognizes the gentleman from Vermont, Mr. Welch.

921 Mr. {Welch.} Thank you, Mr. Chairman, and thank you for
922 this hearing.

923 For decades the issue of climate change has focused on a
924 debate about science but today I think that question is
925 closed. Overwhelming scientific research shows that global
926 warming is real, it is urgent and it requires our immediate
927 action. Last month we heard testimony from our country's
928 largest corporations, and it really goes to the heart of what
929 some of my colleagues on the other side of the aisle have
930 been saying. We have to focus on economic consequences. The
931 universal testimony, undivided, united opinion was that the
932 cost of inaction would be dire to the economy, and today we
933 will hear further that addressing climate change is critical
934 for maintaining national security and protecting public
935 health.

936 Addressing the challenge presents us with an
937 opportunity, and that is really where we have to decide
938 whether we are going to face this confidently the way America
939 does when it is successful or defensively. Addressing this
940 challenge is critical to all of us. We know it in Vermont.
941 Even as a small State, we have realized that we can and must

942 make a contribution to a sustainable future, and in fact, we
943 are seeing that some of our best jobs are created by
944 companies that are engaging in this battle directly and
945 energetically. The test of leadership for this Congress is
946 to face directly the realities that are difficult, and as my
947 colleague from Wisconsin said, delay is going to cost us
948 more, not less. We must tackle this challenge squarely and
949 directly as the confident Nation that we are.

950 Thank you. I yield back.

951 [The prepared statement of Mr. Welch follows:]

952 ***** COMMITTEE INSERT *****

|
953 Mr. {Markey.} The gentleman's time has expired. The
954 chair recognizes the gentleman from New York, Mr. Engel.

955 Mr. {Engel.} Thank you, Mr. Chairman, and thank you for
956 holding this very important hearing this morning.

957 Climate change is real. We all know the science is no
958 longer a debate. It is one of the greatest environmental,
959 economic and international security threats of our time. To
960 protect our Nation and our environment, we must decrease our
961 consumption of oil and increase our ability to produce clean
962 biofuels here at home. We made progress toward these goals
963 last Congress by enacting the Energy Independence and
964 Security Act. That legislation made groundbreaking steps to
965 increase CAFE standards for our vehicle, strength energy
966 efficiency for a wide range of products and promote the use
967 of more-affordable American biofuels. I am continuing to
968 work to advance those goals with my Open Fuel Standards Act,
969 which would require that 50 percent of new cars sold in the
970 United States by 2012 are flex fuel and 80 percent by 2015,
971 meaning that they are able to run on any combination of
972 ethanol, methanol or gasoline.

973 But it is not just the transportation sector that
974 contributes to climate change. It is much bigger than that,
975 and that is why we are gathered here today. We must

976 implement a cap on carbon emissions. We must work together
977 as scientist, entrepreneurs and Americans, simply Americans,
978 to deploy the next generation of energy that will allow us to
979 build the next generation's economy.

980 I look forward to today's hearing, and I thank you, Mr.
981 Chairman, and I yield back.

982 [The prepared statement of Mr. Engel follows:]

983 ***** COMMITTEE INSERT *****

|
984 Mr. {Markey.} The gentleman's time has expired. The
985 chair recognizes the gentleman from California, Mr. McNerney.

986 Mr. {McNerney.} Thank you, Mr. Chairman. I have had
987 the privilege of serving on your Select Committee on Global
988 Warming and I have seen some very incredible testimony, some
989 stunning testimony including some from the witnesses that are
990 in front of us today. I want to thank the witnesses for your
991 hard work, for coming over here today, for facing this panel.
992 I have been in business. I have seen some incredible
993 technology out there. I know we can do this, and, you know,
994 we have heard plenty about the choice between the economy and
995 moving forward in reducing our electronics, that this is our
996 going to hurt our economy. That is a false choice. We have
997 the technology, we have the wherewithal in the United States
998 of America to do this, and it is going to create jobs and it
999 is going to make us have a strong economy.

1000 I look forward to working with members of this committee
1001 and hearing your testimony and we will end this dependence on
1002 oil and we will create a great green economy.

1003 [The prepared statement of Mr. McNerney follows:]

1004 ***** COMMITTEE INSERT *****

|
1005 Mr. {Markey.} The gentleman's time has expired. The
1006 chair recognizes the gentlelady from California, Ms. Capps.

1007 Ms. {Capps.} Thank you, Mr. Chairman, for holding this
1008 hearing. I very much look forward to our esteemed witnesses'
1009 testimony.

1010 The climate crisis is upon us. The earth is warming and
1011 the threat is real. Our economy, our national security and
1012 the public's health and well-being are all at risk. Global
1013 warming will obviously affect our economy. According to the
1014 well-respected Stern Review, every dollar we spend to reduce
1015 greenhouse gases now will save us \$5 later. Already the
1016 rising sea level has left residents of a small village in
1017 northwest Alaska unable to fish, unable to build safe homes,
1018 and that is just one example.

1019 In my home State of California, a study by the
1020 economists from the University of California Berkley found
1021 that \$2.5 trillion worth of real estate assets are vulnerable
1022 to flooding and sea rise. In addition, \$500 billion of
1023 transportation facilities are at risk as a result of rising
1024 sea levels including five major California airports that sit
1025 on the coast. One of these airports is the Santa Barbara
1026 Airport that I fly in and out of each week.

1027 The climate crisis also threatens our national security.

1028 Policy analysts have issued several reports finding that a
1029 failure to act will have dire consequences triggering
1030 humanitarian disasters and political instability in what are
1031 already some of our most fragile regions such as Africa and
1032 the Middle East.

1033 Finally, as a public health nurse, as the grandmother of
1034 a child with asthma, I am gravely concerned about the effect
1035 of global warming on the public's health. For example,
1036 rising temperatures increase ozone smog, which worsens the
1037 condition of people suffering from respiratory diseases like
1038 asthma. Increased levels of carbon dioxide may prolong the
1039 pollen season, intensifying the suffering of the 36 million
1040 American plagued with seasonal allergies. Increased
1041 temperatures have also caused extreme heat waves with tragic
1042 consequences. In July 2006, an extreme heat wave in
1043 California caused at least 140 deaths. Our sources of clean
1044 drinking water are also at risk, especially again in
1045 California. Many of my constituents rely on the Colorado
1046 River for a portion of their drinking water. The river faces
1047 long-term drought due to global warming and it is estimated
1048 that it would take 15 to 20 years of normal rainfall to
1049 refill the river's main reservoirs.

1050 We need to address this situation. I am thankful that
1051 this process is beginning today.

1052 [The prepared statement of Ms. Capps follows:]

1053 ***** COMMITTEE INSERT *****

|
1054 Mr. {Markey.} The gentlelady's time has expired. All
1055 opening statements by members of the subcommittee have been
1056 completed. I note that a member of the full committee, Ms.
1057 Christensen from the Virgin Islands, is here, and if you
1058 would like by unanimous consent, is there a 1-minute
1059 statement you would like to make at this time?

1060 Ms. {Christensen.} Thank you, Mr. Chairman and Ranking
1061 Member, and thank you for allowing me to sit in on the
1062 hearing, and I would like to associate myself with the
1063 remarks of my colleague, Ms. Capps from California, but I
1064 also wanted to point out that while climate change is an
1065 important issue for everyone everywhere, it is especially
1066 critical to the Caribbean, where my district sits, and
1067 despite the fact that we contribute relatively little to
1068 greenhouse gases, we are likely to face the severest of
1069 impacts, and also the reports have shown that the cost of
1070 inaction for us is unsustainable, so I look forward to the
1071 testimony of our witnesses.

1072 [The prepared statement of Ms. Christensen follows:]

1073 ***** COMMITTEE INSERT *****

|
1074 Mr. {Markey.} I thank the gentlelady, and we thank her
1075 for visiting with us today.

1076 That completes all opening statements. We will now turn
1077 to our very distinguished panel, and I will begin by
1078 recognizing our first witness, who is Dr. Daniel Schrag. He
1079 is the director of the Center for the Environment and the
1080 director of the Laboratory for Geochemical Oceanography at
1081 Harvard University. He is a former member of the board of
1082 reviewing editors for Science magazine, and a MacArthur
1083 fellow, a winner of that genius award. We look forward to
1084 your testimony, Dr. Schrag. Whenever you are ready, please
1085 begin.

|
1086 ^STATEMENTS OF DANIEL SCHRAG, DIRECTOR OF THE CENTER FOR THE
1087 ENVIRONMENT, DIRECTOR OF THE LABORATORY FOR GEOCHEMICAL
1088 OCEANOGRAPHY, HARVARD UNIVERSITY; GENERAL GORDON SULLIVAN
1089 (RET.), PRESIDENT AND CHIEF OPERATING OFFICER, ASSOCIATION OF
1090 THE UNITED STATES ARMY; R. JAMES WOOLSEY, VENTURE PARTNER,
1091 VANTAGEPOINT VENTURE PARTNERS, FORMER DIRECTOR, CENTRAL
1092 INTELLIGENCE AGENCY; KRISTIE EBI, PUBLIC HEALTH CONSULTANT,
1093 LEAD AUTHOR, PUBLIC HEALTH CHAPTER OF THE 2007
1094 INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, FOURTH ASSESSMENT
1095 REPORT; FRANK ACKERMAN, SENIOR ECONOMIST, STOCKHOLM
1096 ENVIRONMENT INSTITUTE U.S. CENTER, TUFTS UNIVERSITY; AND
1097 PATRICK MICHAELS, SENIOR FELLOW IN ENVIRONMENTAL STUDIES,
1098 CATO INSTITUTE

|
1099 ^STATEMENT OF DANIEL SCHRAG

1100 } Mr. {Schrag.} Thank you, Mr. Chairman. As an earth
1101 scientist who studies how the climate has changed in the
1102 past, I believe the geologic data suggests that most
1103 scientific assessments of global warming err on the
1104 conservative side. This has led to a misunderstanding of the
1105 risk of adverse impacts of climate change. I will give a few
1106 examples today.

1107 [Slide.]

1108 To quickly remind the committee, and if you could click
1109 once on the slide, humans are changing the amount of carbon
1110 dioxide in the atmosphere, mostly from burning coal, oil and
1111 gas. The current level, more than 380 parts per million, is
1112 higher than it has been for at least the last 650,000 years
1113 and perhaps for tens of millions of years. By the middle of
1114 this century, we will be at 500 parts per million. The issue
1115 before us is not whether we will get to 500 but whether we
1116 stop at 500 or go to 1,000. It is an uncontrolled experiment
1117 filled with uncertainty, and just like uncertainty in
1118 financial markets, it is a reason for grave concern.

1119 Observations and models tell us that climate change in
1120 this century may be dramatic, perhaps even catastrophic. We
1121 tend to focus on the more extreme and more adverse
1122 consequences, not because we are aware of any beneficial
1123 outcomes but simply because global warming is like an
1124 insurance problem. We need to understand the probability of
1125 the most undesirable outcomes to best gauge what steps to
1126 take to avoid them. I will give two examples of how
1127 conservative the scientific community can be. Next slide.

1128 [Slide.]

1129 First, consider the sea ice distribution in the Arctic
1130 in September of 2007. Previous studies, including the IPCC,

1131 predicted that the Arctic icecap might disappear in the
1132 summer toward the end of the century, certainly no earlier
1133 than 2050. Then in 2007, there was a 20 percent decline in
1134 aerial extent of sea ice below the previous record, which was
1135 2005. New studies now predict that the Arctic may be ice-
1136 free as soon as the middle of the next decade, a milestone
1137 that will drastically change the Arctic climate, will change
1138 world commerce and will enhance the melting of land ice on
1139 Greenland because the Arctic sea ice keeps Greenland cold.

1140 [Slide.]

1141 A second example, next slide, is the IPCC's discussion
1142 of future sea level rise. The IPCC predicts 10 to 25 inches
1143 based on different emission scenarios of overall sea level
1144 rise but most of that is actually due to the thermal
1145 expansion of seawater. Only 2 inches over the century are
1146 attributed to melting of Greenland, even though Greenland ice
1147 has about 23 feet of potential sea level rise stored on it.
1148 The projection is an extrapolation of the current rates of
1149 warming, assuming that the current melting of Greenland will
1150 go on and stay the same throughout the century with no
1151 change, a highly unlikely outcome. It illustrates the basic
1152 problem. When pushed, the scientific community often falls
1153 back on an answer that can be defended with confidence, even
1154 though it may not provide you, the policymakers, with an

1155 accurate picture of the risk involved.

1156 Why are scientists so conservative in their assessment
1157 of climate change? A major reason is that the scientific
1158 method teaches us to be conservative and to state things only
1159 when we know them with high confidence such as 95 percent
1160 confidence interval. This is in striking contrast to
1161 questions of national security, as illustrated by the 1
1162 percent doctrine articulated by former Vice President Cheney.
1163 In Cheney's formulation, if a probability of a high-
1164 consequence event such as nuclear terrorist attack is only 1
1165 percent, than we should treat it as an absolute certainty and
1166 act accordingly. It is really just an extension of the
1167 precautionary principle. But climate change may have just as
1168 serious implications for national security. Consider the
1169 advance of the timing of mountain snowmelt as the earth
1170 warms.

1171 [Slide.]

1172 In the western United States, next slide, please, this
1173 could mean as much as 60 to 80 days earlier snowmelt than
1174 today by the end of the century, and again, this could be
1175 conservative. If the river draining the Sierra Nevada in
1176 California, for example, were to run dry by mid-summer, than
1177 California agriculture would be impossible, and this is mild
1178 compared with other parts of the world. The great rivers

1179 that drain the Himalayas and Tibetan plateau, the Indus, the
1180 Ganges, the Mekong, the Yangtze and the Yellow all depend on
1181 melting snow and ice for a large fraction of their water.
1182 How might the decline of the Indus, for example, affect the
1183 political stability of Pakistan and the support for Islamic
1184 terrorism? How will China and India deal with reduced water
1185 resources and will it lead to more regional conflict? The
1186 risk of serious water stress, not just in Asia but around the
1187 world, contributing to failed states and major security
1188 disasters is well above a 1 percent threshold for serious
1189 action and illustrates how global warming poses an enormous
1190 challenge to peace and stability around the world.

1191 A final point I would like to make before this committee
1192 is that many steps to mitigate climate change will also
1193 result in an increase in our national security. Energy
1194 security is at the heart of many issues of security around
1195 the world including funding our enemies or the strengthening
1196 influence that Russia has over Europe because of dependence
1197 on natural gas imports. Most new technologies that can
1198 reduce carbon emissions will also reduce our dependence on
1199 foreign sources of fossil fuels. Energy efficiency is the
1200 most important strategy as it will likely result in
1201 significant savings to our economy. Investments in renewable
1202 energy resources in appropriate locations as well as carbon

1203 capture and storage for coal-fired power plants and other
1204 large stationary sources of CO2 will reduce our need to
1205 import greater amounts of liquid natural gas in the future.
1206 And our dependence on foreign oil will only be reduce in the
1207 long run if we can develop clean, domestic alternatives such
1208 as synthetic fuels produced from blending biomass and coal
1209 with carbon sequestration. Through such steps we can lead
1210 the rest of the world down a path toward greater prosperity,
1211 stability and security. If we fail in this task, we risk
1212 threatening the stability of our climate, our society and our
1213 entire planet. Thank you.

1214 [The prepared statement of Mr. Schrag follows:]

1215 ***** INSERTS 1, 2 *****

|

1216 Mr. {Markey.} Thank you, Professor Schrag, very much.

1217 Our second witness is General Gordon Sullivan, who is

1218 the president and chief operating officer of the Association

1219 of the United States Army, and a former chief of staff of the

1220 U.S. Army. He headed the Military Advisory Board for the

1221 Center for Naval Analysis Corporation's report on national

1222 security and the threats of climate change. We are honored

1223 to have you with us, General Sullivan. Please proceed when

1224 you are ready to go.

|
1225 ^STATEMENT OF GENERAL GORDON SULLIVAN

1226 } General {Sullivan.} Thank you, Mr. Chairman and Ranking
1227 Member.

1228 Two years ago I appeared before the first meeting of the
1229 Select Committee on Energy Independence and Global Warming in
1230 my capacity as the chairman of the Military Advisory Board
1231 for CNA reporting on national security and the threat of
1232 global climate change. The advisory board consisted of
1233 three- and four-star flag and general officers from all four
1234 services. Mr. Chairman, I request that this report be once
1235 again entered for the record.

1236 Mr. {Markey.} Without objection, so ordered.

1237 General {Sullivan.} Our charge was to learn as much as
1238 we could in a relatively short period of time about the
1239 emerging phenomenon of global climate change using our
1240 experience and expertise as military leaders to process our
1241 learning through a national security lens. In other words,
1242 we were asked, what are the national security implications of
1243 global climate change.

1244 In summary, what I reported at that time is the
1245 following. First, global climate change is a serious threat
1246 to our national security. Second, climate change will be

1247 what we call a threat multiplier. In many areas of the world
1248 that will be hardest hit by climate change, impacts are
1249 already being stressed by lack of water, lack of food and
1250 political and social unrest. Global climate change will only
1251 magnify those threats. Third, projected climate change will
1252 add to tensions even in stable regions of the world, and
1253 lastly, climate change, national security and energy
1254 dependence are a related set of global challenges.

1255 In the 2 years since I appeared before this committee,
1256 we have seen no evidence to contradict those findings. In
1257 fact, we have only seen the findings confirmed and
1258 reinforced.

1259 In concurrence with one of our recommendations, a
1260 National Intelligence Assessment on global climate change was
1261 conducted by the National Intelligence Council. The NIA
1262 remains classified but public accounts of the assessment
1263 suggest very strong agreement with our findings. Since our
1264 report, the scientific community including the
1265 Intergovernmental panel on climate change has also continued
1266 their important work in examining climate change. What we
1267 have learned from their most recent work is that climate
1268 change is occurring at a much faster pace than the scientists
1269 previously thought it could. The Arctic is a case in point.
1270 Two years ago scientists were reporting as has been stated

1271 her twice already that the Arctic would be free from ice
1272 within about 40 years. Now they are telling us that it will
1273 happen in a couple of years. As a matter of fact, the
1274 northern part of the Bering Sea is now free of ice. The
1275 acceleration of the changes in the Arctic is stunning.

1276 The trends of climatological data and concrete evidence
1277 of change continue to suggest the globe is changing in
1278 profound ways. I am not a scientist nor are most of my
1279 colleagues on the Military Advisory Board. I would
1280 characterize us as military professionals accustomed to
1281 making decisions during times with ambiguous information with
1282 little concrete knowledge of the enemy intent. We base our
1283 decision on trends, experience and judgment. We know that
1284 demanding 100 percent certainty during a crisis could be
1285 catastrophic and disastrous.

1286 And so we ask, quo vadis? Where do we go? I ask it in
1287 Latin because I believe it is a very fundamental question for
1288 the United States of America. Where we go will be a
1289 reflection of how we feel about the world in which we live.
1290 I feel right now we are drifting--excuse the metaphor--in
1291 uncharted waters. This is not the time to wait for 100
1292 percent certainty. The trends are not good.

1293 What can guide us in choosing our path is up to you. I
1294 believe there is a relationship between energy dependence,

1295 climate change, economic revitalization and our national
1296 security. These are deeply related issues. When we consider
1297 investments in one, we must consider the impact on the whole.

1298 My personal view is that the United States of America is
1299 obliged to play a leadership role in this area. Leadership
1300 by the United States will be key. The best opportunity for
1301 us to demonstrate our global leadership on this issue is in
1302 Copenhagen, and I do believe we must take bold and swift
1303 steps even here at home to gain the credibility necessary to
1304 participate in those discussions with credibility.

1305 We must show leadership in developing energy
1306 alternatives that reduce our need for fossil fuels.

1307 Thank you, Mr. Chairman.

1308 [The prepared statement of Gen. Sullivan follows:]

1309 ***** INSERTS 3, 4 *****

|
1310 Mr. {Markey.} We thank you, General.

1311 Our next witness is Mr. James Woolsey. Mr. Woolsey is a
1312 venture partner with VantagePoint Venture Partners in San
1313 Bruno, California, and serves on the National Commission on
1314 Energy Policy. He is also a senior executive advisor for
1315 Booz Allen Hamilton. He has served presidential appointments
1316 in both Democrat and Republican Administrations, most
1317 recently as director of the Central Intelligence Agency.
1318 Thank you, Mr. Woolsey, for being with us here today.
1319 Whenever you are ready, please begin.

|
1320 ^STATEMENT OF R. JAMES WOOLSEY

1321 } Mr. {Woolsey.} Thank you, Mr. Chairman. It is an honor
1322 to be with you.

1323 The subject of the hearing suggests that energy in the
1324 current environment needs to be secure, needs to be clean and
1325 needs to be affordable, and in moving in that direction, we
1326 have to keep in mind, I think, two different types of threats
1327 to our security. One is what a colleague of mine calls
1328 malevolent as distinguished from malignant. A malevolent
1329 threat is one that someone plans, and with respect to our
1330 energy infrastructure, probably the two most dangerous are
1331 dependence on oil from the Middle East and the results of
1332 four funding both sides of the War on Terror and on and on, a
1333 set of issues I don't need to go into detail with this
1334 committee.

1335 But the electricity grid is another extraordinarily
1336 vulnerable part of our system. A National Academy of
1337 Sciences study of 2002, which I participated in, said
1338 simultaneous attacks on a few critical components of the grid
1339 could result in a widespread and extended blackout.
1340 Conceivably, they could also cause the grid to collapse with
1341 cascading failure in equipment far from the attacks leading

1342 to an even larger long-term blackout, and may I say, Mr.
1343 Chairman, if we had a serious attack on the grid either y way
1344 of cyber attacks or by way of physical attacks and we lost a
1345 chunk of it, we are not back in the 1970s in the pre-Internet
1346 web days, we are back in the 1870s in the pre-electricity
1347 era. That set of issues has not been successfully addressed
1348 in the last 7 years since we wrote for the National Academy
1349 of Sciences.

1350 If we look at malignant threats, threats no one is
1351 trying to create but which come about because of the
1352 complexity of systems, there are a number, and one I think of
1353 the most serious is certainly climate change. That issue is
1354 dealt with in pages 2 through 9 of the attached chapter of
1355 the book which the staff has kindly allowed me to attach to
1356 my testimony, and I will simply say that I believe Professor
1357 Schrag summarized those issues extremely well. We have a
1358 habit from the non-scientific community at looking at change
1359 as if it is linear whereas in fact some of the most troubling
1360 changes can be exponential and particularly in his climate
1361 area, it is difficult for us to get our minds around it.

1362 The other is that we don't need to believe that all of
1363 climate change is anthropogenic, is caused by human beings,
1364 in order to believe that it is a serious problem. The world
1365 may well be in the middle of a several-thousand-year warming

1366 trend now for historic reasons. The world's climate has
1367 changed many times. But we are certainly doing something
1368 quite serious to it by doubling, trebling and more than
1369 trebling the amount of CO2 in the atmosphere. I think that
1370 one needs to keep in mind that one needs to remember both
1371 these malignant and these malevolent problems as one makes
1372 progress. We don't want, for example, to deal with climate
1373 change in a way that enhances the vulnerability of the
1374 electricity grid.

1375 As a device to illustrate this, the last seven pages or
1376 so of the attached chapter of mine is a dialog between a tree
1377 hugger and a hawk. My tree hugger is the ghost of John Muir
1378 and my hawk is the ghost of George S. Patton. Muir is
1379 concerned only about carbon. Patton is concerned only about
1380 terrorism. What they keep finding is that on many proposals
1381 they are able to agree on what to do even though they are not
1382 doing it for the same reasons. For example, energy
1383 efficiency in buildings, so look at what Walmart has been
1384 able to do. Patton and Muir agree on that. Combined heat
1385 and power, generating huge amounts of electricity from waste
1386 heat--Denmark gets a third of its electricity from waste
1387 heat. We get a tiny percent, just because of policies by the
1388 public utility commissions. Patton and Muir agree on that.
1389 Distributed generation encouraged by such steps as the German

1390 feed-in tariff, which Congressman Inslee and others are
1391 working on here, can help us move us toward renewables
1392 substantially. Decoupling revenues from earnings for
1393 electric utilities, as California did 20-plus years ago and a
1394 few States have followed since, can add a substantial set of
1395 incentives toward energy efficiency. Moving toward flexible
1396 fuel vehicles, as Congressman Engel has suggested, as Brazil
1397 has done, making the fuels out of cellulosic and waste
1398 feedstocks and to some extent turning toward electricity as
1399 in plug-in hybrids and electric vehicles, all of these
1400 matters, Patton and Muir in my construct find great common
1401 cause in. Interestingly enough, Muir is more open to adding
1402 large power plants either from renewables or from coal with
1403 carbon capture and sequestration, assuming it is successful,
1404 or from nuclear than is Patton because Patton says I don't
1405 want to add to the electricity grid. He says the electricity
1406 grid is much more vulnerable than the Maginot Line. The
1407 Maginot Line could at least be defended from one direction.
1408 The way we are going about it now, the grid can't be defended
1409 at all.

1410 Thank you, Mr. Chairman.

1411 [The prepared statement of Mr. Woolsey follows:]

1412 ***** INSERT 5 *****

|

1413 Mr. {Markey.} Thank you, Mr. Woolsey, very, very much.

1414 Our next witness is Dr. Kristie Ebi, an independent

1415 consultant specializing in impacts of and adaptation to

1416 climate change. She is a lead author of both the human

1417 health chapter of the United Nations' Intergovernmental Panel

1418 on Climate Change's Fourth Assessment Report and for the

1419 United States Climate Change Science Program's Synthesis

1420 Assessment Product on the effects of the global change on

1421 human health and welfare and human systems. We thank you,

1422 Dr. Ebi, for being here. Whenever you are comfortable,

1423 please begin.

|
1424 ^STATEMENT OF KRISTIE EBI

1425 } Ms. {Ebi.} Thank you very, Mr. Chairman. I appreciate
1426 the opportunity to talk with all the members here of the
1427 Subcommittee on Energy and the Environment.

1428 Climate change poses current and future risks for U.S.
1429 citizens. Although data are limited, injuries, illnesses and
1430 death due to climate change may already be occurring with the
1431 magnitude and extent of adverse health impacts expected to
1432 increase with additional climate change. The risks include
1433 greater numbers of preventable illnesses and deaths due to
1434 increases in the frequency, intensity and length of heat
1435 waves with the greatest risk almost older adults, those with
1436 chronic medical conditions, infants, children, pregnant
1437 women, outdoor workers and the poor. Climate change is
1438 projected to increase heat-related mortality several fold,
1439 increases in the frequency and intensity of floods, droughts,
1440 wildfires and windstorms with the risk highest among the
1441 poor, pregnant women, those with chronic medical conditions
1442 and those with mobility and cognitive constraints.
1443 Projecting additional health burdens is difficult because
1444 extreme weather events by definition are rare. However, the
1445 impacts can be large for single events, higher concentrations

1446 of ground-level ozone with the highest risk among asthmatics
1447 and those with chronic heart or lung disease, diabetics,
1448 athletes and outdoor workers.

1449 Without taking into account possible changes in the
1450 precursors required for ozone formation, ozone-related
1451 morality is projected to increase at least 4 percent by 2050
1452 in the New York area alone. Ozone-related morbidity also
1453 would be expected to increase including more asthma attacks
1454 among susceptible individuals. Certain food- and waterborne
1455 diseases with the highest risks amongst older adults, infants
1456 and those who are immunocompromised. The number of cases of
1457 salmonella, which has caused several recent foodborne
1458 outbreaks, increases with ambient temperature. Possible
1459 changes in the geographic range and incidence of waterborne
1460 and zoonotic diseases. Reports are appearing of infectious
1461 disease outbreaks in areas that previously have been
1462 considered too cold for their transmission.

1463 Other health impacts also may increase. For example,
1464 there are anecdotal reports of increases in suicide rates
1465 among native Alaskans associated with the loss of culture,
1466 lands and livelihoods because of melting permafrost, loss of
1467 sea ice and other changes due to climate change. The
1468 magnitude and extend of these impacts will very significantly
1469 across regions requiring understanding of the local factors

1470 that interact with climate change to increase the health
1471 risks. Demographic trends such as an older and larger U.S.
1472 population will increase overall vulnerability. In addition,
1473 the United States may be at risk from climate-related
1474 diseases and disasters that occur outside our borders. The
1475 unprecedented nature of climate change may bring
1476 unanticipated consequences for public health. The current
1477 and projected health impacts of climate change are
1478 significantly larger in low-income countries, challenging
1479 their ability to achieve the millennium development goals.

1480 Adaptation and mitigation are equally important for
1481 addressing these health risks. Neither is sufficient.
1482 Focusing only on mitigation will leave communities
1483 inadequately prepared for the changes expected in the short
1484 term and focusing only on adaptation will increase the amount
1485 of future climate change to which communities will need to
1486 adapt. The United States has well-developed public health
1487 infrastructure and environmental regulatory programs that if
1488 maintained would moderate the risks of climate change.
1489 However, there are limits to the degree to which adaptation
1490 can reduce these health impacts. Some low-income countries
1491 are struggling to adapt to the climate change impacts they
1492 are experiencing now. As we heard, that does increase our
1493 national security threats.

1494 Actions that lead to greenhouse gas emissions reductions
1495 can have significant positive impacts on human health. For
1496 example, in the year 2020, thousands of premature deaths and
1497 tens of thousands of asthma-related emergency room visits
1498 could be prevented from the implementation of a range of
1499 activities that reduce fine particulate matter concentrations
1500 associated with carbon dioxide emissions. In addition to
1501 saving lives, the associated economic benefits would range
1502 from \$6 billion to \$14 billion, and that is in 1 year.

1503 Thank you very much.

1504 [The prepared statement of Ms. Ebi follows:]

1505 ***** INSERT 6 *****

|
1506 Mr. {Markey.} Thank you, Dr. Ebi. Just for the
1507 members' information, the House is in recess subject to the
1508 call of the chair, so we are going to have a good stretch
1509 here in order to the listen to the witnesses and to cross-
1510 examine them.

1511 Our next witness is Dr. Frank Ackerman, an economist who
1512 has written extensively on environmental economics and
1513 climate change. He is the senior economist at the Stockholm
1514 Environmental Institute, the U.S. Center as well as a senior
1515 research fellow at the Global Development and Environmental
1516 Institute at Tufts University. We welcome you, Dr. Ackerman.
1517 Whenever you are ready, please begin.

|
1518 ^STATEMENT OF FRANK ACKERMAN

1519 } Mr. {Ackerman.} Thank you for inviting my testimony.

1520 As several people have said already today, the debate
1521 has largely shifted from science to economics. Climate
1522 change is real. It is caused by human activity. It is going
1523 to be increasingly bad for us. The question now before us
1524 is, can we afford to do anything about it. As a group of
1525 prominent economists including several Nobel laureates said,
1526 the most expensive thing we can do is nothing. There is a
1527 growing recognition in the economics profession of the costs
1528 of doing nothing. The Stern Review sponsored by the British
1529 government was a major step forward in understanding that.
1530 As has been mentioned, the Stern estimate of the cost of
1531 doing nothing ranged depending on how you understand the
1532 damages from 5 percent to 20 percent of world output compared
1533 to a cost of solving the problem, eliminating most of those
1534 impacts which Stern estimated at 1 percent of world output
1535 for some decades. There are many studies of local and
1536 regional impacts of climate change, varied impacts on
1537 different ecosystems, different climate regions within the
1538 United States. There is an excellent study by Matias Ruth of
1539 the University of Maryland reviewing a lot of these.

1540 My research, which is described in my written testimony,
1541 was in response to requests for a total dollar estimate for
1542 the costs of inaction for the United States. We did one
1543 study of the United States and a study looking more in depth
1544 at Florida. We found that just a few categories of damages
1545 would amount to 1.5 percent of U.S. income by the end of this
1546 century. For Florida, which is much more in harm's way, four
1547 categories of damages could amount to as much as 5 percent of
1548 the State income by the end of the century. The categories
1549 that we looked are hurricane damages, the effects of sea
1550 level rise solely on residential real estate, not on all the
1551 properties in the State, cost to the electrical system of the
1552 changes in demand, costs of more expensive and difficult
1553 water supply for the United States. For Florida, we were not
1554 able to produce a similar water estimate but we estimated the
1555 costs of losses to the State's very important tourism
1556 industry.

1557 Now, I would emphasize that these numbers, while they
1558 are larger than the 1 percent estimate of the costs of
1559 action, they are partial estimates of the costs of inaction.
1560 There is no such thing as a total dollar estimate for the
1561 costs of inaction. Lives will be lost to climate change if
1562 we do nothing about it. There is no meaningful way to put a
1563 dollar cost on those but you can't forget it. The costs of

1564 Hurricane Katrina were not just property losses, they were
1565 also more than 1,000 people who died there. Damages to
1566 nature and extinction of species likewise have no meaningful
1567 price. Turning to economic categories, we did not estimate
1568 agricultural losses except to the extent they were included
1569 in water losses. We didn't estimate wildfires and forest
1570 die-off costs or the costs of floods in the Midwest and
1571 California and elsewhere. We didn't look at the cost of
1572 infrastructure along the coasts other than the cost to
1573 residential real estate, and a very important point which has
1574 come out in the economics literature lately is the importance
1575 of looking at worst-case risks rather than averages. Climate
1576 change will get worse on average, and the worst-case risks
1577 are indeed ominous. The risks of an abrupt discontinuity
1578 climate catastrophe has to be taken seriously. When people
1579 buy insurance, they buy insurance against worst cases, not
1580 average. On average you don't need fire insurance. On
1581 average you have 99 percent confidence that you don't need
1582 fire insurance. You can live a richer life if you cancel the
1583 fire insurance. Not taking seriously the worst-case risks
1584 the same way that we do when we buy fire insurance is taking
1585 a huge gamble. The future is only going to happen once. If
1586 we were lucky, we wouldn't need insurance but that is not the
1587 way anybody thinks about these risks in their ordinary life.

1588 So we concluded that climate change will be bad for the
1589 economy. Just a few categories of economic damages for the
1590 United States as a whole exceed the cost of action. For
1591 Florida, it is much worse. We did a similar short study of
1592 the Caribbean where we found devastating costs to the island
1593 economies that are completely at risk from climate change.
1594 Those are likely to cause a flood of refugees, as the
1595 speakers discussing security have mentioned. There are real
1596 issues about refugees caused by climate change. Where are
1597 people leaving the Caribbean because of climate change going
1598 to go? Probably not to Venezuela.

1599 And finally, there is an international dimension to
1600 this. I have been to a lot of climate change conferences in
1601 the last 8 years. It has been embarrassing to go to them as
1602 an American. People tend to come at you again and again
1603 about what are you thinking of, doing nothing about it and
1604 why we should do anything about it when the world's largest
1605 economy is doing nothing. So I am very happy to see that we
1606 have a chance to change that and to go back and challenge the
1607 rest of the world to keep up with us.

1608 Thank you.

1609 [The prepared statement of Mr. Ackerman follows:]

1610 ***** INSERT 7 *****

|
1611 Mr. {Markey.} Thank you very much. I very much
1612 appreciate your testimony.

1613 And now we will move to our final witness, who is Dr.
1614 Patrick Michaels. Dr. Michaels is a senior fellow of
1615 environmental studies at the Cato Institute. He is also a
1616 research professor of environmental sciences at the
1617 University of Virginia and visiting scientist with the
1618 Marshall Institute in Washington, D.C. Thank you for
1619 joining, Dr. Michaels. Please proceed with your testimony.

|
1620 ^STATEMENT OF PATRICK MICHAELS

1621 } Mr. {Michaels.} Thank you, Mr. Chairman. I would also
1622 like to thank the subcommittee for inviting my testimony on
1623 the impacts of climate change. The subcommittee is asking
1624 very important questions: what are the implications of
1625 climate change for national security, economic development
1626 and public health. But before providing informed opinion on
1627 the costs of climate change, one must have confident
1628 predictions of climate change itself.

1629 [Slide.]

1630 On my first slide, if I could, one proceed from changes
1631 in atmospheric composition to changes as modeled by climate
1632 models and then ultimately to the impacts. What I would like
1633 to examine is what is going on with our climate models. We
1634 often hear that the science is settled on global warming. In
1635 fact, this is far from the truth. Our models are not,
1636 repeat, not simulating global temperature trends in recent
1637 decades.

1638 [Slide.]

1639 Here I am going to examine in the next slide the
1640 ensemble of 21 models used by the United Nations'
1641 Intergovernmental Panel on Climate Change for their midrange

1642 projection of carbon dioxide emissions, and the world has
1643 been going along with this emissions scenario. The changes
1644 in concentration in the atmosphere have been very close to
1645 these estimates. Note that the behavior of the models is
1646 linear. They tend to predict a constant rate of warming.
1647 This is from 2000 to 2020. The individual models vary quite
1648 a bit from model to model and in fact some models can even
1649 have cooling trends in them for certain periods of time.

1650 [Slide.]

1651 The next slide shows the observed temperatures since the
1652 second warming of the 20th century started in the late 1970s.
1653 One of the things that you see is it actually too is constant
1654 despite this much talked of peak in 1998, which is clearly a
1655 high point in the record as a result of solar activity in
1656 addition to an El Nino and pressure from greenhouse warming.

1657 Now what I am going to do is, I am going to give us the
1658 range of predictions from each model, next slide. From all
1659 21 models, I ran them for various periods of time, 5-year
1660 trends, 6-year trends, 7 years and out to 15-year trends.
1661 The bottom line is the 2nd percentile of warming. The top
1662 line is the 97.5 percentile. So this is the 95 percent
1663 confidence range in the climate models, and the solid black
1664 line are the observed temperature trends for the last 5
1665 years, 6 years, 7 years, et cetera, on out to 15 years. You

1666 can see that they are running at or below the bottom limit of
1667 the model's confidence. This is not very good, and
1668 unfortunately tells us that we are undergoing a systematic
1669 failure of our midrange models in recent decades.

1670 [Slide.]

1671 The next slide shows what happens as this persists.
1672 Assume that the temperatures in 2009 globally are the same as
1673 the average for 2008. That is a reasonable assumption
1674 because we are in what is called a La Nina, which is a
1675 relatively cool period, and the addition of yet another year
1676 to these 15-year trends gives you everything below the 95
1677 percent confidence level. It is very unfortunate but it
1678 tells us a lot that we need to do. Now, everybody knows that
1679 the behavior of the last 10, 12 years seems to be a bit
1680 unusual, so let us extend this analysis in the next slide to
1681 the last 20 years, if we could. That would be in the next
1682 image. There you go.

1683 [Slide.]

1684 We have to take out the effect of Mt. Pinatubo, which
1685 occurred in 1991 and introduced a cooling at the beginning of
1686 the record so there was a rapid warming that was induced that
1687 biases that record. The models themselves do not have
1688 volcanoes in them so an apples-to-apples comparison takes
1689 that out and you can see again that the observed temperature

1690 range, now with trends on out from 14 to 20 years, is falling
1691 below the 95 percent confidence level. What do we say? One
1692 implicit assumption about calculating the costs of inaction
1693 is that we know that reasonable confidence with the climate
1694 change will ensue as carbon dioxide accumulates in the
1695 atmosphere. This demonstration shows that oft-repeated
1696 mantra in Washington, ``The science is settled'' is not true
1697 at all. More important, the rates of warming on multiple
1698 time scales are invalidating the midrange sweep of IPCC
1699 models.

1700 This is a problem that has received very little
1701 attention but it is very germane to this committee. Until we
1702 know, until we have models that in fact accommodate the
1703 behavior of recent decades, we appear to be overestimating
1704 the rate of climate change. As you can see, it is all at the
1705 lower end where the observations are. If climate change is
1706 overestimated, then so are the impacts of that change, and
1707 that is something we must pay attention to as we address this
1708 issue. Thank you very much.

1709 [The prepared statement of Mr. Michaels follows:]

1710 ***** INSERTS 8, 9 *****

|
1711 Mr. {Markey.} Thank you, Dr. Michaels, very much. The
1712 chair will now recognize himself for 5 minutes for a round of
1713 questioning.

1714 Professor Schrag, you just heard what Dr. Michaels said.
1715 He is basically saying we just shouldn't worry as much about
1716 global warming because it is not going to be as bad as the
1717 models predicted. Your quick response to that?

1718 Mr. {Schrag.} Well, I think it flies in the face of all
1719 of our knowledge both about earth history--we can actually
1720 get a very good sense of the sensitivity of the earth's
1721 climate to changes in carbon dioxide from looking at the past
1722 over various time scales, over ice ages or even back millions
1723 and tens of millions of years, and the general answer we get
1724 is in fact that the models tend to be less sensitive than the
1725 real world. It is very clear from that estimate that in fact
1726 we are in for bigger trouble.

1727 Looking at the last 2 decades is a very tricky thing,
1728 what Dr. Michaels was talking about, simply because we also
1729 have sulfate aerosols that we are putting out from burning a
1730 lot of coal, especially now that China is burning so much
1731 coal and putting sulfur dioxide into the air. That
1732 counteracts the effect of CO₂, and because we don't know that
1733 number very well, it means that we don't understand the rate

1734 of forcing perfectly but it would be a deep mistake to think
1735 that that should give us comfort. In fact, the opposite
1736 conclusion is the case. If in fact temperature has not
1737 warmed as much because of sulfur emissions, sulfur doesn't
1738 last in the atmosphere very long whereas carbon dioxide lasts
1739 for hundreds of years and that means we are in for a big
1740 shock in the decades ahead.

1741 Mr. {Markey.} Thank you, Professor Schrag.

1742 General Sullivan, you were Army chief of staff back in
1743 the early 1990s and I know you had decisions you made to make
1744 about Somalia at that time and the events that ultimately led
1745 to ``Blackhawk Down'', the movie. Could you talk a little
1746 bit about climate change, Somalia, Darfur, that whole region
1747 in terms of how as a military group you were analyzing the
1748 climate change data?

1749 General {Sullivan.} Well, as you stated, Somalia,
1750 Darfur, that part of Africa has been buffeted by drought for
1751 years. The drought enabled frankly the warlords to start
1752 controlling food aid that was going in. They were
1753 controlling the food, selling the food to their people. That
1754 created the deaths of other tribes that weren't supported by
1755 the warlords, which created in stability and it enabled
1756 frankly Somalia to move on to where it is a failed state now,
1757 and as we all know, you now have privates operating out of

1758 Darfur, which are destabilizing the Gulf of Aden and the Red
1759 Sea. It is all related to the same thing which is going on
1760 in Darfur where you have migratory farmers, herders
1761 superimposing themselves on the top of farmers and it is a
1762 vicious cycle.

1763 Mr. {Markey.} And you relate this to drought that leads
1764 to famine ultimately caused by this climate change
1765 phenomenon?

1766 General {Sullivan.} Absolutely we can, and when we see
1767 the Himalayas, as was mentioned by Dr. Schrag when we think
1768 about the water loss there, you can see the same picture in
1769 Bangladesh, India, Pakistan and elsewhere, not to mention, by
1770 the way, Israel, Jordan, the Palestinians. The water in that
1771 part of the world comes from down the Jordan River, and it is
1772 all related.

1773 Mr. {Markey.} Thank you, General Sullivan.

1774 Mr. Woolsey, could you expand upon General Sullivan's
1775 point with regard to the national security implications for
1776 our country if we see deterioration because of climate change
1777 in these regions of the world?

1778 Mr. {Woolsey.} Mr. Chairman, it can hit us very close
1779 to home. One of the fastest set of melting glaciers is
1780 apparently in the Andes, and if we think we have trouble
1781 coming up with a sound and agreed-upon immigration policy for

1782 the United States now, what is it going to be like if our
1783 southern borders are seeing millions of our hungry and
1784 thirsty southern neighbors headed toward temperate climates?
1785 Also from the point of view of our being able to ameliorate
1786 some of the terrible events from weather pattern changes and
1787 so forth such as the U.S. armed forces did, particularly the
1788 Navy, so well in response to the tsunami in Indonesia a few
1789 years ago, it is going to be very difficult for any country,
1790 even us, to shoulder much of a humanitarian burden if we are
1791 seeing direct and immediate effects that we have to deal with
1792 that stress our own systems here.

1793 I chaired the policy panel for a defense science board
1794 study last year that was chaired by former Secretary of
1795 Defense Schlesinger and our report called ``More Fight, Less
1796 Fuel'' is on the defense science board website. It might be
1797 worth the committee having a look at because it talks about
1798 the interaction of energy policies and the capabilities of
1799 the armed forces, and there is a classified annex which the
1800 committee certainly can have access to I am sure through the
1801 Defense Department, and I can tell the staff about that.

1802 Mr. {Markey.} And Mr. Woolsey, you would recommend that
1803 the members see that classified annex because it does relate
1804 to climate change and its impact on--

1805 Mr. {Woolsey.} It does.

1806 Mr. {Markey.} --national security?

1807 Mr. {Woolsey.} It relates principally to specific
1808 vulnerabilities of our military as a result of things like
1809 electricity grid vulnerability.

1810 Mr. {Markey.} My time has expired.

1811 Mr. {Woolsey.} But that is one of the subjects, but the
1812 classified part deals mainly with that.

1813 Mr. {Markey.} Thank you, Mr. Woolsey.

1814 The chair recognizes the gentleman from Michigan, Mr.
1815 Upton.

1816 Mr. {Upton.} Thank you, Mr. Chairman, and I want to
1817 make a couple of comments and get the reaction from you all.
1818 First of all, General Sullivan, your statement, energy
1819 alternatives to reduce reliance on fossil fuels needs to be a
1820 priority, is one that I think most of us share, and I
1821 appreciated that.

1822 Admiral Woolsey, we have had some briefings, I guess you
1823 could say, in the last year about the vulnerability of our
1824 grid and what terrorists might be able to do, and I would
1825 hope that if this stimulus package passes that some of those
1826 concerns can be addressed in terms of the smart grid. Maybe
1827 that is something that we need to have a hearing on at some
1828 point later this year. It came to a head last year with
1829 Chairman Boucher.

1830 Mr. {Markey.} We will do that.

1831 Mr. {Upton.} But I would like to just make a couple of
1832 comments. We haven't done just nothing. In my view, we have
1833 actually done a lot, and Dr. Ackerman, you shouldn't be
1834 embarrassed by the lack of activity when you look at the
1835 progress that our country has made. Until this year, we have
1836 had a growing economy, growing population, and we have tried
1837 to figure out how we are going to be prepared by the year
1838 2030 when our electricity use is expected to go up as much as
1839 40 to 50 percent. We have done a lot on conservation. We
1840 are focused on renewables. A number of States, including
1841 mine, now have an RFS standard. Texas is another State that
1842 has done the same thing. With maybe the exception of
1843 Nantucket, we are actually doing something about wind but we
1844 will deal with that Massachusetts issue another day. Nuclear
1845 has been to me, I have been embarrassed. I have been
1846 embarrassed about the lack of progress on nuclear, that we
1847 haven't actually turned that switch back to green after 20-
1848 some years. We made progress on autos. I know the chairman
1849 and I were both at the auto show here in D.C. this last week,
1850 and it is amazing to see some of the new cars that are going
1851 to be in the showroom not only this year but in the future
1852 and you look at some of the electric hybrids that the Big
1853 Three are developing, all to be in the showroom by some time

1854 next year.

1855 We have seen great strides on appliance standards,
1856 building standards, Jane Harman, my colleague, on light
1857 bulbs, who is here, those kick within a couple years and we
1858 are going to save tons of carbon from being emitted into the
1859 atmosphere, and it was something that we worked on together.

1860 FutureGen, I think there is money in the stimulus
1861 package for FutureGen, and I hope that that works. I am a
1862 very strong supporter of clean coal, and I would say that we
1863 are probably doing more as a Nation on carbon capture than
1864 just about anything else. In the hearing that we had with
1865 U.S. CAP a couple weeks ago, you know, they are hoping by
1866 2015 we are going to have an answer. Again, we are the
1867 leaders on that technology.

1868 And when you look at that, since 2002, despite, you
1869 know, we have had a growing economy, our greenhouse gas
1870 intensity has actually fallen by an average of about 2
1871 percent per year from the year 2002 to 2007. When you
1872 counter that with what has happened in the E.U., it came up
1873 with a scheme, as Mr. Gore would say, on cap and trade and
1874 their emissions have actually gone up, not gone down. So our
1875 concern when you look at these statistics, the United States
1876 emits about 5-1/2 billion tons of energy based on CO2 each
1877 year. The developing world does 14 billion tons, almost

1878 three times as much. By 2030, we are going to increase
1879 allegedly by about 2 billion tons annually but again the
1880 developing world is going to go up by another 12.8 billion,
1881 or six times what we are expecting to do. Now, we need
1882 incentives for clean energy. I think we can do it. We need
1883 to be on that path, but what happens if the developing
1884 countries, China and India, China now the world's largest
1885 emitter, what if they don't follow that track? My State is
1886 so hard hit, we are devastating with the job losses and our
1887 economy is just totally in the tank, and I can just see that
1888 this will yet be another incentive for those jobs and
1889 economic opportunities to go someplace else.

1890 I don't know who would like to respond to that but I
1891 wouldn't be embarrassed. I think we have been on a road of
1892 progress and I look forward to continuing that road of
1893 progress, to have the incentive to actually see us get to the
1894 conclusion that certainly General Sullivan would like us to
1895 see. In my remaining time, who would like to respond?

1896 Mr. {Markey.} The gentleman has 2 seconds left for the
1897 panel to answer. We will give one person down here a chance
1898 to respond.

1899 Mr. {Woolsey.} First of all, Congressman Upton, thanks
1900 for the promotion but I never got above captain--

1901 Mr. {Upton.} All right. I am sorry.

1902 Mr. {Woolsey.} --in General Sullivan's organization,
1903 the Army. I think you make a good point. In our own way, we
1904 have made some progress in a number of these areas but we
1905 haven't always chosen the most effective way to do it. For
1906 example, the renewable portfolio standard has some positive
1907 features but you get just as much credit for moving away from
1908 natural gas to renewables as you do moving away from coal,
1909 whereas if you had a feed-in tariff, you would have a lot
1910 more incentive, I think, to move not only for large
1911 facilities like, say, solar power plants and wind farms but
1912 also to distribute it a generation. I think it is a far
1913 superior mechanism. The Germans have shown how well it works
1914 in Germany. So we haven't really picked, I think, in many
1915 circumstances the mechanisms that can move us quickly, and I
1916 agree with you very much about plug-in hybrids. I drive one
1917 myself, and the infrastructure I picked up at Walmart for
1918 \$14.95. It is an orange extension cord, and that is all the
1919 new infrastructure you need for a plug-in. It is a pretty
1920 good deal.

1921 Mr. {Markey.} The gentleman's time has expired. The
1922 chair recognizes the gentleman from Utah, Mr. Matheson.

1923 Mr. {Matheson.} Thank you, Mr. Chairman.

1924 Professor Schrag, one of the issues that Congress is
1925 going to have to deal with if it puts together a cap-and-

1926 trade bill is setting the targets from year to year and what
1927 the shape of the curve is going to be over time, and the
1928 panel today has talked about a sense of urgency about wanting
1929 to take action and I think you have heard a lot of folks,
1930 Members of Congress, also acknowledge that sense of urgency.
1931 But we have got this challenge because there are certain
1932 technologies out there that are not at the level of maturity
1933 that we would like them to be for us to have real certainty
1934 about our ability, whether it is carbon capture and
1935 sequestration, whether it is alternative fuels, cellulosic
1936 ethanol, whatnot, so I wondered if you could talk to me for a
1937 bit about your thoughts about what the shape of the curve
1938 should be. If you don't know what specifically what the
1939 shape is, how should we decide what those targets should be
1940 from year to year?

1941 Mr. {Schrag.} I think that is a very good question. I
1942 think that clearly there needs to be, and economists and
1943 scientists would both agree, that there needs to be a price
1944 on carbon, but putting a price on carbon too quickly too high
1945 would have a bad effect because, as you said, some of the
1946 major technologies that are going to be necessary to meet
1947 these challenges aren't really demonstrated yet, and what
1948 that means in practical terms is that banks and financial
1949 institutions aren't willing to invest in those projects.

1950 So I think there is a two-prolonged approach. One is, I
1951 think through the stimulus package and additional things that
1952 this Congress will do over the next 2 years, we need to see
1953 government support, perhaps loan guarantees, for getting some
1954 number, a dozen, 10, 20 major projects in these categories,
1955 carbon capture and storage, synthetic fuels that are clean,
1956 that are low carbon and are capital intensive, and we need to
1957 demonstrate to the market that these technologies can work.
1958 Find out what works and find out what doesn't work and find
1959 out what it really costs. We need to build some nuclear
1960 plants and figure out what they really cost. But it is also
1961 very important in setting the price on carbon through a cap
1962 and trade or whatever additional mechanisms are used by this
1963 Congress that you forecast to the market that the long-term
1964 price is going to rise because unless that is done, you won't
1965 get the right type of investment in technology. It is very
1966 important that I think you start out with a low price that
1967 doesn't really hurt our industry in the short run but in the
1968 long run that price has to rise and we have to forecast that
1969 it will rise.

1970 My final point is the concern that the Congressman from
1971 Michigan and many others have expressed of loss of jobs
1972 overseas. It is a very serious issue. I actually think the
1973 best way to get China and India engaged is to take a start

1974 and focus on the technologies that will apply to their
1975 economies, and there are some trade issues that we could deal
1976 with like a non-discriminatory tariff that would level the
1977 playing field, much more easier to enforce if we got together
1978 with the E.U. and then went to China and India and talked. I
1979 think those are very interesting ideas that need to be
1980 explored.

1981 Mr. {Matheson.} I think your ideas have merit but I
1982 have to say, it also still points out this challenge that we
1983 have of, you have talked about the notion of perhaps
1984 government-sponsored efforts to encourage how we learn about
1985 these technologies over the next couple years and yet we are
1986 talking about moving a bill this year that is going to set
1987 these cap levels and these targets year by year. But we
1988 won't have that information yet in the next 2 or 3 years or
1989 however long is going to take to develop those technologies,
1990 and I don't know if I am asking you another question or just
1991 pointing out the challenge I think we face here in terms of
1992 trying to get this right.

1993 Mr. {Schrag.} I think remember that the low-hanging
1994 fruit in all of this is energy efficiency. It is probably
1995 negative cost, or at least it is not extremely expensive. It
1996 makes us leaner and more competitive around the world, and I
1997 think the initial impact of a low price on carbon through a

1998 cap-and-trade bill is going to be a huge investment in energy
1999 efficiency and that is great for the U.S. economy and its
2000 competitiveness. Some of the bigger, deeper cuts down the
2001 road as the cap tightens in the future will come from these
2002 other technologies and that means separate from the cap and
2003 trade. We have to get some of these technologies built, not
2004 just at a demonstration scale but at a real commercial scale
2005 so we can see what happens.

2006 Mr. {Matheson.} Mr. Woolsey, you mentioned the last
2007 time about the feed-in tariff in Germany. Could you explain
2008 that a little more to the committee right now?

2009 Mr. {Woolsey.} Yes, I will say very briefly,
2010 Congressman Inslee has forgotten more about than issue than I
2011 will ever know so he is one of the resident experts up here
2012 but the Germans came up with this mechanism and it has been
2013 adopted in a number of other countries to guarantee a
2014 reasonable price for generation of renewables that one has a
2015 right to whether one is a small rooftop generator,
2016 photovoltaics on the roof of the farmhouse like I have on
2017 mine or whether one sets up a large number of solar panel,
2018 let us say, in a retirement complex for hundreds of homes.
2019 In most of the United States, the utilities and the public
2020 utility commissions have a mindset that the way to produce
2021 electricity is to build big power plants and string

2022 transmission lines and distribution lines. They have been
2023 doing that for well over a century. They know how to do it
2024 and that is the policies they implement. What a feed-in
2025 tariff does is say if you are doing renewables, you can get
2026 paid a reasonable price by the utility in order to send back
2027 to the grid a certain amount of renewable power, and it may
2028 be a relative large amount if you are a small corporation or
2029 it may be a small amount if you are a household. In much of
2030 the United States, you can do what we do at our farm. You
2031 can run your meter backwards to zero by having photovoltaics
2032 on the roof but you can't make money, and the Germans have
2033 figured out, I think better than anybody else, how to
2034 incentivize renewables with a relatively simple process. It
2035 is easier for them because they have--our electricity is
2036 largely done State by State not everything but a lot, but
2037 that is a broad outline of the issue.

2038 Mr. {Markey.} I appreciate it.

2039 Thank you, Mr. Chairman. I yield back.

2040 Mr. {Markey.} The gentleman's time has expired. The
2041 chair recognizes the gentleman from Kentucky, Mr. Whitfield.
2042 I am sorry. I did not see the gentleman. The chair, with
2043 the indulgence of Mr. Whitfield, will recognize the ranking
2044 member of the full committee, Mr. Barton.

2045 Mr. {Barton.} Thank you, Mr. Chairman. I am such a

2046 shrinking violet, it is easy to overlook me.

2047 I want to start out with Dr. Michaels by complimenting
2048 you on being here, and I want the record to show that the
2049 rules of the committee ostensibly require that there be two
2050 Minority witnesses, or a third of the witnesses be Minority,
2051 which if you take six witnesses, we should have two Minority,
2052 but Dr. Michaels is our only one, so it is five to one, which
2053 we appreciate you being the one, Dr. Michaels, for showing
2054 up.

2055 Mr. {Hall.} Would the gentleman yield?

2056 Mr. {Barton.} I will at the end of my time if we can
2057 get a little extra time.

2058 Mr. {Hall.} I may forget what I am going to ask you by
2059 that time.

2060 Mr. {Barton.} All right. I will yield. I only have 4
2061 minutes.

2062 Mr. {Hall.} I just wondered if you knew that the
2063 chairman had four, and when he found out Dr. Michaels was
2064 really going to be here, that he added Professor Schrag and
2065 made it--it must really say something for Dr. Michaels.

2066 Mr. {Barton.} That is one way to--

2067 Mr. {Hall.} I yield back my time.

2068 Mr. {Barton.} Anyway, Dr. Michaels, you are an active
2069 official of the U.N. Intergovernmental Panel on Climate

2070 Change. Is that not correct?

2071 Mr. {Michaels.} Yes.

2072 Mr. {Barton.} Okay. So you are not some out in right
2073 field guy who is just observing, you are active in the
2074 participation of the IPCC?

2075 Mr. {Michaels.} Yes.

2076 Mr. {Barton.} These models that you refer to in your
2077 testimony, for lack of a better term, they are the official
2078 models of the U.N.?

2079 Mr. {Michaels.} The U.N. uses three suites of models
2080 that they concentrate on in their latest report. The one I
2081 looked at was the midrange suite because that is the one at
2082 which the concentrations of CO2 that are in the atmosphere
2083 resembles the most.

2084 Mr. {Barton.} But these aren't models sponsored by
2085 Exxon-Mobile or--

2086 Mr. {Michaels.} No.

2087 Mr. {Barton.} These are the official U.N.--

2088 Mr. {Michaels.} There are--

2089 Mr. {Barton.} --subset of--

2090 Mr. {Michaels.} --21 different models that they use.

2091 Mr. {Barton.} Okay. Now, I'm going to read from your
2092 testimony, or at least paraphrase from your testimony. We
2093 often hear that the science is settled on global warming.

2094 This is hardly the case. There is considerable debate about
2095 the ultimate magnitude of warming. I must report that our
2096 models are in the process of failing. When I say that, I
2097 mean that the ensemble of 21 models used in the midrange
2098 projection for climate change for the IPCC. If it is
2099 demonstrable that these models have failed, then there is no
2100 real scientific basis for any estimates of the cost of
2101 inaction. Now, why do you say that the models are failing?
2102 And again, these are the official U.N. climate change models.
2103 These aren't some business-sponsored, anti-climate change
2104 models, these are the ones that everybody is basing their so-
2105 called projections on. Why do you say they are failing?

2106 Mr. {Michaels.} What I did is, I looked at the range of
2107 projections made by these models and I looked at them for
2108 multiple, multiple iterations. For example, I used 20 years
2109 of models and for 5-year projection ranges, I moved forward 1
2110 month beginning at 60 months and then 1 plus 61, etc. It was
2111 a very, very large sample size that can give you the
2112 distribution of warming rates for different lengths in time
2113 predicted by the models and then you can compare that to the
2114 observed warming rates for the last 5 years, for the last 10
2115 years, for the last 15 years and the last 20 years, and what
2116 you see is that the observed temperatures fall along or below
2117 the 95 percent confidence limit for the model.

2118 Mr. {Barton.} So they fail because they don't predict
2119 the--

2120 Mr. {Michaels.} They predict too much warming, and if
2121 you take a look at the systematic behavior of the models,
2122 which is very interesting, they generally predict constant
2123 ranges of warming, not increasing rates of warming, and in
2124 fact, the rate of warming since 1977 does correspond to a
2125 constant rate. It just happens to be right at the lower
2126 limit of the rates that are given by the families of models.
2127 That tells me something. Nature has been responding to
2128 carbon dioxide for decades, and maybe we ought to listen to
2129 nature rather than to computers.

2130 Mr. {Barton.} Dr. Schrag showed a chart early in his
2131 presentation that shows the last 650,000 years of temperature
2132 as far as we know it and it shows it going up and down, up
2133 and down, up and down. For most of that time period there
2134 were no human beings as we know them today on the earth, so
2135 what caused the rapid increase in temperature those previous
2136 times since there were men around?

2137 Mr. {Michaels.} Well, these are the Ice Age
2138 oscillations that you see in these ice core records. Those
2139 were caused by earth orbital changes, we think. That is the
2140 current myth. That myth is ultimately subject to--

2141 Mr. {Barton.} But it obviously couldn't have been

2142 caused by manmade CO2?

2143 Mr. {Michaels.} It was not caused by carbon dioxide,
2144 no.

2145 Mr. {Barton.} Mr. Chairman, could I have one more
2146 question?

2147 Mr. {Markey.} Yes.

2148 Mr. {Barton.} I know my time has expired.

2149 Mr. {Markey.} Of course.

2150 Mr. {Barton.} Dr. Michaels, I am told that in these
2151 core samples and the pinecone samples and all of those data
2152 sets that it appears that the temperature goes up before the
2153 CO2 concentrations go up by a time period somewhere between
2154 100 to 800 years. So in other words, the dominant variable
2155 is temperature and the dependent variable is CO2. Is that
2156 correct?

2157 Mr. {Michaels.} There are instances in that record
2158 where in fact the temperature changes precede the changes in
2159 carbon dioxide.

2160 Mr. {Barton.} So what we have is a theory that CO2 is
2161 driving temperature but that is all it is. It is a theory.
2162 It is not a scientific fact, is it?

2163 Mr. {Michaels.} Well, no. This arguments gets very,
2164 very complicated. Carbon dioxide in laboratory experiments
2165 is demonstrated to absorb in the infrared, and everything

2166 else being equal, you will get a warming from CO2. That is
2167 really not the point that I am trying to make. The point is
2168 that the warming has been tending to run underneath what is
2169 projected by our midrange models and so therefore there is a
2170 reasonable argument that the sensitivity that is within the
2171 models for very complicated reasons has been overestimated.

2172 Mr. {Barton.} That little beep beep means our time has
2173 expired.

2174 Mr. {Michaels.} I am sorry.

2175 Mr. {Barton.} We appreciate the discretion of the
2176 chairman and we look forward to him showing more discretion
2177 in future hearings.

2178 Mr. {Markey.} And it will be forthcoming. The
2179 gentleman's time has expired. The chair recognizes the
2180 gentleman from Washington State, Mr. Inslee.

2181 Mr. {Inslee.} Dr. Michaels, I am stunned that you have
2182 come here and talked about things that just don't seem to
2183 make any scientific sense to me. I have listened to your
2184 testimony with care, and what you did is, you compared
2185 observational data in the past to models in the future and
2186 you said that the rate of change in the models of the future
2187 are different than the observational data in the past, that
2188 there must be something wrong with the model. Now, that
2189 makes no sense whatsoever on a scientific basis. If you want

2190 to compare models to observational data, you have to do it in
2191 the same time period, and in fact, the observational data
2192 with the modeling data in the past is quite consistent. You
2193 showed a difference between observational data in the past
2194 and modeling projections in the future, and there is some
2195 difference because it shows an accelerated rate of warming
2196 which is consistent with what is going on in the real world.
2197 Now, how can you possibly come here and think you are going
2198 to blow this one right by us and nobody is going to figure
2199 this out? Do you take us for real chumps up here?

2200 Mr. {Michaels.} I really would prefer that we do not
2201 get personal. In fact, there is substantial overlap between
2202 the period that I looked at. Half of the period that I
2203 looked at overlaps the models. Number two, and we could go
2204 to my graphics. I don't know how hard they would be to come
2205 up with. Can we go to--

2206 Mr. {Inslee.} Sure. Let us do that. Let me ask the
2207 staff to put up the global mean surface temperature chart,
2208 source IPCC/AR-4. Can you put that up, please? Because I
2209 think what we will see is if you were forthright with this
2210 committee, you would say that the modeling data is quite
2211 consistent with the observational data in the past.

2212 Mr. {Shimkus.} Mr. Chairman, would you yield for a
2213 second? I would ask my colleague from Washington State not

2214 to disparage and call the panelist a liar. When you propose
2215 the fact that he is not forthright, you are making the
2216 premise that he is actually providing testimony that is not
2217 true. He is a noted citizen, respected policy observer on
2218 the U.N. climate, and I think it is just egregious that we
2219 attack the only Republican panelist we have on this committee
2220 when you have five on your side.

2221 Mr. {Markey.} Let me just note that the gentleman from
2222 Washington State did not use the word ``liar.''

2223 Mr. {Shimkus.} He said he was not forthright. Mr.
2224 Chairman, we can quibble about words but we know what that
2225 means.

2226 Mr. {Markey.} Well, I appreciate that, but I think, as
2227 we know--

2228 Mr. {Michaels.} I think I can defuse this with a very
2229 simple answer.

2230 Mr. {Markey.} If I may, Dr. Michaels, there is a
2231 difference in terms of which term is used in terms of the
2232 response someone is trying to elicit from a witness, and we
2233 are going to put the time back on the clock for the gentleman
2234 from Washington State, and I don't think that the gentleman
2235 from Washington State was doing anything other than trying to
2236 engage in--by using the word ``forthright'', trying to use
2237 terminology that would have a scientific discussion. If he

2238 had used the word ``liar'' or if any member uses the word
2239 ``liar'' here, I am going to rule them out of order in this
2240 hearing or any other hearing. If he engages in the use of
2241 language which is commonly considered to be abusive, I will
2242 do that. I don't think using the word ``forthright'' in the
2243 way in which he did it in this scientific discussion really
2244 was intended to be a personal insult. If anything, the
2245 gentleman from Washington was using the word ``chump'' to
2246 refer to himself in this discussion and I felt that that was
2247 also an inappropriate word.

2248 Mr. {Inslee.} That may have been over the line. I will
2249 apologize for myself--

2250 Mr. {Markey.} In my opinion, that was--

2251 Mr. {Inslee.} --my self-descriptive chumpdom.

2252 Mr. {Markey.} -- a self description.

2253 Mr. {Inslee.} And I want to say for the record--

2254 Mr. {Markey.} I will put the time back on the clock up
2255 to approximately 3 minutes.

2256 Mr. {Inslee.} Thank you, and I want to make clear that
2257 Mr. Shimkus is always forthright, and I appreciate his
2258 observations. But I do want to point out that I think a
2259 forthright assessment of the scientific principles is that
2260 one does not compare apples to oranges and criticize a model
2261 that has essentially been accurate with observational data,

2262 and if you look at the chart that is on the screen now, it
2263 will compare the modeling data to observational data prior to
2264 the year 2004, and I think you will see there is a very high
2265 degree of correspondence between the two showing that the
2266 modeling data compared to observational data in the past are
2267 very, very close. Now, what we have seen with the modeling
2268 data, a forthright statement is that the model suggests an
2269 accelerating rate of global warming and in fact that is what
2270 we have experienced and that is why everyone with their eyes
2271 open are now seeing very significant changes in our climatic
2272 system. I will ask Professor Schrag to comment on that if
2273 that is a fair assessment of the evidence.

2274 Mr. {Schrag.} I think that is a fair assessment, and I
2275 think it is correct that the models are predicting an
2276 accelerated response over the next several decades. Part of
2277 the reason is what I said earlier, the aerosol effect that
2278 has been essentially dampening the effect of CO2 is short-
2279 lived and over time we will see the CO2 continue to
2280 accumulate and the impact of CO2 grow and grow relative to
2281 the aerosol forces.

2282 Mr. {Inslee.} And I may note the acceptance of this
2283 forthright scientific data is becoming so widespread that
2284 this is a debate we should not be having. Today I just got a
2285 message on my BlackBerry that Exxon Oil was at a meeting

2286 yesterday or this morning talking about the need to respond
2287 to global warming. This just isn't a debate anymore, and it
2288 is unfortunate that is our committee is sort of fighting the
2289 Civil War again, and we have to stop fighting the Civil War
2290 and try to find a bipartisan consensus on how to move
2291 forward, and I really look forward to the day when the
2292 witnesses who are before us from the Republican side will
2293 talk about how we design a cap-and-trade system that will
2294 minimize any dislocation. I just look forward to that day.
2295 I hope it is coming shortly because I think the forthright
2296 conclusion we can draw on a bipartisan basis is that we know
2297 what it is going on, it is not good, and I look forward to
2298 the day we can jointly figure out a way to solve that.

2299 Thank you. I yield back.

2300 Mr. {Michaels.} Mr. Chairman, can I respond?

2301 Mr. {Inslee.} You have 15 seconds if you like. Go
2302 ahead.

2303 Mr. {Michaels.} Okay. These are the A1B scenarios. I
2304 hope you have good eyes. You can see that the rates are in
2305 fact not accelerating over the course of 100 years, in fact,
2306 they are constant, and that the rates that are being observed
2307 which are also constant are at the low end of the projection
2308 ranges made by the A1B scenarios. Those are constant. If
2309 you have good eyes back there, you can see that. Thank you

2310 very much.

2311 Mr. {Inslee.} Thank you to all witnesses.

2312 Mr. {Markey.} The gentleman's time has expired. The
2313 chair recognizes the gentleman from Kentucky, Mr. Whitfield.

2314 Mr. {Whitfield.} Thank you, Mr. Chairman. I think the
2315 frustrating thing about this debate is, I read an article the
2316 other day where someone said that in all my years of doing
2317 science, I have never seen this sort of gag order on people
2318 trying to speak their views, whether they disagree or agree
2319 with the projections of the impact of global warming, and
2320 that stems from the fact that Dr. Michaels because of actions
2321 taken by Governor Tim Kaine of Virginia, Dr. Michaels was
2322 state climatologist and actually lost his job there and at
2323 the University of Virginia because he continued to speak out
2324 on global warming, which was different than the position of
2325 the governor. In addition to that, an official in Oregon
2326 lost his job because his views were different than those of
2327 the governor of Oregon. He continues to speak out on global
2328 warming. In Delaware, Governor Ruth Ann Minner got upset
2329 because one of the climatologists there participated in an
2330 amicus curiae brief before the Supreme Court in which they
2331 were questioning some of the scientific evidence on global
2332 warming. In Washington State, Mark Albright lost his job for
2333 the same reason. And I think it is disturbing that on an

2334 issue this important that can have the impact in the future
2335 that this has, that we get into these kinds of situations. I
2336 think the important aspect of this is that everybody give
2337 their views and then let us make decisions and try to solve
2338 the problem.

2339 I noticed that Professor Schrag made the comment that
2340 generally they are very conservative in their arguments about
2341 global warming and the impact of global warming and yet when
2342 I read Dr. Ackerman's testimony on footnote 4 when he talks
2343 about on page 5, he said since the future will only happen
2344 once and we want to know how bad the risk of future damages
2345 could be, we are going to use the worst limit of what IPCC
2346 calls the likely range of outcomes, and that is fine, but as
2347 politicians when we go out to civic clubs and everywhere else
2348 and we make speeches, we try to find evidence that will back
2349 us up, and when you get people who are really totally
2350 convinced that we need to take drastic action to prevent the
2351 impact of global warming in the future, we are going to take
2352 the studies, the worst-case scenario being according to Dr.
2353 Ackerman that by 2100 U.S. temperatures are going to rise 12
2354 to 13 degrees Fahrenheit. In Alaska they are going to rise
2355 by 18 degrees Fahrenheit. Sea levels are going to increase
2356 by 45 inches and hurricane intensity will create damages
2357 estimated to be \$397 billion by 2100.

2358 Now, I might also say that Chris Lancey, who was
2359 contributing to the IPCC in the area of hurricanes, he
2360 resigned from the IPCC because he said that the leading
2361 author had a press conference and emphatically stated that
2362 increased hurricane intensity was due to global warming, and
2363 Lancey resigned from that. The reason I know about that
2364 because we had a lengthy oversight hearing about that a
2365 number of years ago. Now, Dr. Ackerman, I know you want to
2366 make a comment, Dr. Michaels wants to make a comment, so Dr.
2367 Ackerman, you go ahead.

2368 Mr. {Ackerman.} Okay. We did look at not the
2369 absolutely worst case but the 83rd percentile of the range
2370 that was suggested, the worst of the IPCC likely. It means
2371 the 83rd percentile. The future is going to happen once and
2372 a cost-benefit calculation based on the average or most
2373 likely gives you a 50 percent chance of not being bad enough.
2374 People don't think that way in ordinary life. Insurance,
2375 which never passes a cost-benefit test, is what people do
2376 when they are facing a severe risk which they can't afford.
2377 That is absolutely what we are facing here. The science, you
2378 know, what it looks like at the 83rd percentile of risk for
2379 this century looks pretty bad. Now, in terms of the
2380 hurricane debate, I know there has been a lot of debate about
2381 the details of that. Roger Pielke Jr. is one of the critics

2382 of the position that we took on hurricanes, read over my
2383 reports. I had a long correspondence with him. He persuaded
2384 me that I had a small numerical error that made it 6 percent
2385 too high. He was very happy to hear that I corrected it.
2386 There is another footnote in my testimony that tells you that
2387 I am using the numbers based on my correspondence with him.

2388 Mr. {Whitfield.} And thank you very much for that. My
2389 time has expired but I would like Dr. Michaels to be able to
2390 make his comment as well.

2391 Mr. {Michaels.} Well, there are several places that I
2392 would like to comment and obviously do not have time for it.
2393 I will say in the Stern Report, which has been oft quoted
2394 here, that the worst-case climate scenarios are assumed and
2395 the discount rates are thought to be economically very
2396 unrealistic. With regard to the employment problems that
2397 certain people have had, I just think that is very sad. We
2398 thrive on intellectual diversity. People are not promoted
2399 from assistant to assistant to full professor at major
2400 universities for doing nothing, and for the political process
2401 to have interfered there is a very, very, very black and sad
2402 thing.

2403 Mr. {Markey.} The gentleman's time has expired. The
2404 chair recognizes the gentleman from Texas, Mr. Green.

2405 Mr. {Green.} Thank you, Mr. Chairman. Before I get

2406 into some of the questions, I would like to ask Mr. Woolsey,
2407 you made a statement a few minutes ago that you get the same
2408 credit for not burning coal to create electricity as you do
2409 if you don't burn natural gas, and that is not what I
2410 understood. I thought that coal plants emit much more carbon
2411 than, say, a natural gas plant.

2412 Mr. {Woolsey.} Coal plants do produce a greater amount
2413 of carbon per BTU than natural gas does. What I was saying
2414 was that the instrumentality of the renewable portfolio
2415 standard doesn't really discriminate between gas and coal.
2416 It just wants an increase in renewables. There was a very
2417 good op-ed in the Wall Street Journal about this a couple of
2418 weeks ago and that I thought a feed-in tariff was a superior
2419 mechanism to a renewable portfolio standard for the purpose
2420 of emphasizing renewables in a more effective way.

2421 Mr. {Green.} Thank you for that clarification because
2422 if we are looking at controlling carbon, a renewable standard
2423 may be one of the avenues, but we also need to make sure that
2424 renewable standard is something that you are ultimately going
2425 after with the carbon capture or the carbon sequestration.

2426 Dr. Ackerman, in order to evaluate the cost of inaction
2427 on climate change, you compare the economic consequences of
2428 two possible climate scenarios in a business-as-usual case or
2429 unchecked growth in greenhouse gas emissions with rapid

2430 stabilization case whereby the United States reduces its
2431 emissions by 80 percent accompanied by a 50 percent reduction
2432 in total world emissions. Under your rapid stabilization
2433 case, what happens if only the United States acts to reduce
2434 its emissions while major emitters such as China or India do
2435 not follow suit? Will the cost of inaction become smaller or
2436 greater?

2437 Mr. {Ackerman.} There is really no hope of solving this
2438 problem if we don't have a global agreement on it. No
2439 country represents more than 20 percent of the total. The
2440 United States and China are both at about that point so--

2441 Mr. {Green.} Thank you. Since we only have 5 minutes
2442 and I have a whole lot of questions, I thank you for that.
2443 My next follow-up is, so in your opinion, it is crucial that
2444 reductions in greenhouse gas emissions are linked to a global
2445 action to reduce carbon emissions?

2446 Mr. {Ackerman.} Absolutely. It has to be done
2447 globally.

2448 Mr. {Green.} Could we ever achieve a rapid
2449 stabilization case without strong mandatory reductions by
2450 other major emitters?

2451 Mr. {Ackerman.} No. Everybody has to agree to reduce.

2452 Mr. {Green.} Your analysis found that under the
2453 business-as-usual case, combined increased costs for

2454 electricity added up to \$141 billion per year in 2001 or .14
2455 percent of projected U.S. output. Last year there was an EPA
2456 analysis of climate change legislation, Senate bill 1766, by
2457 Bingaman and Specter and the Senate found that electricity
2458 prices were projected to increase 40 percent in 2030 and an
2459 additional 25 percent in 2050. How do these increased costs
2460 of climate change addressing climate change in the EPA
2461 analysis compare with your estimates under a business-as-
2462 usual case for electricity rates?

2463 Mr. {Ackerman.} I haven't looked at that EPA study. I
2464 know that our subcontractors who analyze the electric power
2465 system were actually quite conservative in the costs that
2466 they were able to look at, mostly looking at increased air
2467 conditioning load. There are a number of other effects on
2468 the power system which they were not able to quantify so I
2469 would not be surprised if someone else came up with a higher
2470 number.

2471 Mr. {Green.} I appreciate it coming from a part of the
2472 country that we need LIHEAP from May to September for our
2473 poor folks. I appreciate that.

2474 Mr. Woolsey, you made several observations in your work
2475 on malevolent and malignant threats regarding climate change
2476 impacts on our energy infrastructure. Can you further
2477 elaborate on your point that our energy systems are

2478 vulnerable to climate change?

2479 Mr. {Woolsey.} Well, they contribute to climate change
2480 insofar particularly as they use coal and oil but they are
2481 also vulnerable. For example, Hurricane Katrina barely
2482 missed the Colonial Pipeline, which is a major pipeline from
2483 the Gulf up to the East Coast. Most of us around here would
2484 have done a good deal more bicycling and walking had Katrina
2485 been just a mile or two different from where it was, and the
2486 electricity grid in Cleveland suffered an outage in August of
2487 2003 when a tree branch touched a power line in the middle of
2488 a storm, and within 9 seconds some 50 million consumers were
2489 offline in the United States and eastern Canada. Now,
2490 probably 2 decades ago that would have been an outage in part
2491 of Cleveland, but because our electricity grid is so stressed
2492 and is so overloaded with the demands of running a
2493 deregulated system and everybody being able to shop all over
2494 the country for every little bit of electricity and so on, it
2495 has produced an extraordinarily vulnerable system, vulnerable
2496 to natural interference such as a tree branch touching a
2497 power line, and unfortunately, terrorists are a lot smarter
2498 than tree branches.

2499 Mr. {Green.} And I appreciate that, and hopefully this
2500 stimulus reinvestment bill that has money in there for
2501 transmission expansion and also other things will help that,

2502 because that is one of the issues. We need to have
2503 alternatives to having just one line.

2504 I have one more question if I could--

2505 Mr. {Markey.} Very quick.

2506 Mr. {Green.} Dr. Ebi, can you explain how increasing
2507 temperatures could facilitate the development of ground-level
2508 ozone and how this could impact public health within
2509 pollution-prone areas. Specifically, do you suggest that the
2510 United States coordinate the public health responses to
2511 climate change across the level of Federal Government?

2512 Ms. {Ebi.} The rate at which ground-level ozone is
2513 formed, and it is formed on clear, cloudless days, the rate
2514 is temperature dependent. All else being equal, if the
2515 temperature goes up there will be more ground-level ozone.

2516 Mr. {Green.} And how do you suggest we coordinate
2517 between our public health responses? Because, again, coming
2518 from the Houston area, we have an ozone problem, and is it
2519 coordination of the federal agencies in response to that is
2520 what we should do?

2521 Ms. {Ebi.} There needs to be coordination not only with
2522 the Federal Government but across borders because there is
2523 also hemispheric transport of ozone.

2524 Mr. {Green.} Thank you.

2525 Mr. {Markey.} The gentleman's time has expired. We

2526 will recognize the gentleman from Illinois for 6-1/2 minutes.

2527 Mr. {Shimkus.} Thank you, Mr. Chairman. I did an
2528 opening statement so--

2529 Mr. {Markey.} I am going to balance you out with Mr.
2530 Green.

2531 Mr. {Shimkus.} Thank you, Mr. Chairman. I would like,
2532 Mr. Chairman, if we could submit James Cunnington's report
2533 from December 2007 on the energy and climate policy. In here
2534 there is a coupled noted aspects, \$37 billion in climate
2535 change. Before the stimulus bill, that would have been real
2536 money in Washington. Now \$37 billion is chump change, but I
2537 would say that is doing something. I would also want to
2538 highlight an issue in here about the important transitions of
2539 emitting countries. It does address what are some of the
2540 answers. We are really flatline growth from 1990 projected
2541 to 2095. It is the developing countries. I can guarantee
2542 you the developing countries are not going to go into a
2543 worldwide climate policy. We met with the Chinese a few
2544 years ago, asked them a couple times. Their basic response
2545 was, you had your chance to get to the middle class, now it
2546 is ours.

2547 The only thing we have is fear left, Mr. Chairman. It
2548 is fear on the stimulus, \$900 billion. It is fear for
2549 immediate action on climate change. When in the world do we

2550 stop attacking a messenger of a divergent scientific opinion?
2551 And shame on us for doing so. If we were to apply the
2552 Fairness Doctrine that we are going to try to ram down
2553 America on telecommunications policy, the Fairness Doctrine
2554 would say three panelists for a view on climate change that
2555 is supportive of what Dr. Michaels is speaking of and three
2556 in opposition, so I would hope that as we talk about Fairness
2557 Doctrine, that would be brought to the committee.

2558 Let me ask, how would each of you respond--of course, I
2559 have very limited time--to this statement: We will harness
2560 the sun and the winds and the soil to fuel our cars and run
2561 our factories. True or false, Dr. Michaels?

2562 Mr. {Michaels.} I can't give you an answer.

2563 Mr. {Shimkus.} Dr. Ackerman?

2564 Mr. {Ackerman.} I would need more information.

2565 Mr. {Shimkus.} Dr. Ebi?

2566 Ms. {Ebi.} I agree, there would need to be additional
2567 information before I could comment.

2568 Mr. {Shimkus.} Okay. Here is a statement: We will
2569 harness the sun and the winds and the soil for fuel to fuel
2570 our cars and run our factories. Mr. Woolsey?

2571 Mr. {Woolsey.} Today I drive a plug-in hybrid and I
2572 have photovoltaic cells on my roof and batteries in my
2573 basement and I drive 40 to 50 miles a day on sunlight.

2574 Mr. {Shimkus.} I mean yes or no.

2575 Mr. {Woolsey.} Yes, it can be done.

2576 Mr. {Shimkus.} And your electricity comes from what
2577 commodity product?

2578 Mr. {Woolsey.} It comes from Baltimore Gas and
2579 Electric, which is whatever they use. Some of it is coal,
2580 some of it is other. But--

2581 Mr. {Shimkus.} But that is not wind and that is not
2582 solar.

2583 Mr. {Woolsey.} They are moving into--

2584 Mr. {Shimkus.} And that is not renewable as by the
2585 definition of our--

2586 Mr. {Woolsey.} Solar is part of it.

2587 Mr. {Shimkus.} Again, I am just saying this statement.

2588 Okay. Let us go to General Sullivan.

2589 General {Sullivan.} I have no idea.

2590 Mr. {Shimkus.} Okay. Yeah. Thank you. An honest
2591 answer. I will tell you, you are not going to operate a
2592 United States steel mill on wind, on solar, on renewables.

2593 Mr. {Woolsey.} It will take a lot longer.

2594 Mr. {Shimkus.} Well, I will say you will never run a
2595 United States steel mill on wind, on solar, on renewables.

2596 Mr. {Woolsey.} I disagree.

2597 Mr. {Shimkus.} And that is what this process is all

2598 about.

2599 Professor Schrag?

2600 Mr. {Schrag.} I think what is missing from this
2601 question is the time scale. In the next decade it is going
2602 to be very hard to switch off of fossil fuels. It is more
2603 than 80 percent of our energy. Long-term scales, we are
2604 going to have to because we are going to run out and that is
2605 just the way it is. It is going to get very expensive. And,
2606 you know, today in Iceland, for example, Alcoa is building
2607 aluminum smelting plants that are run on geothermal so it is
2608 possible, it is just expensive in other parts of the world
2609 and in the United States today, but at some point fossil
2610 fuels are going to get even more expensive, and the security
2611 issues associated with that are serious.

2612 Mr. {Shimkus.} Well, in this part of our debate on
2613 climate change, because those of us who are for all-of-the-
2614 above strategy, if you want to talk national security and
2615 having reliable power, the nuclear power has to be part of
2616 this debate. The environmental left has yet to come to the
2617 table to believe that growth in the nuclear power movement in
2618 this country. They continue to block the ability to store
2619 high-level nuclear waste at Yucca Mountain. They will allow
2620 the continued storing of this on site to a point where the
2621 reservoirs will be full, and these sites will have to be

2622 decommissioned. We are actually paying federal tax dollars
2623 to these companies to store the waste that we have agreed to
2624 hold.

2625 I would like to ask Dr. Michaels, I think a lot of us
2626 are concerned especially with the comments made today and
2627 your lone voice and this issue of fear. I mean, you hear the
2628 world is going to end and we have to do something now. Tell
2629 me why you believe there is this rush to act.

2630 Mr. {Michaels.} That is a very complicated question.
2631 It is obviously political. Obviously a lot of voices are not
2632 being heard. And my fear, my fear is that that is going to
2633 have a very counterproductive effect and I really want the
2634 committee to consider this. If you take capital out of the
2635 system with expensive taxes and cap-and-trade programs, that
2636 capital would normally be used by individuals in their
2637 401(k)'s for investment and those investments are often made
2638 in companies that produce things efficiently or produce
2639 efficient things compared to their competitors. They are
2640 advantaged in the competitive marketplace. So you can have a
2641 very counterproductive effect by putting in regressive energy
2642 taxes or other programs like that. You take capital out of
2643 the system that would normally be used for investment in
2644 companies that produce things efficiently. This is very,
2645 very obvious that people are doing this. I ask you to take a

2646 look at the share prices of various producers of automobiles
2647 and take a look at the share prices of those--

2648 Mr. {Shimkus.} And let me be real quick, Professor
2649 Schrag, just your quick answer on coal-to-liquid
2650 technologies. Support it? I mean, in your testimony you
2651 talked about being able to pull off the carbon stream.

2652 Mr. {Schrag.} Coal to liquids, if done improperly the
2653 way the South Africans do, is one of the dirtiest
2654 technologies in the world. If it is done properly with
2655 biomass blending and carbon sequestration, it can be among
2656 the cleanest technologies in the world.

2657 Mr. {Shimkus.} Mr. Chairman, did you hear that
2658 testimony? It is your witness. Did you hear his answer?

2659 Mr. {Markey.} I am sorry.

2660 Mr. {Shimkus.} I am teasing.

2661 Mr. {Markey.} No, can you repeat the answer?

2662 Mr. {Shimkus.} I am just teasing, Mr. Chairman.

2663 Mr. {Markey.} I would really like to hear the answer
2664 again, please.

2665 Mr. {Schrag.} The answer was that the same technology
2666 that makes incredibly dirty fuel in South Africa, twice the
2667 emissions of regular oil, if done properly with the right
2668 regulations, with blending biomass with the coal, and we are
2669 talking about could be waste biomass or wood chips, and

2670 capturing the carbon from the process can actually produce
2671 very efficient, clean fuel, but it has to be done right, not
2672 in a dirty fashion.

2673 Mr. {Markey.} I will just say to the gentleman, in the
2674 stimulus bill, the House put in \$2.5 billion for carbon
2675 capture and sequestration, trying to find ways of using
2676 technologies that can sequester the carbon. The Senate put
2677 in about \$4 billion. The debate is not over whether or not
2678 we should be doing something in this area, the debate is over
2679 how many billions of dollars we should be spending in this
2680 area. So that is really not what this debate is about.

2681 Mr. {Shimkus.} Yeah, and we haven't seen the commerce
2682 report, Mr. Chairman, but I think that has now been cut to \$1
2683 billion from what I have heard. But I do need to just give
2684 credit to the quote I used on ``We will harness the sun and
2685 the winds and the soil to fuel our cars and run our
2686 factories,'' President Barack Obama, my State. We are very
2687 excited but this is part of the research you have to do to
2688 find out exactly what people are saying because this is
2689 impossible in the near term.

2690 Mr. {Markey.} I thank the gentleman and I thank all of
2691 the witnesses as well. This has been a very, very helpful
2692 stage-setting hearing for us. We discussed the economics,
2693 the national security and the health implications of climate

2694 change, and I think what we heard here today is that there is
2695 a real urgency for our country to become the leader, and that
2696 is the intention of this subcommittee and full committee. We
2697 intend on acting this year in a way that deals with the
2698 urgency of the problem, and there is good news. The good
2699 news includes the fact that 42 percent of all new electrical
2700 generating capacity installed in 2008 was wind power, 50
2701 percent was natural gas, so that is not a bad formula for
2702 dealing with climate change, and I think that is going to
2703 accelerate in the years ahead, even as we do the research and
2704 deal with carbon capture and sequestration to try to
2705 accommodate coal in the years ahead. So that is a huge
2706 number, 42 percent of all new electrical generation capacity.
2707 It can be expected to go to 50 and 60 percent in the years
2708 ahead as a national renewable electricity standard is
2709 adopted.

2710 So I am very optimistic, and this panel has helped to
2711 pinpoint the problem but talk about some of the solutions as
2712 well, and we thank you for that, and with the thanks of the
2713 committee, this hearing is adjourned. Thank you.

2714 [Whereupon, at 12:35 p.m., the subcommittee was
2715 adjourned.]