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## **Lessons from 50 Years of Science Advice to the US President**

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## Lessons from 50 Years of Science Advice to the US President

I have several vignettes to relate but there's an overarching story here about the experiences in the United States with a science advisor. Germany should count itself as fortunate not to be able to have a specific science advisor because there is this mythology – and I'll talk about it in my presentation – this mythology that we get a great man, and it usually is a man, and usually a physicist who sits next to a leader or prime minister, a chancellor, a president and whispers in their ear: Truth. And then the decision-maker is empowered to make decisions. The reality is much more complicated. The science advisor in the United States has done many wonderful things; has had an important role to fill but it's usually not the role that is part of this mythology and so that's the story I'm going to tell. I will close by giving you a short discussion of what I think is more important than a great physicist emphasizing a rather more esoteric focus on process. It's complicated, it's messy, it's not the great wise man sitting next to the president, but it's an important process that is part of democratic governance.

I start out by talking about the very brief rise of the science advisor in the United States, and the long decline. Even so, in the United States – and I think its characteristic in Europe and elsewhere around the world – that expertise has really triumphed in our policy-making processes. I'll then discuss how we think about good advice and what that means in the context of decision-making. Again, the heroic vision of science advice is that we have a wise man who sits with the leader usually standing right over their shoulder ready to give them guidance on complicated, difficult issues.

There is a recent political cartoon from the United States. In the upper left you have the scientist clearing the mud off of the truth and on the right you have the Federal Government, the policy-maker trying to cover up the truth. This is the mythology that we have of the role of science in decision-making. I had the opportunity, and it was really a great privilege, to interview seven science advisors starting in 2005.

1 Parts of this talk have been taken from Pielke, Klein 2009.

Eisenhower	James R. Killian, Jr. (1988)	1957 – 1959
Eisenhower	George B. Kistiakowsky (1982)	1959 – 1961
Kennedy	Jerome B. Wiesner (1994)	1961 – 1963
Johnson	Jerome B. Wiesner (1994)	1963 – 1964
Johnson	Donald F. Hornig	1964 – 1969
Nixon	Lee A. Dubridge (1994)	1969 – 1970
Nixon	Edward E. David, Jr.	1970 – 1973
Nixon	H. Guyford Stever (2010)	1973 – 1974
Ford	H. Guyford Stever (2010)	1974 – 1977
Carter	Frank Press	1977 – 1981
Reagan	George A. Keyworth II	1981 – 1985
Reagan	William R. Graham, Jr.	1986 – 1989
G. H.W. Bush	D. Allan Bromley (2005)	1989 – 1993
Clinton	John H. Gibbons	1993 – 1998
Clinton	Neal Lane	1998 – 2001
G. W. Bush	John H. Marburger III (2011)	2001 – 2009
Obama	John Holdren	2009 – present

Here is a list of all of the science advisors that the United States has had; I'll talk about a number of them. Unfortunately some are no longer with us. We brought almost all of the available former (and current) science advisors to Boulder. I sat on a stage and I asked them questions about their experiences, what they learned, and then they each wrote a chapter that appeared in a book. The last one I interviewed was John Marburger; he was the science advisor for George W. Bush and was still in office when I interviewed him, which I think limited his freedom to speak and say what was really going on. Unfortunately, he died last year, so whatever secrets he might have had never came out.

Some were quite elderly at the time that I interviewed them. It goes all the way back to John F. Kennedy and all the way up through George W. Bush. What I am going to tell you are some stories, some lessons that they had from their experiences as science advisor. The book that resulted from this project has their own versions of the history that they lived and some perspectives from academics on science advice (see Pielke/Klein 2010).

In 1957, the United States president appointed the first presidential science advisor. Yet, even very late in 1957 President Eisenhower said, »I hadn't given thought to any proposal to establish a scientist in a policy position in the White House« (as quoted in Grossberg 1974: 29). For decades, maybe longer, scientists in the United States had always been trying to get close to power, to try to elevate their role in the political process, and the answer was always the same: No thank you. No thank you.

There is a famous story of a scientist who came to Abraham Lincoln during the Civil War and told him that he could provide weather forecasts two days in advance to help the Union Army, and Abraham Lincoln ushered that crazy man out of his office saying, »We have no need for your services.« Everything changed in October 1957 when the Soviet Union launched a satellite into space. This is from an academic, writing in 1974, who said, »Eisenhower saw more scientists in the two weeks following Sputnik than he had seen the year before.« All of a sudden scientists had become necessary. In the United States there was a great political debate: What are you going to do, Mr. President, about the Russian satellite that we can see, the Soviet satellite overhead?

Thus, less than a month later everything changed. The first science advisor – to President Eisenhower – was James Killian. James Killian is often pointed to as the best science advisor that the United States had ever had and, again, this is part of the mythology of science advice in the United States. James Killian, at the time, was the President of the Massachusetts Institute of Technology (MIT). Few people actually realize that he was not a scientist. He had academic training in administration and management, so perhaps that explains why he was such a good manager in the government system. Here's an example of the mythology that has accompanied Killian's appointment: »President Eisenhower assured Dr. Killian that he would enjoy wide latitude in action and guaranteed access to information in every corner of government. He is the Chief Scientist. He oversees the entire government portfolio. He follows the president around everywhere.« (Grossberg 1974: 40)

A political cartoon from the time says, »Don't spare the rod, Professor,« and there's Killian at the head of the class with his rod in a disruptive classroom of politicians fighting with each other. The idea was the science advisor will come in and create some order and get these unruly children – the politicians – to listen to the authoritative voice of science.

The reality, unfortunately, doesn't live up to the mythology. During the swearing in ceremony the President rushed through it very fast. He had a very important engagement to get to. He was leaving on a trip to Augusta, Georgia, where the Masters is played, to play golf; he was ready to set the scientist aside. It was actually foreshadowing of what was to come.

Even the second science advisor, Jerome Wiesner, who was the science advisor to John F. Kennedy, looked back on his predecessor as in a mythological fashion. »Dr. Killian, as the first presidential advisor on scientific matters rapidly became involved in matters of the greatest national importance involving education, defence, disarmament, space and international co-operation« (Wiesner 1963) A Renaissance man was the image of the science advisor.

This is from a perspective in 2007, again, looking back longingly during the Bush Administration era when there were a lot of issues involving politics and science. »During the Eisenhower era never before or since have scientists had a firmer influence on the reins of power that direct national policies.« It turns out that, as you might expect, politicians found a lot of uses for science advisors. Since they had them, they thought they should use them for something. Donald Hornig was one of the advisors that I had a chance to interview, a wonderful brilliant man who was something like 86 years old when I interviewed him; very sharp and on top of things. We asked him about some of the lessons he had as science advisor and he told us a story and it was clear he really relished it. One day he was in his kitchen making dinner with his wife and the phone rang. It was Lyndon Johnson, and the President said, »The President of Korea is coming tomorrow; I need something. I need to give him something.« Don Hornig said, »I'll get right back to you Mr. President.« So he thought something up. Why don't we propose an institute of science and technology to be shared between the United States and Korea? And that became the Korea Institute of Science and Technology which still exists and is thriving.

After a number of years, *Science Magazine* looked back and asked: »did Lyndon Baines Johnson (LBJ) neglect his science advisor?« The science advisor had a function, he had a role in the political process but he wasn't anywhere near the so-called reins of power. He was instrumental, provided some ideas, programs to aid in, as Hornig explained, »Science is a wonderful lubricant for foreign policy initiatives.« This is not really what many people have in mind when they think about the role of science in decision-making. At the time, people took note that even though we had a science advisor, the nature of politics really hasn't changed. In 1965, a political scientist looking back, stated: »The fact that the content of so many political decisions has become heavily scientific has not yet produced a transformation or adaptation of government

decision-making processes to the scientific model for resolving conflicts of opinion, interest or power.« (Leierson 1965).

Having a science advisor didn't make us more rational. It didn't elevate the role of science in decision-making. Politics was continuing as politics always had. When we asked Dr. Hornig to tell us an instance when he gave actual scientific advice to Lyndon Johnson or when the President came to him and said, »We have a question involving science, can you help answer it?« he told us he knew of no example where he was asked to arbitrate a scientific question; certainly useful, but answering questions about science was not in his portfolio.

Now I want to turn to Richard Nixon. Nixon really transformed and changed the role of the science advisor in the United States. Edward David was Nixon's science advisor, and he told us a story that I had never heard before. He said: »Apollo 17 was slated to launch about a month before the Election Day in early November 1972. The big worry by the political forces in the White House was that if there was an accident of Apollo 17, it would bear heavily on the 1972 election outcome negatively. So President Nixon said, »we have to cancel this trip to the moon. I don't want it to interfere with my election.«<sup>2</sup>

One of the things I often hear from my colleagues in the scientific community is that you can't change the laws of physics, so politics must accommodate them and it turns out that in the world of politics – even though there are things like launch windows and schedules – politics has laws that are every bit as firm, perhaps even more firm, than the laws of physics. It's a difficult, uncomfortable reality to accept, but in this case politics won and here's what Ed David did to try to save the situation. »I suggested that Apollo be postponed until the December after the election – one month after it – and then Apollo 16 – this was the earlier launch – was too early to have much influence on the outcome.« We did win that day for the final two moon missions but if the science advisor was not able to come up with a solution, then it seems pretty clear that the President would have cancelled the moon missions and that we would have had two less moon missions in the United States.

This is what Ed David took from that experience. He says that, »This shows you how science hangs by a string in such situations. It illustrates that political thinking is very different from scientific thinking. Anyone coming to the science advisory post without considerable experience in politics is in for some rude shocks« (Ibid). Let me tell you about one rude shock. As many of you are probably aware, this was during the time of the Vietnam War that the US was engaged in. There were protests in the United States across the country at university campuses, and

2 Transcript at [http://sciencepolicy.colorado.edu/scienceadvisors/david\\_transcript.html](http://sciencepolicy.colorado.edu/scienceadvisors/david_transcript.html). ( Roger Pielke Jr., Roberta A. Klein).

one university campus that had particularly loud and visible protest was MIT, The Massachusetts Institute of Technology. Ed David had attended MIT. In fact, his advisor in physics was the President of the university at the time. David got a call one day from the President who said, »Ed, come into my office,« and the President said to him, »I want you to go back and cut off all funding, all research funding from MIT,« because the President was not happy that they were protesting against his war in Vietnam.

Ed David said, »I just sort of sat there dumbfounded... because you know enough about the government that it's completely impossible. Even if he wanted to cut the funding for MIT he had no power to do so.« He continued: »So I went back to my office, sat down, puzzled about this for a while and didn't do anything.« Ed David was fired by Richard Nixon. He lost his job. The President said, »I don't need a science advisor. He's not going to do what I say anyway, go away«<sup>3</sup> Now the response to this explains why the science advisor today is outside of the President's inner circle of advisors. In the United States, the science advisor will never be a man or woman who sits at the right hand of the President. The President has his inner circle and it's usually political officials, often involved in the campaign. After Nixon fired the science advisor the US Congress got involved and said, »No, no that's not acceptable, we're an equal branch of government.« Thus, Congress stepped in and passed legislation to create a new organization inside the White House called the Office of Science and Technology Policy, OSTP.

OSTP is an important organization. It does a lot of work on science policy issues and budget work; but what happened when the Congress created this organization is that the head of the OSTP, who is also the science advisor, has to be available to testify before Congress. The science advisor does not have what is called executive privilege. If you are in the President's inner circle, you do not have to share the details of your conversation with the President with the Congress, it can be kept private, but not for the science advisor. The science advisor at any time can be called before the Congress, so when the President is having a top level meeting on political issues and they have to close the door, the science advisor has to leave first because he is not privileged to be in that inner circle.

Thus, the congressional, the legislative foundations that saved the position of the science advisor back in 1976 actually removed any possibility for that person to be a key advisor to the President of the United States. This position exists but it is not nearly as important as it might be. There is probably a familiar sense to the stories that I am telling, and one thing important to understand over time in the United States is that

3 Ibid.

the dynamics of science advice are very similar under Republicans and Democrats. Republicans have their issues, Democrats have their issues, but in a very real sense the dynamics are quite similar even though some people like Republicans and some people like Democrats.

Here is an example from Jimmy Carter who was a Democrat. We heard from Frank Press, who was Jimmy Carter's science advisor and he told us this story, which should sound familiar to anyone who followed the George Bush or even now, Barack Obama, experiences with science. During President Carter's term in office his political staff proposed that he should commit to a national goal by the year 2000 – this was in 1978 – by the year 2000, the United States would draw 20 per cent of its energy from renewable energy sources, that is, other than hydrocarbon and nuclear. They argued for this action on many grounds, among them, this would improve the President's political standing. It would be very popular with the citizens. The President's political appointees implored Dr. Press to join them in their initiative out of concern that the President might not accept their proposal if the science advisor did not agree with them. **The science advisor and his staff decided not to support the proposal because, though laudable and worthwhile in their opinion, it was not an achievable goal. The science advisor thought, »It's not possible. It would be misleading to propose it.«** You can see from the headline in the *Wall Street Journal* that the President decided to go ahead with the goal of 20 per cent renewable energy by 2000. Frank Press said to this: »Despite the technical advice, the President decided to accept the proposal of the political staff to set a national example. Solar panels were installed on the roof of the White House to provide hot water for the White House kitchen. On this and several other occasions, President Carter told us that he agreed with our technical evaluation, but would follow another course for political reasons. A reasonable action it seems to us for a person in his position« (Press and Smith 2009).

We hear about the politicization of science in recent years where scientific advisors give the President their advice and the President decides to go a different direction. It is an old practice that goes back a long time. In this case the science advisor says, »Well, I understand. Politics are politics.« So is this a story of failure? We started with this idea of the science advisor standing next to the President; whispering in his ear, giving him wisdom across the entire government. Ed David told us, »The old style science advisor, the distinguished person whom the President looked upon as his House intellectual to be listened to on the complex and new issues at that time, of course – this was the 1950s nuclear arms, nuclear defence, advance technologies, infectious diseases and so on – is



not likely to recur soon. We're not going to see the re-emergence of that great vision of the science advisor«<sup>4</sup>

Daniel Kevles, a historian of science in government, tells a different story. He says, »The issues nowadays are unbelievably pluralistic. There is hardly an issue you can think of that doesn't turn, to some extent on technical knowledge.« Instead of losing something with this science advisor's role diminishing, what Kevles and others have argued is, in fact, science and science advice is everywhere. We've seen the triumph of expertise. It is a victory for scientific advice that it is not captured in a single individual, but it's throughout our government, agencies, in our ministries – really everywhere. Consider this: by one estimate in 1950, there were only 350 scientists involved with giving advice to the United States government and they were friends and friends of friends. It was an old boys' network at the time. By 2003, more than 8,000 scientists sat on over 400 government scientific advisory boards in the United States.

In President Obama's cabinet of his top ministers in 2009, there was Steven Chu, the Minister's Secretary of Energy. He has a Nobel Prize in physics. What does a science advisor, in this case John Holdren, have to add to Dr. Chu's credentials on physics, probably not a lot? The Head of the National Oceanic and Atmospheric Administration, Jane Lubchenco, is a distinguished oceanographer, and so on and on throughout government. The problem is not a lack of expertise, I would argue, but how we manage the expertise that we do have.

This is what Jack Marburger said when we asked him about the role of the science advisor. He said, »Most of the decisions that really have technical content get made within the government agencies at a level far below the White House. It is only rarely that science issues, or issues with technical content actually come up to the White House for decisions or for policy direction change.«<sup>5</sup> As a policy scholar I find this somewhat reassuring. The White House is probably one of the last places I would hope to see decisions made about science. With the vast number of agencies and experts that the US government has available, it is nice to know that most of the decisions get made in the agencies by professional scientists and other experts.

The Bush Administration saw a number of conflicts that came up on the management of science, on the role of information where political officials were trying to shape information in preferred directions, i.e. the stacking, the biasing of advisory panels. Expert scientists would be called up and asked, »Would you like to serve on our drug advisory panel?«

4 Transcript at [http://sciencepolicy.colorado.edu/scienceadvisors/david\\_transcript.html](http://sciencepolicy.colorado.edu/scienceadvisors/david_transcript.html).

5 Transcript at [http://sciencepolicy.colorado.edu/scienceadvisors/marburger\\_transcript.html](http://sciencepolicy.colorado.edu/scienceadvisors/marburger_transcript.html).

›Well maybe,‹ and the next question would be, ›Well who did you vote for in the last election?‹ The Bush Administration got into a lot of trouble and it turns out that the Obama Administration is having many of the same issues. Recently an issue surfaced with allegations from a member of a bio security advisory board. The panel was stacked in a certain direction, it was biased. You have conflicts between government career scientists versus political appointees.

The conflicts that we've seen in the Bush Administration, which had a Republican flavor to them, in the Obama Administration, which have a Democratic flavor to them, are really about the dynamics of expertise in government. There was a hope in the United States that if George Bush was voted out and President Obama was voted in, integrity would be returned to science. It turned out, however, that it is a lot more complicated than just changing the leader at the top, as we've seen from this short journey through history.

There are reasons to be confident that the US public has strong support for experts and expert advice. A survey that is conducted every two years by the National Science Foundation asks the American public, ›What institutions do you have the most confidence in?‹ At the top is the military followed by medicine and science. This has been the case over 30 years. If you ask Americans at the individual level, »What profession do you think has the most prestige?«, there's firefighters at the top, but then close behind is the scientist. Members of Congress, journalists, bankers, are much lower and this has been the case for many decades. Incidentally, this is similar elsewhere in the world.

The Eurobarometer conducts similar surveys in Europe. Scientists enjoy very high standing in Europe even though there is a lot of variation between Estonia and Norway and Greece and Portugal. If you ask people, ›Do you think science is generally beneficial?‹, there are some ups and downs, but very strong support for science. The data is similar for all of Europe, as well as across the United States from the south, to the west to the north east to California. There is variation as in Europe but the general message is one of strong support for expertise in science in decision-making.

Now I would like to make the case to you that if it is not the individual, if it's not the heroic person of mythology, how then do we get advice? This is something that I discuss in my book, *The Honest Broker* (Pielke 2007). I will go through a simple analogy to illustrate the challenges of getting good advice. As I do so, let me give you some words just so you know what I mean. When I say science, I simply mean the systematic pursuit of knowledge; social science, humanities, natural science, even military intelligence might fall under that. Entire books, I know,

are written about what is science. All I mean is just trying to get knowledge, typically to inform decisions.

By policy I mean a decision, a commitment to a course of action. Policy has politics. Politics in democratic societies is the bargaining negotiation and compromise in pursuit of a desired aim. Anytime you have more than two or more people together and they make a decision, they engage in politics, they negotiate. This is how we get the business of society done. Often politics and policy are mixed up. The politicization of science – to use these words here – is the use of the systematic pursuit of knowledge as a means of bargaining, negotiation and compromise. We want science to be politicized. In other words, we want to use science in our decision-making. Very often I see – and again I think this is somewhat of a universal characteristic – the idea that politics is bad or dirty and we want science to be free from politics. I don't think that's possible. The question is: how do we wisely put science and politics together?

In my book I have four categories: the pure scientist, the science arbiter, the issue advocate and the honest broker. I could talk about the theory and abstract notions, but I think it is better to illustrate it with an example, and this example is a question. The question is, ›Where should we have dinner?‹ So let us imagine that I am from out of town – not difficult – and I have arrived in Berlin and I want to go to dinner – it's not far from the truth – and I come to you. You are the local expert and I am the decision-maker in this analogy. I ask you some questions and I am going to go through each of these four categories to illustrate the different roles that the expert can play when giving advice. It is important to recognize that, as the expert, you have to choose. You cannot play all of these roles at once or, if you do, I will probably move to another advisor.

So let's go through the pure scientist, the science arbiter, the issue advocate and the honest broker. The pure scientist, let me say upfront, I don't think really exists. I will illustrate it with this: You may go to Google; you say I have this American guy. I need to help him find out where to go to dinner. I don't want to get involved in his messy value-based choices about restaurants. So I went on the website and I found that the US government publishes these healthy dietary guidelines for Americans. This is a document that is supposed to tell people what is a healthy diet based on science. The thinking here might be along the lines of the old linear model, the idea that if we agree on the facts of a case that makes decision-making either straightforward or obvious. So, if you give me these nutrition guidelines, that will help inform me about what I should have for dinner in Berlin.

Now, social scientists often are trouble-makers because they study aspects of society. Two scholars have studied the production of these nutrition guidelines in the United States and they have found that they are very political. One reason why they are political is that the same agency

that tells you what is healthy is responsible for the economic success of farmers in the United States. So consider the simple question, ›Should meat be part of a healthy diet?‹ There are people who will tell me I can eat a perfectly healthy vegetarian meal. That is a question that can be simply resolved by science. Now the US government says you should eat meat; of course, beef and pork and chicken producers have a large economic standing in the agricultural community. The »pure scientist« does not exist in a decision setting because once choice is invoked, the science is no longer »pure.« Choice means values.

Thus, if the pure scientist doesn't really exist, let's talk about the other three categories. The science arbiter is a little bit like the concierge at a hotel, and the defining characteristic of our interaction is that I, as the decision-maker, will ask you questions that can be resolved through the tools of science. That is to say, the questions can be resolved empirically. Thus, I might say to you, ›Could you tell me three Italian restaurants within two kilometers?‹ and you could say, ›Yes, this one, this one and this one.‹ Or I might say, ›Tell me a good Bavarian restaurant that has a Champion's League TV game on tonight?‹ Let's talk about that later, but the key is, I would not come to you and say, ›What do I feel like tonight? What do I enjoy?‹ This is exactly the process that many governments have set up in the science advisory process, where expert committees are put together and they're asked questions about public health or nuclear radiation or weapons system, but the idea is you can assemble experts and they can give you answers to questions that decision-makers have.

Sheila Jasanoff is the scholar who's probably done the most work on such science arbitration. She says that the notion that scientific advisors can or do limit themselves to addressing purely scientific issues in particular seems fundamentally misconceived. The advisory process seems increasingly important as a locus for negotiating scientific differences that have political weight. The point here is that it is very difficult to get good scientific advice particularly on difficult contested scientific questions. Right now, maybe even at this moment, my graduate seminar back in Boulder is working on an assignment. Their assignment is to construct a science advisory committee to advise Barack Obama on regulation of greenhouse gases. When I am back, we will talk about what they did, and if this year's class is like all my other classes, I will learn that they talked about the scientist's view on regulation, whether they got money from fossil fuel interest, their political affiliation. In other words, they will look at a lot of factors that have nothing to do with the purely scientific.

This makes sense because the legitimacy of scientific organizations has a lot to do with their role in politics. Here is a recent example from the United States. During the Bush Administration, a government advisory committee was asked to assess the risk of what is called ›the morning after‹ pill – emergency contraception for women – and they were

asked, ›At what age is it dangerous for women/girls to take this?‹ The science advisory committee came back and said, ›We don't see any difference, a 13-year-old girl has the same risks as a 25-year-old woman.‹ The Bush Administration said, ›Well that can't be true. We think that there's a big scientific difference, and it is at 18 years old.‹ The reason for that, of course, has to do with the highly politicized abortion debate in the United States. Girls under 18 are considered minors and if they can buy contraception at a drug store without parental consent, it becomes a big political mess.

The Obama Administration was supposed to come in and restore the integrity of science. A new advisory committee was asked, What is the threshold for safety for this morning after pill? They came back and said, ›There's no threshold‹, and the Head of the Health and Human Services Agency said, ›Well, that is not true. Obviously there is a threshold. Everyone knows that girls are different than women. We think that age is at 17 years old.‹ Why is that? It is because there was an election coming and just like George Bush, Barack Obama did not want to be talking about the morning after pill in the election.

What is interesting about this debate is that everyone is saying that the science is making them take a certain decision when it is obviously about values. In science arbitration we often take our values disputes and map them onto science. We argue about climate change or nuclear power risks or genetically modified crops in terms of risks and numbers and threats, but really we are often talking about our values. Thus, getting good effective science arbitration is difficult, but it is worth doing if you think, like I do, that science has something to add to our political deliberations. Effective science arbitration faithfully represents the state of the science, regardless of who it may favor in a political debate. That is why strong institutions are so important.

Now, the issue advocate. The defining characteristic of the issue advocate is an effort to reduce the scope of choice and I say that for a reason. So, here I come to Berlin and let us say you have stock in McDonalds or you think I may like McDonalds for some reason and you say, ›I'm going to give you a map of where all the McDonalds are.‹ You want me to go to McDonalds for dinner. You're not lying to me or misrepresenting any information, but you're trying to compel a certain decision. That's the defining characteristic of advocates. Advocacy is a noble cause in democracy. This is how people organize together, they form political parties, interest groups to try to appeal for the vision of a decision that they see.

The scientific community has long discussed advocacy within its ranks because it tends to subtract from legitimacy. The Head of the National Academy of Sciences in 1976 explained, ›We have learnt that the scientist advocate on either side of a political debate is likely to be more advocate

than scientist and this has unfavourably altered the public view of both the nature of the scientific endeavour and the personal attributes of scientists. There is this idea that if scientists become overt advocates that somehow they're less objective or their science might suffer. Thus, scientists tend to stay away from advocacy.

A different role than the advocate is what I call the honest broker of policy alternatives. Focus on the policy alternatives part, so instead of giving me a map of the McDonalds, you might give me a restaurant guide with the idea that you will present me a set of choices that will empower me to make my own decision about going to dinner. Now, obviously, a true honest broker would be useless. If you gave me a list of every restaurant within ten kilometers, I would die of starvation before I would go through it. Thus, think of the difference between the map of McDonalds and the complete honest broker as a spectrum, and I would say there is something very different about giving someone the map of McDonalds versus giving them a guidebook.

There have been some people in the scientific community who have objected fairly strongly to the notion of the honest broker. They say that it reduces the authority of scientists in political debates. There are some scientists who think that scientists should have a larger role. They should be the ones sitting at the right-hand of the decision-maker. If you give me this guidebook, what you are saying to me is that you trust me to make my own decision. Now, if you really, really, really want me to go to McDonalds, then you might feel like you are missing your chance to get me to do what you want, and this is something that I don't have a good answer for but it is something that we should talk about out in the open. What should the political role of scientists be? Is it to clarify choice, to expand choice, to empower decision-makers, or is it to shape decisions in a particular direction? When we talk like that what we are talking about is democracy. What kind of democracy do we want and what do we want experts to do in a democracy? There is no single answer.

The argument that I make in my book (Pielke 2007) is that all four of these categories are important. Somewhere in society and within government we want people playing each of these roles. I should say about the honest broker, none of us are well-prepared to serve as an honest broker. We all have biases, we have values. An honest broker is best conducted in the form of a committee. A committee with diverse perspectives, they don't come to consensus on knowledge. What they do is come to a list of alternatives for action to give to policy-makers, to empower them to make a choice. Policy-makers don't like honest brokers either because it very clearly distinguishes advice from decision. In many political settings – and I am pretty sure that Germany is like the United States in this respect – policy-makers would like to avoid accountability in certain circumstances and say, »Well, the expert told me to do it; if it

failed, go talk to the expert.« If it is clear who is responsible for decisions, then the accountability sits there.

We are all familiar with honest brokers. Take the Deutsche Bahn website, which I used a number of times very effectively during my visit to Germany. I go there to know what my options are. It does not tell me where to go or how much to pay, it tells me what my choices are. It is very useful in certain settings. Thus, if you use the travel websites, then you have availed yourself of an honest broker. There's a tendency to engage in what I call ›stealth issue advocacy.« It is very easy for the scientist to say, »I am not engaging in any political or values-based decisions,« but the scientist is really trying to compel a certain outcome. Thus, if you give me the nutrition guidelines that actually have meat in them versus vegetarian, there is a stealth advocacy there if you claim this is just the science telling you what to do. This is a great threat to the integrity of science; the legitimacy of experts in many societies is that they are perceived to be acting for political reasons, which then diminishes their credibility.

Thus, there are a lot of choices and hopefully I have raised a lot of questions in your mind. The most important question is for the expert to ask, »What role do I want to play?« A choice has to be made. Do I want to compel a decision or do I want to empower decision-makers? Who are the relevant decision-makers? Am I providing knowledge? Am I answering questions that the decision-maker has? Am I providing options? How do I avoid stealth issue advocacy, to preserve the integrity of the science?

The mythology of the heroic value-free science advisor lives on and here are a few recent examples. The House of Lords in the United Kingdom recently issued a report about strengthening the role of chief science advisors. In Britain, they are not happy with a chief science advisor but every minister now is supposed to have their own science advisor. They are even talking about – in the United Kingdom – appointing chief social scientists, and I suppose next we will have a chief political scientist, a chief sociologist, a chief psychologist and so on. Where does that actually end? The European Commission has a chief science advisor whose functions so far (it is early though) seem primarily to be in communication, outreach and advocacy. Some time ago Ban Ki-moon at the United Nations has proposed that the UN needs a chief scientific advisor. As I have told you, the chief scientific advisor can do many wonderful things and maybe that is an important role to have in many settings. However, if the idea is to improve the content or substance of decision-making, it is going to happen from a much more difficult look at the process of securing advice, not finding a great individual to sit next to a decision-maker.

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