

Why U.S. Policies Affecting Science are Changing

Robert S. Walker

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Seven-Year Budget

Some years ago, when I was first learning to drive race cars, the instructor told me that it does little good at 160 mph to look at where you are on the track. Your eyes have got to be focused well down the track or you will be in big trouble very fast. That is not only good advice when you are driving a race car, but also when you are practicing politics, because the fact is we are moving at breakneck speed in many, many areas, and particularly in the areas that I happen to deal with as the Chair of the Science Committee. The advent of new technologies, the way in which science is moving in ever-new directions, the new discoveries that are coming along—all of these things are moving at breakneck speed. Sometimes research is going in directions that we can't anticipate, and certainly in directions difficult for us to deal with in the kind of slow pace that government and governance moves. I think you need to have a sense of perspective of where some of that is headed so that you have some understanding of why some of the policies that affect science are going to be changing and are, in fact, in the midst of some change at the present time.

The first thing you need to know about the reality of what is happening in Washington today is the fact that we are going to balance the budget for real. For the 20 years that I have been on Capitol Hill we have talked about balancing the budget. There has been a series of gimmicks, and there has always been a series of excuses of why we couldn't get there. I think the American public has rightfully become somewhat cynical about this talk about balancing budgets. As a result there has been an impression that this is simply the latest series of gimmicks, is not for real, and therefore will not affect programs that you are interested in.

The first thing I want to say this evening is, this is for real. We are, in fact, going to pass programs this year that will result in the budget being balanced in a seven-year period. We are doing that, in large part, by slowing the spending growth of government. In Washington we figure things a little differently than you do in the laboratory. We don't have to be as precise. In fact, we don't even have to be close at times. In most places if things are going from spending \$25.00 this year to \$30.00 next year, that is an increase. If it is going from \$25.00 to \$23.00, that would be a decrease. Not in Washington.

In Washington, if you cut something that someone doesn't want cut, that can be an increase, and if you increase something that people want to keep spending more on, that can be a cut. So if people anticipated spending \$35.00, and you're only spending \$30.00, then that is a \$5.00 cut, despite the fact that it is going up by \$5.00. It is an interesting process.

The idea of doing a balanced budget within seven years is not something that was pulled out of the air and decided upon as an exercise in Washington politics. That was the time in which we thought that we can both do it for real and sustain it. Those are very important concepts because in the past we said we would balance the budget, and then the budget was either not sustainable, or it was not doable. The cuts were too deep to survive any kinds of political tests, or, as we got into the out years, the pain became too great because the whole system had

been backloaded. In other words, all the savings had been loaded out into the out years rather than doing anything upfront.

We decided that in seven years, if we began doing real things now, the budget would actually be doable and in the end sustainable because we would begin to realize some of those balanced budget bonuses as the years went forward, and we would actually have a chance of getting there. It means, above all else, that the work has to begin right now so that anything that we do cannot be backloaded. We can't say that we are going to keep spending right now and at some point in the future, stop the spending. We can't depend upon economic formulas and forecasts in the out years to give us the balanced budget. We have to have some kind of realistic guide. We have to use honest numbers. What we do has to be measured within that seven-year commitment, and everything, with the exception of the social security retirement monies, is on the line as a part of that exercise.

Supporting Basic Research for Long-Term Knowledge

I gave you that as background in order to present where science and technology fit into the overall picture. There is agreement within the Congressional leadership that science is a major priority as reflected in the congressional organization. For the first time in history, the chair of the Science Committee is also vice-chair of the Budget Committee. That was not by accident. That was the Speaker of the House exercising his right to decide his priorities by putting someone in a position where he could, in fact, have a great deal of influence in the budget priorities.

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I am the only chair that actually sits in the room when the decisions of leadership are made by the seven people who operate the House on a day-to-day basis. In the overall leadership, the chair of the Appropriations Committee, the chair of the Budget Committee, and the chair of the Ways and Means Committee also get into the leadership room, but I am the only chair that sits in the room where the underlying decisions get made. That is also not by accident. It is a sense of commitment to these issues that drives us

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because both Newt [Gingrich, Speaker of the U.S. House of Representatives,] and I over a period of years have strongly believed that the economy of the future is going to be driven by the new knowledge that is being created in the science areas, spilling over into the technological areas.

If we are going to live within this balanced budget and make science a top priority, we have to have a sensible and sustainable science effort. Science has to be viewed as more than simply one piece of the government's program. It has to be viewed in terms of the totality of the economy. The balanced budget program that we are pursuing here is aimed not just at doing something that changes the way business is done in Washington, but aimed at changing the way the economy functions so that the economy will be prepared to take on the new knowledge-based economy which is arising worldwide. If our economy is not prepared, if it is too burdened by debt, if it is too burdened by obsolete programs, we won't be able to compete successfully internationally. We look at all of this in a macroeconomic sense.

Science has to be seen in terms of what is going on in the total economy. What is science contributing in the university? What is it contributing in business? What is it contributing in communities? And then, where are the resources coming from to make certain that that contribution is real and can be maintained over a long period of time? We must set some priorities for the federal involvement because we recognize that we have to have a very, very deep federal involvement in the science policy of the country. The nature of that involvement is what is very much in debate today.

We believe that the federal government has to be the fount of basic science in the country. We think that basic science means the creation of new knowledge, so we are for creating the tools and creating the laboratories and doing what is necessary in order to see to it that there is an underlying, basic science program for the country as a whole that is largely funded through federal government efforts. That is where our priority is. I will talk later about how I think we are dealing with that priority.

Rule Out Programs of "Corporate Welfare"

There is no real debate about this issue of applied versus basic science. There is no clear line of delineation. Nobody has ever suggested that there is. The question is, when looking at priorities, where do we put our money? Are we putting money into places that give a two-year payoff or

into the long-term development of new knowledge? We have decided the long-term development of new knowledge is the right course to go, and we believe that over the last couple of years we have had a tendency in Washington to have the money go where we could get a two-year payoff that just happens to coincide with Congressional elections. Funny thing.

And we think that that was the wrong direction to be going, and that what we need to do is not back off from applied science, but see it in the context of what the federal government is best at. The federal government is best in the applied science areas where it is doing mission-oriented science. If, in fact, we want to do something that gives us a new knowledge and we want to fly a Hubble telescope, the fact is that we can fly a Hubble telescope. We benefit basic science by doing it, but we also create some new initiatives in computers and optics and a number of other things. That is good applied science. The fact is the Department of Defense has mission-oriented science. It is absolutely essential for it. Places like the National Institutes of Health have mission-oriented science. It is absolutely essential to them. And we are going to have the work being done to create the new knowledge applied to government missions. On that we have done pretty well over the years.

Where the federal government doesn't do a good job is in trying to define the marketplace, making decisions about what is good and what is not; what is going to be profitable, what is not going to be profitable; what consumers want, and what consumers don't want. Government is terrible at making those kinds of decisions. And I will give an example why.

Some years ago, I had an opportunity to go to the consumer electronic show in Las Vegas. The convention halls were full of electronics equipment. I was standing on a balcony above all of this, and the fellow who was with me said, "Congressman, within six months all of this will be on the market, and within 18 months it will all be obsolete." I suddenly realized that it takes the government 18 months to do one budget, from the time we put the first numbers on the paper until we actually pass the appropriate bills. It is taking even longer this year.

How does government think that it is going to get out in front of the electronics marketplace when, in fact, a whole generation of consumer electronics equipment has come and gone while we are doing one budget? It is just not possible. So as we have prioritized what we are going to spend for science, we have made some decisions about where we put the money

and where we don't. One of the places we have decided that we can zero out completely are those programs that have largely become corporate welfare programs aimed at defining the consumer marketplace with government dollars. If you think that is not what is happening in programs like the Advanced Technology Program [ATP], you just have to read the General Accounting Office reports. The General Accounting Office recently came out with a report, taking a look at the ATP program, and found that 80% of the companies who have been involved in the program and who were surveyed said that they probably would have, or might have, done the research on their own if the government money hadn't been available.

I don't think you get good science out of that. It cannot be sustained over long periods of time and has not been one of the fastest growing programs in the government that was called "science." That is not a place where government can be very effective, and we don't think that in the end that that is the kind of science spending which is sustainable over a long period of time.

Internationalization of "Big Science" and National Tax Incentives

In the future, we are going to internationalize big science. Now again, that gets controversial with some people, particularly people who are used to doing big science in their field in this country and have been used to receiving very, very large sums of money in order to do domestic projects. Fusion is a good example.

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The difference between the success thus far of maintaining a space station program and the failure to be able to maintain a supercollider program had little to do with the scientific merits of the two programs. In fact some case can be made that the supercollider was actually going to produce better basic science than will the space station. But the difference was the international character of the space station versus the noninternational character of the supercollider. We were going to be asked to sustain the supercollider with

domestic money. It was a program that was becoming increasingly more expensive, we had no idea where the money was going to come from, and there were no international partners willing to sign on. In the future, if you are going to do big science, you had better go out and find your international partners first because you will not do any big science programs in the near term, or well into the next century, without having an international funding source.

You need to put into perspective that not everything in science is going to involve government spending sprees. One of the ways in which we are going to make certain that science has relevance in the totality of the economy is to do some changes in areas like tax policy. One way that we can make certain that companies that want to do research, be involved in the development of new products, be engaged in new products, be engaged in technology transfer, and do so without government involvement is to have policies that encourage them to do so without the government as the handmaiden.

One of the things that we have considered is making the research and development tax credit applicable to university-based research. If companies want to fund new facilities or instrumentation and/or programs at a university, they would be able to do so and write it off against their R&D tax credit. Now all of a sudden we end up with a program that has some ability to survive in the boardroom as well. Instead of going to the boardroom and saying, "We've got this huge expense down here at our R&D lab that we can no longer justify," you will be going to the university that is providing the facilities—and you will be providing some resources to that university—and at the same time you will be able to write it off against your taxes.

Therefore we begin to develop programs where universities can reach out to business and business can reach out to the universities. Why is that important? It is not just the flow of money that is important, but it is the best way for technology transfer to take place. The bright young graduate student who all of a sudden has some ability to work with a company that is interested in what he is doing may find that taking his ideas and all that he has learned from the university into that company at some point in the future is the right goal for him to pursue. You end up with match-ups that too often don't take place right now. Government is not a very good promoter of technology transfer when government is deciding between the winners and the losers, but it

can be a very effective promoter if it has the right kind of tax policies that assures that people do the match-ups on their own. The synergism is created that allows science to become a part of the productive sector of the economy.

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Also, tax policy has a very, very big role to play in whether or not the high-tech firms of the future are going to be creative. It is one of the reasons why we are set on doing the capital gains tax cut. Technology entrepreneurs, when asked what the most important thing that government could do toward assuring that they get the investment money that they need in order to move forward, will tell you, "Cut the capital gains tax rate. Don't give me more government spending programs, don't ask me to fill our more applications to government for funding for this, that, or the other thing. Just give me the ability to reach out to the investment community." The way you do that is with capital gains tax cuts. That particular aspect of our tax plan is one of the most important in terms of the long-term technological progress of the country.

So now does the budget that we have created reflect those priorities? In my view, it does. If you take a look at the budget, one of the few agencies that was held merely harmless in the entire budget was the NSF [National Science Foundation]. And that has come on through not only the budget process, but the appropriations process. Because we said we were going to protect basic science, we did. If you go down the accounts of places like the Department of Energy, and places like the NIH [National Institutes of Health], and places like NASA [National Aeronautics and Space Administration], you will find that in those accounts we have also protected the basic sciences. That is not to say some of those programs haven't been cut. Some of those programs and policies have been cut substantially. When I am talking about cuts here I am talking about real cuts, below last year's spending. We have cut places where we felt we were dealing with programs that were either obsolete, duplicative, or corporate welfare programs. We have dropped those back to protect basic science accounts. In mission-oriented science, you will find that in

NASA, NIH, and a lot of those programs, we have protected the programs across the board because we do believe that mission-oriented science in the applied area is the right direction to go.

On the internationalization front, we have aggressively promoted programs that are already moving toward that goal, such as Space Station, but we have also told the fusion community and others that are looking toward long-term big science programs that they need to become a part of the international program. And so we have actually endorsed the ITER [International Thermonuclear Experimental Reactor] process as a part of our budget scenario.

In tax policy, the R&D tax credit was, in fact, extended as a part of our tax bill. It didn't go as far as I wanted it to go. We did not get the major step toward university cooperation, but we did take a baby step in that direction in the policies. We opened it up more than it has been opened up before. I am hopeful that all of that survives. In terms of assuring that the federal government gets out of the business of defining markets, we have zeroed out programs exactly in that area. The single biggest program that we have zeroed in this area is the Advanced Technology Program. I think that will also ultimately survive the appropriations process as a zero program because it cannot be justified in terms of the science that it produces.

Now that is the budget. On the appropriations side there is a somewhat more mixed bag. In the energy appropriation that has now been signed into law, I think we have managed to maintain the budgets for basic research at most of the national laboratories, and we have maintained a strong basic science commitment in that budget. The Commerce Bill is under discussion. I happen to believe that the elimination of the Department of Commerce that may come as a part of this effort will in fact be a plus for science, because what science is going to get out of this is a brand new science agency. The fact is that zeroing out the Commerce Department will mean that we will have an independent mission-oriented science agency that combines NOAA [National Oceanic and Atmospheric Administration] and NIST [National Institute of Standards and Technology], which, I think, will be far more willing and able to adapt to science-oriented policies in the future.

In the area of NASA, I am not happy with some of the decisions that were made. We asked for some significant cuts in Mission to Planet Earth. I happen to be a supporter of the Mission to Planet Earth program. I think it is going to produce some very good science. But recently we

have had a National Academy of Sciences study on it. The program is now bifurcated through a number of agencies. It is not being very well run. The technology that is being used is outdated, and the ground-base system for gathering the data is, in fact, a mess, because it was created not to serve any scientific needs. It was created as pure pork for members of Congress. We created a bunch of data-gathering stations all over the country, and dumped them in the districts of chairs of appropriation subcommittees, authorization subcommittees, full committees, and so on. They all have a data-collection station. The fact is that you can make the program better and save some money, which is what we ultimately had to do with Space Station. The reason why Space Station is now getting over 300 votes when we vote in the Congress these days is because we now have a program which is sustainable. Mission to Planet Earth in its present form is not sustainable. And yet, the pork barrel raised its head in the deliberations over that program and we ended up cutting some programs with a one-time cut, but we won't be able to do that again next year. Then we will be right back in the soup again. I think that could be detrimental to the overall science effort.

What's Ahead

I described the seven-year budget as being a very real issue with all of us. I believe that the seven-year budget is something which is absolutely mandatory if we are ever going to get it to balance. The seven-year budget is also going to be the fundamental issue in setting priori-

ties. That is a policy debate that you had better be very interested in because science and technology will suffer if we can't do something to rein in entitlement and welfare programs. If we cannot find some way to hold the line on those programs we are simply not going to be able to find the money that we need for discre-

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tionary programs. And science and technology are discretionary programs.

We need the ability for a new knowledge-based economy with United States leadership. Now we can't get there if we don't do something about this massive debt load that we have been carrying. The fact is interest and debt in all of those kinds of things are eating alive the seed corn of what we need to invest in the future. I carry along with me, and the Speaker has been doing the same thing recently, my vacuum tube. Most of you are familiar with that. You probably haven't used them in a long time. Your laboratories probably don't have many of them around any longer. Well I shouldn't say you haven't used them in a long time, because you did. If you flew in here, you used them, because the world's largest supply of vacuum tubes goes to the FAA [Federal Aviation Administration] these days. It still runs their technology on vacuum tubes. Now [I also have] a pentium chip. As most of you know, [a pentium chip is the equivalent of] about 2.2 million [vacuum tubes]. The Congress, just within the last few weeks, got around to installing technology using [modern] technology. And the government is still well behind that curve. That says something about the [process]. We need to have a [process] that allows us to go very quickly from the development of knowledge to the creation of technology, to the consumer marketplace. Government, for the most part, is

not a help in that process; it is a hindrance. It gets in the way in many ways with regulation, with taxation, and with litigation. You name it. Now some of that is very necessary and is very good. But the fact is there is a sorting-out process that has to take place and some of what we are trying to do in the budget debate is decide how that sorting-out process is going to allow us to become a part of a world-based, knowledge-based economy.

The great British statesman Benjamin Disraeli one time said that, "Men and nations move from bondage to faith, from faith to courage, from courage to freedom, from freedom to abundance, from abundance to complacency, from complacency to dependency, and from dependency back to bondage." The interesting thing about that historic continuum is that each generation really gets to choose. I think we are in a period of time right now where we are making fundamental choices. I think that this is a period of time when we can, in fact, choose the no-risk, big-government solution to everything; where we can choose to become more and more complacent about what the future looks like; where we can choose to become dependent upon government to make the decisions for us, and I think that dooms us in very terrible ways in the future. But I also think it is a time when there is a burgeoning new economy, when there are choices that can be made that will put us on the course of courage and freedom, and, I think, abundance.

In large part, what we are doing in trying to develop a new science agenda is to assure that we have the freedom to act so that we can produce the abundance of the future. What it is going to take to get there is a little bit of courage. That is what I hope this nation will demonstrate that it has in the weeks and months ahead.

Robert S. Walker has been the U.S. congressional representative of Lancaster and Chester counties in Pennsylvania since 1977. He chairs the Committee on Science in the U.S. House of Representatives. Its jurisdiction includes space and aeronautics, basic research, energy and environmental research and development, as well as technology. In addition, he is vice-chair of the Committee on Budget, which determines the budget for the federal government. Walker received a master's degree in political science from the University of Delaware in 1968.

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