

Helping shape legislative policy

The 1974-75 APS Congressional Fellows offer an inside glimpse into the intricate, sometimes frustrating process in which they participated—formulating US energy policy and transforming it into law.

Allan Hoffman, Thomas Moss and Haven Whiteside

We came to Congress in the plateau of the energy crisis. The initial crunch of the oil embargo, with its resulting gasoline lines, was already past by the time we became APS Congressional Fellows, but Project Independence was still very much on people's lips. Energy was only one of many subjects the Congress addressed during our year on Capitol Hill, 1974-75, but it was one of the most important ones and one that is of continuing interest to physicists and the community at large.

In this article, therefore, we have chosen energy policy as a case study of how Congress operates and how we as physicists on Congressional staffs helped to shape the legislative process.

The energy problem illustrates many of the frustrating aspects of the legislative process. Technical solutions are easier to conceive than political solutions, and, not surprisingly, many within and outside of Congress feel that the legislation produced so far is inadequate to deal with a problem of such severity and scope. The discussion below will consider three specific examples of energy legislation with which we have been involved, covering energy policy, clean air and energy conservation. First, however, let us briefly review the steps by which a bill becomes a law.

Shaping a bill

The committees of the House and Senate, we soon learned, are the focal points for the legislative activities of

Congress. There are 18 standing committees in the Senate and 21 in the House, and both Houses also have a number of select committees. Each committee has two staffs, Democratic and Republican, the members of which are traditionally hired by the chairman (for the majority party) and the ranking member of the minority party. A major Senate committee might have a staff of fifty, including professional and clerical personnel.

After a bill is introduced in Congress, it is referred to the committee (or committees) that has jurisdiction. Within each committee there are generally half a dozen subcommittees, which are the basic working units, receiving testimony on the referred legislation. After hearings, which are arranged by the staff but chaired by a Senator or Congressman of the majority party, a bill undergoes "mark-up," where changes in the proposed legislation are considered.

A mark-up session typically lasts an hour or two, perhaps one sixth of a Member's day. We found this very unlike the time frame adopted in science, in which one is often free to concentrate on a particular research problem until it is mastered. Because of the large number of matters to be addressed in Congress, there must be a balance between mastery of the subject and the necessity for action within a limited time.

One bill may take several mark-up sessions, the committee members voting, either in person or by proxy, on the issues as they arise. In this process, the bill may go through several drafts; ultimately the subcommittee either reports the bill out to the full committee or decides just to let it die.

The full committee then goes through the mark-up process once again, eventually voting on whether or not to report the

bill favorably to the floor of the Senate or House. Throughout this mark-up period, the professional staff has the responsibility of providing whatever information and assistance the Members require.

When a committee reports a bill favorably, it is accompanied to the floor by a document summarizing it, describing the intent of its various provisions and presenting arguments in favor of its passage or rejection. This report also contains a section showing how existing law is changed by the bill and a section on its budgetary impact. Written to be understandable to non-lawyers, it is generally the major source of information on the bill for Members who are not on the sponsoring committee. The final language of the bill is generally prepared by specially trained attorneys, but other staff, including scientists, contribute.

The bill then goes to the floor for action by the entire legislative body. Before debate begins, Members who wish to propose amendments generally circulate "Dear Colleague" letters enlisting support. Lobbyists on various sides of the issue contact the Members in this period. Most of the voting decisions are made on the basis of these discussions, and discussions with other Members, constituents and staff. The actual debate, later printed in the *Congressional Record*, sometimes is decisive itself in determining the final outcome of the vote.

Committees are focal points of Congressional activity. Testifying at a hearing of the Senate Committee on Energy and Natural Resources on the Clinch River Breeder Reactor are (left to right) Edward Teller, Theodore Taylor, Alvin Weinberg, Milton Levenson and Manson Benedict. The 9 June 1977 hearing, led by Senator Frank Church, was covered by PHYSICS TODAY staff member Bruce Carr, at far right.

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PHYSICISTS AND WASHINGTON

It is sometimes easy to forget that legislators are not as free to act on their judgment as scientists generally are. Whereas scientists are responsible to their subject of study and ideally can follow as far as it leads, Members of Congress are responsible not only to the substance of an issue but also to the priorities of their constituents. They can not pursue a subject much further than the interests of the people they represent unless they are willing to risk placing their reelection in jeopardy.

Ours is a nation of diverse interests and views, which the 535 Members of Con-

gress generally represent. Often the result is inaction, because of their inability to find a middle ground at a particular time. The democratic process requires not only a technical solution to any problem, but also a political solution, one that will win the support of a large number of citizens with various interests. The attainment of a consensus takes time, unless there is a national emergency requiring urgent action. As participants, we have come to appreciate the value of such extended discussions.

Our first case study is the formation of energy policy, seen from the point of view

of Thomas Moss, who worked with Representative George Brown Jr on this problem. The attempt by the 94th Congress to generate its own "energy policy" as an independent alternative to executive policies, provides a vivid case history of the difficulties in forming technology policy.

Energy—coherence or consensus?

In the fall of 1974, when legislative activity resumed after the Nixon resignation, the House began its energy work in a logical, orderly way, but the issues rapidly became fuzzy, as the political di-

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Strip mining by the Peabody Coal Company at Nucla, Colorado. This scene illustrates the fact that energy and environment must be considered to be two different aspects of the same issue.

mensions became apparent. Even before the beginning of the 94th Congress, in January 1975, the report of the "Select Committee on House Committees," chaired by Representative Richard Bolling of Missouri, was received. It proposed the first major reforms in House committee alignments since 1946, including the creation of an Energy Committee to consolidate the fragmented jurisdictions of 8 committees and 70 subcommittees into one functional group.

Such a step was an obvious prerequisite to a coherent policy. However, it failed badly, because even reform-minded Members, faced with the loss of power bases created meticulously over the years, could not accept the prospect of starting over with a new—albeit more rational—structure.

In the absence of real structural reform, the House proceeded as most large organizations would: A special *ad-hoc* task force, headed by Representative Jim Wright of Texas, was established to develop broad energy-policy proposals. The task force's proposals, though politely received, were fatally flawed: Most of the key legislators with energy concerns in the standard committee structure of the House were not represented on the *ad-hoc* group. Without their participation there was little chance of building a consensus around the proposal. Instead the task force's report triggered maneuvers that generated, only days after its release, headlines like "Representative X Will Have His Own Energy Policy."

Once energy-policy formation was fragmented into the standing committees, all the problems of narrow focus inherent in that structure were immediately apparent. To the outside observer, tax in-

centives, regulatory law and research are complementary approaches to restraining energy use and stimulating supply. However, Congressional fragmentation led each Member to concentrate on one or, at most, two aspects of energy policy to the exclusion of others. The Ways and Means Committee considered gasoline taxes; the Committee on Interstate and Foreign Commerce concentrated on controls manipulating oil prices and production levels. The boundaries of thinking about the energy problem rapidly became synonymous with the boundaries of committee jurisdiction. With such a divergent allocation of authority over energy policy, the inevitable result was a set of divergent—and sometimes conflicting—approaches to the problem.

The gas-tax trap

An even broader human impact was evident as the committee recommendations were finalized and brought to the floor of the House for a vote. A hefty gasoline tax was the keystone of the Ways and Means Committee's energy program. From a technical and economic viewpoint, this appeared to many to be the most effective technique for reducing foreign oil dependence, and many still argue it should be essential to our national energy policy. However, a quite different perception by the public at large rapidly began to affect the policy process.

Freshman Democrats especially began to note that, whatever its long-range merits, the idea of higher-priced gasoline was anathema to the people. After each legislative recess and its district visits, the Committee plan appeared to be more in jeopardy. After months of hearings,

studies and mark-ups, the final bill was reported by the Committee only because of Republican support, while a majority of the Democrats voted against it. This "Democratic Congressional alternative" to the Republican executive branch energy policy thus reached the House floor only by the grace of several Republican votes!

By the time these recommendations were ready for a vote on the House floor, the tide of public opinion against this energy strategy had turned to a flood. Consumer groups, large oil companies and labor unions put aside their mutual hostilities to oppose the gasoline tax. During a sequence of votes to reduce the proposed tax, sentiment grew steadily with each reduction until finally its total deletion was demanded. There could hardly be a clearer example of public reaction overwhelming the plans of a legislative committee in an area involving science and economics. The issue even came back later to haunt those who bravely held out for the "planned energy policy" until its final defeat; a frequently heard point in radio spots during the 1976 election campaign was, "The incumbent, X, voted to add an even greater burden to your gasoline taxes."

These are only examples of an oft-repeated pattern. The division of broad policy issues among narrow, separate Congressional jurisdictions based on historical precedent or force of personality occurs more often than not. The dispersion of a coherent policy into a series of compromises with public opinion is not unusual under the adversary-interest system, and these compromises may even be mutually contradictory. Formation of energy policy in the 94th Congress displayed these phenomena particularly clearly because of the intense concentration of technical, political and public interest in this far-reaching issue. The hallmark of these episodes was the intensely personal and human flavor of the decision-making process, which depended on the attitudes of individuals in Congress and on the hopes and fears of the general public.

The Clean Air Act

Given the number of constituencies involved in forming Congressional energy policy, the frequent lament that "we have no energy policy" may have some significance beyond mere frustration. The lack of a single, well defined energy policy should not be surprising; indeed, an "energy policy" implies a self-consistent series of actions based upon accepted assumptions, which can hardly be expected when a premium is placed on guarding against the supremacy of any single individual or interest group. In this context the emergence of an "energy policy" might even be seen as a breakdown in the delicately poised checks and balances that preserve some harmony in the Congress.

Perhaps ultimately we are better off with our fragments of energy compromises than with an "energy policy"!

Let us now consider some environmental aspects of energy production, from the vantage point of Haven Whiteside, who worked on them with Senator Edmund Muskie's Subcommittee on Environmental Pollution of the Senate Public Works Committee. Energy and environment must be considered the front and back doors of the same issue, and the Clean Air Act is a prime example of this fact. The original Clean Air Act, enacted in 1963, has been amended several times. Its present form was established in 1970 when Congress moved most of the programs into the newly created Environmental Protection Agency. With environmental consciousness at its height, the Clean Air Amendments of 1970 passed the Senate unanimously, despite their stringent call for environmental protection.

Today the legislative climate is very different, with economic and energy concerns restraining the progress of environmental legislation. Utilities complain that stack control adds to the cost of primary power, and that the economic ripples from that cost jobs. Auto makers argue that emission-control devices waste energy. Many environmental experts dispute these claims in the current political debate.

With many of the deadlines for achieving clean-air standards approaching, Senator Muskie pointed out in 1975 that it was time to reexamine the 1970 Clean Air Act to consider whether the original goals of protecting public health and welfare from air pollution were still valid, to assess the pace of progress towards these goals, and to determine whether any legislative changes were needed to meet them.

The Act provides that the Environmental Protection Agency study the effects of various pollutants and publish "criteria documents" that describe them. On the basis of research and evaluation by outside groups, EPA establishes primary and secondary standards for air quality. Primary standards are those required to protect public health, including that of sensitive groups such as asthmatics, infants and the elderly. Secondary standards are those required to protect public welfare; for example, to protect crops, materials and buildings from air pollutants.

To date, EPA has promulgated air-quality standards for six pollutants (sulfur dioxide, suspended particulate matter, hydrocarbons, oxidants, carbon monoxide and nitrogen dioxide) and established emission limitations to be met by new stationary sources in certain categories. It has also promulgated "non-deterioration" regulations "to protect and enhance the quality of the Nation's air," which define pollution increments that may be



Piles of tailings from a Union Carbide uranium mill have been covered with topsoil and reseeded. This photo and the one opposite, taken by Bill Gillette, are from the EPA DOCUMERICA series.

added by new sources in "clean-air regions." These increments are small in some areas, such as national parks, and moderate in most other clean-air regions, but they do permit pollution up to the secondary standards in certain "class-III" regions. Mobile sources are handled somewhat differently from stationary sources. The Clean Air Amendments of 1970 established specific maximum emission levels for hydrocarbons, carbon monoxide and nitrogen oxide for each new car by model year 1975, which calls for a 90 percent reduction in such emissions relative to 1970 levels. According to models of air quality and growth, these reductions are necessary for the achievement of primary air-quality standards.

It is up to the states to develop implementation plans to achieve air-quality standards, but a plan can not receive EPA approval unless it will lead to compliance. State implementation plans specify limitations on the amount of sulfur and particulate matter in fuels, and emission limitations on stationary sources; they may also contain transportation-control measures such as parking management, bus lanes, car pools and mass transit.

Interpretation and enforcement of environmental laws and regulations involves a great deal of activity in the courts. The judicial system is not only an enforcer of the law; in many cases, the law is not finally established until a definitive suit has been brought and decided.

Success in Committee . . .

Senator Muskie raised the following questions: Should there be a more complete legislative definition of a national policy to protect clean-air regions? What should be done about cities that are un-

able to meet air quality standards without resorting to such Draconian measures as automobile bans? Should car emission standards be further delayed and relaxed? The Subcommittee held 14 days of hearings in the spring of 1975 and was prepared to go to mark-up in June to produce a bill.

In the past, these mark-ups have been largely educational sessions, with the chairman carefully leading the Subcommittee through each item—but this time there were problems. Mark-up was delayed until July because the Senate decided to conduct no other business until the disputed New Hampshire election was decided. Two key Subcommittee members were also involved in the hearings of the Select Committee on the Central Intelligence Agency. Furthermore, the economy was in very poor condition, with thousands of automobile workers laid off—hardly an ideal time to concentrate on environmental issues!

Nevertheless, the Subcommittee held 28 mark-up sessions and reported out a clean-air bill, which then went to the full Committee. The full Public Works Committee then held 24 more mark-up sessions before finally reporting out a bill to the Senate in February 1976. That bill reaffirmed the need to meet the clean-air goals established by the 1970 Act. It provided a legislative definition of "non-degradation," so that this matter would no longer be left solely to the courts. It gave the automobile manufacturers an additional year, until 1979, to meet the statutory emission limits for hydrocarbons and carbon monoxide and two years to meet a slightly relaxed nitrogen-oxide standard, thus recognizing both the technical difficulties in meeting these

limits and their importance to the public health. Despite the many compromises struck in producing that bill, it was reported out with only one dissenting vote, and that by a Member who felt that, environmentally, it was too weak.

Although the Committee had hoped to get the bill to the floor of the Senate shortly thereafter, some Senators wanted to wait until after the Easter recess so that Members could hear the opponents of the non-degradation proposal back in their home states. Then Senator Muskie was hospitalized with a painfully pinched nerve in his neck. The bill finally came up on the floor on 26 July, after the Democratic Presidential Convention. Debate continued for seven days, culminating in its passage on 5 August, by a vote of 78 to 13. Major occurrences during the debate were the decisive defeats of an amendment by Senator Frank Moss of Utah that would have deleted the non-degradation provision and two amendments that would have tightened the auto provisions.

The House committee filed a report on a similar bill about one month later, beginning its debate on 4 August 1976. However, after opening statements, further consideration was delayed for six weeks, which contributed to the time crunch that occurred later. A highlight of the House debate was the adoption of an amendment, offered by Representative John Dingell of Michigan and supported by the Administration and the auto in-

dustry, that would delay final compliance with the statutory emissions standards for hydrocarbons and carbon monoxide for three years and provide for administrative determination of the final nitrogen-oxide standard. Thus it was considerably less stringent than the bill passed by the Senate.

... but time runs out

A legislative conference of the House and Senate was necessary to reconcile the differences between their bills. Working against the deadline of a 1 October election-year adjournment, this process began on 21 September with a discussion paper listing 78 points for the Members to consider. Non-degradation and autos were to be left to the end, in the hope that the easier issues would be taken care of quickly. However, it soon became clear that even the simplest matter would involve considerable discussion. These meetings continued through 28 September, with offers and counteroffers on both sides.

That evening the Senate participants started talking about non-degradation for the first time, on the basis of a compromise that melded the House and Senate versions together. A compromise was finally reached the following day on all issues except automobiles. On this issue, however, the last House offer did not seem much better than the one before, and the Senate members agreed not to compromise further. Senator Muskie stated that

he did not see any chance of reaching agreement under the circumstances. The conference appeared to be about to fail when Congressman Paul Rogers proposed emission standards that provided one year of delay for hydrocarbons and carbon monoxide and three years for nitrogen oxides, basically the same as one of the previous Senate proposals. Rogers's motion was accepted by the House conferees by a vote of 6-4, despite the fact that it represented a stronger position on autos than the original House committee position. The conference had agreed on a bill at last.

The staff then worked all night to finish writing the conference report (the bill in its final agreed-to form) and the "statement of managers," which discusses how the final bill differs from the original House and Senate versions. All the Senate participants signed the conference report, but some of the Congressmen did not.

It would be nice to say the story had a happy ending, but time had run out. The conference report reached the Senate floor on the evening of 30 September, the day before the scheduled adjournment. Senator E. J. Garn of Utah held a filibuster on the bill and there was not enough time for a cloture vote. Senator Muskie offered a motion that the Senate stay in session an extra day in order to deal with the clean air bill, but that motion lost by three votes.

It is unfortunate that there were not a few more days to break the filibuster. The Senate had voted 55-11 to proceed with consideration of the bill, and the vote would very likely have been similar on final passage. But how would the House have reacted to the conference report, which was tougher on auto emissions than the original House bill? And how would President Gerald Ford have reacted to the choice between signing a bill that was environmentally tougher than he recommended and vetoing the Clean Air Act one month before the election? We will never know the answers to these questions.

The Nation is clearly no longer in a position where there can be a unanimous vote to support clean-air legislation. There is a strong law in place, of course, but there are currents running against it. Many environmentalists would like to see it revised, but others feel that it may be better to let it stand as it is than risk excessive weakening. As the next session of Congress progresses, the proponents and opponents of clean-air legislation are assessing the strength of the political forces that showed themselves in the last Congress.

Two bills on energy conservation

The issue of energy conservation became the concern of Allan Hoffman in his Fellowship work with the Senate Commerce Committee, chaired by Senator

Two bills on energy conservation

The 1975 Energy Policy and Conservation Act has its conservation sections in Title III. They provide for:

- ▶ the establishment and enforcement of fuel-economy standards for new passenger automobiles and light-duty non-passenger vehicles, beginning with model year 1978. In 1978 each importer or manufacturer of passenger cars must maintain a fleet-average fuel economy of at least 18 miles per gallon or face a substantial civil penalty. In 1980 this standard becomes 20 mpg and later it increases even further;
- ▶ the establishment and enforcement of an energy-labelling program for major household appliances, to enable consumers to identify those with the lowest life-cycle costs, and the establishment of voluntary energy-efficiency targets for them;
- ▶ the establishment of voluntary targets for improving energy efficiency in major energy-consuming industries and a reporting system for measuring progress towards meeting them, and
- ▶ a program of grants-in-aid to states implementing energy-conservation programs designed to reduce energy consumption at least 5% by 1980.

The 1976 Energy Conservation and Production Act has conservation provisions that include:

- ▶ the development and enforcement of energy-conservation performance standards for new buildings;
- ▶ the granting of financial assistance to low-income persons for the purpose of weatherizing their homes;
- ▶ the establishment by the states of a new category of federally assisted energy-conservation programs, with primary emphasis on public education and consumer protection;
- ▶ the establishment of a national demonstration program to test various incentives encouraging homeowners to make energy-conservation investments, and
- ▶ the establishment of a federal loan-guarantee program to stimulate investments towards energy conservation by industry, by public and private non-profit institutions (such as universities), and by others.

Warren Magnuson. The need for increased efficiency in energy use came to public attention largely as the result of the 1973 Arab oil embargo. This dramatic event exposed an increasing economic and political vulnerability of the United States, and we are still struggling today to adjust to the new realities so painfully imposed four years ago.

Many people have confused conservation with curtailment—giving up automobiles, living in a house that is too warm in summer and not warm enough in winter. As the debate on national energy policy progressed, conservation has become recognized as something much more positive: trading in a 10-mile-per-gallon fuel guzzler for a 25-mile-per-gallon commuter vehicle, or building a well insulated house with efficient heating and cooling systems.

Today some of the pieces in the national energy puzzle are beginning to be put into place. A very important step was the formation in 1975 of the Energy Research and Development Administration, with a broad mandate to explore all aspects of energy supply and demand. However, ERDA policy so far appears to have placed greatest emphasis on supply options, to the relative neglect of conservation strategies. This is unfortunate, because a balanced energy policy requires careful attention to both sides of the supply-demand equation. Conservation represents the means lowest in cost and least harmful to the environment for avoiding future energy shortages and increased dependence on imported fuel. It is also probably the only energy option that can achieve substantial results within the next few years.

It is useful to recall that Americans waste more fossil fuel each year than two thirds of the world consumes. This is understandable when one considers that the United States grew and developed during a period of inexpensive and abundant energy—but today the situation is different. Although energy waste in the past has been great, the potential for future energy conservation is likewise great, as has been documented by every study of our national energy policy. The challenge is to convert this potential into actual energy savings, with the additional benefit of cost savings.

In the absence of strong leadership by the Ford Administration, Congress has had to assume the leadership role for conservation. The results have been the conservation provisions of the Energy Policy and Conservation Act of 1975 and the Energy Conservation and Production Act of 1976, summarized in the Box on the left. In large part, current national policy with respect to conservation is contained in the relevant provisions of these two major energy bills.

Fuel-economy legislation had its genesis in the 93rd Congress, when the Senate passed the National Fuels and Energy



Industrial smog hides homes near a pipe plant in the northern, most polluted, part of Birmingham, Alabama. Under the 1963 Clean Air Act and its later amendments, EPA promulgates air-quality standards; it is up to the states to implement them. EPA—DOCUMERICA photo by Leroy Woodson.

Conservation Act of 1973. This bill died when the House failed to take similar action. In 1974, during the final months of the 93rd Congress, the Senate Commerce Committee began a new effort in this area, in preparation for the 94th Congress. Fuel-economy bills were introduced in February 1975 by Senator Ernest Hollings and by other Senators; they were the subject of public hearings during March.

On 8 May 1975 the Committee began consideration of an Automobile Fuel Economy Working Paper, prepared by the staff at the request of several Committee members, which attempted to integrate the information gained from the hearing process into the original bills. This Working Paper was marked up during several sessions, and on 15 May the Committee ordered that a "clean" bill (a bill with a new number) be reported favorably to the floor of the Senate. On 15 July 1975, this bill was debated for several hours on the floor of the Senate, after which the Senate approved it by a vote of 63 to 21.

Corresponding legislation introduced in the House of Representatives had been adopted one month earlier as part of an omnibus energy bill. The Senate fuel-economy bill was then combined with three other Senate energy bills, dealing with oil pricing and allocation, emergency petroleum reserves, and energy labelling of appliances, into a Senate omnibus energy bill, after which a House-Senate conference was organized to resolve differences. This conference lasted from September until December, when a compromise package, the Energy Policy and Conservation Act, finally emerged. In a

slightly modified version this Act was approved by both Houses and after much uncertainty signed by the President a few days before Christmas of 1975.

Throughout this process, considerable pressure was exerted by parties on all sides of the fuel-economy issue. The automobile industry argued strongly against any federal regulation, warning that increased fuel economy could only be achieved by relaxing mandated clean-air standards and predicting increased unemployment if fuel-economy standards were adopted. Environmental and consumer groups argued for very stringent fuel-economy standards without any relaxation of emission standards. The legislation finally adopted reflected Congress's judgment that it was clearly in the long-term national interest to combine greater fuel efficiency with a reasonable degree of flexibility to take account of new information and circumstances. The Department of Transportation and the EPA are now preparing regulations for the fuel-economy program, subject to the oversight of the House and Senate Commerce Committees.

A legislative short-cut

The legislative history of the energy-conservation provisions of the Energy Conservation and Production Act presents an interesting contrast to that of the Energy Policy and Conservation Act. Jurisdictionally, the first two provisions listed on the right-hand side of the Box opposite belong to the Banking Committees of the House and Senate. Bills on these subjects had been passed by both Houses but had been stalled for several months in conference. A bill containing



A new car is being tested at the EPA Vehicle Emission Test Center in Ann Arbor, Michigan. Auto makers argue that emission-control devices waste energy. EPA-DOCMERICA photo by Joe Clark.

early versions of the last three provisions had been introduced in the Senate by Senator Edward Kennedy and others on 5 February 1976, and referred to three committees: Commerce, Interior and Banking. The latter bill was the subject of several days of hearings by these committees over the next few months and was reported, in modified form, to the Senate floor on 13 May.

However, a more promising legislative vehicle appeared at that time. The legislation creating the Federal Energy Administration was due to expire on 30 June 1976 and some urgency was attached to legislation extending its mandate. Therefore, on 9 June Senator Kennedy offered the provisions of his bill as an amendment to the Federal Energy Administration Extension Act. His amendment was adopted a week later, and the amended bill was overwhelmingly adopted by the Senate the following day.

Legislation extending the life of the Federal Energy Administration had also been passed by the House, but it contained no provisions comparable to the Kennedy amendment. The House Commerce and Banking Committees therefore held hearings on the conservation provisions even though the House-Senate conference had begun. Eventually a compromise, with a modification of the Kennedy provisions, was reached. The bill was overwhelmingly approved in August 1976 and signed by the President a few days later.

Enactment of a law, as described above, is not the final step in the legislative process. Two critical steps remain: the allocation of funds by the Appropriations Committees, and Congressional oversight

to ensure that Congress's will is carried out by the executive agencies. Now that these two bills have been enacted, considerable attention will have to be devoted to both of these steps to achieve the energy-conservation potential they address.

Physicists on Capitol Hill

Here, then, are three different sets of experiences, from three points of view, of legislative efforts to deal with the national energy problem. We have described the events we took part in without attempting to unify our individual experiences into a single consensus view. We conclude instead with the question: What is the role of the physicist on Capitol Hill?

The APS Congressional Fellowship Program, now completing its fourth year, represents an accumulation of more than 18 person-years of Hill experience. What have we learned about our role?

► We do not function as technical experts in the usual sense of the word. The interests of Congress are so wide-ranging that it would be impossible to be expert in more than one or two issues out of hundreds. Technically trained staff therefore almost always act as generalists, albeit with a particular background in science. Scientists also bring a facility for working with numbers and graphs—the tools of the scientific trade—as well as a facility for communicating with technical and scientific people.

► Congressional staff work can be interesting and exciting for people trained as physicists. While it is true that we are no longer measuring scattering cross sections or transport properties, we are using our scientific knowledge and perspectives in the effort to formulate meaningful energy,

environment and R&D policies, all of which are of national importance and have significant scientific and technological components.

The increasing familiarity with governmental operations resulting from the APS Fellowship Program can only serve to increase effective communication between the physics community and decision-makers in Washington. With the US government playing an increasingly important role in support of scientific activities, this is an important benefit of the Program, and of similar programs supported by other societies, to all members of the technical community.

Epilogue

Several months have now elapsed since the above was prepared. Almost as if time has stood still, Congress is again discussing ways to reduce energy demand, increase the supply, and regulate emissions from sources of pollution. While some of the proposals look different, many were discussed before. What has changed since the 94th Congress is a new emphasis on conservation as the cornerstone of our national energy policy—one that simply did not exist in the previous Administration. In the area of environmental protection very little has changed; for example, both Houses of Congress have passed clean-air legislation similar to that passed during the 94th Congress, and still another conference to resolve differences will be scheduled.

What lessons can be drawn from these developments?

► The most obvious lesson is that complicated issues that affect many constituencies normally take a long time to resolve.

► While the congressional process for considering legislation can be laborious, it does provide opportunities for many different persons and groups to present their views on a given issue.

► Notwithstanding the claims of conventional wisdom, individuals still play a major role in determining the shape of legislation. This is particularly true for Members—a strong Congressional advocate or opponent can significantly affect the legislative outcome—but also, to a lesser extent, for staff. This is perhaps one of the factors that has made congressional staff work attractive to Fellows from scientific societies.

A final lesson that might be drawn from our experiences is the critical importance of Presidential leadership on important national issues. With respect to both energy and environment, a majority of the Congress has been at odds with the President for most of the recent past, with clearly inhibitory results to the achievement of a national policy. With the same party in control of both White House and Congress, it may be—although other inhibiting factors still exist—that these issues finally will be resolved. □