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FROM: GIBBONS, John H.: OFFICE OF TECHNOLOGY ASSESMENT

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 10/25/91

SUBJECT: PROVIDING DR. BROMLEY WITH A COPY OF THE REPORT,
"U.S. OIL IMPORT VULNERABILITY: THE TECHNICAL
REPLACEMENT CAPABILITY.

DIRECTORATE
ASSIGNED: STAFF
ASSIGNED:

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ACTION:

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OSTP DUE DATE: STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley
PHYSICAL SCIENCES
NATIONAL SECURITY
Carl Bretscher
INDUSTRIAL

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JOHN H. GIBBONS

4584
JOHN H. GIBBONS
DIRECTOR

Congress of the United States
OFFICE OF TECHNOLOGY ASSESSMENT

WASHINGTON, DC 20510-8025

October 25, 1991

91 OCT 29 A10:52

The Honorable D. Allan Bromley
Assistant to the President for
Science and Technology
The White House Office
1600 Pennsylvania Avenue, N.W.
Washington, DC 20500

OFFICE OF THE
DIRECTOR

Dear Mr. Bromley:

I am pleased to bring to your attention the OTA Report, U.S. Oil Import Vulnerability: The Technical Replacement Capability. This Report was prepared in response to a request from the Senate Committee on Energy and Natural Resources and endorsed by the Chairman of the Subcommittee on Energy and Power of the House Committee on Energy and Commerce.

This Report examines the changes that have taken place in U.S. oil use since 1984 and provides revised estimates of the technical oil replacement potential that might be attained over several years in the event of a severe and prolonged oil import curtailment. It focuses on technologies that are commercially available today or will be within the next five years and that are among the most cost-effective methods for replacing oil use in applicable sectors. It also examines the economic impacts of adopting an aggressive oil replacement strategy in a severe oil emergency. The Report presents a variety of policy options that could be used to accelerate the adoption of oil replacement technologies in preparation for or in response to a severe supply disruption, or as part of a long-term national policy to reduce import vulnerability.

We will be happy to answer any questions you may have regarding this Report.

Sincerely,

John H. Gibbons
John H. Gibbons

Enclosures:

Report
Report Brief
Summary



U.S. Oil Import Vulnerability: The Technical Replacement Capability

With declining domestic oil production and increasing demand, the United States faces a future of still greater dependence on imported oil. In 1990 imports supplied 42 percent of U.S. oil needs—7.1 million barrels per day (MMB/D) out of total consumption of 16.9 MMB/D. In less than 20 years, many experts predict that America could be dependent on foreign sources for almost three-quarters of its oil.

Because oil use remains pervasive and deeply rooted in America's economy and way of life, U.S. dependence on oil imports is of increasing concern. Major and prolonged import (or price) disruptions would bring hardship and deprivation. Historically, even small supply disruptions have triggered disproportionate economic impacts—the 1973 Arab Oil Embargo and the 1979 Iranian Revolution contributed to drops in U.S. real gross national product of 2.7 and 3.6 percent, respectively.

But rising import dependence alone does not translate into a serious threat to energy security. Import vulnerability arises out of the degree and nature of import dependence, the potential harm to the economic and social welfare of a severe disruption in physical supplies or prices, its duration, and the likelihood of such a disruption occurring. Along with diversifying world petroleum production, and maintaining a viable domestic oil industry, the availability of technologies to replace interrupted or lost imports helps offset the risks of growing dependence on foreign oil and reduces import vulnerability.

The Iraqi invasion of Kuwait renewed concerns over U.S. energy security. While the United States is less dependent on Middle Eastern sources than Europe or Japan, the global nature of the oil trade and international oil sharing agreements assure that any shutoff of Persian Gulf oil will ultimately be reflected in U.S. oil supplies and prices. What could the United States do if events forced an import cutoff that lasted for more than just a few months as in past disruptions? The Strategic Petroleum Reserve, targeted at short-duration disruptions, would quickly be exhausted in a prolonged, major disruption. These concerns prompted the Senate Energy and Natural Resources Committee to request that OTA

update the estimates contained in the 1984 report, *U.S. Vulnerability to an Oil Import Curtailment: The Oil Replacement Capability*.

The 1984 OTA study, which assumed a loss of 3 MMB/D in U.S. oil imports for 5 years, is one of very few that have looked at technologies for responding to a severe, long-lasting oil import disruption. It found that an aggressive program of fuel switching, alternative fuels, conservation, and efficiency measures could replace 3.6 MMB/D, exceeding the shortfall by a sizable margin of safety. But achieving this goal was not cheap or easy.

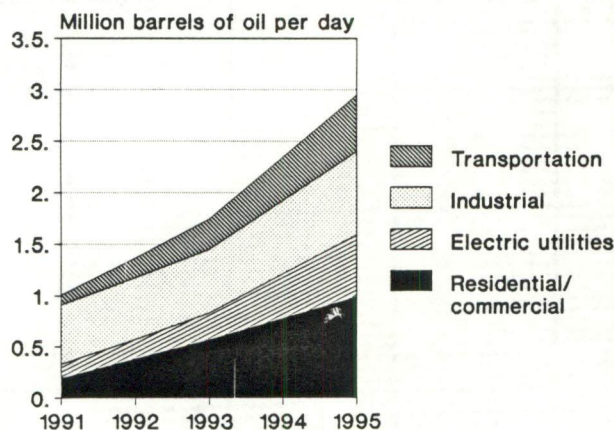
U.S. and world oil market conditions have changed in the 7 years since the first OTA study. A comparable oil disruption scenario set in 1991—roughly equivalent to loss of Persian Gulf production—would involve a loss of 5 MMB/D of U.S. oil imports for at least 5 years. However, aggressive deployment of available oil displacement technologies over 5 years could replace only about 2.9 MMB/D of lost imports. The margin of safety in oil replacement technical potential found in 1984 has vanished. Moreover, the expected continuing decline in domestic crude oil production (resulting in a loss of 0.1 to 1 MMB/D by 1995) reduces the effective net import replacement capability to from 1.7 to 2.8 MMB/D. Instead of being able to replace lost imports, the United States now comes up short, even after expensive oil replacement technologies have been deployed aggressively. Reliance on oil replacement technologies alone is no longer sufficient to offset the threat of a major and prolonged oil supply disruption.

OTA found opportunities for use of oil replacement technologies in all sectors of the economy as shown in the accompanying figure.

In the residential and commercial sectors, switching to natural gas, electricity, coal, and renewable energy could replace much of the oil now used for space and water heating. Improving the efficiency of the remaining oil-burning equipment could boost total oil savings to about 1 MMB/D.

In the electric utilities sector, fuel switching, load shifting, replacing oil-fired generation with natural gas, coal, nuclear, and renewable fuels, and acceler-

U.S. Oil Replacement Potential Technical Capability by Sector, 1991



SOURCE: Office of Technology Assessment, 1991.

ated demand side management could displace about 600,000 barrels per day (B/D).

The industrial sector could cut oil use by about 800,000 B/D through reduced refinery fuel use, switching or converting industrial boilers to natural gas, coal, renewable fuels, or electricity, substituting alternative industrial feedstocks where feasible, and implementing oil-saving process changes and efficiency improvements.

The transportation sector, the largest oil user, is the least flexible—in the short term—in displacing oil. Nevertheless, short-term gains in fuel economy in light-duty vehicles, shifts to alternative motor vehicle fuels, and improved traffic management could yield an average savings of 555,000 B/D within 5 years.

Substantially higher prices following an import cutoff would also be likely to spur additional domestic oil and gas exploration and production. The most attractive near-term opportunities for maintaining or increasing production are continuing development in known fields, accelerating enhanced oil recovery, bringing shut-in or marginal wells into production, and limiting premature well abandonment. At best, these near-term gains in oil production can be expected to stem the continuing decline in domestic crude output. While there is considerable certainty that natural gas production could be increased rather quickly to meet new demand, capacity constraints in the interstate gas pipeline systems and in local distribution and storage networks could limit the use of gas to replace oil.

Much can be done to counter the deeply disturbing projected growth of oil import dependence, but

even with relatively heroic measures the United States faces a future of high dependence on imports. No single technology will eliminate oil import dependence and there are no quick fixes to our growing oil import vulnerability. Any significant shift away from oil products cannot be accomplished quickly and may entail substantial capital investment and adjustments in consumer preferences and lifestyles. An effective approach will require a combination of oil replacement initiatives combined with other energy and environmental policy measures.

OTA presents two strategies for promoting the adoption of oil replacement technologies: 1) replacing oil use in a severe import disruption and 2) reducing oil import vulnerability as part of long-term national energy policy objectives. Both strategies rely on many of the same oil replacement technologies and policy initiatives. One critical difference is that some policy options and technologies have fewer implementation problems and offer greater oil savings if adopted as part of a long-term oil replacement strategy rather than as part of a crisis-driven strategy.

The prospect of continuing oil import vulnerability confronts the United States with three choices:

- waiting until a disruption occurs before deciding on an appropriate response;
- anticipating that disruptions will occur and setting in place effective measures that enhance our ability to replace the lost oil; or
- crafting a more comprehensive national energy strategy that embraces a long-term goal of limiting our reliance on oil and other fossil fuels and does so consistent with other national policy objectives.

Whichever path is chosen, success in reducing U.S. oil import vulnerability will require a strong Federal example, and the sustained support and cooperation of citizens, business, and government.

Copies of the report for congressional use are available by calling 4-9241.

Copies of the report for non-congressional use can be ordered from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402-9325 (202) 783-3238. The GPO stock number for the OTA report, "U.S. Oil Import Vulnerability: The Technical Replacement Capability," is 052-003-01261-8. The price is \$8.00. Summaries of reports are available at no charge from the Office of Technology Assessment.

For further information contact OTA's Publications Office. Address: OTA, U.S. Congress, Washington, DC 20510-8025 (202) 224-8996.

U.S. OIL IMPORT VULNERABILITY

The Technical Replacement Capability

DO NOT RELEASE UNTIL
OCTOBER 29, 1991, 9:30 A.M.
EMBARGOED EMBARGOED



CONGRESS OF THE UNITED STATES
OFFICE OF TECHNOLOGY ASSESSMENT

U.S. OIL IMPORT VULNERABILITY

The Technical Replacement Capability

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OFFICE OF TECHNOLOGY ASSESSMENT

"CORRESPONDENCE TRACKING"

TYPE: CONGRESSIONAL

DOCUMENT NUMBER: 9124261

ORIGINATOR: 02

STATUS I

DIRECTORATE STATUS

FROM: WOLPE, Howard: COMMITTEE ON SCIENCE, SPACE AND TECHNOLOGY

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 09/30/91

SUBJECT: REQUEST THAT OSTP ISSUE A PUBLIC STATEMENT DETAILING
IN FULL, THE ORIGINS AND FUNDING OF THE PRESIDENTIAL
FACULTY FELLOWS PROGRAM.

DIRECTORATE

ASSIGNED: DIRECTOR'S OFFICE

STAFF

ASSIGNED: *Carl Bretscher*

ACTION

REQUIRED: FOR DAB'S SIGNATURE

STAFF

ACTION:

SENDER'S DUE DATE:

OSTP DUE DATE: 10/07/91

STAFF DUE DATE

DATE COMPLETED:

DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley
INTERNATIONAL/POLICY
Damar Hawkins
Ken Yale

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OSTP RECEIVED: 10/02/91
FILE: P-CONGRESSIONAL

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*CB: I found this in an
old Carl Bretscher file,
obviously not
answered. I guess
it can be
closed nt!*
Delle

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U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE, SPACE,
AND TECHNOLOGY

SUITE 2320 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515
(202) 225-6371

September 30, 1991

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Chief Counsel
DAVID D. CLEMENT
Republican Chief of Staff

D. Allan Bromley
Science Adviser to the President
Office of Science and Technology Policy
Washington, D.C.

Dear Dr. Bromley:

Recently at a meeting of the American Association of Engineering Societies, you announced that President Bush would soon launch a major new national program to help young science faculty members remain in teaching. Shortly after your statement, the President -- in a well-publicized Rose Garden ceremony -- announced the creation of the Presidential Faculty Fellows, which was billed as a "new" program of grants to support young scholars who excel in both the laboratory and the classroom. Under this program, approximately 30 young scientists and engineers will be provided with up to \$100,000 per year for five years to support their teaching and research.

What neither you nor President Bush bothered to include in your announcements was the fact that this is not a new program, but a reprogramming of funds that will actually reduce the total number of Presidential grants to promising young academicians. The faculty fellowship program will take approximately 50 grants from the National Science Foundation's Presidential Young Investigators' (PYI) program -- which was established in 1982 for the identical purpose of encouraging the brightest young people to remain in academic careers -- to fund its 30 "new" grants. Under the PYI program, approximately 200 untenured faculty members are chosen every year (this year there were 220) to receive a minimum grant of \$25,000 per year for five years with a promise of \$37,500 more if matched on a dollar-per-dollar basis by grants from industry. Average individual awards are smaller than those for the Presidential fellows -- about \$50,000 annually.

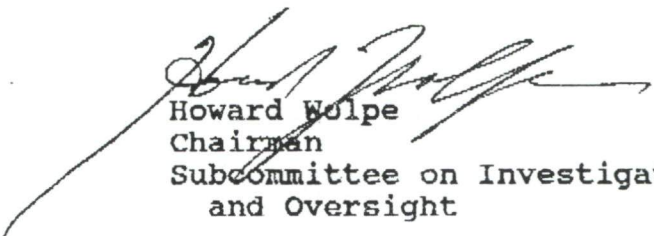
Because of the higher individual award under the Presidential fellows program, the remaining funds available for PYI awards now will be reduced. As a result, it is expected that only 180 young academicians will receive support for their

Because of the higher individual award under the Presidential fellows program, the remaining funds available for PYI awards now will be reduced. As a result, it is expected that only 180 young academicians will receive support for their teaching and research in FY 1992, when the first Presidential fellow awards are expected to be made: 30 under the fellows program; and 150 under the PYI program. In subsequent years, as the higher annual cost of the five-year fellows program takes effect, the number of PYI recipients could be reduced even further.

I am greatly concerned about the cavalier and deceptive manner in which this administration publicly proclaimed its dedication to better science education and then privately undercut one of the few programs to specifically encourage those increasingly rare academicians who bring their knowledge directly to the college classroom instead of filtering it through overworked teaching assistants. These are not the professors who hide from students in their laboratories behind large research and development grants; these are the teachers who will personally challenge and inspire our next generation of technological innovators.

This is another example of the shell game that we see all too often in Washington. Unfortunately, unless quickly corrected, this type of "misstatement" often takes on a life of its own as it is repeated in good faith by public and education officials in addresses all over the country. In the interest of integrity and full disclosure, I request that your office issue a public statement detailing in full the origins and funding of the Presidential Faculty Fellows program so that any further misunderstanding on the part of the press and the public can be avoided.

Sincerely,



Howard Wolpe
Chairman
Subcommittee on Investigations
and Oversight

cc: Walter E. Massey
Director, National Science Foundation

"Document Control"

TYPE: CONGRESSIONAL DOCUMENT NUMBER: 9124264
ORIGINATOR: 02 STATUS C DIRECTORATE STATUS

FROM: GRADISON, Bill: THE HOUSE WEDNESDAY GROUP

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 09/27/91

SUBJECT: A THANK YOU FOR HELPING MAKE THE CONFERENCE A
SUCCESS.

DIRECTORATE STAFF
ASSIGNED: ASSIGNED:

ACTION STAFF
REQUIRED: ACTION:

SENDER'S DUE DATE:
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THE HOUSE WEDNESDAY GROUP

CONGRESS OF THE UNITED STATES

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386 Ford House Office Building, Washington, D.C. 20515

Office: 202-226-3236

Fax: 202-225-3637

91 OCT 3 P 1:52

September 27, 1991

OFFICE OF THE
DIRECTOR

Dr. D. Allan Bromley
Assistant to the President for Science and Technology
Room 358
Old Executive Office Building
Washington, D.C. 20500

Dear Allan,

I would like to thank you for the crucial role that you and your office played in making last weekend's conference a success. The sessions you chaired and the panelists you invited were outstanding.

In the next few weeks, our members will be discussing the conference and what, if anything, we would like to do as a group on the issues discussed. We will be in touch with you for advice and guidance, should we decide on further activities.

I hope you found the weekend to be as interesting and enjoyable as I did. We value the retreats because they provide us the opportunity not only to discuss issues, but also to acquaint ourselves on an informal basis with analysts and officials from outside the Congress. These ties, as you know, can prove important.

Once again, thank you for all your assistance. Thanks also to Ken Yale, who helped us greatly in organizing the event.

Sincerely,

Bill Gradison
Chairman
House Wednesday Group

"CORRESPONDENCE TRACKING"

TYPE: CONGRESSIONAL-INFORMATION DOCUMENT NUMBER: 9124233
ORIGINATOR: 02 STATUS C DIRECTORATE STATUS

FROM: GIBBONS, John H.: OFFICE OF TECHNOLOGY ASSESSMENT

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 09/26/91

SUBJECT: RE: OTA'S REPORT, "BIOLOGICAL RHYTHMS: IMPLICATIONS
FOR THE WORKER".

DIRECTORATE STAFF
ASSIGNED: ASSIGNED:

ACTION STAFF
REQUIRED: ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley
LIFE SCIENCES

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JOHN H. GIBBONS

4233
JOHN H. GIBBONS
DIRECTOR

Congress of the United States
OFFICE OF TECHNOLOGY ASSESSMENT
WASHINGTON, DC 20510-8025

September 26, 1991

RECEIVED
91 SEP 30 P12:13

The Honorable D. Allan Bromley
Assistant to the President for
Science and Technology
Director, Office of Science and Technology Policy
Old Executive Office Building
17th Street & Pennsylvania Avenue, N.W.
Washington, DC 20506

OFFICE OF THE
DIRECTOR

Dear Al:

I am pleased to enclose OTA's Report, Biological Rhythms: Implications for the Worker. This publication is the third in a series on New Developments in Neuroscience. The first, Neurotoxicity: Identifying and Controlling Poisons of the Nervous System, was published in April 1990, and the second, Neural Grafting: Repairing the Brain and Spinal Cord, was published in September 1990. The last report in the series, The Biology of Mental Disorders, is projected for completion in the summer of 1992.

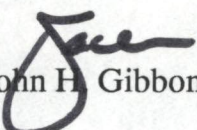
This Report discusses biological rhythms, what they are, how they are controlled by the brain, and the role they play in regulating physiological and cognitive functions. The Report examines the effects of shift work -- work during nondaytime hours, noncontinuous hours, or for extended periods -- on biological rhythms and how these effects can interact with other factors to affect the health, performance, and safety of workers. Approximately 20 million Americans work some form of nonstandard work schedule.

The Report finds that during the last decade there have been significant advances in the scientific understanding of biological rhythms, but there have not been equivalent advances in the application of this research to the workplace. Additional research is needed on biological rhythms and the various effects nonstandard work schedules can cause. The Report also finds that the Federal government's collection of shift work statistical data has been insufficient and needs to be improved.

The Report presents a range of options for Congressional action related to the amount of research being conducted on these topics, the collection of relevant workplace statistical data, and the Congressional role in ensuring the well-being of individuals engaged in nonstandard hours of work.

I hope you will find the Report useful and informative.

Sincerely,


John H. Gibbons

Enclosures:
Report
Report Brief

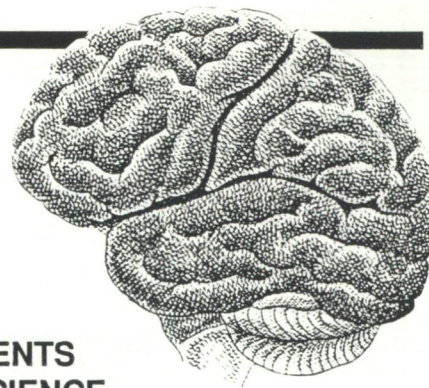


Biological Rhythms: Implications for the Worker

A factory whistle blows and the workers leave their stations, punch the clock, and file out into the morning light. The graveyard shift is over. In a scene that is repeated across the country every day, these workers head home to face their "nighttime," a time that is at odds with the rest of society and the worker's own internal clock. This is shift work, and whether it involves a factory worker, an interstate truck driver, a police officer, or a nurse, concerns have been raised about the effects it can have on the worker.

One in five Americans, approximately 20 million people, work some form of nonstandard work schedule. Nonstandard work schedules, which require that an individual work during nondaytime hours, noncontinuous hours, or for extended periods, are referred to as shift work. Shift work includes evening or night work; a rotating shift, in which hours change regularly (e.g., from day to evening to night); irregular shifts, where the shifts are variable and erratic; split shifts, in which a period of work is followed by a break and then a return to work; and extended duty hours, consisting of long periods of work (usually over 12 hours). Available data indicate that approximately 16 percent of all full-time workers in the United States are engaged in shift work. A quarter of all dual-earner couples without children and one third of all dual earner couples with children include at least one spouse who works a nonstandard shift. Shift work is prevalent in capital-intensive industries, continuous-process operations, transportation, and service industries. While shift work is most frequently thought of in the factory setting, many other workers such as emergency personnel, utility workers, and medical care providers staff their workplaces around the clock.

Although information is scanty, that which is available indicates that shift work can cause adverse effects. Furthermore, recent advances in knowledge of how the brain controls the biological rhythms of the body have begun to explain how nonstandard work schedules can affect workers and to provide some insights into how workers and employers can cope with those problems. Human biological rhythms—changes in various physiological and behavioral functions that repeat at regular intervals and provide a temporal organization for them—have cycles ranging from minutes to months. Cycles that approximate the 24-hour rotation of the Earth, called "circadian rhythms," are the best studied (figure 1). Body temperature, sleep and wakefulness, memory, alertness, and many other functions vary with a circadian rhythm. Researchers examine how these rhythms are controlled and regulated, the roles they play in clinical conditions, their implications for medicine, and how they can be



NEW DEVELOPMENTS IN NEUROSCIENCE

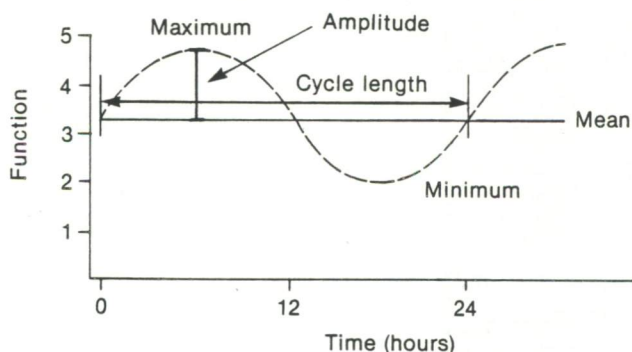
manipulated. Any work schedule that requires people to work when they would normally be sleeping (and sleeping when they would normally be awake) can disrupt workers' circadian cycles.

OTA Findings

OTA finds that significant advances in describing and understanding human biological rhythms, especially circadian rhythms, have not been applied to the problems engendered by shift work. Moreover, studies of the effects of shift work have received little support in this country. Federal research activities in this area are minimal and uncoordinated. Often, these programs focus on settings directly related to the funding agency (e.g., the Federal Railroad Administration conducts research on railroad operations) and few research programs are devoted to investigating general issues related to work schedules.

OTA also finds that the Federal Government's collection of statistical data pertaining to shift work has been inconsistent, precluding any accurate, thorough measure of the scope, nature, and impact of shift work in this country. Systematic collection of workplace data, principally through the Bureau of Labor Statistics (BLS), regarding the demographics and use of shift work and its relationship to the occurrence of on-the-job accidents would provide a solid basis for problem identification and

Figure 1—Circadian Rhythm



Circadian rhythms have a single cycle length of approx. 24 hours.
SOURCE: Office of Technology Assessment, 1991.

solving. Currently, the data gathered by the BLS provide no information to help in assessing the impact of shift work on employee safety and health.

Based on available knowledge, OTA draws some general conclusions. Circadian rhythm disruption caused by shift work often interacts with fatigue, sleep deprivation, and social or domestic stress to affect the health, performance, and safety of the worker. However, people vary greatly in their ability to adjust to shift work, with some individuals suffering few, if any, problems, and others finding certain work schedules intolerable. Shift work is associated with increased incidence of gastrointestinal problems, may be a risk factor for other health problems, and produces a general, chronic malaise in some workers. Diminished performance can result, especially in settings where sleep loss and fatigue compound the effects of circadian disruption. These drops in performance can compromise the safety of the worker and, in some occupations, threaten public safety as well.

Interventions that are being investigated to mitigate the adverse effects of shift work include designing work schedules that have the fewest harmful effects, implementing educational and support programs to aid shift workers, and developing systems to monitor performance and provide feedback to the worker. Also, the development and application of periods of bright light and drugs to help resynchronize the circadian system, and napping strategies to counteract the effects of sleep loss and fatigue, are being studied.

Regulation of Work Hours

Both direct congressional legislation and Executive Branch rules regulate work hours. Examples of the former are the Hours of Service Act, which regulates work hours within the railroad industry, and the Fair Labor Standards Act of 1938, which has an indirect effect on hours of work by mandating that employers pay an overtime premium for time worked in excess of 40 hours a week. Examples of the latter are the requirements imposed by individual agencies, such as the hours of service regulations of various agencies within the Department of Transportation.

Because of its responsibility for workers' safety and health, the Occupational Safety and Health Administration could regulate hours in diverse industries if it determined that certain schedules posed a safety or health threat. In addition, regulatory agencies with authority over specific industries could impose regulations if necessary for workers' health and safety.

Issues and Options for Congress

Policy issues for possible congressional action related to biological rhythms and shift work include:

- *The level of the Federal research effort in this area.* Federally supported research in this area consists of basic research on biological rhythms, applied research in the workplace, and the collection of workplace statistical data on the demographics and use of shift work. Congressional options include creating a Federal interagency task force to guide research efforts, convening a national commission of nongovernmental experts to develop research guidelines and priorities, expanding the collection of data pertaining to the demographics and use of shift work, and expanding extramural and intramural Federal research programs.
- *The adequacy of Federal mechanisms for collecting workplace safety data related to hours of work.*

Case Studies

To study the variety of settings in which shift work can be found, OTA examined four occupations in which nonstandard work hours could affect the public welfare as well as the individual worker: nuclear powerplant control operators, registered nurses, resident physician training, and the military. In all of these, job performance may be degraded by the effects of nonstandard work hours. In the case of nuclear powerplant control room operators the responsibility of work scheduling rests with the plant management, while the Nuclear Regulatory Commission has provided guidelines on total working hours and maximum consecutive hours of work. The shift scheduling associated with registered nursing and the extended and irregular duty hours of resident training can affect both health care providers and the patients they serve. For instance, dissatisfaction with work schedules is a reason often cited by individuals for leaving nursing. What effects the long hours of residents' training may have on medical care are hotly debated, but some medical specialties now limit residents' hours. Military operations are often characterized by long hours and fatigue. The armed services have few regulations or guidelines about hours of service and scheduling except those that pertain to flight operations.

Collection of workplace safety data is conducted by various Federal agencies. Congressional options include directing the Bureau of Labor Statistics to increase its collection of data on the relationship between hours of work and workplace accidents, and directing the Occupational Safety and Health Administration and other agencies that collect workplace safety information to record information on hours of work related to safety incidents.

- *The role of Congress in ensuring the well-being of men and women who work nonstandard hours.* While additional information is still needed, it is clear that shift work can have a variety of effects on some workers. Congressional options include encouraging the development of educational programs and support services for workers, directing the Occupational Safety and Health Administration to determine whether issuing standards related to hours of work and scheduling is warranted, directing appropriate Federal agencies to review current regulations and determine whether they adequately address concerns raised by nonstandard work hours, encouraging labor and management to include provisions regarding the safety and needs of shift workers in collective bargaining agreements, and directing that measures be taken to further ensure individual and public safety in settings where nonstandard work hours are in effect.

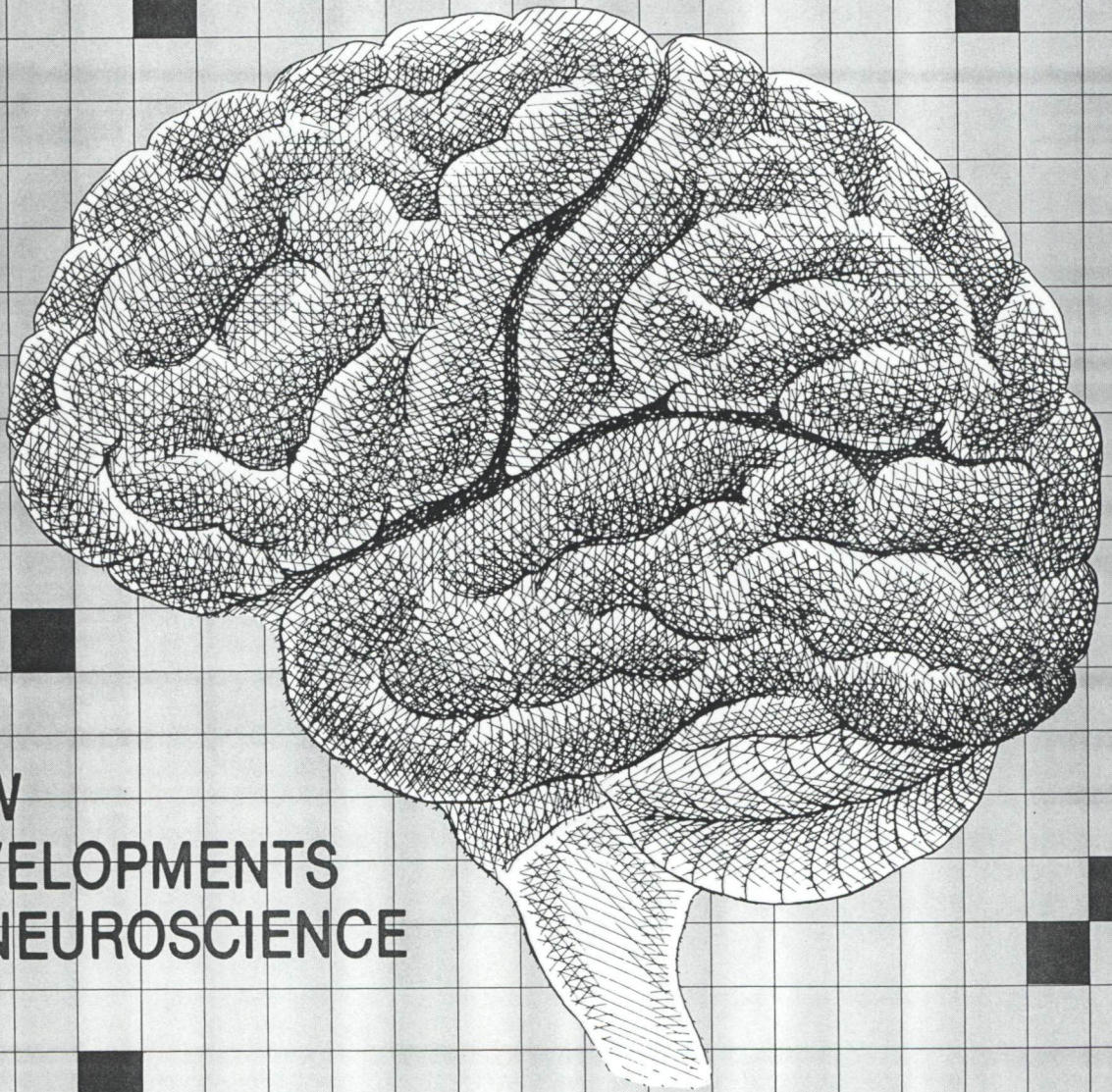
Copies of the report for congressional use are available by calling 4-9241.

Copies of the report for non-congressional use can be ordered from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402-9325 (202) 783-3238. The GPO stock number for the OTA report, "Biological Rhythms: Implications for the Worker," is 052-003-01254-5. The price is \$11.00.

For further information contact OTA's Publications Office. Address: OTA, U.S. Congress, Washington, DC 20510-8025 (202) 224-8996.

BIOLOGICAL RHYTHMS

IMPLICATIONS FOR THE WORKER



NEW
DEVELOPMENTS
IN NEUROSCIENCE



CONGRESS OF THE UNITED STATES OFFICE OF TECHNOLOGY ASSESSMENT

"Document Control"

TYPE: CONGRESSIONAL DOCUMENT NUMBER: 9124263
ORIGINATOR: 02 STATUS C DIRECTORATE STATUS

FROM: HOBSON, David L.: HOUSE OF REPRESENTATIVES

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 09/25/91

SUBJECT: A THANK YOU FOR YOUR PARTICIPATION AND ASSISTANCE AT
THE CONFERENCE

DIRECTORATE STAFF
ASSIGNED: ASSIGNED:

ACTION STAFF
REQUIRED: ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

COPIES TO: Carl Bretscher
D. Allan Bromley
Damar Hawkins

WHITE HOUSE TRACKING #: CONTACT PERSON:
REMARKS: PHONE: EXT:

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OSTP RECEIVED: 10/03/91 DEPT RECEIVED:
FILE: P-EAC-CONGRESSIONAL

4263



HOUSE OF REPRESENTATIVES
WASHINGTON, D. C. 20515

DAVID L. HOBSON
MEMBER OF CONGRESS
SEVENTH DISTRICT OF OHIO

September 25, 1991

OFFICE OF THE
DIRECTOR

Dr. D. Allan Bromley
Assistant to the President
for Science and Technology
Room 358
Old EOB
Washington, DC 20500

Dear Dr. Bromley:

Just a note to tell you how much I enjoyed meeting you this past weekend. I think the conference was a great success, and that was due to both the quality of the people who chaired our sessions and the outstanding organizational skills which were needed to keep everything running smoothly.

We all greatly appreciated your participation and assistance.

Sincerely,

A handwritten signature in blue ink, appearing to read "David Hobson".

DAVID L. HOBSON
Member of Congress

DLH/gg

"INVITATION FOR DR. BROMLEY"

TYPE: CONGRESSIONAL-INVITE

DOCUMENT NUMBER: 9124038

SPEECH: YES NO

FROM: GORE, Albert and Timothy E. Wirth: U.S. SENATE

DATE OF EVENT: 09/25/91

LOCATION OF EVENT: S-151 OF THE CAPITOL BUILDING

TIME OF EVENT: 12:30PM

SUBJECT: INVITATION TO AN OFF-THE-RECORD LUNCHEON WITH THE
SECERTARY GENERAL OF THE UNITED NATIONS CONFERENCE
ON ENVIRONMENT AND DEVELOPMENT, MAURICE STRONG.

RSVP: 09/28/91

CONTACT PERSON: KATIE MCGINTY

CONTACT NUMBER: 224-4944

INVITATION ACCEPTED? YES NO

COPIES TO: Carl Bretscher
ENVIRONMENT
INTERNATIONAL/POL

REMARKS:

9/25/91 Requested belatedly to Katie

CLOSED

DATE OF LETTER: 09/12/91

DATE RECEIVED: 09/17/91

FILE: B-EAC-CONGRESSIONAL

RECEIVED

United States Senate

WASHINGTON, DC 20510

81 SEP 17 4 9:41

September 12, 1991

Bush Library Photocopy
Miscellaneous Handwriting

CHARLES
DIRECTOR

Dr. Allan Bromley
Assistant to the President for Science and Technology
Director, Office of Science and Technology Policy
New Executive Office Building
Washington, D.C. 20506

Dear Allan:

We are writing to invite you to join us in an off-the-record luncheon with the Secretary General of the United Nations Conference on Environment and Development, Maurice Strong, at 12:30 p.m. on Wednesday, September 25, 1991, in S-151 of the Capitol building.

As you know, the third international meeting in preparation for the UNCED was recently concluded in Geneva. This luncheon will allow leading representatives of Congress and the Administration to engage in a substantive discussion with Mr. Strong about the progress made to date by the UNCED Secretariat and to discuss the prospects for the fourth preparatory meeting, which will be held in New York next March.

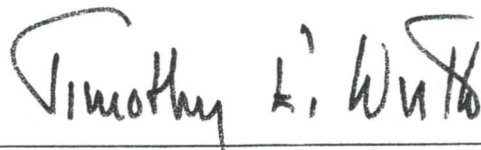
The UNCED conference in Brazil will be the most significant environmental meeting ever held. Given your deep concern for the environment and important role in shaping U.S. environmental policy, we hope you will make a special effort to join us for this unique opportunity to discuss the UNCED with Mr. Strong.

If you have any questions, or if we can be of any assistance, please do not hesitate to contact us. Kindly RSVP to either of our staff contacts -- Katie McGinty (Gore - 224-4944) or David Harwood (Wirth - 224-5852). We look forward to seeing you on September 25th.

Sincerely,



Albert Gore, Jr.



Timothy E. Wirth

"CORRESPONDENCE TRACKING"

TYPE: INFORMATION

DOCUMENT NUMBER: 9123184

ORIGINATOR: 02

STATUS C

DIRECTORATE STATUS

FROM: GIBBONS, John H.: OFFICE OF TECHNOLOGY ASSESSMENT

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 08/01/91

SUBJECT: A COPY OF THE OTA REPORT, "ENERGY TECHNOLOGY
CHOICES: SHAPING OUR FUTURE".

DIRECTORATE STAFF
ASSIGNED: ASSIGNED:

ACTION STAFF
REQUIRED: ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley Ken Yale
PHYSICAL SCIENCES Damar Hawkins
INDUSTRIAL
Carl Bretscher

WHITE HOUSE TRACKING #: CONTACT PERSON:
PHONE: EXT:
REMARKS: Enclosure to DAB.

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JOHN H. GIBBONS

JOHN H. GIBBONS
DIRECTOR

Congress of the United States
OFFICE OF TECHNOLOGY ASSESSMENT
WASHINGTON, DC 20510-8025

August 1, 1991

384
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91 AUG 1 12:06

OFFICE OF THE
DIRECTOR

The Honorable D. Allan Bromley
Assistant to the President for
Science and Technology
The White House Office
1600 Pennsylvania Avenue, N.W.
Washington, DC 20500

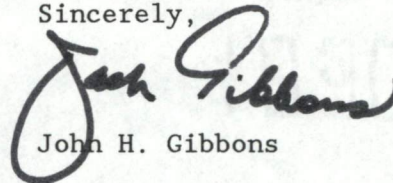
Dear Mr. Bromley:

I am pleased to bring to your attention the OTA Report, Energy Technology Choices: Shaping Our Future. This Report was prepared in response to requests from the Senate Committee on Energy and Natural Resources; the House Committee on Government Operations; the House Committee on Energy and Commerce; and by the Chairman of the Subcommittee on Energy and Power of the House Committee on Energy and Commerce.

The Report provides an overview of energy choices facing the Nation. To prepare this Report, we have drawn together the main themes of OTA reports from the past 16 years, and the findings of many other documents. We hope that this report will be most useful as a "roadmap," rather than as an encyclopedia. The Report reviews options for increasing energy supply and using energy more efficiently. It then analyzes packages of options that would be appropriate to meet national objectives. Finally, the Report suggests policy options to implement the packages.

We will be happy to answer any questions you may have regarding this Report.

Sincerely,

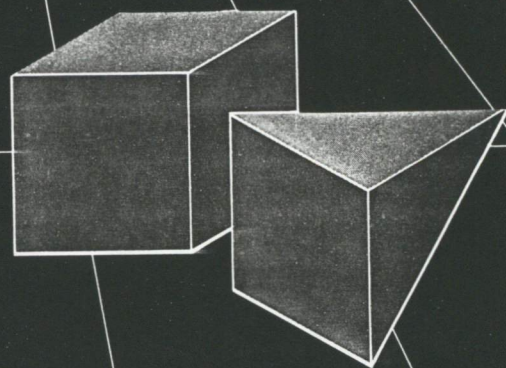

John H. Gibbons

Enclosure

Report
Report Brief

Energy Technology Choices

SHAPING OUR FUTURE



CONGRESS OF THE UNITED STATES
OFFICE OF TECHNOLOGY ASSESSMENT



Energy Technology Choices: Shaping Our Future

The energy crisis of the early seventies has evolved into a more complex and subtle national situation that still entails major dangers. Some fuels, gasoline in particular, are actually cheaper now in real terms, and none show any signs of imminent resource constraints. Energy is used with far greater efficiency than 20 years ago and with less environmental damage per unit of consumption. However, the long-term problems of our growing energy use—accumulating environmental degradation, the national security costs of imported oil supplies, and a worsening trade imbalance from rising levels of oil imports—are as intractable as ever.

Improved technology is a major reason for the present lull in attention to energy. A vast number of options that improved overall energy efficiency allowed the economy to grow 39 percent from 1972 to 1985 with essentially no increase in energy consumption. New technology has also improved the production of oil and natural gas and the combustion of coal. Success in moderating demand and improving supply has led to the present situation of ample supplies at moderate prices. Technology can continue to provide new benefits in the future. Many more technologies for the conversion and use of energy are well along in the development process and can be expected to be cost competitive with further refinement or energy cost increases.

The three greatest uncertainties facing energy policymakers are: how to assure a long-term supply of reasonably priced, convenient fuels, especially for transportation; how to protect the country against disruptions of petroleum imports; and how to mitigate emissions of carbon dioxide if global warming concerns require it. Just as energy itself is useful only insofar as it enables one to achieve some desired service, energy policy is important only in its contribution to the three fundamental national goals of a clean environment, healthy economy, and security. Some energy initiatives contribute to all three goals, while others have conflicting results.

Failure to address these uncertainties could have very serious implications. All indications suggest

that U.S. oil production is in an irreversible decline. Not only are imports almost certain to rise, but peaking production in petroleum fields in other countries indicates that an increasing share of production will be from the Middle East. If the instability of the last several decades continues in that region, it is likely that major disruptions of supply, possibly exceeding our ability to protect the economy against them, will occur. U.S. production of natural gas, the cleanest conventional fuel, may rise some, but it is likely that within a decade the lowest cost resources will be significantly depleted. Oil and gas supply almost two thirds of our energy demand, so the economic cost of price increases will be great unless alternative modes of production or substitutes are available. Failing to prepare for new environmental concerns could lead to extremely costly impacts if global warming develops into a major threat. Complacency on energy issues entails a major risk for the country on all counts—security, economic, and environmental.

High energy prices in the seventies and early eighties were largely responsible for the rapid development and implementation of energy saving technologies that reduced energy demand and led to today's relatively low energy prices. Conversely, these low prices, while good for the economy, are limiting further efficiency, resource exploration, and alternative fuel investments.

Energy investments, whether supply or demand, typically last for decades. Thus, the energy system is slow to change, and problems that are unlikely to be critical for 20 years or more will be far more difficult to manage then if not addressed now. These critical problems include responding to the threat of global climate change, securing affordable supplies of energy, and protecting against oil import disruptions.

There is not now, and probably never will be, any single energy option that will ideally solve our long-term requirements. All options entail some compromises. Opportunities to improve energy efficiency are closest to the ideal. Many cost-effective opportunities exist, even at today's energy prices.

Such investments are generally environmentally beneficial because they reduce energy production and consumption, economically beneficial because they more nearly approach rational distribution of resources, and beneficial to security because they reduce petroleum imports. However, significant structural and behavioral barriers impede their implementation. Alternative energy sources (e.g., nuclear, renewables, synthetic fuel) have some advantages, but none will be cheap relative to current fossil fuels. Thus without major policy initiatives, our energy system is likely to maintain its high dependence on conventional fossil fuels for several decades, increasingly interfering with environmental and security goals and using more than the optimal amount of energy.

Policies to address long-term energy concerns include a wide range of initiatives. Energy taxes can internalize costs, e.g., security or environmental damage otherwise not considered in decisions on appliance, automobile, and industrial process purchases. Financial mechanisms, e.g., subsidies, can target particularly favorable but otherwise uncompetitive (at current energy prices) investments. Regulation can apply standards to raise performance of automobiles, appliances and buildings, and control the conditions under which Federal lands are available for oil and gas exploration. Information programs can improve decisionmaking. Research, development, and demonstration can make available new options. The Federal Government can contribute directly to ameliorating energy problems by taking advantage of highly cost-effective measures to reduce energy purchases for Federal facilities by at least 25 percent.

Initiatives generally could be aimed at improving the efficiency of use and the supply of energy. This report contrasts a baseline scenario (no major initiatives or surprises) with five variations representing different paths the Nation could follow:

- emphasizing production of conventional fuels,
- improving efficiency of use to the economic optimum,
- minimizing the use of energy as far as is technologically possible,
- emphasizing renewable energy sources, and
- emphasizing nuclear energy.

Any of these scenarios could be the most appropriate path depending on the resolution of uncertainties over climate changes induced by the greenhouse effect, technological developments, and resource discoveries. Each scenario presents risks as well as opportunities. The table below shows the effect each scenario might have relative to the base case.

Copies of the report for congressional use are available by calling 4-9241.

Copies of the report for non-congressional use can be ordered from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402-9325 (202) 783-3238. The GPO stock number for the OTA report, "Energy Technology Choices: Shaping Our Future," is 052-003-01251-0. The price is \$7.50.

For further information contact OTA's Publications Office. Address: OTA, U.S. Congress, Washington, DC 20510-8025 (202) 224-8996.

Comparative Impact of Scenarios

Impact	Base	High Growth	Efficiency	High Efficiency	Renewable	Nuclear
Environmental	0	--	+	++	++	+
Security	0	-	+	++	++	++
Economic	0	0	++	0	-	0
Resilience	0	--	+	++	+	0
Implementability:						
Infrastructure	0	++	-	--	-	+
Public acceptance	0	0	+	-	+	-
Sustainability	0	--	+	++	++	+

KEY: 0 = about the same as the base case; + = somewhat better or easier; ++ = much better; - = somewhat worse or harder; -- = much worse.

SOURCE: Office of Technology Assessment, 1991.

"CORRESPONDENCE TRACKING"

TYPE: INFORMATION

DOCUMENT NUMBER: 9123113

ORIGINATOR: 02

STATUS C

DIRECTORATE STATUS

FROM: WATKINS, James D.: THE SECRETARY OF ENERGY

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 07/30/91

SUBJECT: DESIGNATION OF MR. DAVID W. PYATT TO SERVE AS THE
DOE CO-CHAIRPERSON ON THE INTERAGENCY NUCLEAR SAFETY
REVIEW PANEL FOR THE UPCOMING COMET RENDEZVOUS
ASTEROID FLYBY AND CASSINI MISSIONS.

DIRECTORATE
ASSIGNED:

STAFF
ASSIGNED:

ACTION
REQUIRED:

STAFF
ACTION:

SENDER'S DUE DATE:

OSTP DUE DATE:
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STAFF DUE DATE
DATE COMPLETED/DEPT:

COPIES TO: D. Allan Bromley
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PHYSICAL SCIENCES

WHITE HOUSE TRACKING #:

CONTACT PERSON:

PHONE: 202/586-2407 EXT:

REMARKS:

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OSTP RECEIVED: 07/31/91
DEPT RECEIVED:

FILE: P-EAC-CABINET*NAT'L SECURITY



The Secretary of Energy
Washington, DC 20585

July 30, 1991

3113
RECEIVED

91 JUL 31 12:08

OFFICE OF THE
DIRECTOR

The Honorable D. Allan Bromley
Assistant to President for
Science and Technology
The White House
Washington, D.C. 20506

Dear Dr. ^{Allan!} Bromley:

In response to Admiral Richard H. Truly's request to form an Interagency Nuclear Safety Review Panel (INSRP) for the upcoming Comet Rendezvous Asteroid Flyby (CRAF) and Cassini missions, I have designated Mr. David W. Pyatt from the Office of Nuclear Safety (NS) to serve as the DOE's co-chairperson.

Mr. Pyatt was involved with the Ulysses safety review and has been involved with space nuclear power systems since 1966. Mr. Steven M. Blush heads the Office of Nuclear Safety, an independent oversight group reporting directly to me, and will provide any additional information regarding the role of NS if you have any questions. He can be reached at (202) 586-2407.

Sincerely,


James D. Watkins
Admiral, U.S. Navy (Retired)

"CORRESPONDENCE TRACKING"

TYPE: Information
ORIGINATOR: 02

DOCUMENT NUMBER: 9121762
DIRECTORATE STATUS

STATUS C

FROM: COHEN, Bernard, M.D.: MOUNT SINAI SCHOOL OF MEDICINE

TO: DR. D.A. BROMLEY

DATE OF
CORRESPONDENCE: 06/10/91

SUBJECT: A LETTER SENT TO THE MEMBERS OF THE HOUSE AND SENATE
APPROPRIATION COMMITTEES REGARDING THE SPACE
STATION.

DIRECTORATE STAFF
ASSIGNED: D. Allan Bromley ASSIGNED:

ACTION STAFF
REQUIRED: ACTION:

SENDER'S DUE DATE:
OSTP DUE DATE: STAFF DUE DATE
DATE COMPLETED: DATE COMPLETED/DEPT:

COPIES TO: Carl Bretscher

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PHONE: EXT:
REMARKS:

OSTP RECEIVED: 06/17/91
DEPT RECEIVED:

FILE: ~~INFORMATION~~

P- Congressional * Space



THE MOUNT SINAI MEDICAL CENTER

ONE GUSTAVE L. LEVY PLACE • NEW YORK, NY 10029-6574



Mount Sinai School of Medicine • The Mount Sinai Hospital

Bernard Cohen, M.D.
Dr. Morris B. Bender
Professor of Neurology
Box 1135

(212) 241-7068

June 10, 1991

Honorable Allan Bromley
Assistant to the President and Director
Office of Science and Technology Policy
New Executive Office Building
Washington DC 20506

Dear Dr. Bromley:

Enclosed is a copy of a letter that I sent to members of the House and Senate Appropriations Committees. I hope that the country will continue to provide support for the Space Station Program. Thank you for your attention.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Bernard Cohen'.

Bernard Cohen M.D.

OFFICE OF THE
DIRECTOR

91 JUN 17 AIO : 01

RECEIVED



THE MOUNT SINAI MEDICAL CENTER

ONE GUSTAVE L. LEVY PLACE • NEW YORK, NY 10029-6574



Mount Sinai School of Medicine • The Mount Sinai Hospital

Bernard Cohen, M.D.
Dr. Morris B. Bender
Professor of Neurology
Box 1135

June 6, 1991

(212) 241-7068

The Honorable Robert C. Byrd
Senate Committee On Appropriations
136 Dirksen Senate Office Building
Washington, DC 20510

Copy

Dear Senator Byrd:

I am writing to express my deep concern over the recent action that would terminate Space Station Freedom. I would like to urge the restoration of full funding for this program. Space Station Freedom is essential if we are to have a continued presence in space. Without it we will never get the information that is necessary to provide necessary medical support for humans to live and work in space. Moreover, we will never have the ability to do basic biomedical studies that are essential for understanding effects of microgravity on bone, muscle, or the brain in humans. These can only be done in a facility such as Space Station.

I am a neuroscientist, a member of the American Physiological Society, the Neuroscience Society and the American Society for Gravitational and Space Biology. I have been involved in Space Biology Research in the US and COSMOS Programs, so I am well aware of the achievements and needs of the NASA Life Science program. As Space Station has evolved, NASA has made extraordinary efforts to tailor the program to meet Congressional demands. Now that the program is reduced, it is being criticized for being inadequate for scientific needs. This was inevitable, because of the mandated cuts, but it is not enough to justify junking the entire program. The proposed cut in Space Station will virtually bring any long range planning for space biology in larger animals or in humans to a halt. All research cannot be done on small animals or on cells, and it must include work on primates and humans who will have prolonged exposure to microgravity.

I hope that you will consider the continuing need for biomedical information on humans in space when you evaluate the importance of this program.

20 : 02 11 JUN 16

RECEIVED

Respectfully,

Bernard Cohen
Bernard Cohen, M.D.

"CORRESPONDENCE TRACKING"

TYPE: CONGRESSIONAL

DOCUMENT NUMBER: 9121541

FROM: GIBBONS, John H.: OFFICE OF TECHNOLOGY ASSESSMENT

TO: DR. BROMLEY

DATE OF
CORRESPONDENCE: 05/22/91

SUBJECT: A COPY OF OTA'S REPORT ON "RURAL AMERICA AT THE
CROSSROADS: NETWORKING FOR THE FUTURE".

ASSIGNED TO:

ACTION REQUIRED:

SENDER'S DUE DATE:

OSTP DUE DATE:

DATE COMPLETED:

COPIES TO: D. Allan Bromley
INDUSTRIAL

WHITE HOUSE TRACKING #:

CONTACT PERSON:

REMARKS: Enclosures to DAB; the OSTP Library currently has a copy on
file.

DATE RECEIVED: 05/29/91

FILE: P- CONGRESSIONAL

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DON SUNDQUIST, TENNESSEE
AMO HOUGHTON, NEW YORK

JOHN H. GIBBONS

9121541

JOHN H. GIBBONS
DIRECTOR

Congress of the United States
OFFICE OF TECHNOLOGY ASSESSMENT
WASHINGTON, DC 20510-8025

May 22, 1991

The Honorable D. Allan Bromley
Assistant to the President for
Science and Technology
Director, Office of Science
and Technology Policy
360 Old Executive Office Building
Washington, DC 20506

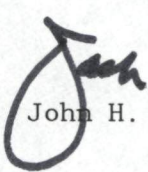
Dear Allan:

I am pleased to enclose OTA's Report on Rural America at the Crossroads:
Networking for the Future.

The Report examines how information and communication technologies can help rural America take full advantage of the information age. It assesses the current status of telecommunication services in rural America, evaluates the potential for new technologies and services, identifies obstacles to using rural telecommunication for rural economic development, and suggests ways that Federal policies might help overcome these barriers.

I hope you will find the Report useful and informative.

Sincerely,


John H. Gibbons

Enclosures:
Summary
Report
Report Brief

RECEIVED
91 MAY 29 A 9:30
OFFICE OF THE
DIRECTOR



RURAL AMERICA AT THE CROSSROADS: Networking for the Future

Economic, education, and health indicators show rural America to lag behind its urban neighbors. Two forces make its economic prospects even more troubling: First, today's global economy forces rural communities to compete in the international marketplace; second, telecommunications and computers are indispensable tools of business, and rural communities lag behind metropolitan areas in being able to access and use them.

Roads and transportation arteries linking rural regions with urban centers were once considered vital to sustaining rural life. In the emerging information age, modern telecommunications and information technology are just as vital as roads. They are the modern roads and byways of commerce. Rural development programs must use them fully. Yet rural telecommunications and computer systems designed solely for business purposes—without concern for improving education, health care, and social services—will still miss the mark.

Just when modern telecommunication and information technologies are playing an increasingly important role in business, the regulatory structure that once provided rural areas equal access to them is coming unraveled. The breakup of the Bell system and the shift toward deregulated services have undermined the system of subsidies that once

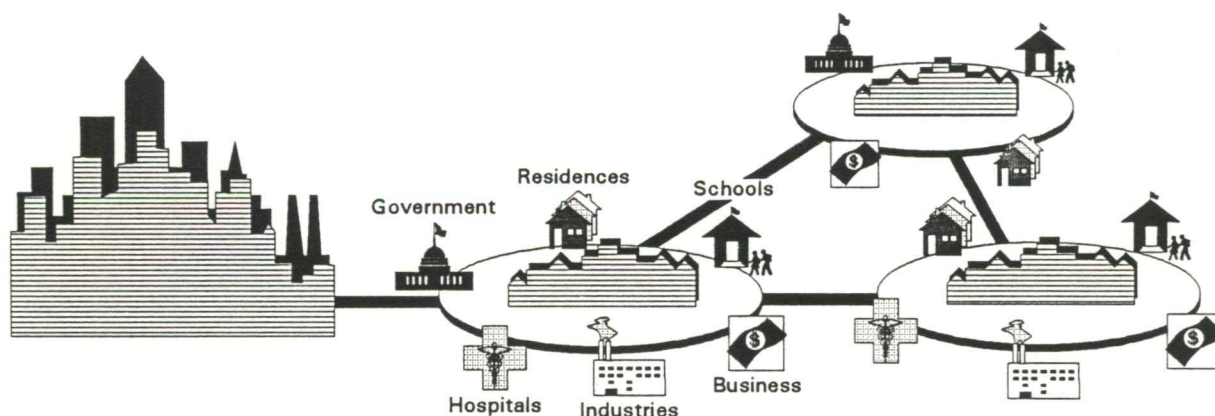
supported rural services. If rural areas are not to suffer further decline, new concepts and designs for rural telecommunication systems must be found. OTA believes this to be possible.

Before divestiture of the Bell system, network designs and regulatory models were the sole province of AT&T and Federal/State regulators. This is no longer the case. Technological innovation and regulatory flexibility now allow mixing and matching of network design and business relationships to fit the needs of the users. This is particularly important to rural areas, which have been forced in the past to accept network designs, services and regulations based on a universal design.

Rural communities, with low population density and long distances, must overcome the cost of bringing in modern telecommunication services. The key is to combine the demand for services from different users in the community, creating sufficient economic clout to justify the deployment of modern technologies and services. One might conceive of this as a "Rural Area Network" or RAN (see figure 1).

A RAN would link many users in a community, including small businesses, educational institutions, libraries, health services, and government services.

Figure 1—Rural Area Network



SOURCE: Office of Technology Assessment.

The Office of Technology Assessment (OTA) is an analytical arm of the U.S. Congress. OTA's basic function is to help legislators anticipate and plan for the positive and negative impacts of technological changes.

For many rural communities, this combined demand would equal that of a modest corporation or large business and thus make it economically feasible to utilize technologies such as fiber optics. RAN's could also become networks within networks by linking them statewide through State educational and/or State government networks that already exist or are planned. (See box)

A number of obstacles must be overcome to develop rural area networks and to integrate them into development programs and strategies. Regulators base their action on conditions of the present and have difficulty in projecting the needs for the future. They are unaccustomed to considering communications in the context of economic development and generally oppose proactive policies for technology deployment. Regulators focus on the needs of individual subscribers on a service-by-service basis, and, because of antitrust concerns, are uneasy about allowing the collaboration among communication vendors and users needed for comprehensive rural development. Federal/State jurisdictional conflicts create an uncertain regulatory environment that can stifle innovative approaches to serving rural needs.

Rural citizens are disadvantaged in using new communication technologies for economic development. They lack adequate infrastructure and the necessary skills and experience. This contrasts sharply with urban areas where there is a critical mass of both technology and sophisticated users that stimulates new applications and expanded use. To overcome the rural disadvantage will require a major commitment on the part of individuals, businesses, educators, libraries, health care providers, and local, State, and Federal Governments. Substantial risk is involved, but being too cautious could lead to failure.

Notwithstanding the opportunities that new communication and information technologies offer, technology alone cannot level the playing field for rural areas in meeting the challenges of urban and global competitors. Many other barriers to economic development exist that are more crucial and immediate. These include social problems such as low educational attainment, poverty, and poor health. Solutions to these problems are difficult because of inadequate physical infrastructure and lack of financial capital. If economic development is to be self-sustaining, these problems must be attacked through comprehensive community development programs that include economic development as one goal, but attack social problems as well. Communications technologies may prove key to delivering educational, health, and social services to rural communities, and may be crucial to stemming further economic decline for rural America.

Means must be found to bring together the interests and energy of a wide array of institutions

Here Is What Rural Area Networks Can Do

- They allow the economic deployment of advanced technology to rural areas through economies of scale and scope.
- By sharing the needs of business, education, health and government, they could foster cooperation and community ties.
- The broad range of participation among shared users would link the technology directly to economic and community development strategies.
- They would overcome limitations of technical telecommunications expertise found prevalent in rural areas by focusing on the design of one system.
- They would induce communication providers to be responsive to rural needs as a result of the combined market power.

and individuals to focus on mutual goals through a common strategy. The actors must include institutions (e.g., schools, libraries, and hospitals), communications providers (e.g., Bell operating companies, independent telephone companies, cable television and satellite companies), and agents of change (e.g., regional and local colleges, universities and educational institutions, Federal and State Governments, and the business community).

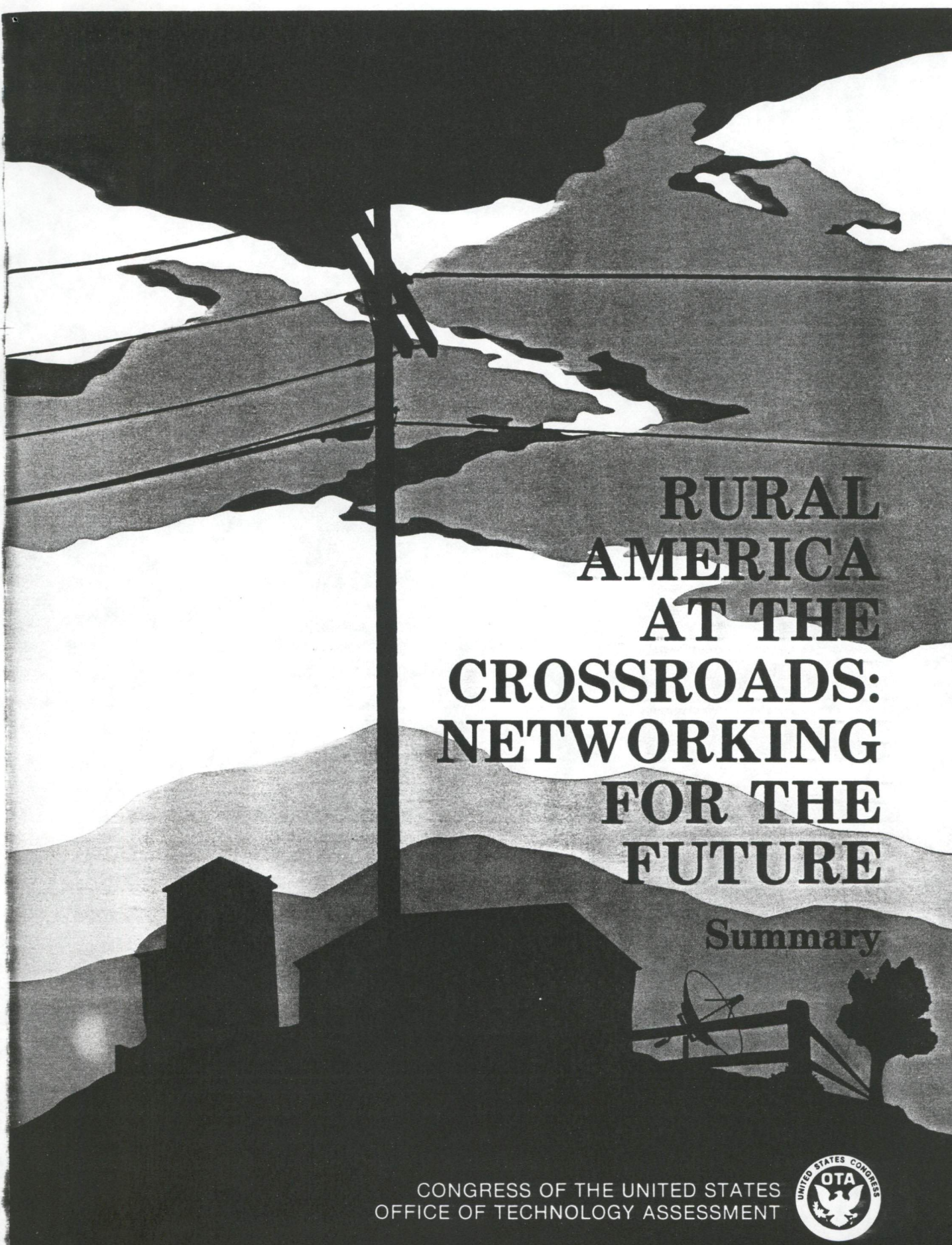
Such a comprehensive approach to economic and community development may seem threatening to entrenched interests. New alliances may threaten established government agencies. Communications providers may fear that efforts to pool the demand of users might lead to bypassing the existing communications systems. The cooperation required for rural economic and community development based on a shared communication network (RAN) will not occur unless petty jealousies are set aside for a common vision and a spirit of cooperation.

If this is to happen, the Federal Government must provide leadership backed up by organizational and financial resources to see it through. While the Rural Development Act is a step in the right direction, the Federal Government could contribute to its success by taking a more active and visionary approach in the future.

Copies of the report for congressional use are available by calling 4-9241.

Copies of the report for non-congressional use can be ordered from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402-9325 (202) 783-3238. The GPO stock number for the OTA report, "Rural America at the Crossroads: Networking for the Future," is 052-003-01228-6. The price is \$9.50. The GPO stock number for the summary is 052-003-01230-8. The price is \$2.00.

For further information contact OTA's Publications Office. Address: OTA, U.S. Congress, Washington, DC 20510-8025 (202) 224-8996.

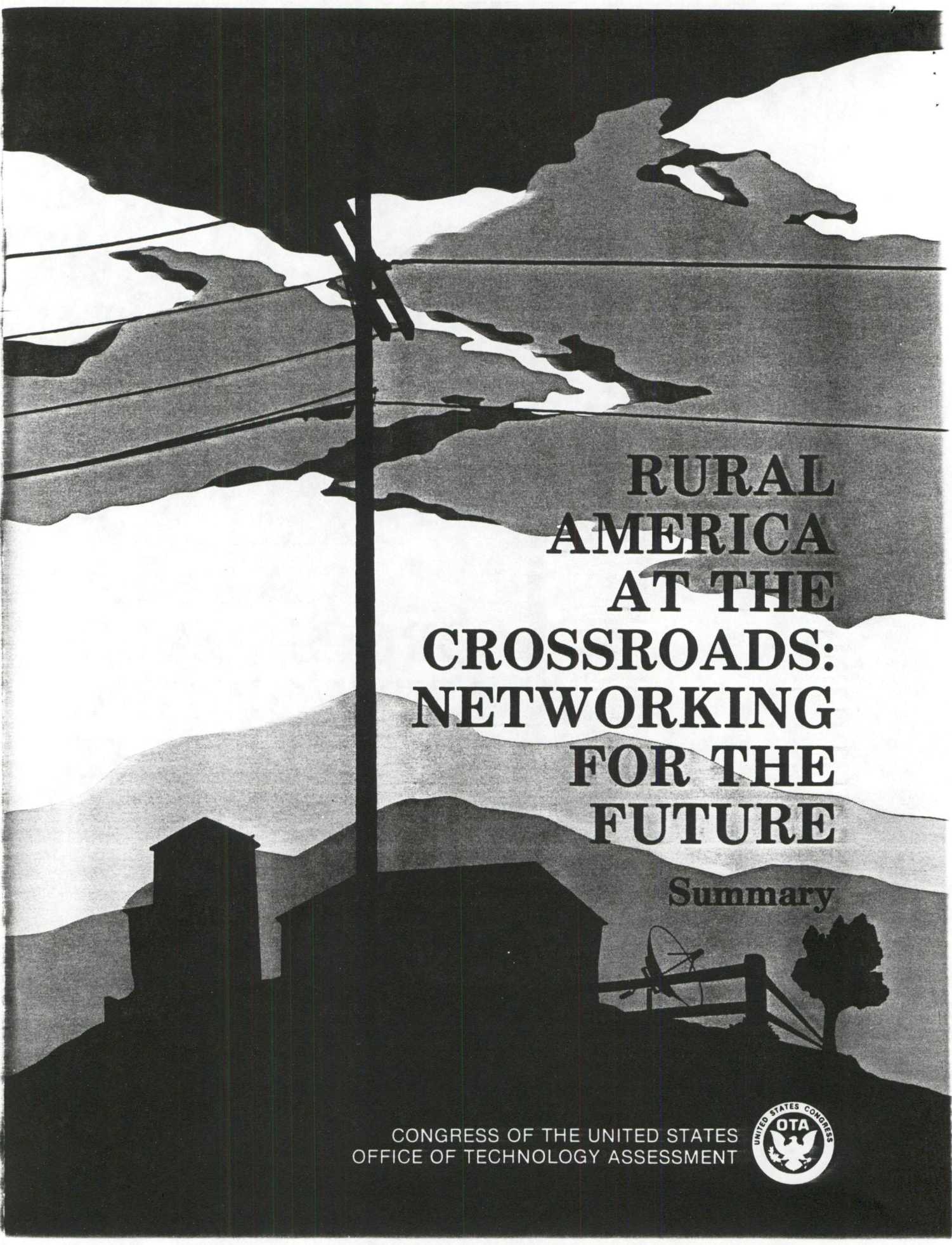
A stylized, high-contrast black and white illustration of a rural landscape. In the foreground, there are dark silhouettes of a barn and a house. A utility pole with several power lines stands prominently in the middle ground. The background features rolling hills and a sky with large, dark, irregular shapes representing clouds or mountains. The overall style is graphic and minimalist.

RURAL AMERICA AT THE CROSSROADS: NETWORKING FOR THE FUTURE

Summary

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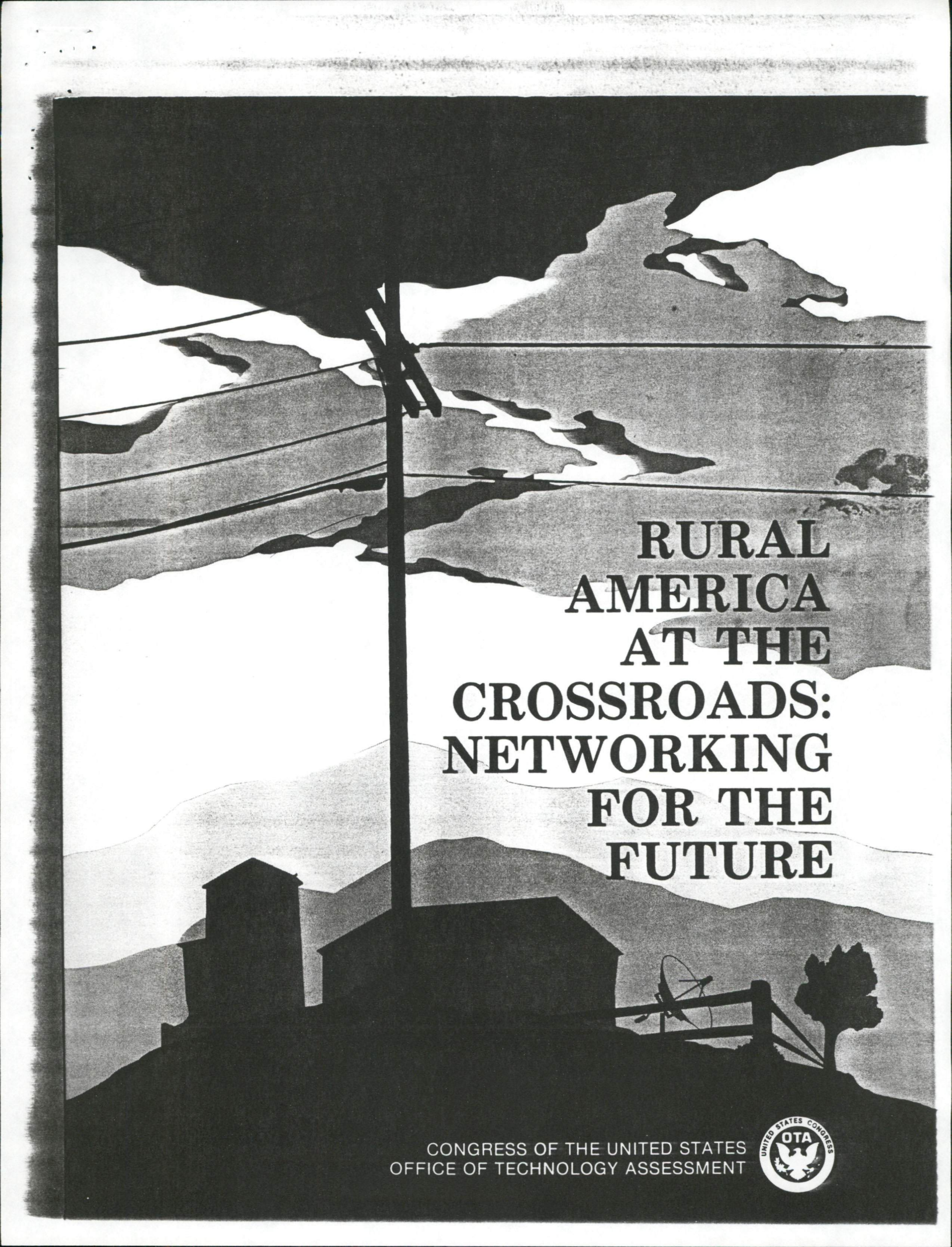
A stylized, high-contrast black and white illustration of a rural landscape. In the foreground, there are dark silhouettes of a barn and a water tower. A utility pole with several power lines stands prominently in the middle ground. The background features rolling hills and a sky with large, dark, irregular shapes representing clouds. The overall style is graphic and minimalist.

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TO: DR. BROMLEY

DATE OF
CORRESPONDENCE: 05/09/91

SUBJECT: RE: OTA REPORT, "ENERGY EFFICIENCY IN THE FEDERAL
GOVERNMENT: GOVERNMENT BY GOOD EXAMPLE?"

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May 9, 1991

The Honorable D. Allan Bromley
Assistant to the President for
Science and Technology
The White House Office
1600 Pennsylvania Avenue, N.W.
Washington, D.C. 20500

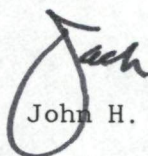
Dear Allan:

I am pleased to bring to your personal attention the OTA Report, Energy Efficiency in the Federal Government: Government by Good Example? This Report was prepared as part of the ongoing assessment, U.S. Energy Efficiency: Past Trends and Future Opportunities, which is examining the opportunities for energy efficiency gains from the perspective of major end users: the residential and commercial sector, industry, transportation, government, and electric and gas utilities. The analysis is being made in response to requests from the Senate Committees on Governmental Affairs, and on Energy and Natural Resources; the House Committee on Energy and Commerce; and endorsed by the Subcommittee on Environment, Energy, and Natural Resources of the House Committee on Government Operations and by the Chairman of the Subcommittee on Environment of the House Committee on Science, Space and Technology.

This Report focuses on the Federal Government's operations in terms of the opportunities and constraints for greater energy efficiency. We conclude that energy efficient technologies could substantially reduce energy use in the government and lessen environmental impacts while increasing productivity and saving money. Yet, adoption rates for energy efficient technologies are low. We review current efforts to improve Federal energy efficiency and discuss policy options that could accelerate the adoption of these measures.

We will be happy to answer any questions you may have regarding this Report.

Sincerely,



John H. Gibbons

Enclosure

Report

Energy Efficiency in the Federal Government

GOVERNMENT BY GOOD EXAMPLE?

DO NOT RELEASE UNTIL

May 14, 1991

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