

OPTIONAL FORM NO. 10 (7-90)

FAX TRANSMITTAL

of pages 4

To: Dirk Forrister	From: T. Narel
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5099-101

GENERAL SERVICES ADMINISTRATION

RAFT

MEMORANDUM

TO: Karl Hausker
Acting Deputy Assistant Administrator, EPA

Dirk Forrister
Special Assistant to the Secretary, DOE

FROM: Tracy Narel
Global Change Division
Environmental Protection Agency

DATE: July 29, 1993

RE: REVISED 1-PAGERS FOR CCMG: COMMERCIAL SECTOR

Attached please find two revised summary matrices for the commercial sector options, along with one-pagers revised to address CCMG issues.

The political analysis is a little short, but I now understand that Chupka wants that under a separate on separate sheets anyway.

I could do further work with my subgroup, early Friday, 7/30th, if you see some obvious holes that you would like to have filled.

DRAFT

	Subgroup Rating	Energy Savings PRIMARY				Carbon Savings				1993-2000 Cumulative Non-Federal Investment Cost	
		2000		2010		2000		2010		Low Lcw (Billion \$)	High High (Billion \$)
		Low Imple (Quads)	High Imple (Quads)	Low Imple (Quads)	High Imple (Quads)	Low Imple (MMTC)	High Imple (MMTC)	Low Imple (MMTC)	High Imple (MMTC)		
NEW TECHNOLOGIES: DEVELOP & COMMERCIALIZE											
Strategy 1: R & D	TC										
Option CD21: DOE R&D		0.008	0.016	0.433	0.811	0.1	0.3	6.8	12.7	NA	
Strategy 2: Commercialization											
Option CD17: Expand Cost-Shared Demonstrations	NB	0.043	0.081	0.183	0.336	0.7	1.5	2.9	5.3	2.5	4.8
Option CD8: Better Refrigerants	NB	0.009	0.009	0.043	0.043	0.2	0.2	0.8	0.8	0.6	0.6
Subtotal		0.06	0.11	0.65	1.19	0.99	1.97	10.45	18.75	3.1	5.4
EXISTING TECHNOLOGIES: EXPAND MARKETS											
Strategy 3: Education and Training											
Option CD18: Nat. EE Education & Training Prg	NB	0.069	0.098	0.304	0.587	1.1	1.5	4.8	9.4	1.6	2.4
Option CD19: Nat. EE and Renew. Info Campaign	NB	0.043	0.106	0.152	0.229	0.7	1.7	2.4	3.7	~~2.2~~ 1.8	~~5.6~~ 4.5
Subtotal		0.11	0.20	0.46	0.82	1.80	3.20	7.20	13.10	3.8	7.9
Strategy 4: Voluntary Commitment Programs											
Option CD6: Expanded Green Lights	NB	0.077	0.148			1.5	3.0			3.6	7.2
Option CD7+: Coordinated DOE & EPA Buildings Program	NB	0.133	0.133			~~2.5~~ 7.5	2.5			~~6.4~~ 5.7	6.4
Option CD22: Environmentally Sustainable Communities	TC										
Subtotal		0.21	0.28	0.00	0.00	4.00	5.50	0.00	0.00	10.0	13.6
Strategy 5: Federal & Related Public Sect Prgs											
Option CD20: Federal Government Leadership	NB	0.068	NA	NA	NA	1.0	NA	NA	NA	3.0	3.0
Strategy 6: State/Local/Utility Programs											
Option CD23: State Revolving Funds for Pub Bldgs	NB					2.0	NA	6.8	NA	4.4	14.4
Strategy 7: Building Codes & Eculp Std											
Option CD24: Resources for st bldg code entr	NB/TC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
COMMERCIAL SECTOR TOTAL		0.450	0.591			9.790	10.670			33.900	44.300

Notes:
-- [] Bracketed numbers indicates no subgroup agreement
-- Status = NB (No Brainer); TC (Tough Choice); NS (Non-Starter)
-- (1) The level of incremental Federal expenditure above current FEMP/EPACT levels is not clear
-- (2) Carbon savings estimates not necessarily calculated using a consistent carbon conversion factor

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COMMERCIAL SECTOR ENERGY DEMAND OPTIONS

FEDERAL BUDGET ESTIMATES FOR OMB/CCMG --- July 29, 1993; Numbers Subject to Change

Option Title	Federal Budget Cost							Federal Cumulative FY 94-2000	
	FY'94 (Million \$)	FY'95 (Million \$)	FY'96 (Million \$)	FY'97 (Million \$)	FY'98 (Million \$)	FY'99 (Million \$)	FY'2000 (Million \$)	Low (Million \$)	High (Million \$)
NEW TECHNOLOGIES: DEVELOP & COMMERCIALIZE									
Strategy 1: R & D									
Option CD21: DOE R&D	10-24	10-24	10-24	10-24	10-24	10-24	10-24	70.0	168.0
Strategy 2: Commercialization									
Option CD17: Expand Cost-Shared Demonstrations	5-10	10-15	10-15	10-15	15-35	0.0	0.0	50.0	100.0
Option CD8: Better Refrigerants	2.0	2.0	2.0	2.0	2.0	2.0	2.0	14.0	14.0
EXISTING TECHNOLOGIES: EXPAND MARKETS									
Strategy 3: Education and Training									
Option CD18: Nat. EE Education & Training Prg	4-6	7-9	7-9	4-6	3-5	0.0	0.0	25.0	35.0
Option CD19: Nat. EE and Renew. Info Campaign	2-4	4-7	4-7	1-2	1-2	0.0	0.0	12.0	22.0
Strategy 4: Voluntary Commitment Programs									
Option CD6: Expanded Green Lights	14.0	14.0	14.0	14.0	14.0	14.0	14.0	98.0	98.0
Option CD7+: Coordinated DOE & EPA Buildings Programs	15-20	15-20	15-20	15-20	15-20	15-20	15-20	105.0	140.0
Option CD22: Environmentally Sustain Communities									
Strategy 5: Federal & Related Public Sect Prgs									
Option CD20: Federal Government Leadership	NA	NA	NA					NA(note)	
Strategy 6: State/Local/Utility Programs									
Option CD23: State Revolving Funds for Pub Bldgs	0.0	10.0	10.0	10.0	10.0	10.0	0.0	50.0	50.0
Strategy 7: Building Codes & Equip Std									
Option CD24: Resources for st bldg code enr	3.0	12.0	12.0	12.0	12.0	12.0	0.0	63.0	63.0
COMMERCIAL SECTOR TOTAL								487.0	690.0

Notes:

-- (1) The level of incremental Federal expenditure above current EPACT levels is not clear

fn: COMDOMB1.WK3

Global Climate Change Actions

Policy	Title	Federal Budget Outlays 1994-2000 (Millions)	Utility Role in Implementation (Yes or No)	Non-Federal Capital Costs (1994-2000) (Millions)	Present Value of Option (Two Values)
Commercial Actions					
CD6	Expanded Green Lights	98	Yes	4,000-7,000	
CD7	Coordinated DOE and EPA Buildings Program	105	Yes	3,700	
CD8B	Refrigerants	14	No	600	
CD11	~~Cool Communities~~ Move to residential sector	—	—	—	—
CD17	Expand Cost-Shared Demonstrations	50	No	2,500	
CD18	National EE Education and Training Program	25	Yes	1,600	
CD19	National EE and Renewable Information Program	12	Yes	1,800	
CD20	Federal Leadership	NA(1)	No	—	
CD21	DOE Research and Development	70	No	NA	
CD23	State Revolving Fund for Public Buildings	50	Yes	4,400	
→	Total				

CD24 Resources for State Building Code Enforcement

63

Yes

NA

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Notes:

NA - Estimate not available.

(1) - Increment over baseline FEMP/EPACT yet to be determined

OPTION DESCRIPTION

TITLE: Expand DOE Research and Development Program For Commercial Buildings

DESCRIPTION: DOE presently spends about \$40 million annually on research, development, and demonstrations (RD&D) of new energy saving technologies for buildings. This research is primarily carried out by national laboratories and tends to be long term in nature. Over the past fifteen years this program has accelerated the commercialization of various energy efficient measures, including electronic ballasts, low-emissivity window coatings, improved compressors for refrigeration equipment, and heat pump water heaters.

It would be useful to expand DOE's R&D program on building technologies, particularly emphasizing R&D funded jointly by the government and the private sector. Many energy-saving technologies have been partially developed by manufacturers, but work to complete their development is proceeding slowly due to cutbacks in private sector R&D budgets and/or manufacturer concerns that consumers will not be interested in energy-efficient equipment. Among the promising products whose commercialization could be accelerated by DOE co-funding are incandescent lamps that are 25-50% more efficient than today's products, fuel cells for building applications, new "electronic" motors that operate at high efficiency even under part-load conditions, and high efficiency commercial air conditioning equipment.

It is proposed that \$10 million in Federal funds be added to commercial building energy efficiency R&D program each year, with the private sector required to match these funds (at least) dollar for dollar. For a high implementation case, it is proposed matching the recommendation of ACEEE-- which would be \$24M/yr for the commercial sector.

IMPLEMENTATION: The program would be administered by the DOE Office of Building Technologies. Proposals would be solicited through private industry, utilities, and states. R&D will be conducted by national laboratories and private R&D entities.

GREENHOUSE GAS EMISSION REDUCTION: In 2000, 0.13-0.27 MMTC; in 2010, 6.75-12.65 MMTC.

ESTIMATE OF COSTS: \$10-24M/yr of Federal funds with cost sharing by the private sector at least equalling that amount. A larger cost share by the private sector is anticipated (2:1) as these technologies move closer to full marketization.

COST EFFECTIVENESS: NA

AFFECTED STAKEHOLDERS: Utilities, Building Contractors, Energy Service Companies, Manufacturers of the affected technologies (e.g., HVAC, appliances, etc.), commercial consumers, environmental groups, government agencies.

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7/16/93 1200 Hours

07/29/93 15:41

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Option: Expand Cost-Shared Demonstrations of Emerging TechnologiesDescription

One major barrier to market acceptance of emerging energy efficiency and renewable energy technologies is a lack of confidence in the technical and economic acceptability of the technologies. In many cases, risk minimization is the major decision factor for energy related investments. This barrier can be substantially reduced through this initiative which promotes field validation through a series of cost-shared demonstrations. These demonstrations would be full-scale applications of new technologies or practices in Federal, state and local, or private buildings. The demonstrations would allow manufacturers to acquire field experience with the technologies - increasing familiarity, lowering perceived risk and accelerating commercialization.

Implementation

The program would be administered by DOE and proposals would be solicited from private industry, and states to demonstrate technologies that are close to "market ready". Proposals would be evaluated on the basis of technical merit, level of cofunding by manufacturers and host agencies, state and local government involvement, and proposed information dissemination. Experience and knowledge gained could be disseminated by the partners and the DOE Field Network.

Program activities would include:

- identification of emerging energy technologies meeting the needs of specific industries and regions;
- identification of complimentary non-hardware innovations to co-demonstrate (e.g., innovative financing arrangements);
- solicitations of proposals from private or public-sector organizations that would act either as hosts or contributors for the demonstration;
- installation of the new technologies with significant cost sharing from the host organizations and other partners;
- monitoring and evaluation of the performance of the technologies;
- facilitation of first-hand observation of the demonstrations by potential investors, users, manufacturers and others; and
- dissemination of evaluation results through the partners, industry associations, state governments and the DOE field network.

Stakeholders Affected

This initiative would impact States, Federal agencies, the gas and electric industries, technology manufacturers and consumers.

Benefits

By 2000, this initiative can save 0.7 to 1.5 MMT of carbon

Cost

A fund of \$50 to \$100 million would be established over 5 years

Staff Contact

David Patton-DOE/EE

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To Tracy Nare	From David Patton	
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TITLE: Better Refrigerants

DESCRIPTION:

Lead agency- EPA. CFC and HCFC refrigerants will be phased out between 1996-2030. To commercialize refrigerants that maximize energy efficiency potential, all risks must be identified and weighed and any institutional barriers resolved. Quantifying risks allows for more informed trade off analysis and decision making, and solid support for revising codes, standards and regulations which may be barriers to market introduction.

Currently, refrigerant alternatives which provide better efficiency (5%) over other alternatives are flammable. To allow the market to determine if flammable risks are acceptable, risk assessment, testing, liability analysis and insurance options are necessary for each use sector; home refrigerators, home air conditioning (central, heat pumps, window units), supermarkets, chillers. The results are necessary to eliminate institutional barriers which restrict their safe use.

IMPLEMENTATION:

Under Section 612 of the Clean Air Act, the EPA has the legislative authority to determine the acceptability of alternatives based on evaluation of all risk factors. The commercialize of energy efficient refrigerants, requires a comprehensive program which includes quantitative data to support changes in codes and standards needs to include: verification of energy performance of refrigerants (through labs like ORNL), conducting risk assessments and full scale fire testing, evaluating product liability issues and facilitating and support of building code and safety standards revisions.

Additional funding would be required:

4 FTE: One each for: risk assessment, full scale testing analysis, legal analysis, regulations.

Funding: \$2 million to support contractors, testing organizations, regulatory development, code and standard changes.

GREENHOUSE GAS EMISSION REDUCTIONS:

Low <1 MMTC

ROUGH ESTIMATE OF COSTS:

Commercializing energy efficient refrigerants should cost less than currently proposed alternatives. Added costs may be necessary to mitigate safety risks, but cost savings from increased energy efficiency and reduced long term risk of making additional changes should offset any potential cost increase.

AFFECTED STAKEHOLDERS:

Environmental groups, Government agencies, Safety organizations, Chemical companies, Refrigeration manufacturers

STATUS OF AGENCY ANALYSIS

Home refrigerator risk assessment and testing conducted on one refrigerant, efficiency testing conducted in home refrigerators and preliminary testing in home air conditioners. Some safety standards being addressed; support revisions to building codes and standards to include CFC substitutes. Further analysis to be conducted to estimate the cost-effectiveness and total greenhouse gas emission reductions in all sectors.

STAFF CONTRACTS:

Jean Lupinacci, EPA, (202) 233-9137 phone; (202) 233-9579.

Option: Establish a National Energy Education and Training Program

Description

Education and training in the deployment of conservation practices and energy efficient technologies is a major barrier to improving energy efficiency nation-wide. Energy efficient technologies are not widely implemented as designers, builders, code officials, business managers, and the financial community lack understanding of how energy efficient technologies and practices work or how they can improve the cost of doing business. Many professionals lack access to the facts about energy saving products and practices, their costs, performance, availability, operation, maintenance etc. Also, many facilities managers are not well trained in monitoring and operating buildings to maximize system efficiency.

In addition to the lack of good information on energy efficient technologies, the practice of commissioning after a building is built to ensure that the buildings energy performance meets expectations. Commissioning is estimated to save 10% to 20% of the energy used in a new building by optimizing its performance. However, the benefits of commissioning are not well documented or known by builders.

Implementation

This initiative is a broad based education effort. The following activities are examples of some components of a comprehensive national education and training program.

- Conduct a comprehensive review of energy education and training programs nationwide including a review of the available resources in all trade, professional, and technical fields related to energy efficiency in the energy end-use sectors.
- Provide matching grant funds to states (through State Energy Conservation Program grants) for state and local government energy education programs. Target specific professionals such as code officials, engineers architects and builders. Training can also be cofunded with utilities, industry and professional associations.
- DOE can develop generic training materials aimed at the specific needs of certain energy professionals to provide consistency and reduce the setup costs for state and local, and industry sponsored programs.
- Initiate a series of regional and one national design competition to promote the use of energy efficient design practices and technologies by architects and engineers. The competitions would also encourage architects and builders to voluntarily use and understand the building energy standards.
- Work with industry to design a certification process for facilities managers to encourage more efficient operation and maintenance of existing buildings.
- Establish a project to quantify the costs and savings of commissioning and provide necessary information and products to help establish it as a widespread practice.

Stakeholder Support

This initiative would be supported by universities, States, utilities, energy efficiency and renewable energy groups and private industry.

Benefits

Carbon savings from this initiative would be 1.6 to 2.2 MMT by 2000

Cost

The collective costs of the above described activities would be \$25 million over 5 years

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Option: Establish an Energy Efficiency and Renewable Energy Information Campaign

Description

A pervasive barrier to the deployment of energy efficiency and renewable energy technologies and practices is the the lack of accurate and useful information in the hands of key end-users and professionals. A national information initiative would facilitate better decisions by facility managers, homeowners, architects and engineers, and others. In addition, this program is a key in supporting and complementing all other deployment programs.

DOE will leverage the campaign by working with a variety of different groups and organizations, such as the National Advertising Council, industry associations, state energy offices, technology manufacturers and public interest groups. DOE already has pre-existing agreements and working relationships with many of these organizations, as well as an effective field structure reaching into every state. This program will build on the activities of the regional building efficiency centers that are being established under the Energy Policy Act. However, the budget estimates in this initiative does not include the cost of the centers.

Implementation

Implementation of this program would consist of a number of actions, including, but not limited to:

- using the 10 regional building efficiency centers authorized in the Energy Policy Act of 1992 to distribute the materials provide expert support to buildings professionals.
- development of information materials targeted to specific end-users and professionals;
- initiate a media campaign to promote energy efficiency and renewables
- identification of past or ongoing related information activities as well as organizations to cofund the program;
- make available through the centers the materials developed for architects, engineers, and facility managers in the energy efficiency education and training program.

Stakeholders Affected

Consumers, private corporations, and industry and professional associations.

Benefits

Carbon savings from this initiative would be 0.7 to 1.8 MMT by 2000

Cost

5 year costs for the expert support at the centers, the materials, and the media campaign would be approximately \$12 million

Staff Contact:

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July 29, 1993

TITLE:

Option CD6: EXPANDED GREEN LIGHTS

DESCRIPTION:

Expand current EPA voluntary Green Lights Program.

Launched in January of 1991, the EPA Green Lights Program is a voluntary, non-regulatory program designed to reduce pollution through the initiative of organizations across the country. All Green Lights participants ("Partners") sign a "Memorandum of Understanding" (MOU) with EPA, agreeing to (1) survey all their domestic facilities, (2) upgrade their lighting where profitable, and (3) complete their lighting upgrades within 5 years. An upgrade is deemed profitable if it shows an internal rate of return exceeding the prime rate plus six points (i.e., roughly 12-13%). EPA supports Green Lights participants with a package of tools designed to ensure that lighting upgrades will result in the greatest possible energy savings and the highest possible return on investment. A team of lighting experts provides Green Lights participants with technical support and problem-solving advice through a technical hotline, comprehensive manual, regional training workshops, up-to-date literature, and on-site implementation visits. Additionally, Green Lights "Allies" programs for lighting manufacturers, lighting management companies, and electric utilities extend the Green Lights partnership by enlisting the support of the lighting and power industries.

Expansion of the Green Lights Program to produce energy savings beyond those included in the baseline would entail several new or significantly expanded initiatives designed to capture hard to reach portions of the market and generally increase the availability of energy-efficiency lighting products. Expanded programs would include: Green Lights; Non-Profit Marketing support to increase participation by other segments such as universities and health-care facilities; Small Companies marketing and implementation; Super Ally Program to include 10 new utilities; Expand Assist Organization's education effort to 5 more regional groups; and, Distributor Ally Program support to benefit non-participants.

IMPLEMENTATION: Voluntary program under requirements of the Clean Air Act (CAA) and the Pollution Prevention Act.

GREENHOUSE GAS REDUCTION:

MEDIUM: TOTAL EXPANDED GREEN LIGHTS: 1.5 - 3 MMTC

COSTS:

Public: EPA costs:

Non-Profit Marketing: 4 FTE, \$2 million. Small Companies: 4 FTE, \$2 million. Super Ally Program: 4 FTE, \$2 million. Assist: 2 FTE, \$6 million. Distributor Ally Program: 4 FTE, \$2 million. TOTAL EXPANDED GREEN LIGHTS: 18 FTE, \$14 MILLION.

Private: NA. Program based on highly profitable investments which show internal rates of return exceeding the prime rate plus 6 points (i.e., 12-13%). The cumulative required private investment between 1992-2000 is projected to be \$4.0-7.0 Billion.

AFFECTED STAKEHOLDERS: Private: Non-profits, small businesses, and utilities' response medium to very positive. Vendors: generally very positive. Voluntary, non-regulatory programs have received strong support from private-sector participants.

STAFF CONTACT:

July 29, 1993

TITLE: OPTION CD21: Coordinated DOE and EPA Commercial Buildings Programs

Description:

Expansion of the EPA Energy Star Buildings Program and development of the DOE Rebuild America would be coordinated so that the programs will be complementary and will reflect the strengths of each agency, as well as on-going agency program activities. Working in concert, DOE and EPA will provide the product development, marketing, and implementation functions necessary for realizing comprehensive commercial buildings retrofits.

Commercial buildings represent one of the largest targets of opportunity for reducing global warming emissions through increased efficiency. Commercial buildings are complex, dynamic systems made up of numerous components and subsystems. Many past programs have used a fragmented strategy targeted at individual end-uses or technologies and ignored interactions between systems. EPA and DOE program strategies will reflect a comprehensive, whole-building approach to reduce energy use in buildings.

Energy Star Buildings is a voluntary, non-regulatory program that is a sister program to the Green Lights Program, and participants will meet similar requirements. Partners to the Energy Star Buildings programs will be required to (1) survey all their domestic facilities, (2) upgrade their lighting where profitable, and (3) complete their buildings upgrades within 7 years. Rebuild America is a new DOE initiative that will incorporate extensive demonstrations, training, education, performance monitoring and cost-shared energy audits.

Implementation:

Highlights of DOE / EPA program implementation will include:

- **Rebuild America:** DOE will utilize the 10 regional building efficiency centers, established under the Energy Policy Act of 1992. The centers will be valuable in working with states and regional participants. Training of building owners and managers and retrofit performance monitoring will also take place through centers.
- **Expanded Energy Star Buildings:** EPA will use marketing and program implementation resources developed for the Green Lights and baseline Energy Star Buildings Programs to support increased program participation. EPA Ally Programs targeting manufacturers, utilities, distributors, surveyors, and energy service companies would be expanded.

Greenhouse Gas Emissions:

MEDIUM: Savings would range from 1.6 to 2.5 MMT by 2000.

COST:

Public: Full funding and strong management support for both programs at both DOE and EPA will be required to ensure the full success of either program. Total funding required will be \$20 million per year.

- **Rebuild America:** Initial Federal costs will be a 50% cost sharing of the efficiency centers, and energy management/building operation training, and other cost shared activities. \$45 million over 5 years.
- **Expanded Energy Star Buildings:** EPA projects requirements of 10 FTE and \$10 million/year to successfully expand Energy Star Buildings.

Private: NA. Programs will be based on profitable investments. The cumulative private investment between 1993-2000 is projected to be roughly \$6.5 Billion.

Affected Stakeholders: Private sector voluntary program participants generally view voluntary programs positively. Industry allies: generally very positive.

Staff Contacts:

Tracy Narel
John Millhouse

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Demand Working Group

Option: Establish Environmentally Sustainable Communities

Description

Many energy efficiency and renewable energy technologies are synergistic in nature - a large number of technologies can combine to substantially reduce energy consumption in a given community, building or industrial facility. Savings from an individual technology like passive daylighting can be important, but more substantial when combined with other technologies such as ground-source heat pumps and advanced shell materials. It is important for marketplace decision-makers to gain experience not only with individual technologies, but appropriate combinations of technologies, including efficient, enhancing and renewable technologies in other end-use sectors.

Under the Environmentally Sustainable Communities Program, DOE would work with state economic development agencies, state energy offices, and private partners to negotiate (based on state and local priorities) a comprehensive set of energy efficient and renewable energy technologies in residences, commercial buildings, industrial facilities and perhaps transportation facilities to demonstrate their cost effectiveness in reducing CO₂, other environmental pollutants at the source, and to enhance the competitiveness of the community.

Implementation

Communities choosing to participate in the Environmentally Sustainable Communities program would sign a Memorandum of Agreement with DOE. Selected Communities would be eligible to receive seed funds, to be matched from locally generated sources. DOE, in conjunction with local utilities, would also agree to provide technical assistance through its Regional Support Offices and National Laboratories. The Office of Energy Efficiency and Renewable Energy's grant programs and energy technology development and deployment programs in all end-use sectors, will form the nucleus for a coordinated and integrated community-based initiative. University participation would be encouraged. Evaluation would be performed by utilities, universities or laboratories; volunteers would be provided by local service and environmental groups and information dissemination would be provided by state governments, private partners, trade associations, the DOE field network and a public television series.

Several federal, state and local government activities have already built on this concept. For example, the DOE Office of Transportation Technologies targeted Atlanta for an alternative fuels project called "Clean Cities". The goal of this project is to replace 10 to 15% of the transportation fuels with alternative fuels by 1996. In Washington State, the State Energy Office selected Ellensburg, a rural farming community, to assess and target all of the end users for energy reduction. The City of Seattle has also recently completed a process to determine how the city can successfully grow while still maintaining a sustainable development philosophy. These are just some of the many cities that have explored similar concepts.

A limited number of Sustainable Communities will be negotiated, based on participation by private industry, state and local governments and universities. Specific technology proposals would then be negotiated in each community and a portfolio of technologies would be selected by the project partner, based on local priorities and on a comprehensive energy/environmental strategy. Private partners would provide investment capital and technologies. This program would be combined with local utility DSM programs and make use of the technical expertise of the DOE Energy Analysis and Diagnostic Centers.

Stakeholder Support

This initiative would be supported by States, the energy efficiency industry and other DOE offices.

Benefits

Estimated Reductions from Greenhouse Gas Emission Baseline:

- * Low Case - [analyses not yet complete - will be sent separately]
- * High Case -

Cost

Costs are dependent on program size. Assuming substantial cost sharing with State and local governments, utilities and private industry, annual federal investment would be in the range of \$20 - \$50 million for 10 to 25 communities. Total leveraged investment \$60 - 150 Million.

Staff Contact: DOE EE/KE, Jerry Kolas, Phone 566-9918, Fax 566-9260

**Demand Working Group
Commercial Sub-Group**

Option Title: FEDERAL GOVERNMENT LEADERSHIP IN REDUCING GREENHOUSE GAS EMISSIONS THROUGH ENERGY EFFICIENT PROCUREMENT AND INVESTMENT IN BUILDINGS AND GENERAL OPERATIONS (Commercial and Residential Workshops)

Description: The President would commit the Federal government to exceeding substantially the National objective of reducing greenhouse gas emissions to 1990 levels by 2000 and sustaining these reduced emissions beyond 2000. To reenforce this commitment, the President would issue an Executive Order directing all departmental and agency heads to inventory the greenhouse gas emissions associated with Federal facilities and operations, to establish a goal for reducing year 2000 emissions by a specified percentage below 1990 levels, and to submit a plan to DOE for achieving these objectives. Federal agencies would consider the feasibility of reducing total greenhouse gas emissions by at least 20% below 1990 levels. The Executive Order would also reenforce the importance of fully implementing the Federal energy management requirements of the Energy Policy Act, including expanded budgets for energy efficiency investments, procurement of the energy efficient equipment and vehicles that minimize life cycle costs, the establishment and use of streamlined procedures for performance contracting, Federal agency participation in utility rebate programs, and other efforts.

Implementation

- o **Statutory Authority:** Existing statutes, including the Energy Policy Act
- o **Required Regulatory or Other Actions:** Redraft of pending Executive Order on Federal facility energy management.
- o **Additional Federal Funding:** Expanded funding for Federal energy management, as outlined in the President's multi-year investment program proposals.

Estimated Reduction from Greenhouse Gas Emission Baseline:

- o 1 MMTCe in 2000
- o [NA] in 2010

[Reductions of roughly 1.5 MMTCe are now attributed to Federal facility energy management activities in the baseline forecast estimates; reductions of roughly 5 MMT have already been incorporated to reflect expected reductions in military operations.]

Public and Private Costs: Total efficiency and related investments in Federal facilities are expected to exceed \$3 billion from 1990 to 2000. The President's investment program proposals are consistent with these levels of expenditures.

Cost-Effectiveness: Efficiency investments should be more than offset by the resulting energy cost savings. The discounted benefit/cost ratio for such investments is estimated to exceed 2.]

Affected Stakeholders: Federal agency and Congressional advocates of tight budget controls may oppose such large Federal investments in energy efficiency. Energy management companies servicing Federal agencies and advocates of improved energy efficiency are likely to increased support for such Federal investments.

Status of Analysis: Initial analysis complete.

Staff Contacts: Mark Friedrichs, DOE/Policy, 586-0124, FAX: 586-4447
Tracy Narel, EPA/OAR, 233-9145; FAX: 233-9578

Option: State Revolving Fund for Public BuildingsDescription

State and local government facilities represent an important target of opportunity for highly cost-effective energy savings, as well as a source of leadership and example--complementing the Federal effort--to stimulate voluntary private investments in energy-efficient buildings. The Federal Institutional Conservation Program, which provides matching grants for energy audits and retrofit projects in schools and hospitals (and audits only in other local government buildings) has reached only a small fraction of the eligible stock. Several states have established successful programs to invest bond funds, third-party capital, or other resources in energy management projects for existing facilities. The Energy Policy Act of 1992 (Sec. 141) authorizes DOE to establish a State Buildings Energy Incentive Fund to provide cost-shared funding for energy efficiency improvements in state and local government buildings. This initiative provides highly-leveraged Federal support to implement this statutory provision.

Implementation

A Federal program, funded at a level of \$10M/year for five years, will provide seed money to pay for design and start-up of energy management programs in state and local public buildings (including schools and public housing), which together represent about 20% of the U.S. non-residential building stock. Federal funding would also pay for technical assistance and training to improve the levels of expertise in energy auditing, project engineering and design, quality control/commissioning, performance monitoring, and long-term O&M to assure that energy savings are maintained. Financing of actual energy efficiency measures--including both hardware retrofits and improved operation and preventive maintenance practices--would come primarily from State bond-financing and third-party funding (performance contracts), as well as utility DSM incentives (along with an assumed continuation of Federal ICP grants at a modest level). After 15 years, total coverage of such programs could reach about half the total stock of non-Federal public buildings, or about 6 B sq. ft., not including public housing.

Stakeholders Affected

This initiative would provide strong tangible benefits to states and local governments, helping them to create or expand energy management programs that produce net benefits to taxpayers once energy cost savings are realized. Energy services firms and manufacturers of energy-efficient products would benefit from expanding markets, while utilities would see an increased demand for their DSM incentive and assistance programs.

Benefits

By 2000, this initiative can save 2.0 MMT of carbon.

Cost

A Federal investment of \$50 M over five years could stimulate non-Federal public investments of about \$4.4 B (cumulative) by 2000.

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INDUSTRIAL DEMAND

UPDATED ONE-PAGE SUMMARIES

July 30, 1993

The industrial demand workgroup has developed an overall plan comprised of three broad areas of activity incorporating eight individual actions to implement the President's goal. A major focus of the Industrial Demand initiative is to reduce energy demand through more rapid diffusion of existing "on-the-shelf" technologies. More rapid adoption of such technologies will take place both through programs to demonstrate and publicize such technologies and through expansion of existing infrastructure to more rapidly deploy those technologies. The program encourages technological innovation and adoption of efficiency measures across the industrial sector by recognizing a broad spectrum of company-generated reduction measures. These include technology-based improvements. Technical assistance and technology transfer components of the program will provide a vehicle for sharing and disseminating information on new advances.

As indicative of the first category, DOE plans to aggressively promote and implement its Motor Challenge initiative to galvanize U. S. industry into action to apply and target energy efficient Electric Motor Systems into manufacturing facilities. Related activities within the industrial technology program include the accelerated adoption of energy efficiency technologies, along with a new "Golden Carrot" program jointly administered by EPA and DOE to reward innovative designs of new environmentally friendly, energy efficient pumps and compressors.

The second broad area of technology diffusion revolves around enhancements of existing infrastructure. Three separate options build on an existing base of information and institutions. First, DOE and EPA will support a broad based expansion of recycling both through additional collection and processing of secondary materials, and expansion of opportunities for re-use of these materials within industrial processes. Additionally, DOE will expand the existing National Industrial Competitiveness through Energy, Environment and Economics (NICE³) program to accelerate the recycling program. Second, DOE proposes to expand and enhance the Energy Analysis and Diagnostic Center (EADC) program to provide energy audits by graduate engineering students to small and medium size firms, as well as to train a new generation of energy managers. Finally, to demonstrate Federal leadership, the action plan calls for a new Public-Private Partnership with the paper industry to accelerate federal waste paper recycling. By "closing the loop" to link supply of waste office paper with demand for recycled paper, the Federal government will spur investment in new waste paper recycling facilities.

Finally, the action plan calls for establishment of new voluntary programs -- highlighted by a new Green Companies initiative modeled after EPA's highly successful Green Lights program. This joint DOE/EPA program would recognize and provide credit for voluntary reductions in emissions by both industry and utilities. Green Companies will be linked to the emissions reduction inventory being developed by DOE under Section 1605(b) of the Energy Policy Act and provides an incentive for companies to report.

<u>Effects of Policy Options</u>	<u>Reduced Energy Demand</u>		<u>Cumulative Federal Budget 95-96</u>
	2000	2010	
Technology Demonstration & Diffusion	1.7% - 3%	6% - 11%	15.5 MM
Technology Deployment Programs	.9% - .9%	3% - 3%	47.0 MM
Voluntary "Green" Programs	1.3% - 2%	6% - 9%	16.0 MM

		Emissions Reductions (MMt Co)		Costs per ton (\$/T)			Federal budget (in \$ Million)							
Option Code	Option Title	Low	High	Private	Public	Total	FY '94	'95	'96	'97	'98	'99	2000	Cum '94 - 2000
ID5	Accel. Adapt.	1.0	2.1	?	7.41	?	1.5	1.5	2.0	3.5	4.0	5.0	5.0	21.5
ID10	EADC	3	6	0	26.5	24	3.1	3.5	3.7	4.3	4.8	5.3	5.8	50.7
ID13	Recirc	16.5	21.5				13	16	16	16	16	16	16	109
ID19	Motor Efficiency	3	6.1	0	3.27	3.27	3.0	3.5	5.7	5.7	5.7	5.7	2.0	31.4
ID21	Green Computers	7	10	—	—		1	5	10	10	10	10	10	56

Option Code	Option Title	Low	High	Private	Public	Total	FY '94	'95	'96	'97	'98	'99	2000	Cum '94 - 2000
ID20	Fed Recirc	34	4.1	—	—		0	0	0	0	0	0	0	—
ID32	Gold Carrots	1	1	?	—		2	2	2	2	2	2	2	14
ID11	Fuel Switch													

Carry 11 Industrial Fuel Switching as Part of Utility Fuel Switching
 * ID 5(a) Cement Industry option carried as part of ID 21.

TRANSPORTATION

UPDATED ONE-PAGE SUMMARIES

July 30, 1993

Options Analysis: Autos and Light-Trucks
Options' Cost Effectiveness and Federal Budget Implications

Option Code	Option Title	Carbon Reduction Estimates (mmTcE)		Cost Effectiveness (1993 \$/MTcE)			Federal Expenditure Requirements (million 1993 Dollars)							
		Low	High	Public	Private	Combined	1994	1995	1996	1997	1998	1999	2000	Total 1994-2000
AT2	State-level Pay-as-You-Drive Insurance	3	3	0	0	0	0	0	0	0	0	0	0	0
AT9	End Preemption of State Feebate Programs	0	1	0	100	100	0	0	0	0	0	0	0	0
AT19	Fuel Economy Labels for Tires	1	2	1	0	1	4	1	1	1	1	1	1	10
"Easier Choices" not Currently Included														
AT11	Promote Natural Gas and Propane Powered School Buses	0	1	60	16	76	30	30	30	30	30	30	30	210
AT12	Increased Government and Private Cooperation to Promote Alternative Fuel Use (Clean Cities)	0	0	10	1,000	1,010	1	1	1	1	1	1	1	7
AT15	"Green Car" Programs	0	1	4	120	124	1	1	1	1	1	1	1	7
Removed or Counted in Clinton Base Case														
AT13	Incentives to Increase Scrappage of Old, Inefficient Vehicles	0	1	0	1,000	1,000	0	0	0	0	0	0	0	0
AT17	Expanded/Enhanced Inspection & Maintenance Programs for Vehicle Efficiency	2	3	0	TBD	TBD	0	0	0	0	0	0	0	0

**GCC TRANSPORTATION OPTIONS
AUTO/TRUCK OPTIONS INCLUDED**

as of July 29, 1993

**GCC TRANSPORTATION OPTIONS
AUTO/TRUCK
(PERSONAL TRANSPORT VEHICLES)
July 29, 1993**

<u>Original</u> <u>Option</u> <u>Number*</u>	<u>Current</u> <u>Option</u> <u>Number</u>	<u>Carbon Reduction</u> <u>(mil. metric tons)</u>	<u>Option Title</u>
		<u>2000</u> <u>2010</u>	

ACTIONS CURRENTLY INCLUDED

AT12	AT19	0.4 - 1.0	0.4 - 1.0	Fuel economy labels for tires
	AT2	2.5 - 3.0	5.0 - 6.0	State-level Pay-as-you-drive (IAT has included in AT_B option)
AT15	AT9	0 - 1.0	0.5 - 1.5	End preemption of state feebate programs (IAT has included in AT_B option)

"EASIER CHOICES" NOT CURRENTLY INCLUDED

	AT11	0 - 1.0	0 - 1.0	Promote natural gas and propane-powered school buses
	AT12	0 - 0.2	0 - 1.0	Increased government and private cooperation to promote alternative fuel use (Clean Cities Program)
AT9	AT15	0 - 0.5	0.5 - 1.0	"Green Car" programs

REMOVED OR COUNTED IN CLINTON BASE CASE

	AT13	0 - 1.0	0 - 1.0	Incentives to scrap old, inefficient vehicles (counted in Clinton Base Case)
AT11	AT17	1.5 - 2.5	1.5 - 2.5	Expanded or enhanced inspection and maintenance programs (counted in Clinton Base Case)
	AT22	TBD	TBD	Increased cooperative research and development (including "Clean Car" initiative and alcohol production from biomass energy crops) - referred to EE for analysis

* As delineated in White House options list circulated 7/7. These options represented the four or five most promising candidates in each area at that time.

Option Title: STATE-LEVEL PAY-AS-YOU-DRIVE INSURANCE

Description: Pay-as-you-drive involves collecting a substantial percentage of automobile insurance payments through increased motor fuel taxes. Additional revenues could be collected through vehicle registration and traffic ticketing. These revenues would be used to subsidize the insurance premiums paid by individual motorists or to pay for universal insurance coverage for all licensed drivers. Some proposals also include expanding no-fault insurance, but this is not a required component. Implementation is expected to occur at the state level, with states gaining SIP emission reduction credits under the Clean Air Act. Analysis here assumes that states will adopt a 25 cent per gallon Pay-as-you-drive program and includes two cases that differ in terms of the percentage of the U.S. population covered: 10 percent (e.g. California) and 25 percent (e.g. California and the northeastern states). The 25 percent case is reported in the attached summary tables. In both cases, the analysis assumes that for the average driver reductions in direct payments to insurance companies offset increased fuel taxes (about \$150 per year).

Implementation:

- o **Statutory Authority:** None required
- o **Required Regulatory or Other Actions:** EPA may issue guidance
- o **Additional Federal Funding:** None

Analysis Assumptions: see attached.

Estimated Reduction from Greenhouse Gas Emission Baseline:

Case 1: 10 Percent of U.S. population covered:

- o 0.8 - 1.2 mmMTCe in 2000 (oil displacement: 20 - 30 mB/D)
- o 1.5 - 2.5 mmMTCe in 2010 (oil displacement: 38 - 62 mB/D)

Case 2: 25 Percent of U.S. population covered:

- o 2.5 - 3.0 mmMTCe in 2000 (oil displacement: 62 - 75 mB/D)
- o 5.0 - 6.0 mmMTCe in 2010 (oil displacement: 125 - 150 mB/D)

Public and Private Costs: few net private or public costs - consumer fuel cost increase offset (or more than offset) by savings from reduced direct auto insurance premiums. Second order considerations: costs of insurance industry restructuring, cost to previously uninsured motorists.

Cost-Effectiveness: Near \$0 per MTCE

Affected Stakeholders: Insurance industry may be strongly against; most others appear to support. The position of the insurance industry may be strongly dependent on the form of insurance states consider adopting. If a simple tax/allocation system is considered without extensive insurance reforms such as "true" no-fault then the industry may be in favor of such a system. However, Pay-as-you-drive has so far been advocated primarily as a means to achieve comprehensive insurance reform. Any guidance to states under the Clean Air Act must make clear that it is only the fee shifting aspect, not total reform, that provides SIP credits. It is still unclear whether most consumers will support a simple Pay-as-you-drive system, but they are more likely to if they understand that a) motorists will, on average, recover all (or more than all) of their increased fuel expenditures in the form of reduced direct insurance payments, and

b) previously uninsured motorists will now pay their "fair share".

Status of Analysis: full equilibrium impact estimates require runs of IDEAS model.

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Option Title: STATE-LEVEL PAY-AS-YOU-DRIVE INSURANCE (continued)

Affected Stakeholders: Insurance industry may be strongly against; most others appear to support. The position of the insurance industry may be strongly dependent on the form of insurance states consider adopting. If a simple tax/allocation system is considered without extensive insurance reforms such as "true" no-fault then the industry may be in favor of such a system. However, Pay-as-you-drive has so far been advocated primarily as a means to achieve comprehensive insurance reform. Any guidance to states under the Clean Air Act must make clear that it is only the fee shifting aspect, not total reform, that provides SIP credits. It is still unclear whether most consumers will support a simple Pay-as-you-drive system, but they are more likely to if they understand that a) motorists will, on average, recover all (or more than all) of their increased fuel expenditures in the form of reduced direct insurance payments, and b) previously uninsured motorists will now pay their "fair share".

Option Title: END FEDERAL PREEMPTION OF STATE FEEBATE PROGRAMS

Description: Many states have considered implementing fuel economy-based fee/rebate systems to promote fuel efficiency and/or raise revenue. Maryland passed a feebate law in 1992, but did not implement it after being informed by the National Highway Traffic Safety Administration (NHTSA) that it considered the Maryland law preempted by the Motor Vehicle Cost and Savings Act. However, Dept. of Justice could review this legal finding. A DOJ reversal would allow Maryland and other states to proceed. However, without a DOJ reversal, legislative action would be required to amend the current law, which would be unlikely to occur without raising broader CAFE issues. The analysis here assumes that DOJ reverses NHTSA's interpretation of the existing law, that several large states adopt mild feebate programs (about \$100 to \$200 per vehicle) by 1997, and that this will elicit some consumer, but little manufacturer, response. This is comparable to recent proposals in California, but higher than the feebate program adopted by Maryland.

Implementation:

- o **Statutory Authority:** unclear whether Congressional Directive required
- o **Required Regulatory or Other Actions:** DOJ must reverse previous administration's position on preemption
- o **Additional Federal Funding:** none

Estimated Reduction from Greenhouse Gas Emission Baseline:

- o **0-1 mmMTCe in 2000** (oil displacement: 0 - 25 mB/D)
- o **0.5-1.5 mmMTCe in 2010** (oil displacement: 12 - 38 mB/D)

Public and Private Costs: vehicle manufacturers: slight revenue losses for manufacturers from decreased sales of "high profit" larger, lower fuel economy cars; for all manufacturers and consumers: increased costs for fuel economy technology and lost vehicle attributes. Based on analysis of nation-wide feebate options, at low levels of feebate present value of fuel savings appear likely to offset increased vehicle costs to consumers. If manufacturers do not respond significantly, hedonic losses could be greater for consumers than with a national-level feebate of similar magnitude.

Cost-Effectiveness: -\$100 - \$300 per MTCE removed

Affected Stakeholders: Conservation community will be strongly in favor, auto industry will be against. The auto industry's main concern will be that this is the first step toward a national feebate program. With the auto industry in opposition, certain key members of Congress are likely to oppose this as well.

Status of Analysis: In-house analysis complete; full equilibrium impact estimates required from IDEAS model.

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Option Title: END FEDERAL PREEMPTION OF STATE FEEBATE PROGRAMS (continued)

Affected Stakeholders: Conservation community will be strongly in favor, auto industry will be against. The auto industry's main concern will be that this is the first step toward a national feebate program. With the auto industry in opposition, certain key members of Congress are likely to oppose this as well.

Option Title: FUEL ECONOMY LABELS FOR TIRES

Description: A program would be established to label tires in the replacement market with a measure of their impacts on vehicle fuel economy (based on their rolling resistance), thereby encouraging consumers and businesses to purchase and manufacturers to produce more fuel-efficient tires. The expected success of such a program is a 10% to 20% consumer shift to tires with the lowest rolling resistance in the light duty market and a 30% shift in the heavy duty market, and additional benefits as manufacturers drop poor efficiency tire models and introduce new low-rolling resistance designs. The results will be closely monitored and if response to the increased information is low, a request will be made for legislative authority to set rolling resistance standards.

Implementation

- o **Statutory Authority:** new legislation not required (possible extension of the Uniform Tire Quality grading program), unless decision is made to move to standards.
- o **Required Regulatory or Other Actions:** Test procedures would have to be adopted and new DOT rules requiring tire manufacturers to test and label would have to be promulgated. A consumer-focused publicity program and a monitoring program are also required to realize maximum benefits.
- o **Additional Federal Funding:** Low (on order of \$4 million for program development and \$1 million/yr for program implementation)

Estimated Reduction from Greenhouse Gas Emission Baseline:

- o **0.8-2.0 mmMTCe in 2000** (oil displacement: 20 - 50 mB/D)
- o **0.8-2.0 mmMTCe in 2010** (oil displacement: 20 - 50 mB/D)

Public and Private Costs: Public and private costs low.

Cost-Effectiveness: About \$100 / MTCE after fuel savings for light-duty vehicles, \$0 / MTCE for heavy-duty vehicles.

Affected Stakeholders: Tire manufacturers will be mixed; some will support and some who do not have efficient tire designs or technology will oppose. Consumer groups should support if they can be assured that safety will not be compromised.

Status of Analysis: The feasibility of establishing a rolling resistance measure that can serve as a basis for a labeling program has not been established; better estimates of impacts on consumers desirable.

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Option Title: FUEL ECONOMY LABELS FOR TIRES (continued)

Affected Stakeholders: Tire manufacturers will be mixed; some will support and some who do not have efficient tire designs or technology will oppose. Consumer groups should support if they can be assured that safety will not be compromised.

DETERMINED TO BE AN
ADMINISTRATIVE MARKING

INITIALS: JAM DATE: 9/23/13
2013-1074-5

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SINK OPTIONS - POLITICAL HISTORY/ANALYSIS

LOW COST OPTIONS:

SK1 Reduced Timber Harvest on National Forest System lands

Because this option is already occurring for many reasons other than carbon sequestration it has become an easier pill to swallow. Reduced timber harvests have a local impact for many small, timber dependent communities across the nation and have been brought about by issues such as the old growth forest conflict in the Pacific Northwest, policy changes reducing below-cost timber sales on National Forests and policy direction toward ecosystem management, to name a few.

There may be some offset of carbon sequestration through increased harvest in other countries (Canada for example) to fill the market vacuum. Tree planting under the tree planting option could lower prices or slow the rate of increase of timber prices and thus offset any trend to more energy-intensive product substitutes otherwise caused by decreasing harvests.

SK__ Federal Forest Land Management

This option is based on a new policy direction of the Forest Service. Although it is embraced as a "good idea" by everyone involved, it has yet to be defined by the agency. Therefore, ecosystem management is being interpreted non-uniformly across the country. Also, once defined, ecosystem management is anticipated to be very expensive to implement because it may involve overhauling the way federal forests are managed in this country.

SK7 Reduce Stand Depletion

For the most part, this option follows current legislative authority granted in the Farm Bill and is very popular with private interests. The success of this program relies on the level of funding it receives.

SK2 Tree Planting

This is a popular program with the public. As with other options, funding is key.

A negative impact of this option is the removal of these lands from the economic base for the local community.

SK3 Increased Recycling

For the most part, this is a popular option which is already occurring. This is a program that the public enjoys participating in without much federal intervention.

In some instances, the paper industry sees recycling as a threat to the pulpwood market.

MODERATE COST OPTIONS:

All of the above plus:

SK10 Urban Forestry/Cool Communities

Urban Forestry is a very popular program with the public.

The negatives of this program are based on the very high cost of urban trees, both in the purchasing of trees and their maintenance.

HIGH COST:

All of the above, plus:

Expanded Use of Forest Products

This is a program which, with the proper investment of research funding (potentially very expensive), could have many economic benefits.

However, some argue that the carbon benefit of this program is offset by the substitution of producing other carbon-emitting products. In the past, this issue has also generated some international trade concerns.

Wetland Reserve Program

This program is very expensive and its success hinges upon the approval by Congress to dedicate funding for the long term. This program also reduces the economic base for communities.

AGRICULTURE OPTIONS:

SK4 Conservation Practices

In the past, this is a program which has seen lively debate in Congress due to interests of farmers, ranchers and environmentalists. In some cases, this program causes negative reaction from farmers and land-holders because of the high cost to implement these programs.

SK5 Modify CRP

This option has some positive effects, however, caution must be taken in assessing areas actually compatible for the program. Not all lands are suitable for high carbon sequestering.

This is a very expensive program for the federal government to implement. What's more, it is re-authorized every five years, so there is no long-term assurance.

INTEGRATED RESOURCE PLANNING OPTION

JULY 30 DRAFT

SUPPLY/DEMAND WORKING GROUP (July 30, 1993: 9:30am)

Option Title: EXPANDED INTEGRATED RESOURCE PLANNING (ES8, SU5, SU2):

Expand Technical and Financial Support to Encourage State Regulatory Commissions, and Public and Private Utilities to take Actions To Reduce Greenhouse Gas Emissions

Summary of Analysis Results

1. Description of Option: Through DOE's Integrated Resource Planning Program, informational and technical and financial support would be provided to encourage State Regulatory Commissions, and Public and Private Utilities to take actions to reduce greenhouse gas emissions. The expanded IRP program would focus on areas determined to support good IRP.

2. Estimated energy & carbon impacts ¹ - The expanded IRP option is considered a foundation option. It is estimated that the likely DSM savings opportunity (yr 2000) is about 15 Billion Kwh. Expanded IRP activities will encourage states to take action sooner and realize GHG reductions quicker than would occur otherwise.

(a) Energy Reductions (2000)

- Electricity (bkwh)	5 Bkwh (direct incremental effect)
- Natural Gas (TBtu)	NA

(b) Yr 2000 emission reduction from base (MMTC)	2 MMT of Carbon (direct incremental effect) 0.95 MMT (removing barriers to increased use of natural gas); 1.05 MMT (DSM activities)
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In addition to the direct incremental effect of expanded IRP, this foundation option serves to facilitate achievement of another 2 MMTC and 10 Bkwh of utility-induced DSM savings opportunity, driven by specialized utility program elements in GREEN LIGHTS, MOTOR CHALLENGE, etc.

3. Federal Budget Cost

	Incremental Federal IRP Budget above current FY94 request of \$6.8 million
- FY'94	\$3 million
- FY'95	\$6 million
- FY'96	\$6 million
- Total FY'94-2000	\$39 million
4. Total Investment/Compliance Costs

(a) Life Cycle Private Costs	Negative
(b) Initial Investment Costs (1994-2000)	> \$6 billion
5. Cost-Effectiveness (Cost per MMTC Saved) 0
6. Interaction with Other Options -- YES (Particularly GREEN LIGHTS and MOTOR CHALLENGE)

SUPPLY/DEMAND WORKING GROUP (July 30, 1993: 9:30am)

**Option Title: EXPANDED INTEGRATED RESOURCE PLANNING (ES8, SU5, SU2):
Expand Technical and Financial Support to Encourage State Regulatory Commissions, and
Public and Private Utilities to take Actions To Reduce Greenhouse Gas Emissions**

Description: Through DOE's Integrated Resource Planning Program, informational and technical and financial support would be provided to encourage State Regulatory Commissions, and Public and Private Utilities to take actions to reduce greenhouse gas emissions. The expanded IRP program would focus on areas determined to support good IRP, and would include both supply and demand facets. Areas that may be considered include but are not limited to: (1) removing barriers to increased use of natural gas ²; (2) regulatory changes that encourage utilities to make cost-effective investments in efficiency measures in generation, transmission and distribution of power; (3) regulatory reform to make utility investments in energy efficiency and conservation at least as profitable as supply-side investments (e.g., decoupling utility profits from sales); (4) demand side management (DSM) for electric and natural gas utilities; (5) rate design reform that is economically efficient and consistent with DSM activities (e.g., seasonal marginal cost pricing for gas and electric utilities); (6) cost-effective approaches to incorporation of environmental externalities into utility resource decisions; and (7) least cost Clean Air Act compliance.

Delivery mechanisms would include:

- direct technical assistance
- direct financial assistance
- performing analysis of state experiences and disseminating the results of such experiences
- providing training opportunities and tools for PUCs
- providing support to regulatory proceedings that may include participating in State regulatory proceedings to provide information on good IRP

These delivery mechanisms would expand the scope of, and strengthen the effect of mechanisms already employed in the existing IRP program. In addition, several new delivery mechanisms would be introduced into the existing IRP activity portfolio.

Implementation: This is an administrative option that could be implemented under DOE's current authority. The mission and budget of DOE's IRP program would be expanded. DOE's IRP program would coordinate with the EPA and other Federal agencies in the development and provision of relevant technical and financial assistance to the States.

Benefits: An estimate of the likely carbon reduction impacts is 2 MMT by the year 2000 (1 MMT for activities that aim to remove barriers to increased use of natural gas, and 1.05 MMT for expanded demand-side management activities). There will be additional benefits from supply-side efficiencies which are non-quantifiable. In addition to the direct incremental effect of expanded IRP,

²

Removing barriers to natural gas use includes the following initiatives:

- providing access to natural gas distribution systems
- efficient retail prices for electricity
- efficient retail prices for natural gas distribution services
- fuel switching to natural gas, when cost effective

this foundation option which serves to facilitate the achievement of another 2 MMTC and 10 Bkwh of utility-induced DSM savings opportunity, driven by specialized utility program elements in GREEN LIGHTS, MOTOR CHALLENGE, etc. Expanded IRP activities will encourage states to take action sooner and realize GHG reductions quicker than would occur otherwise.

For the expanded demand-side management activities the direct incremental effect of **5.0 Bkwh** deferred electricity has been estimated. These are savings that would be achieved above & beyond the IDEAS Clinton baseline over the time frame 1994 to 2000. It is also incremental to DSM savings already attributed to specialized utility-DSM elements of the GREEN LIGHTS and MOTOR CHALLENGE options, and assumed utility-driven DSM savings arising from the market-pull effects of other proposed GHG options.

It is estimated that the likely DSM savings opportunity (yr 2000) is about 15 Billion Kwh. The expanded IRP option is considered a foundation option. It makes two contributions to the overall DSM savings opportunity of 15 Bkwh:

- it facilitates the capturing of DSM savings through other programs that have specialized utility-DSM elements, such as GREEN LIGHTS Super Ally program element, MOTOR CHALLENGE, and other utility-induced DSM savings that could arise from the market-pull effects of other proposed GHG options
- it has a direct incremental effect of achieving DSM savings above and beyond DSM savings expected to arise from other programs that have induced-DSM effects.

Roughly 65% of the overall DSM savings opportunity would be induced-DSM savings attributed to programs such as GREEN LIGHTS, MOTOR CHALLENGE, and other utility-induced DSM savings that could arise from the market-pull effects of other proposed GHG options. The remaining 35%, or **5 Bkwh** can be attributed to the direct effect of expanded IRP activities on PUCs and utilities.

Likely DSM savings potential (See Mark Friedrick's analysis sheet)		15.0 Bkwh (YEAR 2000)
DSM savings reportedly attributable to specialized utility-DSM elements from other GHG options	=	4.2 Bkwh (GREEN LIGHTS), and 3.8 Bkwh (MOTOR CHALLENGE)
Assumed DSM savings arising from the market-pull effects of other proposed GHG options (assumes about 10% of 15 Bkwh)	=	2.0 Bkwh
Direct incremental effect of expanded IRP activities	=	5.0 Bkwh

Timeline of DSM savings:

	1994	1996	1998	2000
IRP impacts (Bkwh)	0	1	3	5
(Divided 50% Industrial DSM, and the remainder equally split between Residential & Commercial)				

Costs: The Federal IRP budget under the proposed expanded IRP should increase above the current FY94 request of \$6.8 million by \$3 million in FY94, and \$6 million annually from 1995 to 2000. The cumulative (1994 thru 2000) Federal cost (incremental to a constant level of \$6.8 million) is \$39 million.

Cost Effectiveness: 0

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July 30, 1993: 9:30am

Option Title: Expand Technical and Financial Support to Encourage State Regulatory Commissions, and Public and Private Utilities to take Actions To Reduce Greenhouse Gas Emissions

Extended Political Analysis

Support: Environmentalist would favor Demand-Side management and marginal cost pricing of electricity (one of the natural gas initiatives). Utilities like DSM as long as they get cost recovery. State regulators generally favor DSM.

Opposition: Opposition should not be great because this proposal deals only with information and technical assistance. Utilities and State regulators in general do not favor marginal cost pricing for electricity. Utilities often oppose marginal cost pricing because they are afraid they will not receive full cost recovery. Large industrial consumers (represented by ELCON) are sensitive to any action that may increase their electricity rates. They oppose DSM activities that result in interclass subsidies (e.g., industrial customers supporting residential customers) or interclass subsidies (one industrial customer favored over another). There may be some Congressional resistance to additional appropriations.

**SUPPLY OPTIONS: ES7, ES5 AND ES9/10
UPDATED SUMMARIES AND POLITICAL ANALYSIS**

July 30, 1993

ES-7

BIOMASS COFIRING: ZERO-NET CO₂ POWER GENERATION

July 19, 1993

Summary: Options for reducing CO₂ emissions from coal-fired units include fuel switching to natural gas, installing CO₂ scrubbers, repowering to improve efficiency, reducing electric output, and retiring units. Another option involves cofiring coal with biomass, a renewable energy resource. Because they remove CO₂ from the atmosphere during growth, biomass feedstocks can be utilized to offer a zero-net CO₂ power generation technology. Biomass cofiring capacity can be added for \$185/kW - \$400/kW, costs well below the \$1000 - \$1500/kW required for greenfield biomass installations. In terms of its impacts on the cost of electricity, the cofiring alternative is projected to add, at most, 0.2 cents/kWh to the COE of the existing facility, although at biomass fuel prices equal to or below \$0.50/MMBtu the effect is a reduction in COE. By expanding the EPACT production credits to all cofired units regardless of biomass feedstock, cofiring projects result in a reduction in generating costs for biomass fuel prices at or below \$1.55/MMBtu. When the incentives are applied, the incremental COE for cofiring retrofits fueled with \$1.55/MMBtu biomass feedstocks is effectively transferred from the utility, its ratepayers, and its stockholders, to the Federal government. The majority of biomass feedstocks for cofiring will come from wood and forest product industry wastes, silvicultural practices, and urban wood waste. These resources are typically priced in the \$0.50-\$2.00/MMBtu range. Assuming the expanded definition of the EPACT production incentive, it is projected that each coal fired boiler in the United States can be retrofit to provide an average of approximately 10 MW of biomass cofiring. Therefore over 17,000 MW of biomass capacity can be introduced in existing coal-fired utility boilers, displacing nearly 80 million metric tons of CO₂ to supply 20% of the industry's required reduction. Over 1 quad (1 quad = 10¹⁵ Btu) of wood wastes and residues required is currently available, although many of these resources have previously been under-utilized and/or unaccounted; end-use demand and a positive market price will bring these materials to market.

	Low Implementation Case	High Implementation Case
(1) Description	Expand EPACT incentives to all publicly owned cofired units regardless of biomass feedstock. Technical assistance to investor owned utilities.	Expand EPACT incentives to all investor-owned utility cofired units regardless of biomass feedstock.
(2) Emissions reduction (mmtc-e)		
- 2000	4.8	14.1
- 2010	4.8	14.1
(3) Compliance cost (\$M)	Cost to utilities is offset by 1.5 cent/kWh production incentives.	Cost to utilities is offset by 1.5 cent/kWh production incentives.
- 2000		
- 2010		
(4) Federal budget cost (\$M) ^{2,3}		
- FY '94	32 \$M	100 \$M
- FY '95	71 \$M	238 \$M
- FY '96	118 \$M	405 \$M
- FY 2000 (est.)	225 \$M	797 \$M
(5) Cost-effectiveness (\$/mmtc-e) ¹		
- 2000	44 \$/mmtc-e	53 \$/mmtc-e
- 2010	0 \$/mmtc-e	0 \$/mmtc-e
(6) Interaction with other options		

1 Calculated on the basis of total cost/carbon reduction as of given year.

2 In 1992, biomass power produced approximately 375 \$M in federal tax revenue and 94 \$M in state tax revenue. By 2000 tax revenue is anticipated to grow to 713 \$M and 78 \$M in federal and state tax revenue, respectively. The cofiring option will account for nearly 25% of these totals.

3 Renewables accounted for approximately 50 \$M in FY '92 budget outlays compared to 1.7 \$B for natural gas, 1.1 \$B for coal, 0.9 \$B for nuclear, 1.8 \$B for electricity, and 0.6 \$B for conservation.

POLITICAL ANALYSIS

Co-firing biomass with coal is an opportunity identified at the June 11th public meeting and later submitted by the renewable energy community as an Initiative and reworked by the Department. This Initiative with its 17,000MW's goal was considered perhaps too aggressive and required a revision of the "closed-loop" eligibility requirement for the cent and half tax credit. The revised Initiative submitted by OSTP, based on co-firing wood wastes and planting dedicated crops in quantities equivalent to the amount of wastes co-fired with the crops to be harvested in the post 2000 time frame and provided as a fuel supply for advanced biomass conversion systems, passes political muster easier than the prior version provided that it meets the current legal interpretation of a "closed-loop" biomass system. The Department supports even this lower goal. It would enjoy support from the wood products and coal fired utility industry. However, coupling financing of co-firing and CRP credits complicates the co-firing Initiative considerably. Because utilities will essentially will have to become farmers to earn CRP credits, it may be too difficult to implement. Both sustainable crop development and co-firing are widely supported. The Department has funds for programs to stimulate sustainable crop development, but no funds are available to stimulate co-firing other than to support studies.

ES-5

Conversion of Defense Facilities and Equipment for Renewable Energy Project Development

Summary: There are currently 80 military installations slated for closure, representing over 150,000 acres of land that could be made available for renewable energy development. There are thousands of additional acres that could be available from scaled back operations at other bases and DOE facilities, like the Nevada Test Site. Renewable energy proposals are also likely to be prominent in the first round of Technology Reinvestment Project under ARPA's \$472 million program. This effort would complement and if possible leverage these proposals, and the overall defense conversion effort. Under this effort DOE would facilitate the development of solar energy projects on unused portions of military bases and other Federal facilities affected by defense conversion, employing underutilized resources at the sites to prepare them for energy development as they scale back operations or prepare for closure. Using these sites as host locations for renewable energy projects would encourage expanded renewable energy development and accompanying environmental and energy benefits. In addition the activity would reduce the impact of defense reconversion on local economies and lay the foundation for offsetting displaced military activity with a self-sustaining renewable energy industry.

The Nevada Test Site is being assessed for conversion to a solar energy production and manufacturing facility as a result of Congressional mandates in the Defense Authorization Act, and is thus the most well-developed prototype. The scenarios for the Nevada Test Site would involve privately owned solar generating and/or manufacturing facilities at the site and its accompanying facilities in Las Vegas to produce power for sale to utilities in the region and to manufacture renewable energy products for sale domestically and internationally. Power would be transmitted through the Western Area Power Administration's transmission system or other utility's lines.

To foster private development at the NTS the Federal government would provide a package of incentives including free federal land, upgraded transmission and natural gas supply for hybrid applications, and assistance from Nevada Test Site personnel and equipment in site construction and permitting. Additional incentives could include access to Federal financing, loan guarantees, interest buydowns or other support, in particular for technologies like photovoltaics whose deployment at the test site could help foster major improvements in manufacturing and performance that are needed for broader competitiveness.

Use of the site would be offered to developers on a competitive basis to the best proposals; developers would be responsible for project development, management, power sales and outside financing. Near term projects could be initiated as early as 1996, and would be expected to stimulate additional construction on a phased basis through 2000 and beyond.

	Low Implementation Case	High Implementation Case
(1) Description	See summary. Assumes 1000 MW of commercial installations attracted to site by 2000, additional 1000 MW by 2010.	Same as low implementation case
(2) Emissions reduction (mttc-e) - 2000 - 2010	0.94 2.0	
(3) Compliance cost (\$M) - 2000 - 2010	no compliance cost; private investment funds expected for for-profit venture	
(4) Federal budget cost (\$M) - FY '94 - FY '95 - FY '96 - FY 2000 (est.)	\$0 \$49 \$49 \$0	
(5) cost-effectiveness (\$/mttc-e) - 2000 - 2010	\$10.41/MT for initial project \$5.20/MT for later projects	
(6) Interaction with other options	2000 results independent of other options; 2010 results likely to be independent.	

1
Calculated based on total cost/average annual carbon reduction over life of projects.

POLITICAL ANALYSIS

This Initiative is new and responds to the Administration's objective of replacing defense jobs with jobs in clean environmentally acceptable technologies. It is widely supported by renewable energy groups, environmental organizations, and areas threatened by Defense downsizing. By using existing Federal authorities, it minimizes downstream obligations. Funds used to bring sites to the point that they can be made available for renewable energy projects and not for the projects themselves may have some critics. Initiatives that are aimed at employment and the environment enjoy support by states and communities affected. There is an Initiative close to this one submitted at the June meeting. The FY94 Defense Authorization legislation includes a requirement to study such an effort for the Nevada Test Site. The results of this study will be available in thirty days. Congressional support starts with the Nevada delegation. No funds are currently available or budgeted for site conversion.

Combi ES-9 10
Renewable Energy Market Mobilization Collaborative

Summary: An estimated \$10 billion in combined U. S. private and public research and capital investment expenditures for renewables has brought them to the starting point of commercial availability. Consensus is that increased purchases will initiate significant production cost learning and user confidence resulting in sustainable markets and widespread cost competitiveness. National leadership through a market mobilization challenge would stimulate this final development stage. This challenge issued to American utilities and independent power producers (IPP) calls for forming a collaborative that would accelerate market acceptance of all appropriate renewable technologies and applications and supported by an appropriate market infrastructure. This collaborative has two levels of federal involvement. The first supports a voluntary utility/IPP consortium formed to aggregate near term markets of developed or near-commercial renewable based technology small scale power systems in order to enable the industry to attract capital and achieve production economies of scale. The second level of participation would be to partner with the consortium and states through cost-shared demonstrations to spread the risks of fielding new technologies and new applications not yet cost effective and to share in the evaluation of prototypes and performance of technologies in these initial applications. This support would allow investors to acquire field experience with the technologies--increasing familiarity, testing operability with specific systems and lowering risks. This two part challenge would provide a huge incentive for renewable technology manufacturers enabling them to attract investment capital and achieve production economies of scale resulting in significant and important outcomes. Within four years annual domestic sales will more than quadruple, five times the current number of utilities and IPPs will have working experience and confidence for making future purchases, production capacity will increase and costs will be lowered by 25% to 50%. Cumulative capacity additions will total more than 17,000 by year 2000 --all bringing increases in U. S. jobs and attendant economic benefits and creating a downward trajectory of greenhouse gas emissions.

	Low Implementation Case	High Implementation Case
(1) Description	Federal cost share of purchase consortium for aggregating markets for small cost effective systems. Cost \$5M	Federal cost share of purchase consortium and participating in heavily cost shared demonstration of new technologies and/or applications to induce 12,300 cumulative installed capacity by 2000. collaborat. Cost \$434M over 4 to 6 years.
(2) Emissions reduction (mtc-e) -2000 -2010	0.1 0.75 Supports only small scale photovoltaics and wind; no central station projects.	1.6 6.4 Supports a wide variety of technologies and applications.
(3) Compliance cost (\$M) -2000 -2010	no compliance cost; private cost sharing expected to be \$5M/yr	no compliance cost; private cost sharing expected to be \$372M/yr, varied by technology
(4) Federal budget cost (\$M) -FY '94 -FY '95 -FY '96 -FY '97 -FY '98 -FY '99	\$0 \$5 \$5 \$5	\$72 \$72 \$72 \$72 \$72 \$72
(5) Cost-effectiveness (\$/mtc-e) ¹ -2000 -2010	Average \$2.00/MT over life of assumed projects	Average of \$5.82/MT over all technologies.
(6) Interaction with other options	Leveraged by IRP, Fed Gov. purchases, other information options	Leveraged by renewable consortium, information options

¹ Calculated on the basis of total cost/average carbon reduction per year over life of project.

POLITICAL ANALYSIS

There is widespread stakeholder support for using demonstrations to both improve user confidence and create renewable industry cost-learning curves. It will result in strong market response. The consortia idea capitalizes on the benefit of the Federal government cooperating with the private sector to bring about change. The Initiative builds in the comments from all the industry groups, including the utility organizations and environmental community. The Department's FY95 Target (at the Energy Efficiency Renewable Energy Assistant Secretary level), does not support this Initiative. The Initiative is responsive to the Energy Policy Act and because FY94 markup has been delayed to September, there is an opportunity for FY94 "get-start" funds, if so desired. The proposed program can be quickly implemented. Including this initiative is a signal of the strongest possible support to the U.S. renewable energy community by the Clinton Administration.

CLASS EVALUATION

Date:

8/12/93

Instructor:

Ben

Course:

Regencies OASIS

A. What was your computer background prior to this class: (Circle choice)

1. I have have not used a personal computer.
2. I have have not used word processing on a personal computer.

B. Course content:

1. Did the course cover what you expected? Yes No
2. What would you add to the course? _____
3. What would you drop from the course: _____
4. Was the course length: about right too long too short

C. Do you believe the class will be useful? Yes No

D. How would you rate the instructor's knowledge of the subject?

	<u>Excellent</u>		<u>Average</u>		<u>Poor</u>
(Circle #)	<u>5</u>	4	3	2	1

E. How would you rate the presentation of the subject?

	<u>Excellent</u>		<u>Average</u>		<u>Poor</u>
(Circle #)	<u>5</u>	4	3	2	1

F. Was the time convenient? Yes No

If not, why not? _____

G. Other than what is currently offered, are there any classes you would like to see developed?

H. Comments: _____

NAME (Optional):

Brian A Burke

AGENCY/DIV (Optional):

456-2995

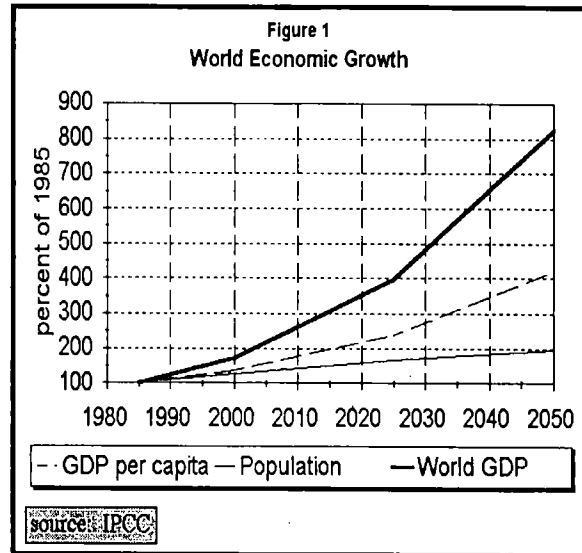
Long Term Strategies for Reducing Emissions of Greenhouse Gasses

Stabilizing world production of greenhouse gas emissions beyond the year 2000 while ensuring robust economic growth presents the world community with a dramatic challenge. During the next half century, world population is expected to double and incomes per person may increase by nearly a factor of four (the IPCC scenario leading to this estimate assumes that by 2050 the GDP per capita in developing nations will average 1/3 that of the US today). If production of greenhouse gases increase in proportion to economic growth, the world would experience an eight fold increase in production rates above current levels -- levels that already risk significant climate change (see Figure 1). Expected rates of technical change mean that greenhouse emissions will grow more slowly than GDP but expected improvements will not be enough to prevent rapid rates of growth in greenhouse gas production

A program designed to respond to this challenge must be a global effort. The US and other industrial countries, however, bear a special responsibility because of their leadership in many of the technologies that are essential to combine world economic growth with sustainable levels of greenhouse gas production. Developing nations will need to use these technologies to design a paradigm of growth far different than the resource-intensive growth that has been followed by existing industrial nations. The US and other industrial nations will need to renovate their existing buildings and industries and

encourage growth based on resource-efficient technologies, and low-carbon fuels.

Most of our short term steps are directed at creating an effective market



for investments that reduce greenhouse gas production. Before the year 2000 these programs will act largely to encourage markets for equipment that is on the market or commercially ready. The core of our long-term strategy is to ensure that a constant stream of technology is made available -- technology developments that can ensure a continuing decline in the cost of reducing greenhouse gas emissions and carbon sequestration (see Box 1). Our near-term efforts in creating market incentives should play a powerful role in encouraging innovations in these areas.

Clearly a strategy designed to achieve a several-fold decrease in the amount of greenhouse gas produced per unit of economic activity over the long-term must move aggressively both to improve the efficiency with which energy and non-renewable materials are used and to achieve substitutes for

carbon-based fuels. While the kinds of concerted use will be made to ensure that

**Elements of a Long-Term Strategy for
Reducing Emissions of Greenhouse Gases***

- .A credible long-term strategy must rely on programs that (i) eliminate subsidies for economic activities that lead to greenhouse gas production (e.g. subsidies for fossil fuel production and use), and (ii) ensure that markets operate in a way that recognize the costs of greenhouse gases
- Accelerated research and development of technologies that increase the productivity of energy use in buildings, industry, and transportation
- Accelerated research and development of technologies that substitute renewable energy sources and low-carbon fuels for carbon-intensive fuels.
- Programs involving industrialized and developing countries ensuring that technology capable of achieving economic growth and low production of greenhouse gases is rapidly put to use worldwide
- Carbon sequestration
- Recycling and waste-minimization programs that minimize the amount of organic material in landfills
- Expanded worldwide investment in population control

improvements needed are technically possible, developing and introducing technologies capable of capturing this potential requires a long-term strategy that begins today.

The programs are designed to capitalize on the administration's aggressive new programs which accelerate development, demonstration, and adoption of new technology throughout American business. Key elements include expanded cost-shared research with industry, encouragement of industrial research consortia and use of federal purchases to encourage innovations, and expanded use of extension and outreach programs. A

technologies available in the National Laboratories and other defense research centers are available for use in civilian applications. Expanded international research and demonstrations will also be key. Support for many pre-competitive research projects in areas like recovering land for biomass crops, or advanced photovoltaic cell design -- can be shared. International collaboratives can produce early demonstrations and create large early markets for innovative products.

Joint implementation projects provide cost-effective opportunities for global emission reductions while advancing development aspirations in developing countries.

Energy Efficiency

There is sound technical evidence that the efficiency of many building, transportation, and industrial systems can be increased by factors of 3 or more. Research designed to capture this potential will require:

1. A systematic approach to the design of buildings which consume 60-70% of all US electricity. Major gains can be made in the performance of appliances, lighting, HVAC equipment, and other energy-consuming devices used in buildings. The prospects for realizing the potential gains would be the greatest if the improvements in individual technologies were systematically integrated into well-concieved building system designs by a sophisticated construction industry -- an industry that behaves much like a modern manufacturing enterprise in the way it conducts research and incorporates technology into production products and processes. A clear goal of our policy will be to encourage the emergence of a more technologically sophisticated construction industry.
2. Development of autos and light trucks that can achieve a several-fold reduction in energy use per mile driven. This can be achieved using a variety of technologies such as advanced electric and hybrid vehicle designs including fuel cells. The efficiency of automobiles, light and heavy-trucks is key to the carbon emissions of the transportation sector worldwide. It is critical that the US lead in the development and production of vehicles capable of

delivering attractive and affordable personal transportation while meeting ambitious local pollutant and greenhouse gas emission reduction goals. These vehicles should also be compatible with low-carbon fuels. Emission goals should embrace the full product cycle -- including emissions associated with the production of fuels or electricity used in the vehicle and the disposal of vehicles and vehicle parts. A central objective of our programs in this area is to ensure that the development of such vehicles is consistent with our clear goal of securing the growth and prosperity of the domestic auto industry.

3. The prosperity of US manufacturing enterprises depends on the efficiency with which they can develop and adopt new technology both for production processes and products. The goal of our programs to improve manufacturing performance is to ensure that the administration's major new programs designed to support technical innovation in US manufacturing are fully consistent with the goal of making more efficient use of energy and material resources. In most cases the greenhouse gas emissions of modern equipment are much lower than the emissions associated with older processes. Improved controls, higher temperature processes, real-time sensing and feedback, and a variety of other techniques ensure optimum use of energy and materials. Quality control systems can also reduce

waste by ensuring that a high fraction of the materials entering an industrial process emerge in a useful product. Advanced design and simulation systems both for production processes and for product designs can ensure that materials use is minimized and that operating energy use is minimized. The goal of our environmental programs in these areas is to ensure that the reduction of greenhouse gases is an integral part of the new public/private research programs -- including manufacturing extension programs. Energy efficiency and other techniques capable of reduction of emissions will be an integral part of federal programs to encourage productivity in small and large businesses throughout the economy.

Low-Carbon Energy Supply Technologies

While substantial improvements in the efficiency of resource use are possible, the major reductions in greenhouse emissions required worldwide will almost certainly also require finding substitutes for fuels with a high carbon content. A variety of technologies appear most promising:

1. The use of forest and agricultural product biomass wastes and biomass feedstock grown on set-aside or reclaimed lands for fuels or for generating electricity. This will require research on techniques for land restoration, the development of a range of productive energy crops that can be grown sustainably under a variety of conditions, the development of advanced biomass thermochemical gasifiers for power generation and fuels production applications, and the development of advanced biological processes for biofuels production (e.g. ethanol produced from wood and other lignocellulosic materials via enzymatic hydrolysis and possibly conversion of biomass to hydrogen.).
2. The development of advanced gas turbine and fuel cell technologies for generating electricity from natural gas and gasified biomass fuels
3. Research designed to ensure the viability of nuclear electric generation must include (i) development of a safe, permanent solution to storage of nuclear waste materials, (ii) development of safe, proliferation-resistant advanced reactor designs, (iii) advanced research on fusion, and (iv) improving methods for assuring safe, economical life-extension for existing plants.
4. The development of electric generating and cogeneration technologies suitable for siting near users in industry and buildings (including distributed photovoltaic and fuel-cell power systems
5. The development of other low or zero greenhouse gas emitting electric generating technologies for centralized production of electricity including large-scale photovoltaic and solar thermal-electric power, advanced wind power, geothermal power, and more effective use of hydroelectric resources.

6. The developmet of advanced technologies for producing hydrogen and hydrogen carriers (e.g. methanol) for transportation applications from natural gas, and gasified biomass fuels, and the development of advanced hydrogen storage technologies.

System-Wide Improvements

While improved technology can greatly improve the efficiency of resource use, the efficiency of many resource-intensive systems depends on policies governing the efficiency with which the system operates as a whole. Topics include:

1. Improved strategies for urban design, flexible public transit systems, telecommunications, and other techniques for reducing demand for movement of people and freight -- particularly in congested urban areas.
2. Improved design of electric utility systems that ensure an efficient investment portfolio including end-use equipment, transmission, distribution, as well as centralized and distributed electric generation and storage systems. The analysis should include a systematic method for attaching value to greenhouse gas reductions. It should give appropriate incentives for decommissioning older plants which produce significant amounts of CO₂ and for shifting fuel sources to low-carbon fuels -- such as natural gas or renewable fuels.

Carbon can be removed from the atmosphere by planting trees and other plants. In many cases it will be attractive to harvest these plants for use as a fuel since biological fuels produce no net CO₂. A significant, one-time sequestration of carbon can be achieved by planting land areas degraded by poor forest and agricultural practices. Carbon is captured when the organic content of the soil is increased and when extensive root-systems are developed. Research is needed to improve methods for reclaiming degraded lands and for the development of optimum biomass crops in different regions.

Non-biological methods for sequestering CO₂ have also been proposed -- such as injecting CO₂ into abandoned gas wells. The feasibility of these concepts will be investigated.

Carbon Sequestration

International Greenhouse Gas Reduction Projects

(Projects Submitted as of August 3, 1993)

Department of State
Office of Global Change
OES/EGC

International Greenhouse Gas Reduction Projects

(Projects Submitted as of August 3, 1993)

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Compiled from information sent to us by project participants. Some editorial changes and unit conversions were made.

MMTC = million metric tons of carbon

MTC = metric tons of carbon

Table of International Greenhouse Gas Reduction Projects
(Compiled as of August 3, 1993 -- ranked by cost per MTC)

No.	Location	Category	GHG Addressed	US Sponsors	Foreign Sponsors	Duration	GHG Offset Claimed	Total Costs	US Contribution	Description	\$/MTC
1	Amazon basin	Forestry	Carbon dioxide	AES Shady Point; OXFAM America	COICA; numerous indigenous groups	10 years starting in 1993	60 MMTC over project duration	\$3.4 million	\$3.0 million by AES	Support for indigenous groups to develop sustainable resource extraction plans	\$0.06/MTC
2	Paraguay	Forestry	Carbon dioxide	AES Barbers Point; The Nature Conservancy	Moises Bertoni Foundation	Permanent preserve has been created	14 to 15 MMTC over project duration	\$3.8 million (first 3 yrs.)	\$2.0 million by AES	Protection of dense tropical forests. Planting of cash-producing indigenous trees.	\$0.25 to \$0.27/MTC (3-yr. costs only)
3	India	Agriculture	Methane	US EPA; ATI; Rockefeller Foundation; a major North American IPP; a major North American utility	National Dairy Development Board; National Dairy Research Inst.; others	10 years starting in 1993	15.9 MMTC over 30-yr duration	\$5.3 million	\$1.8 million	Supplementation of diets of milk-producing animals to promote more efficient digestion and thereby decrease methane generation.	\$0.33/MTC
4	Poland	Methane recovery	Methane	McCormick Poland	Jastreble Coal Concern; Krupinski Mine	30 years starting in July 1990	48.9 MMTC over project duration	\$30 to \$35 million	Not provided	Application of advanced methane drainage, gas utilization, and gas storage technologies to commercialize gas and store in abandoned coal mines.	\$0.61 to \$0.72/MTC
5	Guatemala	Forestry	Carbon dioxide	AES Thames; US Peace Corps; US AID; CARE	Guatemalan Forest Service; 8000 Guatemalan small holder farmers	1988-1998	16.5 MMTC over 40-yr life of power plant	\$14.5 million	\$2.0 million by AES	Soil conservation, nursery development, and tree planting directly on farms	\$0.60/MTC
6	Russia	Forestry	Carbon dioxide	US EPA; EDF; NEES; Coudert Bros.; Tenaska Inc.; Oregon St. Univ.; Trexler & Assoc.; Pacificorp; NY Merc. Exchange; Concord Co.; USDA-Forest Service	Moscow St. Univ.; Inst. for Problems of the Market Economy; Int'l Forestry Inst.; Univ. of Oslo; others	1993-1995	Not applicable for pilot project; expanded project 15 MMTC	\$537,000 (pilot costs only); \$15 million US funding for expanded project	Not provided	Reforestation program in the deforested areas of the Volga River Basin.	\$1 to \$2/MTC
7	Ukraine	Methane recovery	Methane	Resource Enterprises; Raven Ridge Resources Inc.	Shahktyorskugol and Makeavugol Coal Production Assocs.	20 years starting in 1994	2.37 to 4.73 MMTC over project duration	\$15 to \$25 million	Not provided	Application of advanced methane drainage, gas utilization, and gas enrichment technologies to commercialize gas produced in conjunction with active underground coal mining.	\$3.17 to \$10.55/MTC

Table of International Greenhouse Gas Reduction Projects -- Continued

(Compiled as of August 3, 1993 -- ranked by cost per MTC)

No.	Location	Category	GHG Addressed	US Sponsors	Foreign Sponsors	Duration	GHG Offset Claimed	Total Costs	US Contribution	Description	\$/MTC
8	Malaysia	Forestry	Carbon dioxide	New England Power Co.; The Rainforest Alliance; COPEC; Univ. of Florida	Rakyat Berjaya SDN.BHD; The Forest Research Inst. of Malaysia; Queensland Dept. of Primary Industries (Australia)	1993-1995	75,000 to 150,000 MTC over project duration	\$600,000 (pilot costs only)	Not provided	Implementation of reduced impact logging techniques on 1400 hectares of RBJ forests	\$4 to \$8/MTC
9	Czech Republic	Methane recovery	Methane	Resource Enterprises; Raven Ridge Resources Inc.	Dulni Pruzkum a Bezpecnost (DPB)	20 years starting in 1994	0.75 to 1.5 MMTC over project duration	\$10 to \$12 million	Not provided	Application of advanced methane drainage and gas enrichment technologies to commercialize gas produced in conjunction with active underground coal mining.	\$6.67 to \$16/MTC
10	Pakistan	Energy supply	Carbon dioxide	American Electric Power Energy Services; EBASCo.; ITECo.; US AID	Pakistan Water and Power Development Authority	1984-1991	Not provided	Not provided	Not provided	Institutional improvement, training, energy loss reductions, and rural system expansion.	Not provided
11	Venezuela	Energy supply	Carbon dioxide	American Electric Power Energy Services	EDELCA; CADAPE	1984-present	Not provided	Not provided	Not provided	Consultation on the development and technical specifications for and the purchase and testing of transmission equipment	Not provided
12	Costa Rica	Forestry	Carbon dioxide	Trexler & Assoc.; Tenaska Inc.	Costa Rican Ministry of Natural Resources, Energy, and Mines (MIRENEM)	Permanent preserve has been created	125 to 175 MTC per hectare (size not specified)	Not provided	Not provided	Purchase of private land which is under imminent threat of deforestation.	Not provided
13	Russia	Forestry	Carbon dioxide	Trexler & Assoc.; Tenaska Inc.	Russian Forest Service; Intl Forestry Inst. (Moscow)	60 years	90 to 150 MTC per hectare (size not specified)	Not provided	Not provided	Planting trees in currently fallow land.	Not provided
14	PRC	Other -- technical assistance and training	Carbon dioxide	Illinois Dept. of Energy and Natural Resources; Argonne National Laboratory	Liaoning Environmental Protection Bureau	3.5-4 years	Not applicable	\$1.5 to \$2 million	Not provided	Objective is to determine cost-effective strategies for slowing growth of GHG concentrations in Liaoning province.	Not applicable

Project Name: AES Thames: CARE Guatemala Agroforestry Project

Category: Forestry

Greenhouse Gases Addressed: Carbon dioxide

U.S. Actors: AES Thames (subsidiary of The AES Corp.)
U.S. Peace Corps
USAID
CARE

Foreign Actors: Guatemalan Forest Service
8000 Guatemalan small-holder farmers

Domestic Requirements/Motivations: None; self-motivated

Foreign Requirements: None

Project Duration: 1988-1998

Greenhouse Gas Reduction: 16.5 MMTC forecasted over 40-year life of power plant

Monitoring and Verification: CARE will monitor critical agroforestry variables and will report quarterly to AES. At three points during the ten-year project, independent reviewers will evaluate.

Budget: \$14.5 million total; \$2.0 million provided by AES

Other Environmental Impacts: Not provided

Description: Project is designed to plant trees, to prevent or reduce the future loss of forest, and to control soil erosion through reforestation activities and soil conservation measures. Carbon sequestration is accomplished through the planting of 40 to 50 million trees over the ten-year duration. By growing trees directly on farms and greatly improving existing farmland productivity, local fuelwood needs are met, and the need for further expansion is reduced.

CARE has operational responsibility and provides farmers with technical support in areas such as soil conservation, nursery development, and tree planting. The farmers grow or purchase trees which they plant themselves on land that they own or control individually or as a community. CARE has cooperative agreements with the other project actors.

Total cost per unit of greenhouse gas reduced: \$0.80/MTC

Project Name: AES Barbers Point: Mbaracayu Conservation Project
(Paraguay)

Category: Forestry

Greenhouse Gases Addressed: Carbon dioxide

U.S. Actors: AES Barbers Point (subsidiary of The AES Corp.)
The Nature Conservancy

Foreign Actors: Moises Bertoni Foundation (Paraguay)

Domestic Requirements/Motivations: None; self-motivated

Foreign Requirements: None

Project Duration: Infinite; permanent preserve has been created

Greenhouse Gas Reduction: 14 to 15 MMTC estimated

Monitoring and Verification: Preserve will be managed by an independent board. Although a detailed monitoring plan is still being developed, it is anticipated that land-based and remote sensing will be used to monitor the status of the preserve.

Budget: \$3.8 million total for first three years;
\$2.0 million provided by AES

Other Environmental Impacts: Biodiversity; preservation of indigenous peoples' homeland

Description: Project will protect the Mbaracayu, one of South America's last remaining major tracts of undisturbed dense tropical forest, from commercial logging and conversion to agriculture. Sequestration is accomplished through the planting of fruit and cash-producing indigenous trees. The primary source of GHG offset is the conservation of carbon in the 143,000 acre tract. In 1991, the forest was to be sold to a local timber products company. As a result of the project, the land is now held in a permanent private nature reserve established with the cooperation of the Paraguayan government and managed by a stakeholder board. This board includes United Nations as well as local indigenous representatives.

Total cost per unit of greenhouse gas reduced: \$0.25/MTC to \$0.27/MTC
(3-yr costs only)

Project Name: AES Shady Point: OXFAM American Amazon Project

Category: Forestry

Greenhouse Gases Addressed: Carbon dioxide

U.S. Actors: AES Shady Point (subsidiary of The AES Corp.)
OXFAM America

Foreign Actors: Coordinating Body of Indigenous Peoples Organization of the Amazon Basin (COICA) and numerous indigenous groups

Domestic Requirements/Motivations: None; self-motivated

Foreign Requirements: None

Project Duration: Funding term: 10 years starting in 1993

Greenhouse Gas Reduction: 60 MMTC estimated

Monitoring and Verification: OXFAM America will be the coordinator and project manager. Project success will be documented through the implementation of a Geographical Information System and on-ground monitoring by the affected indigenous groups.

Budget: \$3.4 million total; \$3.0 million provided by AES

Other Environmental Impacts: Preservation of indigenous peoples' homeland

Description: Project will support indigenous groups from Peru, Ecuador, and Bolivia to gain control over their lands and to develop sustainable resource extraction plans for the forest. The World Resources Institute estimates that 10 years of support of these activities can conservatively be expected to protect 1.2 million acres of pristine rain forest and at least 60 MMTC that would be released if the forest were cleared, as is the practice in the affected project areas.

Total cost per unit of greenhouse gas reduced: \$0.06/MTC

Project Name: Tropical Forest Protection in Costa Rica

Category: Forestry

Greenhouse Gases Addressed: Carbon dioxide

U.S. Actors: Trexler and Associates
Tenaska Inc.

Foreign Actors: Costa Rican Ministry of Natural Resources, Energy and Mines (MIRENEM)

Domestic Requirements/Motivations: Bonneville Power Administration requested offset commitment for new power plant

Foreign Requirements: None

Project Duration: Implementation to begin in 1994; infinite project duration as permanent reserve has been created

Greenhouse Gas Reduction: Not provided; estimate 125 - 175 MTC/ha of protected tropical forest

Monitoring and Verification: Costa Rican National Park System will manage and monitor project

Budget: Not provided

Other Environmental Impacts: Biodiversity; park is biological corridor

Description: Project involves purchase of private land within a designated Costa Rican National Park. Much of designated land is under imminent threat of deforestation through either agricultural/pastoral expansion or logging. The land purchased under the project would be turned over to the Costa Rican Park Service, thus preventing future deforestation.

Total cost per unit of greenhouse gas reduced: Not provided

Project Name: Afforestation in Russia

Category: Forestry

Greenhouse Gases Addressed: Carbon dioxide

U.S. Actors: Trexler and Associates
Tenaska Inc.

Foreign Actors: Russian Forest Service
International Forestry Institute (Moscow)

Domestic Requirements/Motivations: Bonneville Power Administration
requested offset commitment for
new power plant

Foreign Requirements: None

Project Duration: Project expected to last 60 years

Greenhouse Gas Reduction: Not provided; estimate 90 - 150 MTC/ha
including vegetation and soils

Monitoring and Verification: Small geographic information system will be
used

Budget: Not provided

Other Environmental Impacts: Soil conservation; water conservation

Description: Project involves planting new trees to sequester carbon. Currently, the land is generally in a fallow condition with sandy soil; however, initial site visits into existing forests in the area have demonstrated that the area is capable of successfully sustaining long-term tree growth. The Russian forest service proposes to plant pine, ash, larch, and birch trees in the area and will sustain their growth for a minimum period of 60 years.

Total cost per unit of greenhouse gas reduced: Not provided

Project Name: Dairy Feed Supplementation Program, Gujarat, India

Category: Agriculture

Greenhouse Gases Addressed: Methane

U.S. Actors: Appropriate Technology International (ATI); U.S. EPA; Rockefeller Foundation; a major North American independent power producer; a major North American utility

Foreign Actors: (India) National Dairy Development Board; National Dairy Research Institute; BAIF Development Research Foundation; Self Employed Women's Association; World Women's Veterinarian Association

Domestic Requirements/Motivations: Voluntary

Foreign Requirements: Project is required to adhere to normal Government of India clearance procedures applicable to all development activities receiving foreign financial assistance. In addition, the host and donor agencies involved in the project will sign a Memorandum of Understanding (MOU). This MOU has been developed in anticipation of a global agreement on the allocation of credits for carbon offset programs, but as India has no formal national position on carbon offsets at the present time, the MOU is drawn as a private contract among the cooperating parties.

Project Duration: Expected to begin September/October 1993, lasting 10 years

Greenhouse Gas Reduction: 15.9 MMTC over 30-yr duration

Monitoring and Verification: National Dairy Research Institute will use field monitoring technology developed by Washington St. Univ. and U.S. EPA. External reviews in year 3 and year 5.

Budget: Donor contribution	\$1.8 million
Indian partner contribution	<u>\$3.5 million</u>
Total	\$5.3 million

Other Environmental Impacts: By year 10, project will have generated addition \$48 million of cumulative dairy income for almost 670,000 farm families

Description: Strategic supplementation of the diets of milk-producing animals can promote more efficient digestion and thereby decrease methane generation per unit head of cattle. Molasses-urea block lick is one type of multi-nutrient supplementation.

Project involves research on molasses-urea block formulation and process technology issues, production of high quality blocks through retrofitting of existing plants and construction of new units, and an intensive marketing effort that involves recruiting and training village-based agents (predominantly women) to promote and sell the blocks and eventually operate as self-sustaining small-scale entrepreneurs.

Total cost per unit of greenhouse gas reduced: \$0.33/MTC

Project Name: New England Electric System (NEES) Carbon Offset Pilot
Project: Reduced Impact Logging in Malaysia

Category: Forestry

Greenhouse Gases Addressed: Carbon dioxide
Methane

U.S. Actors: New England Power Company (NEP)
The Rainforest Alliance
COPEC
Dr. Francis E. Putz, Prof. of Botany,
Univ. of Florida

Foreign Actors: Rakyat Berjaya SDN.BHD. (RBJ; a subsidiary
of Innoprise Corporation SDN.BHD.)
The Forest Research Institute of Malaysia
Department of Primary Industries,
Queensland, Australia (tech. consultants)

Domestic Requirements/Motivations: In anticipation of possible domestic
and international initiatives related to GHG

Foreign Requirements: No commercial barriers were encountered in
executing this agreement. Under the NEP-RBJ contract, NEP has exclusive
rights to any GHG offsets credits that result from the improved logging
practices in the project area

Project Duration: Contract was signed in August, 1992. Harvesting
begins in July 1993 and continues through mid-1994. Pilot phase will be
completed by July 1995.

Greenhouse Gas Reduction: 75,000 to 150,000 MTC cumulative

Monitoring and Verification: Environmental Audit Committee, consisting
of the Forest Research Institute of Malaysia and The Rainforest Alliance
personnel, will monitor compliance with harvesting guidelines. Dr. Putz will
lead the carbon study.

Budget:	Pilot project costs	\$450,000
	Monitoring and research costs	\$150,000
	Total	\$600,000

Other Environmental Impacts: Benefits to wildlife habitat, biodiversity, soil
erosion control, and water quality

Description: Pilot project will implement Reduced Impact Logging (RIL)
techniques on 1400 hectares of RBJ forests. It is estimated that current
logging damage can be reduced by as much as 50% by pre-cutting vines,
directional felling, and planned extraction of timber on properly constructed
and utilized skid trails. On site training will be followed by implementation
on the 1400 hectares.

Total cost per unit of greenhouse gas reduced: \$4 to \$8/MTC
(Pilot project costs)

Project Name: American Electric Power/Pakistan -- Energy System Improvements

Category: Energy supply

Greenhouse Gases Addressed: Carbon dioxide

U.S. Actors: American Electric Power Energy Services
EBASCo.
ITECo.
US/AID

Foreign Actors: Pakistan Water and Power Development Authority

Domestic Requirements/Motivations: Service contract

Foreign Requirements: Not applicable

Project Duration: 1984 to 1991

Greenhouse Gas Reduction: Not provided

Monitoring and Verification: Not provided

Budget: Not provided

Other Environmental Impacts: Not provided

Description: Project was a joint venture between AEP Energy Services, EBASCo. and ITECo. to provide consulting and training services to US/AID and the Pakistan Water and Power Development Authority. Institutional improvements, training, energy loss reductions, and rural system expansion were among the areas covered. In particular, AEP consulted in the areas of distribution engineering, planning, construction, and operations and maintenance.

Total cost per unit of greenhouse gas reduced: Not provided

Project Name: American Electric Power/Venezuela -- Energy System Improvements

Category: Energy supply

Greenhouse Gases Addressed: Carbon dioxide

U.S. Actors: American Electric Power Energy Services

Foreign Actors: EDELCA (Venezuela)
CADAPE (Venezuela)

Domestic Requirements/Motivations: Service contract

Foreign Requirements: Not applicable

Project Duration: 1984 to present

Greenhouse Gas Reduction: Not provided

Monitoring and Verification: Not provided

Budget: Not provided

Other Environmental Impacts: Not provided

Description: Project provides advice on the development and technical specifications for and the purchase and testing of transmission equipment. The overall goal is to improve the reliability and efficiency of the Venezuelan electric system which already includes some 765-kV transmission capability.

Total cost per unit of greenhouse gas reduced: Not provided

Project Name: Methane Recovery and Commercialization in the Czech Republic

Category: Methane recovery -- coal

Greenhouse Gases Addressed: Methane

U.S. Actors: Resource Enterprises
Raven Ridge Resources Inc.

Foreign Actors: Dulni Pruzkum a Bezpecnost (DPB)

Domestic Requirements/Motivations: Service contract

Foreign Requirements: Not provided

Project Duration: Expected start June 1994; duration of 20 years

Greenhouse Gas Reduction: 0.75 to 1.5 MMTC over life of project (3 mines)

Monitoring and Verification: Direct verification through monitoring and documentation of produced gas volumes

Budget: Estimated total: \$10 to \$12 million

Other Environmental Impacts: Fuel switching to gas

Description: Proposed project involves the application of advanced methane drainage and gas enrichment technologies. These technologies were developed in the US to commercialize high quality and low quality gas resources produced in conjunction with active underground coal mining in the Ostrava-Karvina Mining Region of the Upper Silesian coal basin in the Czech Republic.

Total cost per unit of greenhouse gas reduced: \$6.67 to \$16/MTC

Project Name: Methane Recovery and Commercialization in Ukraine

Category: Methane recovery -- coal

Greenhouse Gases Addressed: Methane

U.S. Actors: Resource Enterprises
Raven Ridge Resources Inc.

Foreign Actors: Shahktyorskugol and Makeavugol Coal Production
Assocs.

Domestic Requirements/Motivations: Service contract

Foreign Requirements: Not provided

Project Duration: Expected start Dec. 1994; duration of 20 years

Greenhouse Gas Reduction: 2.37 to 4.73 MMTC over life of project (5
mines)

Monitoring and Verification: Direct verification through monitoring and
documentation of produced gas volumes

Budget: Estimated total: \$15 to \$25 million

Other Environmental Impacts: Fuel switching to gas

Description: Proposed project involves the application of advanced methane drainage, gas enrichment, and gas utilization technologies. These technologies were developed in the US to commercialize high quality and low quality gas resources produced in conjunction with active underground coal mining in the Donbass Mining Region of Ukraine.

Total cost per unit of greenhouse gas reduced: \$3.17 to \$10.55/MTC

Project Name: Methane Recovery, Gas Storage, and Power Generation in Poland

Category: Methane recovery -- coal

Greenhouse Gases Addressed: Methane

U.S. Actors: McCormick Poland

Foreign Actors: Jastreble Coal Concern, Krupinski Mine

Domestic Requirements/Motivations: Service contract

Foreign Requirements: Not provided

Project Duration: Started July 1990; duration of 30 years

Greenhouse Gas Reduction: 48.9 MMTC over life of project (1 mine and adjoining concession area)

Monitoring and Verification: Direct verification through monitoring and documentation of produced gas volumes

Budget: Estimated total: \$30 to \$35 million

Other Environmental Impacts: Fuel switching to gas

Description: Proposed project involves the application of advanced methane drainage, gas enrichment, gas utilization, and gas storage technologies. These technologies were developed in the US to commercialize high quality and low quality gas resources by enrichment and storage in abandoned coal mines for subsequent power generation. These gas resources will be produced in conjunction with active underground coal mining in the Upper Silesian Coal Basin of Poland.

Total cost per unit of greenhouse gas reduced: \$0.61 to \$0.72/MTC

Project Name: Russian Demonstration Joint Implementation Forestry Project

Category: Forestry

Greenhouse Gases Addressed: Carbon dioxide

U.S. Actors: Environmental Defense Fund; U.S. EPA; Coudert Brothers (international law firm); New England Electric System; Oregon State Univ.; Trexler and Assoc.; Tenaska Inc.; PacifiCorp; New York Mercantile Exchange (invited); Concord Co. (invited); USDA-Forest Service (invited)

Foreign Actors: Institute for Problems of the Market Economy; Institute for the Economy in Transition; Moscow State Univ.; Commission for Productive Forces and Natural Resources; International Forestry Institute; Vologda regional Soviet of People's Deputies; Center for International Energy and Climate Research (Univ. of Oslo)

Domestic Requirements/Motivations: Demonstration project in anticipation of possible domestic and international initiatives related to GHG.

Foreign Requirements: Part of the work to be accomplished is to specifically address any limitations and uncertainties.

Project Duration: Two years: Fall 1993-1995

Greenhouse Gas Reduction: Not applicable for pilot project; expanded project projected 15 MMTC

Monitoring and Verification: Strategies will be examined. Plan to create blue-ribbon panel of scientific experts to review research.

Budget: Total pilot costs (exclusive of tree planting): \$537,000; expanded project seeks \$15 million US funding

Other Environmental Impacts: Projects may increase forest cover, provide additional habitat, protect species, enhance water supply, and prevent erosion

Description: The first project would establish a reforestation program in the deforested areas of the Volga River Basin in Russia. The project would include the formation of a multi-party, intergovernmental partnership between and among agencies of the USG, the Russian federal and the Vologda regional governments, and various NGOs. The project would include a series of meetings to investigate the biophysical issues raised by reforestation efforts as well as to illuminate institutional and legal issues with respect to creating legitimate offsets under national and international regulatory regimes. After the initial demonstration reforestation project is completed, the partnership would evolve into an on-going institutional mechanism to facilitate and attract investment and help implement ecologically beneficial projects in Russia.

Total cost per unit of greenhouse gas reduced: \$1 to \$2/MTC

Project Name: State of Illinois/Province of Liaoning, PRC -- Joint Implementation Pilot Study

Category: Other -- technical assistance and training in conducting inventories and projections of greenhouse gas emissions and in development of models to analyze mitigation strategies

Greenhouse Gases Addressed: Initially carbon dioxide; others may be examined

U.S. Actors: St. of Ill. Dept. of Energy and Natural Resources
Argonne National Laboratory

Foreign Actors: Liaoning Environmental Protection Bureau
Unspecified national Chinese agency

Domestic Requirements/Motivations: Not provided

Foreign Requirements: Not provided

Project Duration: Awaiting funding; projected to take 3.5 to 4 years

Greenhouse Gas Reduction: Not applicable

Monitoring and Verification: Not applicable

Budget: Projected to be \$1.5 to 2 million

Other Environmental Impacts: Not provided

Description: Project objective is to determine "the most economically and technically efficient strategies for slowing growth of greenhouse gas concentrations" and will be carried out by organizations in Liaoning province with the assistance of Illinois organizations. Objectives of pilot project are to: (1) develop data on levels of GHG emissions; (2) identify efficient strategies for economic development that minimize GHG emission levels; (3) examine barriers to implementation of mitigation options; and (4) develop, test, and refine methodologies for use by other provinces and nations. The State of Illinois and Argonne National Lab will provide technical expertise and some computer equipment. The project is currently awaiting state funding and private grant approval.

Total cost per unit of greenhouse gas reduced: Not applicable

Project Information

Project Name: title of the project or program

Categories: Select from the following:

- Forestry (forest management practices, tree planting, forest protection/preservation, other -- please specify),
- Energy demand/efficiency,
- Energy supply (fuel switching, power plant heat rate improvement, renewable energy, cogeneration, other -- please specify),
- Agriculture (farming practices, crop selection, animal husbandry, other -- please specify),
- Methane recovery (coal, natural gas, landfill, other -- please specify),
- Industrial processes,
- Transportation (reducing vehicle emissions, transportation infrastructure, other -- please specify),
- CFC substitutes (not controlled by the Montreal Protocol),
- Other -- please specify

Greenhouse Gas(es) Addressed: carbon dioxide, methane, nitrous oxide, CFC substitute, carbon monoxide, non-methane volatile organic compounds, other -- please specify

Firm/cooperating technical contractor: U.S. company(ies), government agency or other organization involved in the program and, if relevant, supporting technical contractor(s) (including legal experts)

Foreign Country/key technical contact: foreign country(ies), government agency(ies) and other organization(s) participating in project including technical/private sector contact(s)

Domestic Requirements/Motivations: description of factors that motivate project, including federal, state or local regulations, tax considerations, insurance requirements, legal and technical considerations, or others -- please specify

Foreign Requirements: description of requirements host countries impose on project(s), including provincial or local requirements and any barriers encountered (e.g., limitations on protection of intellectual property, repatriation of property, permitting requirements, taxation and insurance issues), and whether contract was negotiated that divides emissions reductions "credits" between host country and donor

Project Duration: length of project operation/duration, including how long the project has been underway, expected date by which project is/will be fully operational, projected length and level of involvement of U.S. organization in project maintenance or follow-up

-2-

Greenhouse Gas Reduction: amount of greenhouse gas reduced (for current year and for out-years -- through duration of project if possible), including method for calculating reduction (e.g., baseline projection used for comparison), allocation of "credits" (e.g., contract provisions, banking of credits, etc.), provisions in case contract is broken

Monitoring and Verification: procedures for monitoring and verification of GHG reductions, institutions created/ responsible for assuring project is sound (e.g., local government, environmental groups, expert panels, etc.)

Budget: total budget for project, average annual budget, capital start-up and maintenance costs, breakdown of cost distribution among participants, cost per ton GHG offset (both to overall project and to U.S. participant)

Other Environmental Impacts/Benefits: impacts and/or benefits to, e.g., biodiversity, air pollution, soil and water conservation, indigenous peoples, etc.

Description: BRIEF (no more than 1 page) description of project and how it works, including procedures for preparation of project evaluation plan

THE WHITE HOUSE
WASHINGTON

August 13, 1993

MEMORANDUM TO CLIMATE CHANGE MITIGATION GROUP

FROM: Katie McGinty
SUBJECT: August 17 Meeting

The next meeting of the CCMG will be Tuesday, August 17, at 4:00PM in Room 472 OEOP.

Distribution:

Brian Burke
Joseph Canny
Eileen B. Claussen
Bowman Cutter
Everett Ehrlich
John H. Gibbons
T.J. Glauthier
James Lyons
Alicia Munnell
Alice M. Rivlin
Richard Rosenzweig
Kathryn Sullivan
Robert Sussman
Laura D'Andrea Tyson
Tim Wirth
Brooks Yeager

International Greenhouse Gas Reduction Projects

(Projects Submitted as of August 3, 1993)

Department of State
Office of Global Change
OES/EGC

International Greenhouse Gas Reduction Projects

(Projects Submitted as of August 3, 1993)

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Compiled from information sent to us by project participants. Some editorial changes and unit conversions were made.

MMTC = million metric tons of carbon

MTC = metric tons of carbon

Table of International Greenhouse Gas Reduction Projects

(Compiled as of August 3, 1993 -- ranked by cost per MTC)

No.	Location	Category	GHG Addressed	US Sponsors	Foreign Sponsors	Duration	GHG Offset Claimed	Total Costs	US Contribution	Description	\$/MTC
1	Amazon basin	Forestry	Carbon dioxide	AES Shady Point; OXFAM America	COICA; numerous indigenous groups	10 years starting in 1993	60 MMTC over project duration	\$3.4 million	\$3.0 million by AES	Support for indigenous groups to develop sustainable resource extraction plans	\$0.06/MTC
2	Paraguay	Forestry	Carbon dioxide	AES Barbers Point; The Nature Conservancy	Moises Bertoni Foundation	Permanent preserve has been created	14 to 15 MMTC over project duration	\$3.8 million (first 3 yrs.)	\$2.0 million by AES	Protection of dense tropical forests. Planting of cash-producing indigenous trees.	\$0.25 to \$0.27/MTC (3-yr. costs only)
3	India	Agriculture	Methane	US EPA; ATI; Rockefeller Foundation; a major North American IPP; a major North American utility	National Dairy Development Board; National Dairy Research Inst.; others	10 years starting in 1993	15.9 MMTC over 30-yr duration	\$5.3 million	\$1.8 million	Supplementation of diets of milk-producing animals to promote more efficient digestion and thereby decrease methane generation.	\$0.33/MTC
4	Poland	Methane recovery	Methane	McCormick Poland	Jastreble Coal Concern; Krupinski Mine	30 years starting in July 1990	48.9 MMTC over project duration	\$30 to \$35 million	Not provided	Application of advanced methane drainage, gas utilization, and gas storage technologies to commercialize gas and store in abandoned coal mines.	\$0.61 to \$0.72/MTC
5	Guatemala	Forestry	Carbon dioxide	AES Thames; US Peace Corps; US AID; CARE	Guatemalan Forest Service; 8000 Guatemalan small holder farmers	1988-1998	16.5 MMTC over 40-life of power plant	\$14.5 million	\$2.0 million by AES	Soil conservation, nursery development, and tree planting directly on farms	\$0.80/MTC
6	Russia	Forestry	Carbon dioxide	US EPA; EDF; NEES; Coudert Bros.; Tenaska Inc.; Oregon St. Univ.; Trexler & Assoc.; PacifiCorp; NY Merc. Exchange; Concord Co.; USDA-Forest Service	Moscow St. Univ.; Inst. for Problems of the Market Economy; Int'l Forestry Inst.; Univ. of Oslo; others	1993-1995	Not applicable for pilot project; expanded project 15 MMTC	\$537,000 (pilot costs only); \$15 million US funding for expanded project	Not provided	Reforestation program in the deforested areas of the Volga River Basin.	\$1 to \$2/MTC
7	Ukraine	Methane recovery	Methane	Resource Enterprises; Raven Ridge Resources Inc.	Shahktyorskugol and Makeavugol Coal Production Assocs.	20 years starting in 1994	2.37 to 4.73 MMTC over project duration	\$15 to \$25 million	Not provided	Application of advanced methane drainage, gas utilization, and gas enrichment technologies to commercialize gas produced in conjunction with active underground coal mining.	\$3.17 to \$10.55/MTC

Table of International Greenhouse Gas Reduction Projects -- Continued

(Compiled as of August 3, 1993 -- ranked by cost per MTC)

No.	Location	Category	GHG Addressed	US Sponsors	Foreign Sponsors	Duration	GHG Offset Claimed	Total Costs	US Contribution	Description	\$/MTC
8	Malaysia	Forestry	Carbon dioxide	New England Power Co.; The Rainforest Alliance; COPEC; Univ. of Florida	Rakyat Berjaya SDN.BHD; The Forest Research Inst. of Malaysia; Queensland Dept. of Primary Industries (Australia)	1993-1995	75,000 to 150,000 MTC over project duration	\$600,000 (pilot costs only)	Not provided	Implementation of reduced impact logging techniques on 1400 hectares of RBJ forests.	\$4 to \$8/MTC
9	Czech Republic	Methane recovery	Methane	Resource Enterprises; Raven Ridge Resources Inc.	Dulni Pruzkum a Bezpecnost (DPB)	20 years starting in 1994	0.75 to 1.5 MMTC over project duration	\$10 to \$12 million	Not provided	Application of advanced methane drainage and gas enrichment technologies to commercialize gas produced in conjunction with active underground coal mining.	\$6.67 to \$16/MTC
10	Pakistan	Energy supply	Carbon dioxide	American Electric Power Energy Services; EBASCo.; ITECo.; US AID	Pakistan Water and Power Development Authority	1984-1991	Not provided	Not provided	Not provided	Institutional improvement, training, energy loss reductions, and rural system expansion	Not provided
11	Venezuela	Energy supply	Carbon dioxide	American Electric Power Energy Services	EDELCA; CADAPE	1984-present	Not provided	Not provided	Not provided	Consultation on the development and technical specifications for and the purchase and testing of transmission equipment.	Not provided
12	Costa Rica	Forestry	Carbon dioxide	Trexler & Assoc.; Tenaska Inc.	Costa Rican Ministry of Natural Resources, Energy, and Mines (MIRENEM)	Permanent preserve has been created	125 to 175 MTC per hectare (size not specified)	Not provided	Not provided	Purchase of private land which is under imminent threat of deforestation.	Not provided
13	Russia	Forestry	Carbon dioxide	Trexler & Assoc.; Tenaska Inc.	Russian Forest Service; Int'l Forestry Inst. (Moscow)	60 years	90 to 150 MTC per hectare (size not specified)	Not provided	Not provided	Planting trees in currently fallow land.	Not provided
14	PRC	Other -- technical assistance and training	Carbon dioxide	Illinois Dept. of Energy and Natural Resources; Argonne National Laboratory	Liaoning Environmental Protection Bureau	3.5-4 years	Not applicable	\$1.5 to \$2 million	Not provided	Objective is to determine cost-effective strategies for slowing growth of GHG concentrations in Liaoning province.	Not applicable

Project Name: AES Thames: CARE Guatemala Agroforestry Project

Category: Forestry

Greenhouse Gases Addressed: Carbon dioxide

U.S. Actors: AES Thames (subsidiary of The AES Corp.)
U.S. Peace Corps
USAID
CARE

Foreign Actors: Guatemalan Forest Service
8000 Guatemalan small-holder farmers

Domestic Requirements/Motivations: None; self-motivated

Foreign Requirements: None

Project Duration: 1988-1998

Greenhouse Gas Reduction: 16.5 MMTC forecasted over 40-year life of power plant

Monitoring and Verification: CARE will monitor critical agroforestry variables and will report quarterly to AES. At three points during the ten-year project, independent reviewers will evaluate.

Budget: \$14.5 million total; \$2.0 million provided by AES

Other Environmental Impacts: Not provided

Description: Project is designed to plant trees, to prevent or reduce the future loss of forest, and to control soil erosion through reforestation activities and soil conservation measures. Carbon sequestration is accomplished through the planting of 40 to 50 million trees over the ten-year duration. By growing trees directly on farms and greatly improving existing farmland productivity, local fuelwood needs are met, and the need for further expansion is reduced.

CARE has operational responsibility and provides farmers with technical support in areas such as soil conservation, nursery development, and tree planting. The farmers grow or purchase trees which they plant themselves on land that they own or control individually or as a community. CARE has cooperative agreements with the other project actors.

Total cost per unit of greenhouse gas reduced: \$0.80/MTC

Project Name: AES Barbers Point: Mbaracayu Conservation Project
(Paraguay)

Category: Forestry

Greenhouse Gases Addressed: Carbon dioxide

U.S. Actors: AES Barbers Point (subsidiary of The AES Corp.)
The Nature Conservancy

Foreign Actors: Moises Bertoni Foundation (Paraguay)

Domestic Requirements/Motivations: None; self-motivated

Foreign Requirements: None

Project Duration: Infinite; permanent preserve has been created

Greenhouse Gas Reduction: 14 to 15 MMTC estimated

Monitoring and Verification: Preserve will be managed by an independent board. Although a detailed monitoring plan is still being developed, it is anticipated that land-based and remote sensing will be used to monitor the status of the preserve.

Budget: \$3.8 million total for first three years;
\$2.0 million provided by AES

Other Environmental Impacts: Biodiversity; preservation of indigenous peoples' homeland

Description: Project will protect the Mbaracayu, one of South America's last remaining major tracts of undisturbed dense tropical forest, from commercial logging and conversion to agriculture. Sequestration is accomplished through the planting of fruit and cash-producing indigenous trees. The primary source of GHG offset is the conservation of carbon in the 143,000 acre tract. In 1991, the forest was to be sold to a local timber products company. As a result of the project, the land is now held in a permanent private nature reserve established with the cooperation of the Paraguayan government and managed by a stakeholder board. This board includes United Nations as well as local indigenous representatives.

Total cost per unit of greenhouse gas reduced: \$0.25/MTC to \$0.27/MTC
(3-yr costs only)

Project Name: AES Shady Point: OXFAM American Amazon Project

Category: Forestry

Greenhouse Gases Addressed: Carbon dioxide

U.S. Actors: AES Shady Point (subsidiary of The AES Corp.)
OXFAM America

Foreign Actors: Coordinating Body of Indigenous Peoples Organization of the Amazon Basin (COICA) and numerous indigenous groups

Domestic Requirements/Motivations: None; self-motivated

Foreign Requirements: None

Project Duration: Funding term: 10 years starting in 1993

Greenhouse Gas Reduction: 60 MMTC estimated

Monitoring and Verification: OXFAM America will be the coordinator and project manager. Project success will be documented through the implementation of a Geographical Information System and on-ground monitoring by the affected indigenous groups.

Budget: \$3.4 million total; \$3.0 million provided by AES

Other Environmental Impacts: Preservation of indigenous peoples' homeland

Description: Project will support indigenous groups from Peru, Ecuador, and Bolivia to gain control over their lands and to develop sustainable resource extraction plans for the forest. The World Resources Institute estimates that 10 years of support of these activities can conservatively be expected to protect 1.2 million acres of pristine rain forest and at least 60 MMTC that would be released if the forest were cleared, as is the practice in the affected project areas.

Total cost per unit of greenhouse gas reduced: \$0.06/MTC

Project Name: Tropical Forest Protection in Costa Rica

Category: Forestry

Greenhouse Gases Addressed: Carbon dioxide

U.S. Actors: Trexler and Associates
Tenaska Inc.

Foreign Actors: Costa Rican Ministry of Natural Resources, Energy and Mines (MIRENEM)

Domestic Requirements/Motivations: Bonneville Power Administration requested offset commitment for new power plant

Foreign Requirements: None

Project Duration: Implementation to begin in 1994; infinite project duration as permanent reserve has been created

Greenhouse Gas Reduction: Not provided; estimate 125 - 175 MTC/ha of protected tropical forest

Monitoring and Verification: Costa Rican National Park System will manage and monitor project

Budget: Not provided

Other Environmental Impacts: Biodiversity; park is biological corridor

Description: Project involves purchase of private land within a designated Costa Rican National Park. Much of designated land is under imminent threat of deforestation through either agricultural/pastoral expansion or logging. The land purchased under the project would be turned over to the Costa Rican Park Service, thus preventing future deforestation.

Total cost per unit of greenhouse gas reduced: Not provided

Project Name: Afforestation in Russia

Category: Forestry

Greenhouse Gases Addressed: Carbon dioxide

U.S. Actors: Trexler and Associates
Tenaska Inc.

Foreign Actors: Russian Forest Service
International Forestry Institute (Moscow)

Domestic Requirements/Motivations: Bonneville Power Administration
requested offset commitment for
new power plant

Foreign Requirements: None

Project Duration: Project expected to last 60 years

Greenhouse Gas Reduction: Not provided; estimate 90 - 150 MTC/ha
including vegetation and soils

Monitoring and Verification: Small geographic information system will be
used

Budget: Not provided

Other Environmental Impacts: Soil conservation; water conservation

Description: Project involves planting new trees to sequester carbon. Currently, the land is generally in a fallow condition with sandy soil; however, initial site visits into existing forests in the area have demonstrated that the area is capable of successfully sustaining long-term tree growth. The Russian forest service proposes to plant pine, ash, larch, and birch trees in the area and will sustain their growth for a minimum period of 60 years.

Total cost per unit of greenhouse gas reduced: Not provided

Project Name: Dairy Feed Supplementation Program, Gujarat, India

Category: Agriculture

Greenhouse Gases Addressed: Methane

U.S. Actors: Appropriate Technology International (ATI); U.S. EPA; Rockefeller Foundation; a major North American independent power producer; a major North American utility

Foreign Actors: (India) National Dairy Development Board; National Dairy Research Institute; BAIF Development Research Foundation; Self Employed Women's Association; World Women's Veterinarian Association

Domestic Requirements/Motivations: Voluntary

Foreign Requirements: Project is required to adhere to normal Government of India clearance procedures applicable to all development activities receiving foreign financial assistance. In addition, the host and donor agencies involved in the project will sign a Memorandum of Understanding (MOU). This MOU has been developed in anticipation of a global agreement on the allocation of credits for carbon offset programs, but as India has no formal national position on carbon offsets at the present time, the MOU is drawn as a private contract among the cooperating parties.

Project Duration: Expected to begin September/October 1993, lasting 10 years

Greenhouse Gas Reduction: 15.9 MMTC over 30-yr duration

Monitoring and Verification: National Dairy Research Institute will use field monitoring technology developed by Washington St. Univ. and U.S. EPA. External reviews in year 3 and year 5.

Budget: Donor contribution	\$1.8 million
Indian partner contribution	<u>\$3.5 million</u>
Total	\$5.3 million

Other Environmental Impacts: By year 10, project will have generated addition \$48 million of cumulative dairy income for almost 670,000 farm families

Description: Strategic supplementation of the diets of milk-producing animals can promote more efficient digestion and thereby decrease methane generation per unit head of cattle. Molasses-urea block lick is one type of multi-nutrient supplementation.

Project involves research on molasses-urea block formulation and process technology issues, production of high quality blocks through retrofitting of existing plants and construction of new units, and an intensive marketing effort that involves recruiting and training village-based agents (predominantly women) to promote and sell the blocks and eventually operate as self-sustaining small-scale entrepreneurs.

Total cost per unit of greenhouse gas reduced: \$0.33/MTC

Project Name: New England Electric System (NEES) Carbon Offset Pilot
Project: Reduced Impact Logging in Malaysia

Category: Forestry

Greenhouse Gases Addressed: Carbon dioxide
Methane

U.S. Actors: New England Power Company (NEP)
The Rainforest Alliance
COPEC
Dr. Francis E. Putz, Prof. of Botany,
Univ. of Florida

Foreign Actors: Rakyat Berjaya SDN.BHD. (RBJ; a subsidiary
of Innoprise Corporation SDN.BHD.)
The Forest Research Institute of Malaysia
Department of Primary Industries,
Queensland, Australia (tech. consultants)

Domestic Requirements/Motivations: In anticipation of possible domestic
and international initiatives related to GHG

Foreign Requirements: No commercial barriers were encountered in
executing this agreement. Under the NEP-RBJ contract, NEP has exclusive
rights to any GHG offsets credits that result from the improved logging
practices in the project area

Project Duration: Contract was signed in August, 1992. Harvesting
begins in July 1993 and continues through mid-1994. Pilot phase will be
completed by July 1995.

Greenhouse Gas Reduction: 75,000 to 150,000 MTC cumulative

Monitoring and Verification: Environmental Audit Committee, consisting
of the Forest Research Institute of Malaysia and The Rainforest Alliance
personnel, will monitor compliance with harvesting guidelines. Dr. Putz will
lead the carbon study.

Budget: Pilot project costs	\$450,000
Monitoring and research costs	\$150,000
Total	\$600,000

Other Environmental Impacts: Benefits to wildlife habitat, biodiversity, soil
erosion control, and water quality

Description: Pilot project will implement Reduced Impact Logging (RIL)
techniques on 1400 hectares of RBJ forests. It is estimated that current
logging damage can be reduced by as much as 50% by pre-cutting vines,
directional felling, and planned extraction of timber on properly constructed
and utilized skid trails. On site training will be followed by implementation
on the 1400 hectares.

Total cost per unit of greenhouse gas reduced: \$4 to \$8/MTC
(Pilot project costs)

Project Name: American Electric Power/Pakistan -- Energy System Improvements

Category: Energy supply

Greenhouse Gases Addressed: Carbon dioxide

U.S. Actors: American Electric Power Energy Services
EBASCo.
ITECo.
US/AID

Foreign Actors: Pakistan Water and Power Development Authority

Domestic Requirements/Motivations: Service contract

Foreign Requirements: Not applicable

Project Duration: 1984 to 1991

Greenhouse Gas Reduction: Not provided

Monitoring and Verification: Not provided

Budget: Not provided

Other Environmental Impacts: Not provided

Description: Project was a joint venture between AEP Energy Services, EBASCo. and ITECo. to provide consulting and training services to US/AID and the Pakistan Water and Power Development Authority. Institutional improvements, training, energy loss reductions, and rural system expansion were among the areas covered. In particular, AEP consulted in the areas of distribution engineering, planning, construction, and operations and maintenance.

Total cost per unit of greenhouse gas reduced: Not provided

Project Name: American Electric Power/Venezuela -- Energy System Improvements

Category: Energy supply

Greenhouse Gases Addressed: Carbon dioxide

U.S. Actors: American Electric Power Energy Services

Foreign Actors: EDELCA (Venezuela)
CADAPE (Venezuela)

Domestic Requirements/Motivations: Service contract

Foreign Requirements: Not applicable

Project Duration: 1984 to present

Greenhouse Gas Reduction: Not provided

Monitoring and Verification: Not provided

Budget: Not provided

Other Environmental Impacts: Not provided

Description: Project provides advice on the development and technical specifications for and the purchase and testing of transmission equipment. The overall goal is to improve the reliability and efficiency of the Venezuelan electric system which already includes some 765-kV transmission capability.

Total cost per unit of greenhouse gas reduced: Not provided

Project Name: Methane Recovery and Commercialization in the Czech Republic

Category: Methane recovery -- coal

Greenhouse Gases Addressed: Methane

U.S. Actors: Resource Enterprises
Raven Ridge Resources Inc.

Foreign Actors: Dulni Pruzkum a Bezpecnost (DPB)

Domestic Requirements/Motivations: Service contract

Foreign Requirements: Not provided

Project Duration: Expected start June 1994; duration of 20 years

Greenhouse Gas Reduction: 0.75 to 1.5 MMTC over life of project (3 mines)

Monitoring and Verification: Direct verification through monitoring and documentation of produced gas volumes

Budget: Estimated total: \$10 to \$12 million

Other Environmental Impacts: Fuel switching to gas

Description: Proposed project involves the application of advanced methane drainage and gas enrichment technologies. These technologies were developed in the US to commercialize high quality and low quality gas resources produced in conjunction with active underground coal mining in the Ostrava-Karvina Mining Region of the Upper Silesian coal basin in the Czech Republic.

Total cost per unit of greenhouse gas reduced: \$6.67 to \$16/MTC

Project Name: Methane Recovery and Commercialization in Ukraine

Category: Methane recovery -- coal

Greenhouse Gases Addressed: Methane

U.S. Actors: Resource Enterprises
Raven Ridge Resources Inc.

Foreign Actors: Shahktyorskugol and Makeavugol Coal Production
Assocs.

Domestic Requirements/Motivations: Service contract

Foreign Requirements: Not provided

Project Duration: Expected start Dec. 1994; duration of 20 years

Greenhouse Gas Reduction: 2.37 to 4.73 MMTC over life of project (5
mines)

Monitoring and Verification: Direct verification through monitoring and
documentation of produced gas volumes

Budget: Estimated total: \$15 to \$25 million

Other Environmental Impacts: Fuel switching to gas

Description: Proposed project involves the application of advanced methane drainage, gas enrichment, and gas utilization technologies. These technologies were developed in the US to commercialize high quality and low quality gas resources produced in conjunction with active underground coal mining in the Donbass Mining Region of Ukraine.

Total cost per unit of greenhouse gas reduced: \$3.17 to \$10.55/MTC

Project Name: Methane Recovery, Gas Storage, and Power Generation in Poland

Category: Methane recovery -- coal

Greenhouse Gases Addressed: Methane

U.S. Actors: McCormick Poland

Foreign Actors: Jastreble Coal Concern, Krupinski Mine

Domestic Requirements/Motivations: Service contract

Foreign Requirements: Not provided

Project Duration: Started July 1990; duration of 30 years

Greenhouse Gas Reduction: 48.9 MMTC over life of project (1 mine and adjoining concession area)

Monitoring and Verification: Direct verification through monitoring and documentation of produced gas volumes

Budget: Estimated total: \$30 to \$35 million

Other Environmental Impacts: Fuel switching to gas

Description: Proposed project involves the application of advanced methane drainage, gas enrichment, gas utilization, and gas storage technologies. These technologies were developed in the US to commercialize high quality and low quality gas resources by enrichment and storage in abandoned coal mines for subsequent power generation. These gas resources will be produced in conjunction with active underground coal mining in the Upper Silesian Coal Basin of Poland.

Total cost per unit of greenhouse gas reduced: \$0.61 to \$0.72/MTC

Project Name: Russian Demonstration Joint Implementation Forestry Project

Category: Forestry

Greenhouse Gases Addressed: Carbon dioxide

U.S. Actors: Environmental Defense Fund; U.S. EPA; Coudert Brothers (international law firm); New England Electric System; Oregon State Univ.; Trexler and Assoc.; Tenaska Inc.; PacifiCorp; New York Mercantile Exchange (invited); Concord Co. (invited); USDA-Forest Service (invited)

Foreign Actors: Institute for Problems of the Market Economy; Institute for the Economy in Transition; Moscow State Univ.; Commission for Productive Forces and Natural Resources; International Forestry Institute; Vologda regional Soviet of People's Deputies; Center for International Energy and Climate Research (Univ. of Oslo)

Domestic Requirements/Motivations: Demonstration project in anticipation of possible domestic and international initiatives related to GHG.

Foreign Requirements: Part of the work to be accomplished is to specifically address any limitations and uncertainties.

Project Duration: Two years: Fall 1993-1995

Greenhouse Gas Reduction: Not applicable for pilot project; expanded project projected 15 MMTC

Monitoring and Verification: Strategies will be examined. Plan to create blue-ribbon panel of scientific experts to review research.

Budget: Total pilot costs (exclusive of tree planting): \$537,000; expanded project seeks \$15 million US funding

Other Environmental Impacts: Projects may increase forest cover, provide additional habitat, protect species, enhance water supply, and prevent erosion

Description: The first project would establish a reforestation program in the deforested areas of the Volga River Basin in Russia. The project would include the formation of a multi-party, intergovernmental partnership between and among agencies of the USG, the Russian federal and the Vologda regional governments, and various NGOs. The project would include a series of meetings to investigate the biophysical issues raised by reforestation efforts as well as to illuminate institutional and legal issues with respect to creating legitimate offsets under national and international regulatory regimes. After the initial demonstration reforestation project is completed, the partnership would evolve into an on-going institutional mechanism to facilitate and attract investment and help implement ecologically beneficial projects in Russia.

Total cost per unit of greenhouse gas reduced: \$1 to \$2/MTC

Project Name: State of Illinois/Province of Liaoning, PRC -- Joint Implementation Pilot Study

Category: Other -- technical assistance and training in conducting inventories and projections of greenhouse gas emissions and in development of models to analyze mitigation strategies

Greenhouse Gases Addressed: Initially carbon dioxide; others may be examined

U.S. Actors: St. of Ill. Dept. of Energy and Natural Resources
Argonne National Laboratory

Foreign Actors: Liaoning Environmental Protection Bureau
Unspecified national Chinese agency

Domestic Requirements/Motivations: Not provided

Foreign Requirements: Not provided

Project Duration: Awaiting funding; projected to take 3.5 to 4 years

Greenhouse Gas Reduction: Not applicable

Monitoring and Verification: Not applicable

Budget: Projected to be \$1.5 to 2 million

Other Environmental Impacts: Not provided

Description: Project objective is to determine "the most economically and technically efficient strategies for slowing growth of greenhouse gas concentrations" and will be carried out by organizations in Liaoning province with the assistance of Illinois organizations. Objectives of pilot project are to: (1) develop data on levels of GHG emissions; (2) identify efficient strategies for economic development that minimize GHG emission levels; (3) examine barriers to implementation of mitigation options; and (4) develop, test, and refine methodologies for use by other provinces and nations. The State of Illinois and Argonne National Lab will provide technical expertise and some computer equipment. The project is currently awaiting state funding and private grant approval.

Total cost per unit of greenhouse gas reduced: Not applicable

Project Information

Project Name: title of the project or program

Categories: Select from the following:

- Forestry (forest management practices, tree planting, forest protection/preservation, other -- please specify),
- Energy demand/efficiency,
- Energy supply (fuel switching, power plant heat rate improvement, renewable energy, cogeneration, other -- please specify),
- Agriculture (farming practices, crop selection, animal husbandry, other -- please specify),
- Methane recovery (coal, natural gas, landfill, other -- please specify),
- Industrial processes,
- Transportation (reducing vehicle emissions, transportation infrastructure, other -- please specify),
- CFC substitutes (not controlled by the Montreal Protocol),
- Other -- please specify

Greenhouse Gas(es) Addressed: carbon dioxide, methane, nitrous oxide, CFC substitute, carbon monoxide, non-methane volatile organic compounds, other -- please specify

Firm/cooperating technical contractor: U.S. company(ies), government agency or other organization involved in the program and, if relevant, supporting technical contractor(s) (including legal experts)

Foreign Country/key technical contact: foreign country(ies), government agency(ies) and other organization(s) participating in project including technical/private sector contact(s)

Domestic Requirements/Motivations: description of factors that motivate project, including federal, state or local regulations, tax considerations, insurance requirements, legal and technical considerations, or others -- please specify

Foreign Requirements: description of requirements host countries impose on project(s), including provincial or local requirements and any barriers encountered (e.g., limitations on protection of intellectual property, repatriation of property, permitting requirements, taxation and insurance issues), and whether contract was negotiated that divides emissions reductions "credits" between host country and donor

Project Duration: length of project operation/duration, including how long the project has been underway, expected date by which project is/will be fully operational, projected length and level of involvement of U.S. organization in project maintenance or follow-up

-2-

Greenhouse Gas Reduction: amount of greenhouse gas reduced (for current year and for out-years -- through duration of project if possible), including method for calculating reduction (e.g., baseline projection used for comparison), allocation of "credits" (e.g., contract provisions, banking of credits, etc.), provisions in case contract is broken

Monitoring and Verification: procedures for monitoring and verification of GHG reductions, institutions created/ responsible for assuring project is sound (e.g., local government, environmental groups, expert panels, etc.)

Budget: total budget for project, average annual budget, capital start-up and maintenance costs, breakdown of cost distribution among participants, cost per ton GHG offset (both to overall project and to U.S. participant)

Other Environmental Impacts/Benefits: impacts and/or benefits to, e.g., biodiversity, air pollution, soil and water conservation, indigenous peoples, etc.

Description: BRIEF (no more than 1 page) description of project and how it works, including procedures for preparation of project evaluation plan

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF SCIENCE AND TECHNOLOGY POLICY
WASHINGTON, D.C. 20506

FAX TRANSMITTAL SHEET

DATE: 8-2-93

TO:

Brian Burke

FAX NUMBER

7737

PHONE NUMBER

FROM:

Jack C. Owens

TELEPHONE: (202) 456-7116

FAX: (202) 395-3261

NUMBER OF PAGES (INCLUDING COVER SHEET): 5

SPECIAL INSTRUCTIONS:

MEMORANDUM:

To: CCMG
From: OSTP (J. Gibbons, R. Watson, H. Kelly)
Subject: National Action Plan to Reduce Greenhouse Gas Emissions

OSTP would like to acknowledge the hard work put into this exercise by a very large number of White House and Agency staff, in particular at DOE and EPA. The concerns and issues raised in this memorandum are in no way a criticism of any individual or Agency. The task that was undertaken was daunting at best, and is proving to be even more challenging than originally envisaged.

OSTP believes that given the time limitations the only real possibility will be to release a very concise (eg. less than 10-12 page) document that will, in effect, serve as a report on our progress. The document must be credible, technically accurate, show realistic uncertainties and caveats, quantify the baseline, and should make the following points

- * We are taking our commitment to stabilize greenhouse gasses seriously and are making a concerted effort to craft a practical program
- * We have identified the major areas where progress is possible by the year 2000 as well as identifying strategies for the long run (eg. 50 years), including R&D.
- * We have identified a range of policy concepts which, taken together, have a reasonable chance of meeting the objectives. These rely primarily on market mechanisms and creative use of existing authority and program funding rather than on increased use of regulations or significantly increased budgets.
- * A significant amount of work, however, remains before the policy concepts can be converted into practical policy suggestions. Among other things, we want to discuss the details of the plan with the Congress and with key business groups and other private groups.

We believe that such a document would satisfy the commitment made in the President's Earth Day speech and would avoid the embarrassment of issuing a detailed report before it has been adequately coordinated with Congress.

The concise report must present only numbers which we expect to withstand the test of the rigorous analytical work that must be done in the months ahead. To the extent that implementation strategies are presented, we need to present enough information that provides confidence that the proposed implementation strategies will result in the predicted emissions reductions. OSTP continues to strongly believe that the report should also indicate that our analysis will include:

- * HFCs in the baseline
- * carbon sequestration projects
- * joint implementation (US should lead in developing international "rules of the road" and promote Federal and private sector demonstration projects)

A key question that must be asked is what are the political costs of failing to meet the August deadline, versus the the political costs of publishing a Plan that is not technically and economically credible, and has not been discussed with Congress, Industry and Environmental groups.

The key concerns include:

1. OSTP believes that the goal of limiting net U.S. greenhouse gas emissions in the year 2000 to those in 1990 can be achieved. However, while the overall magnitude of emissions reductions identified by sector are clearly technically feasible, OSTP is very concerned that several of the proposed implementation approaches to realize these reductions are either unrealistic or cannot be defended (Appendix I). We believe that tough verifiable measures need to be part of the Plan if the claimed reductions are to be credible, and that wherever possible the report should promote utility RIP programs as the approach for reduced demand rather than a large number of voluntary programs.
2. OSTP is concerned that the Plan will look weak because it lacks focus, has no unifying theme (such as market reform to ensure the diffusion of emerging energy efficient technologies), and the options do not differ substantially from those presented in the "Bush National Action Plan / National Energy Strategy", i.e., no tough measures (e.g. national pay at the pump) and a primary reliance on voluntary measures. We should remember that these Plans were soundly criticized by environmentalists and politicians (especially Vice President Gore) because of the optimistic assumption about the potential of voluntary programs.
3. OSTP is concerned that there is not enough time remaining to provide detailed support of specific measures linked to specific savings and costs. Because of the haste, most of the proposals analyzed have not been evaluated using a consistent set of assumptions. While the IDEAS model can provide consistency in energy and emissions accounting, it is not able to systematically track such critical matters as total private sector investment requirements, the cost per unit of carbon equivalent saved, or expected federal program costs. In fact, we still lack a clear statement to the analysts about how such accounts should be made (eg. what discount rates should be employed, how marginal energy costs should be computed, etc.). In summary, our Plan will lack acceptance and credibility if it is not based on sound economic data, hence the August Plan, at a minimum, needs to speak to this need and commit to further analysis. In fact OSTP remains surprised at some of the alleged returns per Federal dollar invested.
4. OSTP is very concerned that there is no time to consult with Congress, Industry and Environmental Groups before the document is released internationally. This is very disturbing given the importance that we all attached at the start of this process to consensus building. This lends support to the proposition that this "report" should be brief and conditional.
5. There has been an understandable preoccupation with the year 2000 target, which has unfortunately resulted in an almost total disregard for the post-2000 era. While OSTP will take the lead in drafting a strategy for the era beyond 2000 (the role of R&D, renewable energies (e.g., wind, solar, biomass), transportation, carbon sequestration, and joint implementation), there needs to be time to discuss the relative merits of different strategies and priorities for Federal outlays for these projects versus those aimed at attaining the year 2000 goal.
6. OSTP is concerned that the requested Federal outlays will not be forthcoming given the budget deficit problem. If this is also a concern of other agencies it means that we have to take a much harder look at the tough options. For example, a likely question to be raised is which Agencies would plan to re-adjust their present budgets to accommodate these new priorities?

Appendix I

OSTP is concerned that the uncertainty ranges (presented by Abe Haspel) are not appropriate. We understand how they were derived, but believe that they do not encompass the true range of uncertainty, especially on the low end. Therefore, the uncertainty ranges should be expanded to reflect the "true" range of uncertainty. In addition, OSTP believes that the Plan should emphasize Utility IRP programs as the approach to reduce demand rather than the large number of voluntary green programs.

A few of our major concerns follow:

Energy Supply:

- * Good idea but the reform measures seem vague and the impact estimated by the IDEAS model seems large. Why is the IDEAS model result for FERC reform so much higher than the working group result?
- * The nuclear option does not pass the "laugh test". How can a Federal outlay of \$30M over 7 years have the claimed large improvements in capacity for such a sophisticated industry that is very profit conscious?
- * Are the Federal revenues from leasing Federal Hydro facilities to the private sector solid? We question whether the management systems required to implement this option are adequate and whether there are any issues with respect to the Power Marketing Authorities.

Residential Actions

- * The home improvement options appear sound, but the range of emissions reductions looks high compared to the working group estimates, and the cost estimates are not calculated correctly. A simple addition of the three options gives 2.8-6.1, and that assumes no double counting.
- * This option looks good, however, more information is needed on the societal costs for the appliance standards option because the energy efficiency standards go beyond the cost-effective limit.

Commercial Actions:

- * The low end estimate of this ensemble of actions looks high. A simple addition of the options, assuming an unlikely assumption of no double counting, gives 5.7 - 12.7. The Federal leadership initiative does not seem cost-effective and should be deleted because cost-effectiveness is a basic tenet of the Plan.

Industrial Actions:

- * The motor challenges project needs examination. How can \$20M of Federal outlays so effectively affect an "industry" that uses \$100B worth of electricity per year. A reduction of 7.5 to 10.1 MMTCE per year for such a paltry Federal outlay is rather surprising.

Transportation:

- * OSTP believes that national "pay at the pump" and gas guzzler options should be analyzed as example of strong measures.

- * We are convinced that the cash-out parking option will be politically difficult, because the general public will fight any loss of free parking.

Sinks:

- * The reduced harvest option looks reasonable, however, the write-up needs to stress that this can only be achieved because of enhanced recycling, not because of differences in carbon density.

Methane and Other Gases:

- * There are no major concerns with these programs.