

United States
Environmental Protection
Agency

Air and Radiation
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The Climate Is Right for Action Voluntary Programs to Prevent Atmospheric Pollution



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The Climate Is Right for Action

Voluntary Programs to Prevent Atmospheric Pollution

The United States Environmental Protection Agency is expanding its voluntary programs. This plan describes the voluntary atmospheric pollution-prevention programs already under way and provides a blueprint for future action.

Four principles guide our efforts:

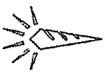
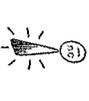
1. **Voluntary Participation:** We seek partners who want to work with us to prevent pollution by increasing the productivity of energy systems.
2. **Strong Technical Support:** We will provide strong assistance to partners to help them decide how to accomplish their goals, but we will never try to dictate solutions.
3. **Profitable Upgrades:** We only ask partners to make investments that are profitable and that sustain or improve quality.
4. **Minimal Bureaucracy:** We only seek practical solutions and promise to minimize paperwork and red tape in all our efforts.

"Our goal is to serve the American public, to prevent pollution at a profit, to create jobs, and to foster private initiative. Please join us."

John S. Hoffman
Director, Global Change Division
Office of Air and Radiation

Voluntary Pollution Prevention Programs

EPA envisions a rapid roll-out of its voluntary pollution prevention programs, illustrated in this box and in the timeline beginning on this page. Other events supporting the voluntary efforts are included in the timeline as well.

| | | | |
|---|----------------------------------|---|------------------------------|
|  | Green Lights |  | Environmental Best Practices |
|  | Energy Star |  | "Golden Carrot" |
|  | Regulatory/Legal Support |  | International Cooperation |
|  | Consortium for Energy Efficiency |  | AgStar |
|  | New Technology |  | Energy Star Buildings |
|  | Reports |  | Natural Gas Star |
|  | Landfill Methane |  | Coalbed Methane |

Dates prior to February 1994 are historical; those following the winter of 1994 are subject to significant uncertainty and are included to provide a template for EPA's anticipated actions.

Preventing Pollution At a Profit

President Clinton has decided to expand EPA's voluntary programs to prevent air pollution at a profit.

"The task is accomplished primarily by harnessing private market forces, by leveraging modest government expenditures to create a much larger set of private-sector investments, and by establishing new public-private partnerships to bring out our best research and our best technologies...."

President Clinton, The release of the Climate Change Action Plan October 19, 1993

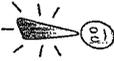
EPA's programs seek to create voluntary agreements with industry, governments, and nonprofit organizations to make investments that will increase profits and simultaneously prevent pollution.

These programs encompass five major areas:

- Commercial and Industrial Buildings
- Residential Energy Use
- Energy Supply
- Industrial and Agricultural Practices
- CFC Substitutes

The principles behind these programs are simple: to identify opportunities for greater efficiency; to identify barriers that have prevented or slowed taking advantage of these opportunities; and to

Program Initiatives Timeline

| | | | | | | | | |
|---|---------------|---|---|----------------|--|---|-----------------|---|
|  | January 1991: | Green Lights program launched |  | May 1991: | First Green Lights State Government Partners (California and Maryland) |  | September 1991: | Consortium for Energy Efficiency (CEE) established and incorporated |
|  | March 1992: | EPA/Chinese non-CFC insulated refrigerator prototypes developed |  | February 1992: | Chlorofluorocarbon (CFC)-free refrigerator with improved energy efficiency developed |  | April 1992: | U.S. Views on Global Climate Change published by U.S. Department of State |

formulate programs that enhance market operation to overcome those barriers.

"Innovative green programs, such as Green Lights, Energy Star Computers, and the Golden Carrot® Refrigerator program, are critical to achieving national goals for reducing greenhouse gas emissions. Economically sound programs like these are absolutely necessary for achieving the environmental goals of the 1990's."

*Rafe Pomerance
Deputy Assistant Secretary for Environment
and Development, State Department*

EPA's Voluntary Green Programs

Commercial Buildings

The United States spends \$71 billion annually to supply electricity to commercial and industrial buildings. This energy, which is used to light, heat, air condition, and operate office equipment, produces approximately 15 per-

Green Lights Upgrades Surpass Estimates Of Technical Potential

When EPA launched Green Lights in early 1991, published engineering calculations estimated the largest possible lighting electricity savings to be 25-54 percent. Many of the first lighting upgrades completed under Green Lights exceed these estimates of "maximum technical potential."



The Gillette Company

Santa Monica, CA

50,000 ft²

61% Energy Savings

37% IRR*



Laverne, TN

125,000 ft²

54% Energy Savings

72% IRR



Vancouver, WA

45,000 ft²

71% Energy Savings

36% IRR

*Internal rate of return (IRR).

Source: Green Lights Upgrade Reports.

cent of all air pollution from utilities in the United States.

EPA's programs seek to cut building energy use in half,

while earning average rates of return on these investments of 20 to 40 percent.



June 1992:

Earth Summit in Rio: United Nations Framework Convention on Climate Change signed



June 1992:

Energy Star Computers kick-off—35% of PC market participating on first day!



June 1992:

EPA testified in Georgia hearing on utility regulatory reform



July 1992:

Utilities commit ~\$30 million in "Golden Carrot"® Refrigerator incentives, RFP issued



July 1992:

Ohio Public Utility Commission briefing on integrated resource planning



July 1992:

U.S.-Russian natural gas meeting in Moscow



August 1992:

Green Lights: Over 600 participants



September 1992:

Public Affairs Program on Green Lights aired on CNBC



Green Lights

The Green Lights program offers corporations, governments, and nonprofit organizations an opportunity to upgrade lighting in their offices and factories with more efficient and higher quality technologies.

"So I say to all the American people, ... if you own a business and the EPA offers you a chance to join the Green Lights program, do it."

President Clinton, The release of the Climate Change Action Plan October 19, 1993

Available technology can reduce the electricity used for

lighting by 50 to 70 percent and earn internal rates of return of 20 to 30 percent. In addition, typical lighting upgrades significantly improve lighting quality. Better quality lighting enhances color rendition and eliminates flickering, reducing eye strain and increasing worker productivity.

In Green Lights, organizations sign an agreement to upgrade 90 percent of their space within 5 years wherever it is profitable and wherever lighting quality is maintained or enhanced. EPA assists Green Lights participants with

their decision making. GPO and implementation processes by providing tools and support, such as

Green Lights Today

Estimates include the Green Lights program, as well as other promising DOE and utility programs to promote energy-efficient lighting.

Green Lights Today: 1993
3.8 Billion ft² Committed

Expected From These Commitments
8.6 BkWh/yr Energy Savings
1.8 MMT of Carbon Emissions Avoided
49,590 Metric Tons of SO₂ Emissions* Avoided
21,375 Metric Tons of NO_x Emissions Avoided
\$600 Million Reductions in Electricity Bills**

* As a result of the Clean Air Act, these reductions may lead to SO₂ allowance credits, worth an estimated \$300-\$1,000/ton, rather than actual emission reductions.
** At 7.0 cents/kWh.

Source: EPA. Calculated using the following emission factors: Carbon: .21 MMT/BkWh; SO₂ = 5.8 g/kWh; NO_x = 2.5 g/kWh.

decision support system software, product information, a lighting upgrade manual, and financing information. EPA also gives partners public recognition for their contribution to reducing pollution.



September 1992:
EPA/China development of non-CFC Lorenz-cycle refrigerators achieved 20% energy reductions



September 1992:
EPA manual for chiller refrigerant containment, conservation, and conversion for developing countries published



October 1992:
Incentive regulations for energy efficiency promulgated by EPA



November 1992:
Energy Star Buildings corporate pilot program launched



November 1992:
Appalachian Coalbed Methane Environmental and Economic Benefits Study released



November 1992:
Conservation Verification Protocol published by EPA



November 1992:
EPA Energy Star Computers program endorsed by National Association of Regulatory Utility Commissioners



November 1992:
Ads in major business magazines placed by Green Lights Partners



Energy Star Buildings

The Energy Star Buildings program expands beyond lighting to reduce other building loads and improve the performance of air-distribution systems and heating and cooling equipment. Organizations participating in Energy Star Buildings can reduce energy bills for commercial buildings by more than 50 percent.

EPA provides program participants with many of the technical

tools required to survey buildings and evaluate the suitability of different energy upgrade options. In 1994, the Energy Star Buildings program will showcase 20 buildings across the country that demonstrate the efficiency and profitability of entire building upgrades. The Showcase buildings will serve as models for program participants and will help document the successful approach of profitably reducing building energy while maintaining or improving occupant comfort.

"Current Partners have reduced their electricity bills in half... They're learning about new programs in heating, ventilation, and air conditioning, which can be combined with savings from Green Lights to reduce the cost of running a building by 50 percent or more."

*Carol Browner
EPA Administrator*



Energy Star Computers

The Energy Star Computers program is helping to create a market for energy-efficient desktop computers, monitors, and printers by working with both equipment manufacturers and consumers.

Future Energy Star Product Identification Programs*

Following the Energy Star Computers program, EPA is planning the introduction of similar programs in conjunction with the DOE appliance standards program, targeting the following technical opportunities:

- Copy Machines
- Residential Appliances
- Fax Equipment
- Home Heating & Cooling Equipment

*As technologies evolve and market conditions change, EPA will modify and expand this list.



November 1992:

Federal Green Lights program launched



December 1992:

CEE Board of Trustees installed



December 1992:

500 Green Lights upgrades under way



December 1992:

Whirlpool & Frigidaire become finalists in "Golden Carrot" refrigerator contest



January 1993:

Energy Star Printers MOU released



January 1993:

Energy Star Allies MOU released



February 1993:

Green Lights: More than 3 billion square feet committed



Spring 1993:

Green Lights has over 6,000 upgrade projects under way

As of February 1994, companies representing over 75 percent of the U.S. computer market and 85 percent of the U.S. printer market have joined the Energy Star Computers program and are developing and producing Energy Star products—machines that power down by going to “sleep” when left idle.

Consumers and businesses can easily recognize the new, more efficient PCs because they carry the Energy StarSM logo.

There are Energy Star Computers, monitors, and printers currently

available on the market that will not compromise performance or cost extra. And recognizing that Energy Star computers can cut utility bills, President Clinton has signed an executive order directing the U.S. Government, the largest computer buyer in the world, to purchase only products meeting the Energy Star criteria.

“EPA should be congratulated for its creative and inspired solution.”



InfoWorld

The Exploding Market for Energy Efficiency

Energy efficiency is BIG business. Sales for efficient products targeted by these four innovative programs alone are expected to total \$53 billion by the end of the decade—comparable to the entire domestic paper-producing industry.

SALES OF EFFICIENT PRODUCTS (MILLIONS OF \$)

| Efficient Products | Historical | | Projected | |
|---|------------|-------|-----------|--------|
| | 1985 | 1990 | 1995 | 2000 |
| Lighting ¹ | * | 340 | 2,000 | 10,000 |
| Personal Computers | * | 3,400 | 25,000 | 37,000 |
| Variable-Speed Motor Drives For Ventilation | * | 50 | 115 | 400 |
| Refrigerators ² | * | * | 4,200 | 5,200 |

* Negligible.

¹ Includes only compact fluorescents, T-8 lamps, and electronic ballasts.

² Efficient refrigerators are defined to be those that use <700 kWh/yr, the level of the 1993 DOE standard.

Sources: EPA estimates derived from Electric Power Research Institute, International Data Corporation, manufacturers, and Bureau of the Census data.

March 1993: Natural Gas Star program launched

April 1993: CEE executive director hired

April 1993: EPA released report, “Space Conditioning: The Next Frontier” on advanced residential heating and cooling

April 1993: Presidential Executive Order for procurement of Energy Star Computer products by the U.S. Government issued

May 1993: Energy Star Buildings Showcase demonstrations launched

June 1993: Russian natural gas pilot projects identified

June 1993: EPA/European Community (EC) meeting convened to discuss Energy Star Computers—Europe

June 1993: Debut of Energy StarSM logo on computer equipment



March 1993:

Natural Gas Star program launched



April 1993:

EPA released report, “Space Conditioning: The Next Frontier” on advanced residential heating and cooling



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June 1993:

EPA/European Community (EC) meeting convened to discuss Energy Star Computers—Europe



June 1993:

Debut of Energy StarSM logo on computer equipment

Residential Energy Use

Homeowners and renters pay \$100 billion a year for energy,

which produces 20 percent of U.S. carbon dioxide emissions. EPA's residential programs will be aimed at helping homeowners and renters reduce those bills at a

profit, earning a significantly higher return on "investment" in their homes than available from comparable investment opportunities.

There will be three primary

thrusts to EPA's program:

Future Programs to Encourage Commercialization of Resource-Efficient Technologies*

The Consortium for Energy Efficiency (CEE) has been established by utilities, EPA, and several environmental groups to roll out future "Golden Carrot®" programs for other promising technologies. EPA and utility members are advising CEE staff in new program areas, including

- Advanced Electric and Gas Heat Pumps
- Advanced Water Heaters
- Air Conditioners
- Low-Flow Shower Heads
- Windows and Insulation
- Clothes Dryers
- Ducts

*As technologies evolve and market conditions change, EPA and CEE will modify and expand this list.

EPA's first major success in this area was in helping to create a Super-Efficient Refrigerator Program with 30 utilities and several environmental organizations (see box).



In June 1993, Whirlpool won the "Golden Carrot®" Super-Efficient

Refrigerator contest by making two major improvements: designing a CFC-free unit and increasing the energy efficiency by more than 25 percent over the 1993 DOE standard. Whirlpool will receive over \$30 million in rebate incentives and will introduce its product to the market in 1994.



June 1993: New super-compressor technology prototype for home refrigerators released



June 1993: Whirlpool wins "Golden Carrot" Refrigerator contest



June 1993: Natural Gas Star Partnerships with 45% of natural gas transmission and distribution industry



Fall 1993: Five additional Virginia mines recover methane (total = 11)



Fall 1993: Launch "Golden Carrot" washer program



October 1993: U.S. Government begins purchasing Energy Star computer equipment



October 1993: President Clinton presents Climate Change Action Plan



October 1993: 2nd meeting with European Community, Japan, and other countries to plan international Energy Star

"Whirlpool deserves real credit for creating a world class, environmentally friendly refrigerator."

David B. Goldstein
Natural Resources Defense Council

Energy Supply

Energy Star Transformers

Approximately 50 billion kWh are lost each year in transformers across the country. EPA will implement a voluntary program to encourage electric utilities to invest in high-efficiency transformers that reduce transformer losses. EPA will work with industry to establish target efficiency levels, and all qualifying equipment will

carry the Energy StarSM logo.

Utilities participating in the program would agree to purchase Energy Star transformers and upgrade their system only where profitable.



Methane Recovery at Coal Mines

Methane, a significant greenhouse gas, can be profitably recovered from coal mines and used for energy instead of being wasted and released into the atmosphere. A variety of proven technologies are available to recover and use this waste gas, but prospects are hampered by legal and regulatory barriers. Principal barriers include

legal questions about who owns the gas released by coal mining, the unwillingness of utilities and pipelines to buy the electricity or gas produced by these facilities, and the existence of regulatory frameworks that discourage the use of the recovered gas.

These barriers can be addressed through legislative actions at the State or Federal level; incentive programs; and outreach to coal mines, operators,

utilities, pipeline companies, states, and municipalities.

EPA has efforts under way to ensure that the full benefits of methane recovery at coal mines—environmental protection, job creation, and increased revenues—are recognized by coal mine operators, as well as by States and other Federal agencies.

The key focus of the EPA program is the Appalachian region, which has the largest potential for

Coal Mine Methane Means Jobs and Environmental Benefits

1990

150 bcf* of wasted methane



2000

100 bcf recovered
2,000-3,000 jobs

*bcf = billion cubic feet.



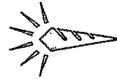
October 1993:

Charter members join AgStar program



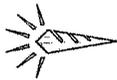
April 1994:

AgStar program launched



Spring 1994:

Mass market debut of "Golden Carrot" refrigerators



Spring 1994:

CEE/EU Summit on "Golden Carrot" opportunities for Europe



April 1994:

Launch key state programs in coal mine methane recovery



Summer 1994:

Expand Natural Gas Star to gas producers



Summer 1994:

Expert panel updates CAA Amendment Conservation Verification Protocol



Summer 1994:

Mass market debut of CEE commercial rooftop air conditioners

Future Events are Projected...

methane recovery and could benefit most from actions to address ownership issues and remove other hurdles.



Natural Gas Star

The Natural Gas Star program aims to reduce emissions of methane—the primary component of natural gas—from natural gas transmission and distribution systems.

Methane emissions can be reduced by up to one-third by enhancing inspection and maintenance practices aimed at reducing fugitive emissions, by replacing equipment that normally vents gas with new low-emission technologies, and by repairing or replacing leaky service lines.

Partnership agreements have been signed with 27 leading natural gas transmission and distribution companies, and in 1994 the program will seek to increase

membership and work with industry to develop more cost-effective technologies and practices to prevent emissions of methane. These efforts will translate to benefits for ratepayers, consumers, and corporations through more efficient use of energy and advances in technology.

EPA will also seek to help gas companies export their strategies to Russia. Current estimates suggest that about 5 percent of the gas produced in the former

U.S.S.R. is released into the atmosphere. EPA and Russian gas specialists are working together to reduce leakage of this greenhouse gas to 2 percent by adopting existing and profitable western technologies and work practices.



Energy From Landfill Methane

Landfills are the largest methane source in the United States. EPA is developing an out-



Summer 1994:

Launch "Golden Carrot" heat pump and central air-conditioner effort



Fall 1994:

Natural Gas Star: Partnerships with 10% of gas production industry



Fall 1994:

Launch national certifies program for lighting professionals, managers & technicians



Fall 1994:

Launch outreach program on methane energy recovery from landfills to industry/states, municipalities, utilities



Fall 1994:

Green Lights to team with CEE to release national residential lighting initiative



Fall 1994:

Launch voluntary program with the aluminum industry



Fall 1994:

Launch national certification program for architects and lighting consultants



Fall 1994:

Develop HCF-Cfree, energy-efficient air-conditioner prototype

reach program to promote methane recovery at those landfills where energy recovery is economically attractive but limited by other hurdles. EPA's outreach program will address regulatory, institutional, financial, and technical hurdles. The program will reduce methane emissions from landfills substantially as well as reduce emissions of CO_2 , SO_2 , and NO_x from displaced fossil fuels.

Industrial and Agricultural Practices

emitted as by-products of the primary aluminum production process and are extremely potent greenhouse gases. Emissions of CF_4 and C_2F_6 may be reduced by 30-60 percent through management and technological reforms by the aluminum industry.

Voluntary Program With Aluminum Producers

EPA will partner with aluminum producers to reduce emissions of carbon tetrafluoride (CF_4) and carbon hexafluoride (C_2F_6) where technically feasible and cost-effective. These gases are

site visits to aluminum companies to assess processes and refine emissions estimates, and will organize a series of workshops to assess available technologies and develop partnership program components.



AgSTAR

EPA, in partnership with USDA and DOE, is also promoting pollution-preventing "best management practices" in the



Fall 1994:

Launch Energy Star Transformers



Fall 1994:

Launch new program for Energy Star Copy Machines



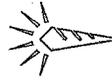
Fall 1994:

20 State Partners in Green Lights



Winter 1995:

Phase I utilities can earn "reduced utilization" conservation credit



Winter 1995:

Announce CEE "Golden Carrot" for advanced electric water heating



Winter 1995:

Launch Energy Star Homebuilders program



Spring 1995:

Launch "Golden Carrot" for high efficiency gas heaters



Spring 1995:

Energy StarSM logo appears on most personal computers and printers sold in the U.S.

Prevention, Profit & Jobs

As we move forward at EPA, it becomes increasingly obvious that environmentalists and business leaders are often pursuing the same goals. Through voluntary atmospheric pollution-prevention programs, EPA and its private-sector partners seek to enhance market forces to save energy, earn profits, and improve the environment. We encourage you to take advantage of these opportunities.

CFC Substitutes

HFC-23 Reduction Program

agricultural sector. The AgSTAR program is a voluntary program with swine and dairy producers to promote recovery of methane from manure management wherever profitable. AgSTAR will target about 4,000 farms across the country and may reduce emissions from this source by 25 percent. Through EPA's Livestock Productivity program, EPA is also promoting "best management practices" which make beef and milk production more efficient, reduce methane, and provide the consumer with lower cost products.

EPA will step up efforts in a new partnership program with manufacturers of HCFC-22 to develop and implement processing practices and technologies to reduce HFC-23 as a by-product of HCFC-22 production where it is technically feasible and cost-effective. Currently, 2-4 percent of the HCFC-22 production is released as HFC-23, a potent greenhouse gas. Manufacturers who sign a vol-

untary agreement with EPA agree to reduce emissions of HFC-23 to 50 percent of 1990 emissions at the lowest possible cost. EPA will help conduct economic and technical analysis for different emission reduction techniques, such as recovery and destruction technologies and process changes. From 1994 to 1996, EPA will also refine estimates of emissions, document reductions that have occurred between 1990 and the present, and help develop methods to measure and ensure emission reductions.

 Summer 1995: Launch Energy Star program for large consumer appliances

 Summer 1995: Utilities offer incentives for "Golden Carrot" washers

 Fall 1995: Energy Star Showcase Buildings complete

 Fall 1995: Key States remove legal ownership barriers hindering methane recovery at mines

 Fall 1995: Announce CEE program for ductwork repairs

 Winter 1996: Release case studies on coalbed methane recovery and use

 Winter 1996: Announce pilot program for comprehensive utility home retrofits

 Summer 1996: Natural Gas Star Partnerships with 60% of natural gas transmission and distribution industry

Information Available From the Global Change Division

Global Change Division

EPA's Voluntary Energy Star Programs: General Information Package
 Washington-Baltimore Energy Star Region Information Package
 Global Change Division - 1992 Accomplishments and Prospects for 1993
 The Climate Change Action Plan

Green Lights

Green Lights General Information Package
 Partner (Sample) MOU
 Participant List
 Lighting Upgrade Case Studies
 Green Lights Annual Report
 Green Lights: An Enlightened Approach to Energy Efficiency and Pollution Prevention

Energy Star Buildings

General Information Package
 Showcase Building Program Description (2 pages)
 Variable Speed Drive Pilot Study
 Joining the Energy Star Buildings Program: Sample Partnership Agreement (Addendum)
 Joining the Showcase Buildings Program: Sample Partnership Agreement (Addendum)

Energy Star Computers

General Information Package
 Purchasing Energy Star Computers (procurement language, letter of principle)
 Federal Government Purchasing
 List of Participating Manufacturers (PCs, Printers, and Allies)
 Abbreviated list of qualified Energy Star products
 Sample Agreement: PC Monitor Manufacturers
 Sample Agreement: Printer Manufacturers
 Sample Agreement: Software or Component Manufacturers

Methane Programs

Methane Programs General Information Package
 Natural Gas Star General Information Package
 Joining the Natural Gas Star Program: The MOU Agreement
 AgStar General Information Package
 Coalbed Methane Outreach Program General Information Package
 Livestock Productivity Program General Information Package
 Landfill Methane Outreach Program General Information Package
 Anthropogenic Methane Emissions in the United States: Report to Congress
 Opportunities to Reduce Anthropogenic Methane Emissions in the United States: Report to Congress

If you would like to receive any of the above publications, please call the Green Lights & Energy Star Programs Hotline at 202-775-6650, or call our 24-hour fax-on-demand service for program information by fax at 202-233-9659.



Summer 1996:

China markets super-efficient, non-CFC refrigerator



Fall 1996:

Energy Star Buildings Partners commit 1 billion square feet



1996:

Green Lights Partners upgrade 1.5 billion square feet



1996:

Utilities installing Energy Star transformers approach 10% of total



1997:

Five additional Appalachian mines recover methane (total 16)



1997:

Natural Gas Star: Partnerships with 70% of transmission and distribution industry and 40% of production industry



1997:

Key demonstrations completed throughout country



1997:

Voluntary aluminum program with 70% of industry

Action Memo

Please tell me how we can participate in:

- Green Lights — Energy Star Buildings — Energy Star Computers
— Residential "Golden Carrot"[®] — AgStar — Natural Gas Star — Other Methane Programs

Name and Title:

Organization:

Address:

Please send this memo to: Maria Tikoff, Marketing Director
Green Lights and Energy Star Programs
U.S. EPA - 6202J
401 M Street SW
Washington, DC 20460

or fax it to: (202) 775-6680

