

U.S. Cement Industry: Background Information for Industry Consultations

U.S. Industry at a Glance:

- ▲ In 1997, there were a total of 47 U.S. cement companies operating 118 plants.
 - ❖ 110 plants making and grinding clinker.
 - ❖ 8 plants grinding clinker purchased elsewhere.
 - ❖ Approximately 73% of clinker produced in "dry" kilns and 27% in "wet" kilns.
- ▲ The top ten producers account for 59% percent of clinker capacity and production: Holnam, Inc.; Lafarge Corp.; Southdown, Inc.; Ash Grove Cement Co.; Blue Circle Inc.; Lone Star Industries, Inc.; Essroc Materials, Inc; Medusa, Inc.; California Portland Cement Co.; and Lehigh Portland Cement Co.
- ▲ 1996 cement shipments by U.S. producers were 78.8 million metric tons (tonnes), imports were 12.7 million tonnes, exports were 0.5 million tonnes, for total U.S. consumption of 90.1 million tonnes.
- ▲ The U.S. cement industry employs about 17,400 people, down from 32,000 in 1974.
- ▲ The average primary energy intensity of cement production in the U.S. has declined about 1.2% per year from 8.4 MMBtu per metric ton of cement in 1972 to 6.3 MMBtu per tonne of cement in 1995. (The average delivered, or site, energy intensity of cement production in the U.S. declined about 1.5% per year from 7.4 to 5.3 MMBtu per tonne of cement over the same period.) (PCA)
- ▲ The average primary energy intensity of cement production in selected countries: China, 5.3 MMBtu/tonne (1992); Brazil, 4.3 MMBtu/tonne (1988); Uruguay, 5.9 MMBtu/tonne (1988); Germany, 3.6 MMBtu/tonne (1990); Spain, 3.8 MMBtu/tonne (1989); Former Soviet Union, 6.9 MMBtu/tonne (1990).¹

Background Information

The U.S. cement industry (SIC 3241) accounts for about 1.5 percent of U.S. industrial (non-feedstock) energy use and about 4.7 percent of U.S. industrial CO₂ emissions. Half of the industry's CO₂ emissions result from energy use and half result from limestone calcination (the largest non-energy source of anthropogenic CO₂ emissions). The hydraulic cement industry, SIC 3241, consists of those firms producing portland, masonry, prepared hydraulic, natural, lime, and oil well cements. Portland cement comprises 96 percent of the hydraulic cement production, with masonry cement producing a significant proportion of the remainder. The U.S. cement industry is recovering from a period of decreased profits, largely due to reduced demand for building materials and competition from low-cost imports.

The production of cement involves four main steps: quarrying and crushing, raw grinding, pyroprocessing, and finish grinding. During pyroprocessing, which accounts for about 82 percent of total cement production energy use, limestone (and other raw materials) are heated to 2,700°F in "wet" or "dry" kilns to produce clinker, the primary intermediate product of cement making. When the limestone is heated it undergoes a calcination reaction, resulting in CO₂ emissions.² Clinker is ground with about

¹ Values from the World Energy Council (WEC), 1995. The WEC data for the United States are inconsistent with PCA values, which raises questions about data comparability. The WEC reports U.S. primary energy intensity in 1988 to be 5.4 MMBtu/tonne, while ICF calculations based on PCA data suggest a value of 6.5 MMBtu/tonne in 1989, or 21% higher. WEC assumes a heat rate of about 9,000 Btu/kWh, whereas ICF assumed a heat rate of 10,000 Btu/kWh. If the same heat rates are used, the discrepancy is still 18%.

² $\text{CaCO}_3 + \text{Heat} \rightarrow \text{CaO} + \text{CO}_2$

five percent gypsum (and other additives) to produce cement. The primary use of cement is in the production of concrete, where cement, in the presence of water, binds together coarse and fine aggregate material, such as gravel and sand.

In 1997, 47 U.S. cement companies operated 118 plants, all but 8 of which were integrated facilities producing both clinker and cement. In 1996, approximately 73% of all clinker produced in the U.S. in dry kilns and 27% in wet kilns. Between 1974 and 1995, the number of kilns in operation dropped by more than half from 432 to 208, while domestic production grew about 45 percent and the average plant size increased. The top ten producers account for 59% percent of clinker capacity and production: Holnam, Inc.; Lafarge Corp.; Southdown, Inc.; Ash Grove Cement Co.; Blue Circle Inc.; Lone Star Industries, Inc.; Essroc Materials, Inc.; Medusa, Inc.; California Portland Cement Co.; and Lehigh Portland Cement Co. In 1996 U.S. cement producers shipped 78.8 million metric tons of cement. Cement imports are estimated to be 12.7 million tonnes for the same year, or about 14 percent of total shipments. U.S. cement consumption is expected to grow at a rate of approximately one percent per year, with half of the increase met by domestic production and the other half by imports. Total cement industry employment was about 17,400 people in 1996, down from 32,000 in 1974.

The average primary energy intensity of cement production in the U.S. has declined about 1.2% per year from 8.4 MMBtu per metric ton of cement in 1972 to 6.3 MMBtu per tonne of cement in 1995. (The average delivered, or site, energy intensity of cement production in the U.S. declined about 1.5% per year from 7.4 to 5.3 MMBtu per tonne of cement over the same period.) The World Energy Council provides average primary energy intensity numbers for a number of countries: United States, 5.4 MMBtu/tonne (1988); China, 5.3 MMBtu/tonne (1992); Brazil, 4.3 MMBtu/tonne (1988); Uruguay, 5.9 MMBtu/tonne (1988); Germany, 3.6 MMBtu/tonne (1990); Spain, 3.8 MMBtu/tonne (1989); Former Soviet Union, 6.9 MMBtu/tonne (1990). The WEC data for the United States are inconsistent with data from the Portland Cement Association (PCA).³

Wet and dry kilns can produce the same types and quality of cement, but wet kilns are less efficient. Wet kilns consume about 6.5 MMBtu per tonne of cement. The three types of dry kilns, long, preheater, and precalciner, use about 5.8, 4.6, and 4.4 MMBtu per tonne of cement, respectively (APCA). The U.S. cement industry has made steady improvements in the overall energy efficiency of cement production, primarily through shutting down older wet-process kilns, and replacing them with modern dry-process units. Wet process kilns accounted for 58% of capacity in 1974, but only 27 percent in 1994. Coal and coke account for about 70 percent of cement industry energy use, natural gas 11 percent, electricity 10 percent and waste fuels eight percent. Other key benchmark data for the U.S. cement industry are presented in Table 1, below, as adapted from the DOE Energy Information Administration's *Annual Energy Outlook 1998* (AEO98), Portland Cement Association (PCA), and American Portland Cement Alliance (APCA) data. The information includes energy consumption, carbon emissions and total greenhouse gas emissions for the years 1990, 1998, and 2010.

³ ICF calculations based on PCA data show that the average primary energy intensity in the United States was about 6.5 MMBtu/tonne of cement in 1989, or 21% higher than the WEC value. WEC assumes a heat rate of about 9,000 Btu/kWh, whereas ICF assumed a heat rate of 10,000 Btu/kWh. If the same heat rates are used, the discrepancy is still 18%.

Table 1: U.S. Cement Industry Benchmark Data for Selected Years

Category of Information	1990	1998	2010 BAU
Total Cement Production (million tonnes)	72	80	86
Output (billions of 1987 dollars)	4.1	4.5	4.9
Site Energy (trillion Btu)	330	363	354
Economic Energy Intensity (site kBtu/\$)	80.2	80.1	72.6
Physical Energy Intensity (site MMBtu/tonne)	5.32	4.96	4.43
Physical Energy Intensity (primary MMBtu/tonne)	6.34	5.91	5.28
Energy Related Carbon Emissions (MMTC)	8.35	9.32	9.21
Total Greenhouse Gas emissions (MMTCe)	17.25	19.87	20.54

Source: 1998 and 2010 Cement Shipments are based on PCA data and APCA projection assumptions (consumption grown at 1%/yr with half the increase attributed to domestic production). Output, Site Energy, and Economic Energy Intensity are from AEO98 (supplemental data e-mailed from EIA). Physical Energy Intensity data for 1990 are from the PCA; 1998 and 2010 data are based on efficiency growth rates from APCA that need to be verified. Primary physical energy intensity is based on PCA fuel mix data, and an assumed heat rate of 10,000 Btu/kWh. Energy related carbon emissions are based on AEO98. Greenhouse gas emissions from calcination are based on EIA, PCA, and ICF data.

Technological Opportunities

A number of methods can be used to determine goals for the cement industry such as (1) doubling an historical rate of energy efficiency improvement; (2) doubling the forecasted rate of energy efficiency improvement; or (3) reducing CO₂ emissions seven percent below 1990 levels by the year 2008. Table 2 illustrates potential targets and emission savings using each of these methods.

Table 2: Alternative Goals for Cement in 2010

Scenario	GHG Emissions (MMTCe)	Emission Reductions (MMTCe)
AEO98 Business-as-Usual (BAU) Forecast	18.4	--
APCA Forecast	22.1	-3.6
Two-Times a 1.5% Historical Rate of Improvement in Delivered <i>Physical</i> Energy Intensity	7.5	11.0
Two-Times 0.8% Forecasted Rate of Improvement in <i>Economic</i> Energy Intensity	8.3	10.1
7% below 1990 CO ₂ by 2010	15.5	2.9

The average delivered physical energy intensity of cement production in the U.S. has declined about 1.5% per year, from 7.4 MMBtu per metric ton of cement in 1972, to 5.3 MMBtu per tonne of cement in 1995. The AEO98 BAU forecast projects cement industry carbon emissions to be 18.4 MMTCe in 2010. The American Portland Cement Alliance forecasts that 2010 carbon emissions will be 20 percent higher than in the AEO98 BAU scenario.⁴ Doubling the historical 1.5% annual rate of delivered *physical* energy intensity decline (from PCA) yields a projection of carbon emissions that is about 60 percent lower than

⁴ APCA assumptions: consumption growth of one percent per year, with half of the increase met by domestic production; an average of 450,000 tonnes of capacity retired each year and replaced by 810,000 tonnes of new capacity; and energy intensity declining from 4.97 MMBtu/tonne in 1990 to 4.43 MMBtu/tonne in 2010 -- APCA has indicated that they may need to revisit some of these numbers.

the AEO98 BAU scenario. Doubling the forecasted rate of decline in *economic* energy intensity (AEO98) leads to a 55 percent decrease in carbon emissions relative to the 2010 BAU forecast. A seven percent reduction in CO₂ emissions below 1990 levels by 2010 would result in carbon emissions 16 percent lower than the AEO98 BAU projection for 2010.

Key Economic Drivers Shaping the Industry

- *Energy and capital costs.* On average, energy accounts for between 30 and 40 percent of cement manufacturing costs. Purchased fuel and power costs were about 16 percent of the value of shipments in 1995, and capital expenditures were about 5.3 percent of the value of 1995 shipments. Cement companies typically look for a return on discretionary capital of about one to three years.
- *International competition.* Imports accounted for about 14 percent of U.S. cement consumption in 1996. Any energy conservation efforts that increase production costs could increase imports rather than increase U.S. energy efficiency, and could increase global CO₂ emissions if the foreign cement kilns are less efficient than average U.S. kilns.
- *Environmental Concerns.* CKD, HAPs, SO_x, NO_x, CO₂. Raw material mining: dust, stream sediment loads, chemical changes to local water supplies.
- *Material substitution.* What potential exists for engineered wood products or other materials to displace concrete in building construction? Would this reduce GHGs?

A Summary of Technologies and Measures That Can Reduce GHG Emissions:

Near term and/or cost effective practices: Examples of cost-effective measures for cement plants include heat transfer optimization in the clinker cooler, optimization of raw mix components, limestone addition to clinker, increased use of blended cements produced from industrial wastes (such as fly ash and blast furnace slag), housekeeping improvements, heat recovery — waste heat drying using preheater exit gas, kiln shell heat loss reduction, roller mills, wet process slurry dewatering with filter presses, improved grinding media, high efficiency particle size classifiers, mechanical conveying systems, and specifying low alkali cement only when necessary. The potential application of cogeneration, by using waste heat from the cooler or by using gas turbines as tertiary air supply or to dry blast furnace slags, is also an option in some plants. Whether or not a given measure makes sense for any specific facility will depend upon individual site-specific characteristics such as kiln configuration, energy prices, availability of capital, and payback requirements.

A number of cement plants are implementing new clinker cooler technology that can reduce kiln energy use by up to six percent, and facility CO₂ emissions by up to 2.5 percent, with a payback on the order of two years at some plants. Optimizing raw mix components to achieve better burnability could save up to five percent of kiln energy use and up to two percent of facility CO₂ emissions, where technically feasible.

Intergrinding moderate amounts of limestone with the clinker could reduce cement industry CO₂ emissions from energy use and from calcination without affecting product quality. Adding limestone may improve cement properties in some cases. Countries such as Brazil, Canada, Germany, France, Japan and Russia allow up to five percent limestone in portland cements. The American Society for Testing and Materials (ASTM) does not permit addition of limestone to portland cement. Many construction specifications require that portland cement used in concrete meet ASTM standard C150 for portland cement. The APCA is currently advocating a five percent limestone addition standard. APCA

members have been seeking to have limestone additions allowed under the Cement standard for a number of years for reasons unrelated to GHG reduction. Institutional and economic barriers to modifying ASTM C150 standard need to be examined. If ASTM standard C150 were modified to allow limestone addition of up to 2.5 percent, U.S. cement industry CO₂ emissions might be reduced by 2.5 percent. It is important to note that adding limestone to cement could have the effect of reducing the amount of CO₂ emitted per ton of cement *without* reducing total U.S. cement industry CO₂ emissions. If limestone addition were to displace imports and not U.S. clinker production, then foreign cement industry CO₂ emissions would be reduced. With cement imports expected to meet about half of the expected future increase in U.S. cement demand, further analysis of this issue will be important.

Industrial wastes such as coal fly ash, blast furnace slag and silica fume have cementitious properties and can be interground with cement or added at the concrete mixing stage. For each percent of cement displaced by these materials, CO₂ emissions are reduced proportionally. (It takes approximately 1.2 tonnes of coal fly ash to displace a tonne of portland cement in concrete.) The consistency and quality of blended cements will determine their market demand and price. At present, blended cements account for about one percent of domestic cement shipments. As indicated above, cementitious industrial wastes can be added during the concrete mixing stage. According to the American Coal Ash Association (ACAA), coal fly ash used in concrete displaced approximately 4 million metric tons of portland cement in 1993 (about five percent of total shipments) and about 1.0 MMTCe. ACAA estimates that increased penetration of fly ash into the concrete market could reduce carbon emissions by an additional three to five MMTCe. The Interlab Study indicates that 1-2 mmtce reduction through increased use of fly ash and slag would be possible, along with a 0.6 mmtce reduction in energy related emissions. Limitations on further penetration of fly ash into the concrete market such as ash quality availability, construction standards, transportation costs, and user preferences require warrant further examination. Specifying low alkali cement only when necessary could reduce CKD and CO₂ emissions.

The quality of blended cements is comparable to Portland cement; the main differences are lower early strength but higher final strength, and improved resistance to sulphates and seawater. Portland Cement Association has estimated a potential market of 30 Mtonnes blended cement production capacity in 2001--about a third of existing 1994 capacity--which could result in significant CO₂ emissions reductions (on the order of 20-30% or greater) if implemented (PCA, 1997). The market barriers to the adoption of this measure will need to be addressed in greater detail.

Material substitution options such as clinker substitution with fly ash or blast furnace slag, or use of slag as a raw material substitute to be fed into the kiln would be much more attractive than limestone additions from an environmental perspective:

- Ash and slag can be added to clinker in much larger quantities than limestone.
- Limestone is essentially an inert filler which, according to PCA's own reports (Detwiler, 1996), is at best neutral and increases variability of quality; ash and slag have pozzolanic or cementitious properties.
- Limestone additions must be mined; while unused ash and slag must be landfilled.
- Allowing addition of limestone under current specifications without similar treatment for ash and slag would substantially undermine future efforts for similar treatment.
- Ready mix suppliers are very much opposed to limestone as filler.

Advanced or currently un-economic efficiency practices: Examples of advanced or un-economic opportunities for reducing cement industry GHG emissions include wet to dry process conversion, fuel switching, advanced kiln systems such as fluidized bed or trough kilns, expert systems for kiln secondary

control, other monitoring and dynamic process controls, low pressure drop cyclones, high pressure finish grinding, unconventional clinkers, and new cementitious materials (such as geopolymers).

If all existing wet kilns and long dry kilns were replaced with high efficiency, preheater, precalciner dry kilns, and all new kilns were of the same type, total carbon savings in 2010 would be about the same as the APCA forecast in Table 2, or 20 percent above the AEO98 BAU scenario. Coal and coke account for about 70 percent of cement industry energy use, natural gas 11 percent, electricity 10 percent and waste fuels eight percent. Switching from coal to natural gas could significantly reduce fuel-related CO₂ emissions, but at current fuel prices is cost-prohibitive for the industry. Switching to natural gas may also face some technical limitations and could potentially increase NO_x emissions. Expert systems for kiln secondary control could reduce kiln energy use by up to three percent, and facility CO₂ emissions by up to one percent, with a payback time of less than two years, although maintenance costs can be significant. New cyclone designs that allow for lower system pressure may be able to reduce electricity use by up to 4 percent (and CO₂ emissions by less than one half percent), but are usually only cost-effective with a production increase. Increased use of waste fuels in cement production (such as hazardous wastes, tires, and MSW) could offer modest CO₂ emissions reductions, but is constrained by technical factors, costs and environmental concerns.

Existing Program Activities: Climate Wise

In the first Climate Wise industry partnership of its kind, the American Portland Cement Alliance (APCA) has embarked upon an exciting relationship with the Climate Wise Program. Through an innovative partnership with APCA, the principal cement industry trade organization in the United States, 15 member companies, representing over 50 percent of U.S. cement manufacturing capacity, are turning energy efficiency and pollution prevention into a corporate asset through Climate Wise. To date Climate Wise has received 16 facility and company Action Plans from eight APCA Climate Wise Partner companies, which were submitted using software that Climate Wise designed specifically for the cement industry.

Climate Wise Customized Technical Assistance

Because the cement industry has joined as a group, Climate Wise has customized technical support to meet their needs. As a key part of this effort, Climate Wise has developed a new tool, the Cement Industry Action Plan Software and Reporting Workbook. The Action Plan Software helps cement companies prepare their Action Plans and report on the results of their efforts. The Software incorporates cement industry-specific issues such as CO₂ emissions resulting from calcination, a principal part of the cement manufacturing process. Climate Wise has continued to support and improve this software through workshops for APCA members and technical support through the Climate Wise *Wise Line*.

Climate Wise Sample Cement Industry Action Plan

Climate Wise, working with APCA and industry representatives, developed a sample cement industry Action Plan that gives examples of energy efficiency opportunities. Through these actions, Climate Wise determined that a mid-to-large size cement company could reduce its annual carbon emissions by more than 22,000 metric tons in the year 2000 with gross annual fuel cost savings of about \$1 million. The measures from the sample Action Plan include: optimizing heat transfer in the clinker cooler (6,600 metric tons carbon), intergrinding clinker with 2.5% limestone (6,200 metric tons carbon), installing expert systems for kiln secondary control (3,100 metric tons carbon), optimizing raw mix components (2,500 metric tons carbon), compressed air leak repair, and motor efficiency measures.

Climate Wise Action Plans Submitted by Cement Companies

With only 50% of the Climate Wise cement company Action Plans completed, project savings in the year 2000 are expected to be about 7.4 TBtu of energy (10% of these companies' energy consumption) and almost 190,000 metric tons of carbon. The majority of projects included in these cement company Action Plans are new projects that have been or will be implemented since joining Climate Wise. These new projects account for about 5.7 TBtu in energy savings and a carbon reduction of 140,000 metric tons in the year 2000. These energy savings represent a 7% reduction from a BAU scenario for these plants over the next 2 years. Summary results from these Action Plans are presented in Table 3. If all APCA/Climate Wise companies were to submit similar quality action plans, the savings in the year 2000 could be about 280,000 metric tons of carbon. If the entire U.S. cement industry implemented similar energy efficiency and GHG emissions reduction measures, carbon savings in the year 2000 could be on the order of 560,000 metric tons of carbon. Company Action Plans have incorporated the energy efficiency measures included in the sample Action Plan as well as: modernizing kilns and mills; changing from wet kilns to pre-heater pre-calciner systems; burning tires in place of coal; and installing VFDs. In all, 92 measures from these Action Plans have been or will be implemented by the year 2000.

**Table 3: Aggregated Values for the 16 Cement Companies' Climate Wise Action Plans:
New Projects**

Year	Current		2000	
	Percent Savings**		Percent Savings**	
ANNUAL ENERGY USE*				
Electricity (MWh)	1,823,143		1,902,645	
Fuel (MMBtu)	50,412,644		49,877,460	
Total (MMBtu)	56,633,208		56,369,285	
ANNUAL ENERGY SAVINGS				
Electricity Savings(MWh)	25,192	1%	93,325	4%
Fuel Savings (MMBtu)	269,761	1%	5,367,216	8%
Total (MMBtu)	355,716	1%	5,685,641	7%
ANNUAL CARBON SAVINGS (tonnes)				
From Electricity Savings	3,256	1%	14,861	5%
From Fuel Savings	6,799	1%	97,650	8%
From Calcination	2,560	0.2%	25,176	1%
Total (tonnes)	12,614	0.4%	137,685	4%
ANNUAL COST SAVINGS (\$)***				
Gross	344,504		3,413,182	
Net	625,658		760,046	

* Annual energy use values represent only the 13 Action Plans that included total energy use.

** Percent energy and carbon savings represent only the 13 Action Plans that included total energy use.

*** Companies reported either gross or net cost saving, but not both.

APCA/Climate Wise Cement Industry Partners

- Arizona Portland Cement Company
- Ash Grove Cement Company
- Calaveras Cement Company
- California Portland Cement Company
- Capitol Aggregates Ltd.
- Dragon Products Company
- ESSROC Corp.
- Holnam Inc.
- Lafarge Corporation
- Lehigh Portland Cement Company
- National Cement Company of California
- Phoenix Cement
- RC Cement Co. Inc.
- RMC Lonestar
- Southdown, Inc.

Other Program Opportunities

Energy Star, NICE³, Motor Challenge, Air Compressor Challenge, Industrial Assessment Centers, among others.

Sources or Contacts:

American Portland Cement Alliance, 1225 Eye Street NW, Suite 300, Washington, DC 20005. Andrew O'Hare, VP Environmental Affairs: (202) 408-9494; fax (202) 408-0877.

Portland Cement Association, 5420 Old Orchard Road, Skokie, IL 60077-1083. William D. Toal, Chief Economist: (847) 966-6200, x377; fax (847) 966-9781.

U.S. Department of the Interior, U.S. Geological Survey, Hendrik G. van Oss, Commodity Specialist, (703) 648-7712; fax: (703) 648-7722.

EPA Climate Wise Program, OPPE, 401 M Street NW, Washington, DC 20460. Pam Herman-Milmoe, Climate Wise Director: (202) 260-4407; fax: (202) 260-0572

EPA Energy Star Program, Atmospheric Pollution Prevention Division, 401 M Street NW, MS 6202-J, Washington, DC 20460. Matt Williamson: (202) 564-9094.

National Institute of Standards and Technology, Bldg Materials Division, Building 226, Room B368, Gaithersburg, MD 20899. Dr. Geoffrey Frohnsdorff, Chief: (301) 975-6706; fax (301) 990-6891.

American Coal Ash Association, 2760 Eisenhower Avenue, Suite 304, Alexandria, Virginia 22314, Samuel S. Tyson, Executive Director: (703) 317-2400.

Domestic
Industry by
Industry

Semiconductor Manufacturing Industry: Background Information for Industry Consultations

Industry at a Glance:

- ❖ A total of about 380 semiconductor "fabs" were operating in the U.S. as of April 1997. About 170 organizations including firms, universities and the federal government operate these fabs.¹
- ❖ Major producers include multi-national companies such as Intel, IBM, Motorola, Texas Instruments, and Advanced Micro Devices.
- ❖ World manufacturing facilities are concentrated in the U.S., Japan, Europe, Korea, and Taiwan.
- ❖ The U.S. industry processed about 1 billion square inches of silicon chips in 1997.²
- ❖ Industry's GHG emissions include CO₂ from energy consumption as well as direct emission of 5 perfluorocompounds (PFCs) and 1 hydrofluorocarbon (HFC) used as requisite process chemicals and ultimately exhausted to the atmosphere.

Benchmark Data for Selected Years			
Category of Information	1990	1998	2010
Output Physical Units (Million Sq. Inches) ²	434.00	804.00	2,140.00
Output (Billions \$) ^{3,4}	20.10	76.40	340.00
Site Energy (Trillion Btus) ⁴	26	30	46
Energy Intensity (kBtus/\$ or kBtu/ton)	1.30	0.49	0.13
Energy Related Carbon Emissions (MMT) ⁴	0.94	1.01	1.64
Greenhouse Gas Emissions (MMTCE)	1.1	2.2	5.9
Emissions With CCAP* (MMTCE)	1.1	2.2	3.8
* These estimates represent reduction of PFCs only.			

Background Information:

This template addresses the semiconductor manufacturing industry represented by the Standard Industrial Classification (SIC) code 3674. Code 3674 is used to classify companies that manufacture semiconductor circuit networks (solid-state circuits) and semiconductor devices. Manufacturing integrated circuits or semiconductor devices on silicon wafers is termed wafer or microchip fabrication and the manufacturing facility is often termed a "wafer fab".

The semiconductor industry is rapidly expanding with annual growth projected at 18% annually through 2000. Leading semiconductor producing nations and their production capacities in million square inches of silicon processed are shown in Table 2.

Country	Approximate Annual Production Capacity (million inch ² Si processed)
Japan	148.1
United States of America	109.3
Taiwan	54.0
South Korea	40.6
Singapore	19.3
Germany	14.2
China	13.8
Malaysia	10.6
Italy	9.8
France	9.5

Table 2. Semiconductor manufacturing capacity by nation.¹ Products of similar wafer surface area may differ dramatically in complexity and price.

The semiconductor industry employs five perfluorocompounds (PFCs) and one hydrofluorocarbon (HFC) to produce integrated circuits. These include tetrafluoromethane (CF₄), hexafluoroethane (C₂F₆), sulfur hexafluoride (SF₆), nitrogen trifluoride (NF₃), octafluoropropane (C₃F₈), and trifluoromethane (CHF₃). These gases are used in two crucial manufacturing processes. The first is plasma etching where the gases are disrupted into a plasma which can remove microscopic areas of selected material from the wafer surface to create the channels that form the circuit's pathways. In the second process, the gases are used as plasma cleaning agents for chemical vapor deposition (CVD) equipment. In both cases, the PFCs are desirable to industry because all byproducts of the reaction are gaseous and exit equipment without damage to the product. Further, the PFCs have allowed the industry to construct smaller and faster integrated circuits with sub-micron sized features.

While a portion of the gas introduced to the plasma is destroyed, emissions occur as constituents which have passed through the chamber unreacted re-form as PFCs in

the exhaust stream. If not captured or abated, these stable exhaust constituents are vented to the atmosphere.

Energy is used in two major ways within semiconductor fabs: air conditioning and production tool operation. The small scale of features on the final product requires a very clean and consistent production environment. This is achieved through a high and constant flow of extremely clean air (Class 1 or 1 particle per cubic foot of air is common for microchip production) which removes small particles generated in production and supplies fresh replacement air to the fab. Drag created by filtration combined with a high flow rate lead to high energy use from fans, chillers and pumps.

Energy is also required to run many of the manufacturing processes found in fabs. Many of these steps involve the use of large amounts of electricity. These include generation of plasmas for use in etching chip surfaces, ion implantation devices and CVD chambers. Currently, there are few, if any, alternatives to use of these processes in microchip manufacture.

Defining Technological Opportunities:

Near term:

Energy efficiency (CO₂): Because of the high cost of downtime at semiconductor fabs most energy efficiency opportunities rarely make sense as stand alone projects, rather in new construction or in combination with other planned down-time. Potential HVAC system improvements: reduced air velocity in laminar flow cleanrooms; reducing cleanroom area through bulkheading equipment; optimizing fan impeller design and speed; reducing pressure drop through alternative HEPA filters, re-engineering piping and ductwork; optimizing chillers and pumps; VSDs for chillers, booster pumps and nitrogen production compressors; reuse of high purity water.

PFCs: The use and subsequent emission of PFCs may be reduced by modifying the process tool "recipes," or the prescribed operational gas flow rates, power levels, and pressures for a specific manufacturing process. By adjusting these settings, the company may be able to perform the same process step while using less PFC gas. These changes are termed process optimizations and are challenging to achieve while maintaining peak tool production rates. And, typically, only larger companies can afford the dedicated research and development facilities and staff required to evaluate process optimizations.

PFC capture/recycle technology is currently available and being tested by the industry. This approach separates and collects unreacted and process-generated PFCs from the exhaust stream for further processing (recycling or destruction).

Thermal destruction abatement devices are also available and are being tested by the industry. While this technology is effective at destroying PFCs (> 95%), it may be

considered an environmental trade-off at best due to the fact that the devices consume water, electricity, and fuel and generate undesirable by-products that then require further treatment (e.g. HF, NO_x, COF₂). High installation and operating costs are of concern for both the PFC capture/recycle and abatement technologies.

Advanced practices:

Energy Efficiency (CO₂): mini-environments; clean room automation; reduced use of high purity water; improved manufacturing tool efficiency through optimized exhaust levels and standby modes.

PFCs: Alternative chemistries for wafer patterning and CVD chamber cleaning are being researched. The industry's National Technology Roadmap projects the development of non-emitting tools by 2010, but at this time states that continued research is required.

Program Opportunities:

PFC Emission Reduction Partnership for the Semiconductor Industry, Climate Wise, ENERGY STAR[®], Motor Challenge, Air Compressor Challenge, Industrial Assessment Centers, among others.

Program Status:

PFC Emission Reduction Partnership: EPA's Partners represent approximately 70% of PFC emissions from U.S. semiconductor manufacturing and include industry leaders such as IBM, Intel, Motorola, and Texas Instruments. The Partnership's MOU allows for a two-year technology research/investigation period after which the Partners will meet with EPA to establish emission reduction strategies and goals. Most Partners' two-year anniversary is Summer, 1998. EPA is currently planning for these discussions to begin June, 1998.

Semiconductor Industry Energy Efficiency Initiative: Held Energy Efficiency Opportunities workshop with wide industry participation in November, 1997. Seeks to facilitate improvement in fab energy efficiency through focus on improved HVAC system design.

Climate Wise: The Climate Wise program invites companies to submit comprehensive environmental Action Plans detailing energy efficiency, water conservation, and pollution prevention measures that reduce greenhouse gas emissions. Current industry Partners include Lucent Technologies, Advanced Micro Devices (AMD), IBM, and Samsung.

ENERGY STAR Equipment and Buildings: Several companies that manufacture semiconductors (e.g. Digital, Hewlett-Packard, IBM, Intel, and Texas Instruments) also develop and promote energy efficient products as participants in EPA's ENERGY STAR program. Minor industry participation in ENERGY STAR Buildings program.

Motor Challenge: Minor industry participation.

Sources or Contacts:

EPA ENERGY STAR[®] Program, Atmospheric Pollution Prevention Division, 401 M Street SW, MS 6202-J, Washington, DC 20460. Mr. Matt Williamson: (202) 564-9094; fax (202) 565-2083.

EPA PFC Emission Reduction Partnership for the Semiconductor Industry, 401 M Street SW, MS 6202J, Washington, DC 20460. Mr. Scott Bartos. (202) 564-9167; fax (202) 565-2134.

EPA Climate Wise Program, OPPE, 401 M Street NW, Washington, DC 20460. Ms. Pam Herman-Milmoe: (202) 260-4407; fax: (202) 260-0572.

EPRI Center for Electronics Manufacturing/SEMATECH, 2706 Montopolis Drive, Austin, TX 78741. Ms. Phyllis Pei: (512) 356-3872; Fax (512) 356-3189.

Semiconductor Equipment and Materials International (SEMI), 805 E. Middlefield Rd, Mountain View, CA 94043. Ms. Aimee Bordeaux: (415) 940-6939; Fax (415) 940-7925.

Semiconductor Industry Association, 181 Metro Drive, Suite 450, San Jose, CA 95110. Mr. Lee Neal: (408) 436-6600; Fax (408) 436-6646.

References:

1. Semiconductor Equipment and Materials International, International Fabs on Disk, April, 1997.
2. World Wafer Data, DataQuest.
3. Semiconductor Industry Association "Chip Industry Statistics: World Market Sales and Shares for 1991-1996 and 1982-1990".
4. CAVLON Associates "Report on Energy Use and Efficiency Opportunities in the Semiconductor Manufacturing Industry" commissioned by EPA/APPD.

*Domestic
Industry by
Industry*

AIRLINE INDUSTRY

Draft: March 25, 1998

Background

The Administration has worked closely with the airline industry in gaining acceptance at Kyoto of a provision shifting initial responsibility for emission reductions to the International Civil Aviation Organization (ICAO), essentially exempting bunker fuels from control under the Protocol. In addition, the industry has urged the Administration to support implementation of advanced air traffic management systems, both here and abroad, which would substantially reduce fuel use and therefore reduce carbon dioxide emissions.

Scoping Meeting

The scoping meeting will be scheduled for the week of March 30.

Sector Analysis Paper Status

As part of the preparation for ICAO's meeting on April 6-8, the Task Force has worked closely with OSTP on internal government meetings to discuss the potential for a partnership with industry on reducing greenhouse gas emissions. DOD, FAA, NASA and EPA are working with the industry on ways to advance efforts to implement an advanced air traffic management system. EPA has the lead in preparing the background paper with a draft due the week of March 23.

Industry Participants

Key participants should include representatives from United, Northwest, Airline Industry Association, Boeing, UPS and Federal Express. The industry is composed of a small number of engine and airframe manufacturers, a larger number of commercial airlines, and a few large freight transporters. Several airlines (e.g., USAir and United) and the largest manufacturer (Boeing) appear to be supportive of action to reduce emissions and the industry as a whole is highly supportive of efforts to improve air traffic management.

Agency Participants

NASA and the Department of Defense are partners with industry in the development of future technologies and the FAA plays a substantial role in regulating and supporting air traffic control systems.

OSTP -- Steve Moran, consultation lead

EPA -- Technical staff: Steve Andersen (564-9069), Bob Noland (260-2418), John Thomas (260-9504)

Commerce -- Technical staff: Eugene Alford (482-5071)

Timeline

Scoping meeting:	Week of March 30
First Meeting w/ Full Industry:	Week of April 13 (after ICAO meeting)
Meeting w/Agencies:	Week of June 1
Additional Meetings:	June - August
Draft Commitment:	Early September

ALUMINUM

Draft: March 25, 1998

Background

The aluminum industry already has an R&D partnership with DOE and a voluntary reduction program with EPA on N₂O. The U.S. industry, consisting of 23 facilities operated by 13 firms, is the world's largest, annually producing about \$37 billion in products and exports.

Scoping Meeting

A scoping meeting could be scheduled for the week of April 6.

Sector Analysis Paper Status

A draft of the analysis paper is in circulation now for agency comments (see attached). Contact: Doug Kaempf, DOE

Industry Participants

Alcoa (Paul O'Neill), representing over a quarter of the industry capacity, has already asked to be involved in the consultations. Adding the CEOs of Kaiser, Alumax, and Reynolds would mean that the consultations represented about 60 percent of the industry. Stephen Larkin has recently been appointed President of the Aluminum Association and has stated that he wants to take a lead in the process of setting voluntary commitments.

Agency Participants

DOE -- Denise Swink as consultation lead; Hank Kenchington (586-1878) as technical staff.

EPA -- Technical staff: Eric Dolin (564-9044), Kathleen Hogan (564-9190)

Commerce -- Technical staff: David Cammarota (482-5157)

Time Line

Scoping Meeting:	Week of April 6
First Meeting w/ Full Industry:	Week of April 20
Meeting w/Agencies:	Week of June 1
Additional Meetings:	June - August
Draft Commitment:	Early September

CEMENT

Draft: March 25, 1998

Background

Two key manufacturers -- Holnam and Southdown -- already advocate changes in federal cement specifications and state/local building and road construction code changes that could save 5-15 percent below 1990 levels. There is also a Climate Wise Cement Industry Compact with the American Portland Cement Alliance (APCA), whose 15 companies represent over 50 percent of U.S. production.

Scoping Meeting

We are working to set up a scoping meeting for the week of March 30.

Sector Analysis Paper Status

A draft of the analysis paper is in circulation now for agency comments. Contact: Alex Christafaro, EPA

Industry Participants

The top ten producers account for 60 percent of clinker capacity and production: Holnam, Lafarge Corp., Southdown, Ash Grove Cement, Blue Circle, Lone Star Industries, Essroc Materials, Medusa, California Portland Cement, and Lehigh Portland Cement. Other participants might include the APCA and the Portland Cement Association.

Agency Participants

DOE -- None

EPA -- Jeanne Briskin (564-9135), Pam Herman-Milmoe (260-4407), Kevin James (260-2424), Matt Williamson (564-9094)

Commerce -- Technical staff: Patrick MacAuley (482-0134)

Time Line

Scoping Meeting:	Week of March 30
First Meeting w/ Full Industry:	Week of April 20
Meeting w/Agencies:	Week of May 25
Additional Meetings:	June - August
Draft Commitment:	Early September

BULK CHEMICALS

Draft: March 25, 1998

Background

The chemicals industry is large and varied, so the first consultations will be with the bulk chemical manufacturers -- organic and inorganic chemicals, plastics materials and synthetics and agricultural chemicals. The rest of the industry, including the manufacturers of consumer products such as pharmaceuticals, soaps and cosmetics, can be handled later. There are several large chemical companies interested in participating.

Scoping Meeting

The scoping meeting will be scheduled for the week of April 6. The second Thursday in April, the Chemical Manufacturer's Association's Climate Change Committee will be meeting.

Sector Analysis Paper Status

The paper is circulating for final comments (see attached). Contact: Kathleen Hogan, EPA

Industry Participants

We should cultivate CEO champions from Dow and Monsanto. The 50 largest producers yield 84 percent of sales. The top 5 basic chemical producers are Dow, Monsanto, Hoechst Celanese, Union Carbide, and Eastman Chemical. Other companies that are top producers in their sub-sector include: Ashland Chemical, DuPont, BOC Group, Occidental Chemical Corporation, Air Products, ICI Klee, Allied Signal, and BP Chemicals.

Agency Participants

DOE -- Denise Swink (586-9232) as consultation lead; Merrill Smith (586-3646) as technical staff.

EPA -- Technical staff: Skip Laitner (564-9833), Chyi Sun (564-9442)

Commerce -- Technical staff: Michael Kelly (482-3090)

Time Line

Scoping Meeting:	Week of April 6
First Meeting w/ Full Industry:	Week of June 1
Meeting w/ Agencies:	Week of July 6
Additional Meetings:	July - August
Draft Commitment:	September

ELECTRIC UTILITIES

Draft: March 25, 1998

Background

The "Climate Challenge" has several hundred electric utilities already participating in voluntary reduction programs. In addition, with utility restructuring on the horizon, most progressive utilities are interested in working to provide certainty for their investors and to brandish their "brand name" with a greener image. Climate Challenge benefitted from involvement from the Large Public Power Council, as well as the three large major trade associations (EEI, APPA, and NRECA).

Scoping Meeting

A scoping meeting will be scheduled for the week of March 30 (Forrister, Mansuetti, Gardiner, Anderson, Lance). Also, the Climate Challenge utilities will gather at EEI in April (TBD), when we will be given an opportunity to discuss our process and desired outcomes. The Global Warming Task Force of the American Public Power Association will meet on March 31.

Sector Analysis Paper Status

The paper is still in the draft stage and needs comments from all participating agencies (see attached). Contact: Larry Mansuetti, DOE

Industry Participants

We should cultivate leadership through Linn Draper (AEP), Fred Buckman (PacifiCorp), Craven Crowell (TVA), John Bryson (SCE), and John Rowe (Comm Ed). In addition, we have encouraged a self-organized group of progressive companies that is already meeting to develop a strategic "jump start" for this sector's work. This group includes the five mentioned above plus Niagara Mohawk, PSE&G, Tucson Electric, WEPCO, Duke Energy, Texas Utilities, Arizona Public Service Co., Entergy, LA Dept of Water and Power. We also need to engage the independent power leaders -- like Ken Lay (Enron), Tom Casten (Trigen), Roger Sant (AES), and US Generating -- as well as rural electric cooperatives.

Agency Participants

DOE -- Dan Adamson or Abe Haspel (DOE, Policy Office) as consultation lead; Larry Mansuetti (586-2588), Bob Kane (586-4753), Bill Parks (586-2093) as technical staff.

EPA -- Technical staff: Joe Bryson (564-9631), Sam Napolitano (564-9751), Paul Stolpman (564-9140), James Turnure (260-2784)

Commerce -- Technical staff: Jane Malloy (482-5926)

USDA -- Forthcoming from Keith Collins

Time Line

Scoping Meeting:	Week of March 30
First Meeting w/ Full Industry:	Week of April 13
Meeting w/Agencies:	Week of May 18
Additional Meetings:	June - August
Draft Commitment:	Early September

FOREST PRODUCTS

Draft: March 25, 1998

Background

The pulp and paper industry seem to be taking a progressive stance, in part because of their unique position as sink enhancers and biomass cogenerators. The leading U.S. companies (e.g., International Paper, Kimberley-Clark, Georgia-Pacific) are diversified, multi-billion dollar global entities with holdings that include timberlands, forestry, pulp and paper, and finishing operations.

Scoping Meeting

An initial meeting was held with Stern and Forrister on March 24. A more comprehensive scoping session should follow within 10 days.

Sector Analysis Paper Status

A good draft of the analysis paper is in circulation now for agency and other comments (see attached). Contact: Doug Kaempf, DOE

Industry Participants

CEO champions will likely be Georgia Pacific (Pete Correll) and Boise Cascade (). Katie McGinty has strong ties to Correll from PCSD. Other large companies in this sector that we hope will participate include International Paper, Kimberley-Clark, Weyerhaeuser, Stone Container, and Champion. Trade associations, like the American Forest and Paper Association, will likely also want to participate. Their CEO, Henson Moore (former Deputy Secretary of DOE and Member of Congress [R-LA]), and Jo Cooper of his staff are poised to be constructive.

Agency Participants

DOE -- Denise Swink as consultation lead; Valri Robinson (586-0937) as technical staff.

EPA -- Technical staff: Linda Baynum (564-9211), Joe Ferrante (260-2790), Skip Laitner (564-9933)

Commerce -- Technical staff: Gary Stanley (482-0376)

USDA -- Forthcoming from Keith Collins

Time Line

Scoping Meeting:	Week of March 23
First Meeting w/ Full Industry:	Week of April 13
Meeting w/Agencies:	Week of May 25
Additional Meetings:	June - August
Draft Commitment:	Early September

IRON AND STEEL

Draft: March 25, 1998

Background

The iron and steel industry -- led by Bethlehem, USX, Inland, LTV, National and North Star -- has already offered a 10 percent cut in on-site emissions by 2010 conditioned on flexibility to do it in any gas, source or sink, at home or abroad. These companies represent approximately 40 percent of U.S. steel sales.

Scoping Meeting

We met informally with steel leaders on 3/12, and they are pulling together a draft plan. This initial planning effort will build to a more comprehensive effort that they will take to their Global Climate Subcommittee meeting the second week of April.

Sector Analysis Paper Status

The paper is circulating for final comments, awaiting DOE comments (see attached). Contact: Skip Laitner, EPA

Industry Participants

CEO champions will likely be Barnett (Bethlehem) and Usher (USX), with the remaining CEO's from the original group who proposed the 10 percent cut not far behind. Barnett met with the President in August 1997, and he is actively encouraging this effort among his colleagues. Usher championed the steel partnerships with DOE and is poised to link climate benefits to the climate challenge. Also, Bruce Steiner from the American Iron and Steel Institute is trying to be helpful. We should orchestrate calls to these CEOs (perhaps Stern with Swink, who has strong ties) by March 30 to get their commitment to help lead this effort within the industry.

Agency Participants

DOE -- Denise Swink (586-9232) as consultation lead; Scott Richlen (586-2078) as technical staff.

EPA -- Technical staff: Jeanne Briskin (564-9135), Pam Herman-Milmoe (260-4407), Kevin James (260-2424), Virginia Gorsevski (564-9796)

Commerce -- Technical staff: Charles Bell (482-0608)

Time Line

The industry already has a proposal on the table, so should be among the first to be approached.

Scoping Meeting:	3/12; Week of April 6
First Meeting w/ Full Industry:	Week of April 27
Meeting w/ Agencies:	Week of May 25
Additional Meetings:	June - July
Draft Commitment:	Early August

SEMICONDUCTOR INDUSTRY

Draft: March 25, 1998

Background

The electronics industry uses HFCs and PFCs in the manufacture of circuit boards. They supported the U.S. positions against harmonized policies and measures proposed by the Europeans and for the inclusion of these compounds in a single, six gas target. The industry has been participating with EPA in a voluntary program to reduce emissions. This effort includes firms representing roughly 70 percent of production and includes IBM, Intel, Motorola, and Texas Instruments. Building on this effort, one of the proposed tax cuts in the Climate Change Technology Initiative would provide a 10 percent tax credit for the purchase of recycling equipment to reduce emissions. Actions to reduce greenhouse gases could potentially expand market opportunities for this industry in areas such as electronic controls for motors and HVAC systems, hybrid vehicles, and telecommuting. The Electronics Industries Alliance recently adopted a position on climate change that urges "voluntary measures and incentives" to achieving reductions in greenhouse gas emissions (see attached).

Scoping Meeting

A scoping meeting will be scheduled for the week of March 30. This meeting would include representatives from EIA, Sematech, and other companies, including Motorola, Intel and Lucent.

Sector Analysis Paper Status

EPA has taken the lead in drafting the background paper with the support of DoD and Commerce. A draft should be completed the week of March 23. Contact: Jeanne Briskin, EPA

Industry Participants

Key industry leaders would include: Motorola (Rich Guimond, formerly of DOE and EPA); Intel; Lucent; the Semiconductor Manufacturers Association; SEMATECH; and the Electronics Industry Alliance. Possible CEO leaders on this issue would include: Motorola (Christopher Galvin) and Lucent Technologies (Richard McGinn).

Agency Participants

EPA -- Jeanne Briskin as technical lead; Scott Bartos (564-9167), Sally Rand (564-9061), Matt Williamson (564-9094) as technical staff.

Commerce -- Technical staff: Robin Roark (482-3090)

DoD -- Names forthcoming

Timeline

Scoping Meeting:	Week of March 30
First Meeting w/Full Industry:	Week of April 6
Meeting w/Agencies:	Week of May 25
Additional Meetings:	June - August
Draft Commitment:	Early September

Domestic
Industrial
Industry

'98 MAR 24 AM 9:38

Office of Industrial Technologies

202-586-9232

Fax Cover Sheet

Date: 3/24

To: Todd Stern

From: Denise Swink

of pages: 6

March 24, 1998

Note to: Todd Stern

Attached for your info are samples of two "compacts" we signed with industry: steel and glass. We have similar compacts with the other industries with whom we partner.

Also, attached is a letter from Hank Barnett to the President inviting him to the "Burns Harbor" event on April 30. I'd like to chat with you about the merits of this event, not only because I've organized it, but also because it is somewhat of a "\$100 on the floor" event.

Hope to talk to you soon (202) 586-9232.



Denise Swink

units from plant solid wastes.

- environmental engineering - to achieve further reductions in air and water emissions and generation of hazardous wastes, and to develop new processes to avoid pollution rather than control and treat it.

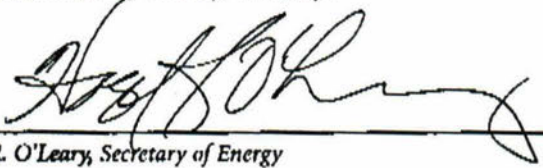
The work that springs from this research partnership will be carried out in a joint Federal-Industry Program designed to develop technologies for the industry end-users. It will be guided by collaborating among: industry, associations, agencies of the federal government, universities and other major research institutions with expertise in the fields of interest.

Although product development is essential to the long-term success of the industry and part of the STEEL Program, it is also a primary basis for competition among companies through product differentiation. Therefore, projects that benefit the industry broadly rather than specific product research and development work will be addressed in this program. Other projects are best left to the individual efforts of company proprietary research and development programs.

The Compact is also intended to re-emphasize and reinforce the activities already underway in collaboration between the government, industry and the academic institutions. The steel industry is supporting

This compact shall become effective upon execution by representatives of the United States Department of Energy, the American Iron and Steel Institute and the Steel Manufacturers Association for the industry. It shall remain in effect for two years, but may be extended by mutual agreement of the parties.

Signed this 2nd day of May, 1995, by:


Hazel R. O'Leary, Secretary of Energy


Thomas J. Usher, Chairman, American Iron and Steel Institute


Marilyn Selby, Chairman, Steel Manufacturers Association

Glass

A Clear Vision for a Bright Future

April 29, 1998

This Compact is a voluntary collaborative effort between the glass industry (container, flat, fiberglass, and specialty glass) and the U.S. Department of Energy. The purpose of the compact is to provide the framework for identifying appropriate areas for joint research, development, and technology demonstrations. The results will be a research partnership between the Department of Energy and the glass industry.

The partnership will work to demonstrate, evaluate, and accelerate new technologies and scientific insights that address several specific needs in the following areas:

- Processing advances in melting/refining processes, and fabricating/forming processes.
- Technology development of new glassmaking techniques, processing controls and computer simulations to model new processes.
- Systems improvements in emission controls, recycling methods, and solid waste management.
- Products development of innovative new uses for glass.

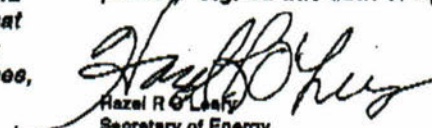
The projects identified by the research partnership will be carried out in a joint Federal-industry program designed to develop technologies for the industry's end-users. The program will be guided by various collaborations among: industry, glass associations, Federal agencies, universities, national laboratories, and other major research institutions.

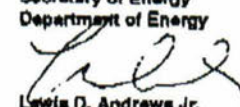
Although process/product development is essential to the long-term success of the glass industry, it is also a primary element for competition among companies through product differentiation. Therefore, pre-competitive projects that benefit the industry across the board will be addressed in this program. Specific product development will be left to individual companies.

The compact is also intended to re-emphasize and reinforce the activities already underway through collaboration between the government, industry, and academic institutions. The glass industry is supporting pre-competitive research and development projects in production efficiency, energy efficiency and conservation, recycling, environmental protections, and innovative uses, with both short-term and long-term potential. These efforts are emphasized in order to build upon the successes of the past. Examples include: simplified, flexible forming; high strength coatings; direct, optimized heat transfer combustion, and waste minimization. For the future vision of the glass industry to become a practical reality, a program of long-term R&D will be required.

This compact expresses the intentions of the parties to pursue collaborative research efforts. It does not, however, create legal rights or obligations for any party and any party may withdraw without penalty and without being subject to remedies at law or equity.

This compact shall become effective upon execution by representatives of the United States Department of Energy, Anchor Glass Container, Carr Lowrey, Vetrotex-Certainseed, Corning Incorporated, Fenton Art Glass, Ford Motor Company Glass Division, Glass Packaging Institute, North American Insulation Manufacturers Association, Society of Glass Sciences, and Techniglas. It shall remain in effect for two years, but may be extended by mutual agreement of the parties. Signed this 29th of April, 1998 by:


Hazel R. Leary
Secretary of Energy
Department of Energy

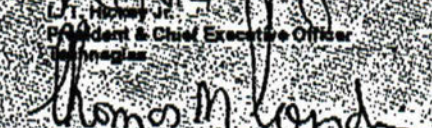

Lewis D. Andrews Jr.
President
Glass Packaging Institute


Cherry Bernard
President & Chief Executive Officer
Carr Lowrey Glass Company

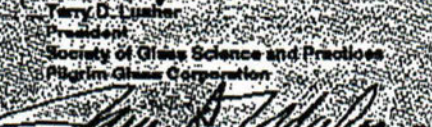

Charles W. Bassett
Senior Vice President & Chief Technical Officer
Corning Incorporated

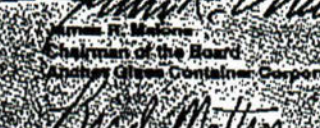

M. S. Gill
General Manager, Glass Division
Ford Motor Company


L. J. Hickey Jr.
President & Chief Executive Officer
Techniglas


Thomas M. Landin
Vice President - Governmental Affairs
Certainseed Corporation


Terry D. Lusher
President
Society of Glass Science and Practices
Pilgrim Glass Corporation


James R. Malone
Chairman of the Board
Anchor Glass Container Corporation


Brad Mattoon
President - Fiberglass Division
Vetrotex-Certainseed

Bethlehem Steel Corporation

1170 EIGHTH AVENUE
BETHLEHEM, PA 18016-7699

CURTIS H. BARNETTE
CHAIRMAN
AND
CHIEF EXECUTIVE OFFICER



March 13, 1998

The Honorable William J. Clinton
The White House
1600 Pennsylvania Avenue, N.W.
Washington, D.C. 20500

Dear Mr. President:

We have discussed the competitiveness of the steel industry in this country, and did so at the meeting on global climate change on August 7 at the White House. I have also invited you to visit Bethlehem Steel's flagship Burns Harbor Division in Burns Harbor, Indiana, which we believe to be the premier steel business. On April 30, 1998, an important Climate Wise Program signing ceremony will take place at Burns Harbor in conjunction with a Department of Energy Steel Technology Showcase. Your personal participation at this combined event is respectfully requested. Your presence and involvement will underscore the importance that voluntary programs can play in moving the nation toward your goals of reduced energy consumption and greenhouse gas emissions.

Bethlehem Steel will become the 400th organization to sign on to the Administration's Climate Wise Program. This is an important event for both the government and the steel industry signaling an impressive participation milestone. Bethlehem Steel will be the first integrated steel company to join the program. The program creates a unique government-industry partnership that will help improve energy efficiency and environmental performance.

In addition to the Climate Wise signing ceremony that day, the Burns Harbor Division will be hosting a Department of Energy Steel Technology Showcase event. The Showcase will demonstrate a dozen or so steelmaking and processing technology advancements that were accomplished through a number of partnership activities between DOE and the steel industry. As part of an outreach program, we anticipate a large number of outside visitors will be at the Showcase to learn more about the new technologies.

There are significant synergies between the Climate Wise program and the new steel technologies. These technologies will improve energy efficiency and productivity and result in reduced environmental emissions. In addition, while Burns Harbor is the newest integrated mill in the country and one of the most efficient in the world - we continue to strive to further increase its efficiency. It is located approximately 40 miles southeast of Chicago in northwest Indiana, which is the largest steel producing state in the nation. Burns Harbor employs approximately 6000 and produces 5.6 million tons of steel annually.

- 2 -

Mr. President, your participation in this event would add enormously to our efforts in demonstrating the dramatic steps being taken in the steel industry to improve the environment through new technology applications.

In addition to federal officials and company representatives, we are planning to have state officials, including Governor O'Bannon and high-ranking union officials join in the event. We will, of course, also invite the Vice President.

We appreciate your continued leadership, and hope your schedule will permit you to join us at Burns Harbor on April 30.

Best personal regards.

Sincerely,



Curtis H. Barnette
Chairman and CEO
Bethlehem Steel Corporation
Bethlehem, PA 18016-7699
Phone: 610-694-6137
Fax: 610-694-3686

cc: Maria Echaveste

*Industry by
Industry*

'98 MAR 23 PM6:



White House Climate Change Task Force

734 Jackson Place, N.W. • Washington, DC 20503

FAX

To: Todd Stern

Organization/Title:

Fax: 456 2215

Phone:

Pages (including cover): 9

Date: 3/23

From: Lisa McNeilly

Phone: 343-1091

Message:

Attached are the draft iron and steel sector
one-pager and background paper. We are making
good progress on the documents for the other
sectors and will send to you in the next two
days

You can send comments to either me or Dick

Lisa

IRON AND STEEL

Draft: March 23, 1998

Background

The iron and steel industry -- led by Bethlehem, USX, Inland, LTV, National and North Star -- has already offered a 10 percent cut in on-site emissions by 2010 conditioned on flexibility to do it in any gas, source or sink, at home or abroad. These companies represent approximately 40 percent of U.S. steel sales.

Scoping Meeting

We met informally with steel leaders on 3/12, and they are pulling together a draft plan. This initial planning effort will build to a more comprehensive effort that they will take to their Global Climate Subcommittee meeting the second week of April.

Sector Analysis Paper Status

The paper is approaching final draft stage, awaiting DOE comments (see attached). Contact: Skip Laitner, EPA

Industry Participants

CEO champions will likely be Barnett (Bethlehem) and Usher (USX), with the remaining CEO's from the original group who proposed the 10 percent cut not far behind. Barnett met with the President in August 1997, and he is actively encouraging this effort among his colleagues. Usher championed the steel partnerships with DOE and is poised to link climate benefits to the climate challenge. Also, Bruce Steiner from the American Iron and Steel Institute is trying to be helpful. We should orchestrate calls to these CEOs (perhaps Stern with Swink, who has strong ties) by March 30 to get their commitment to help lead this effort within the industry.

Agency Participants

DOE -- Denise Swink (586-9232) as consultation lead; Scott Richlen (586-2078) as technical staff.

EPA -- Technical staff: Jeanne Briskin (564-9135), Pam Herman-Milmoe (260-4407), Kevin James (260-2424), Virginia Gorsevski (564-9796)

DOC -- [Jeffery Hunker to provide names.]

Time Line

The industry already has a proposal on the table, so should be among the first to be approached.

Scoping Meeting:	3/12; Week of April 6
First Meeting w/ Full Industry:	Week of April 27
Meeting w/ Agencies:	Week of May 25
Additional Meetings:	June - July
Draft Commitment:	Early August

Industry Consultations:

Representative Sector Information in a Template Format

(Non-Decisional Draft - Do Not Cite or Quote)

March 23, 1998

A (Draft) Information Template for the Iron and Steel Industry

U.S. Industry at a Glance:

- ▲ Based upon 1997 data, there is a total of 142 operating steel plants in the U.S.
 - ◆ 20 integrated plants (with 40 blast furnaces) owned by 14 companies
 - ◆ 122 secondary plants (with 226 electric arc furnaces) owned by 85 companies
- ▲ The industry emits an estimated 49 million metric tons of carbon equivalent (MMTce) in greenhouse gas emissions (GHG).
- ▲ The top eight producers account for 75 percent of the sales, including US Steel, Bethlehem Steel, LTV Corporation, National Steel, Inland Steel, Armco, Weirton, and Wheeling-Pittsburgh
- ▲ In 1997 the industry shipped approximately 106 million net tons of steel, a 24 percent increase over 1990 levels. It imported an estimated 30 million tons in that year. Based upon 1995 data, it employs about 355,000 people.
- ▲ The industry has achieved a 68 percent recycling rate for the past six years. Each ton of recycled steel conserves 2500 pounds of iron ore, 1400 pounds of coal, and 120 pounds of limestone.
- ▲ Primary energy intensity of steel making (million Btu per ton produced) for selected countries in 1994: United States, 24.14; Japan, 19.87; Germany, 16.90 (1993); France, 20.66; Italy, 15.19 (1992); Brazil, 26.16; Poland, 26.86 (1993); China, 34.43 (1993); and South Korea, 16.54.
- ▲ The U.S. rate of improvement in energy intensity was 1.4 percent per year in the period 1971-1994 when measured as a change in primary energy consumption per ton of raw steel produced.

Background Information

The iron and steel industry is the fourth largest energy-consuming subsector in the United States, behind petroleum refining, pulp and paper, and bulk chemicals. The production of iron and steel is a batch process that involves six different steps, including: (1) ore concentration and coke production; (2) ore reduction in which ore is either sintered or pelletized; (3) ironmaking in which the ore is reduced to either pig iron in blast furnaces (which accounts for 97 percent of global iron production), or sponge iron by direct reduction processes using syngases from fossil fuels to reduce ore at temperatures below the melting point of iron (about 3 percent of current production); (4) steel making which takes place in either the basic oxygen furnace (BOF) using molten iron ores, or electric arc furnaces (EAF) using mostly scrap materials. Primary steel making using the BOF process accounts for about 57 percent of total steel production while secondary production using EAFs account for about 43 percent of steel production; (5) casting into ingots or slabs; and (6) rolling and finishing.

In 1997, there was a total of 142 operating steel plants operating in the United States, including (a) 20 integrated plants with 40 blast furnaces owned by 14 companies; and (b) 122 secondary plants (sometimes referred to as "mini-mills") with 226 electric arc furnaces owned by 85 companies. The production of molten iron ore in integrated steel making is the more energy intensive process, using more than twice the energy per ton of steel comparing to the recycling of scrap in second plants. Greenhouse gas emissions are almost entirely the result of the incomplete use of energy in the various processes described above.

The top eight producers account for 75 percent of the sales, including US Steel, Bethlehem Steel, LTV Corporation, National Steel, Inland Steel, Armco, Weirton, and Wheeling-Pittsburgh. In 1997 the industry shipped 106 million net tons of steel. Steel imports are estimated to be 30 million tons for that same year. Total employment was about 355,000 people in 1995 (based upon Annual Survey of Manufactures data for SIC categories 331 and 332).

In 1994, the latest year for which comparable data is now available, the primary energy intensity of steel making in the United States was 24.14 million Btu (MBtu) per ton of steel produced. For comparison, the 1994 energy intensity in Japan is estimated to be 19.87 MBtu per ton; in Germany, 16.90 (1993); France, 20.66; Italy, 15.19 (1992); Brazil, 26.16; Poland, 26.86 (1993); China, 34.43 (1993); and South Korea, 16.54.

The industry has made steady improvements in its overall energy efficiency. The U.S. rate of improvement in energy intensity was 1.4 percent per year in the period 1971-1994 when measured as a change in primary energy consumption per ton of raw steel produced. Other key benchmark data for the iron and steel industry is shown in Table 1 below as adapted from EIA's Annual Energy Outlook 1998 (AEO98) which references SIC categories 331 and 332. The information includes energy consumption, carbon emissions, and total greenhouse gas emissions for the years 1990, 1998 and 2010. Based upon the AEO98 forecast, total greenhouse gas emissions (measured in million metric tons of carbon equivalent, or MMTce) are expected to increase from 43 MMTce in 1990 to 49.2 MMTce in 2010.

Table 1: Benchmark Data for Selected Years

<i>Category of Information</i>	<i>1990</i>	<i>1998</i>	<i>2010 BAU</i>
Crude Steel Production (million tons)	99	112	n/a
Net Shipments (million tons)	85	117	122
Output (Billions of 1987 Dollars)	57.45	70.50	74.04
Site Energy (Trillion Btu)	1,747	1,988	1,977
Economic Energy Intensity (kBtu/\$)	30.41	28.20	26.70
Physical Energy Intensity (Site MBtu/ton)	17.64	17.75	n/a
Physical Energy Intensity (Primary MBtu/ton)	21.04	21.56	n/a
Energy Related Carbon Emissions (MMT)	42.10	48.40	48.30
Total Greenhouse Gas Emissions (MMTce)	43.00	49.20	49.20

Source: The above information has been adapted from AEO98, referencing SIC sectors 331 and 332 (except the crude steel production data which are taken from AISI; 1998 production is estimated on 1996 levels, based on an average growth rate of about 3% per year experienced between 1991 and 1996). Note that the energy and emissions referenced above do not include Coke Oven Gases, which appears to be consistent with AISI accounting for its 1990 benchmark. Adding Coke Oven Gases to the totals would increase total emissions. Further discussions with AISI will clarify this accounting framework. Physical Energy Intensity (Primary MBtu/ton) was calculated based on an average heat rate of 10,500 Btu/kWh.

Defining Technological Opportunities

A number of methods can be used to inform our collaboration with industry on possible goals, such as: (1) doubling some historical rate of energy efficiency improvement; (2) doubling the forecasted rate of energy efficiency improvement; or (3) using DOE/National Labs engineering estimates of technology-specific cost curves to estimate cost-effective energy saving investments. This section explores these alternatives by applying them to the iron and steel industry. Table 2 illustrates potential targets and emission savings using each of these methods. With each of these methods, there is some uncertainty which is discussed in more detail below.

Table 2: Alternative Goals for Iron and Steel in 2010		
Scenario	GHG Emissions (MMTce)	Emission Reductions
AEO98 Business-as-Usual Forecast	49.2	—
Two-Times a 1.4% Historical Rate of Improvement	37.0	12.2
Two-Times a 0.45% Forecasted Rate of Improvement	46.6	2.6
Technology-Specific Cost Curves	<38.7	10.5

Historically, energy intensity in the iron and steel industry has varied from year to year. Over the period from 1971 to 1994, however, energy efficiency improved at an average rate of 1.4 percent per year when measured as the number of Btus per ton of steel produced. Doubling this rate of improvement over the forecast would lead to a 25 percent overall improvement in energy efficiency in the years 1998 through 2010 relative to the business-as-usual case. This improvement in energy efficiency implies a corresponding emission reduction of 12.2 MMTce. On the other hand, doubling the forecasted rate of improvement (0.45 percent) would result in only a 5 percent overall improvement relative to the 2010 BAU forecast, with corresponding emission reductions of only 2.6 MMTce.

A number of issues arise when using energy intensity to define a stretch target. First, energy intensity can vary widely from year to year. Depending on the period of years chosen, the average annual rate for iron and steel could vary from a 2.1 percent improvement in energy efficiency in the years 1975-1990 to a 0.6 percent improvement in the years 1974-1984 (when energy prices were quite high). Second, energy intensity can be measured several ways: energy use per unit of output; energy use per dollar of output; or energy use per dollar value added. Each metric can have a different impact. For example, if measured as the amount of energy per ton of steel produced in 1975-1990, the efficiency improvements are estimated to increase by 2.1 percent annually. On the other hand, when measured as the amount of energy

per constant dollar of output, the rate of improvement is only 1.0 percent annually for that same period.

Finally, a cost-curve analysis by the Lawrence Berkeley National Laboratory (LBNL) suggests an economic potential to reduce energy consumption by 17 percent per ton of steel compared to current practice. The LBNL analysis, originally done for EPA's Atmospheric Pollution Prevention Division (APPD), suggests that a combination of structural changes (e.g., increasing the market share of the less energy-intensive EAF production from 43 to 50 percent), coupled with normal improvements in energy intensity, could easily drop GHG emissions to 10 percent below 1990 levels by 2010. Cost-effective measures to reduce emissions include simple housekeeping improvements, improved heat recovery and process controls, the use of combined heat and power (CHP) systems, better use of adjustable speed drives on fans and compressors, reduced material losses, and optimized oxygen production.

The American Iron and Steel Institute (AISI) has proposed a target of 10 percent below 1990 levels by 2010. There is a wide range of issues that need to be agreed upon as a result of the consultation process prior to entering actual industry negotiations. These are outlined below:

- ◆ What specific sub-sectors within an industry will be included in the consultations? In the case of iron and steel, does it include off-site production of coke and oxygen? Does it include blast furnace and basic steel products (SIC 331) as well as iron and steel foundries (SIC 332)? The AISI proposal data, for example, appears to be limited largely to SIC 331.
- ◆ What are the benchmark numbers for all greenhouse gases in 1990? Again, in the case of iron and steel, other gases are about 0.9 MMTCe larger than carbon emissions alone. The difference between carbon and total GHG emissions will vary widely among some industries.
- ◆ What are the industry trends, such as increasing production levels and technology changes, that will shape both the future growth in emissions and the opportunities to cost-effectively reduce those emissions?
- ◆ What other considerations may be important to a given industry that might increase the level of reductions above a cost-effective target? For instance, other productivity gains resulting from the energy efficiency investments may increase the benefits to industry such it might be able to consider additional reductions. Dematerialization is another example that may secure additional reductions. On the one hand, the industry is promoting an ultralight steel car. The goal is to reduce the amount of steel in a vehicle by up to 35 percent and still maintain and improve the structural and safety performance. At the same time, the chemical industry is promoting the use of high strength plastics as a substitute for metals. If successful, this may also reduce the amount of steel needed in a typical passenger car.

Key Economic Drivers Shaping the Industry

The iron and steel industry has undergone a significant restructuring since the early 1980s, driven both by domestic and international competition. Since that time, both total factor productivity and product quality has improved. The technologies used in the production of iron and steel will evolve in response to perhaps five different economic drivers. These include:

- ◆ *Domestic competition between primary and secondary steel producers.* The secondary producers (i.e., mini-mills), relying on scrap metal and electric arc furnaces, now hold about 43 percent of market share. This compares to a 4 percent share in 1986. The shift to secondary production is expected to rise to more than 50 percent by 2010.
- ◆ *International competition, particularly where the U.S. dollar is valued higher relative to other currencies.*
- ◆ *Changes in levels and patterns of demand.* A major example of this potential shift is competition from the aluminum and chemical industries which are seeking to provide a greater share of structural components as substitutes for steel products.
- ◆ *Changes in the relative price for energy, capital, labor and scrap materials.* Integrated mills, for instance, are roughly twice as intensive as secondary mills. Hence, a rise in capital costs may favor secondary producers. On the other hand, a drop in coal costs and changes in technologies which allow primary producers to bypass the coking process may tend to favor integrated mills.
- ◆ *Environmental concerns.* These will continue to push both segments of the industry to develop new technologies. For example, coke dry quenching (using an inert gas instead of water to cool the newly-formed coke) is more often used as an environmental control technology to reduce dust emissions. But it also has energy savings benefits provided the added capital costs and operating expenses can be justified by the savings and/or benefits to the society.

A Summary of Technologies Which Can Reduce GHG Emissions:

Near term and/or cost-effective measures: Examples of cost-effective measures for integrated mills (including casting and rolling) include injection of natural gas into the blast furnace, improved maintenance procedures, hot blast stove automation, improved blast furnace control systems, energy monitoring and management systems, combined heat and power, variable speed drives on combustion air fans, efficient ladle preheating, thin slab casting, and optimized oxygen production. An LBNL cost-curve analysis of integrated steel mills done for APPD suggests an economic potential to reduce current U.S. primary steel making energy consumption by 17 percent. Further LBNL analysis suggests that assuming constant crude steel production of about 100 million tons, carbon emissions from energy

consumption could drop to 10 percent below 1990 levels by 2010 through structural changes alone (e.g., increasing EAF and mini-mill market share from 43 to 50 percent). Additional carbon reductions are possible based on extending the business-as-usual trends in energy efficiency improvement.

Midterm measures not quite cost-effective: Examples of measures for integrated mills that reduce energy use and carbon emissions but that are not currently cost-effective include basic oxygen furnace gas and sensible heat recovery, coke dry quenching, and hot charging (or preheating steel slabs before they enter the rolling mills).

Program Opportunities:

DOE Industries of the Future, Climate Wise, Energy Star, NICE-3, Motor Challenge, Air Compressor Challenge, Advanced Turbines Systems, Industrial Assessment Centers, among others. (See the program inventory of agency programs for further details.)

Sources or Contacts:

American Iron and Steel Institute (AISI), 1101 17th Street NW, Suite 1300, Washington, D.C. 20036-4700. Telephone: (202) 452-7100; Fax: (202) 463-6573.

Steel Manufacturers Association (SMA), 1730 Rhode Island Avenue, NW Suite 907, Washington, DC 20036-3101. Telephone: (202) 296-1515; Fax: (202) 296-2506.

Specialty Steel Industry of North America (SSINA), 3050 K Street, N.W., Washington, DC 20007. Telephone: (202) 342-8630; Fax: (202) 338-5534.

U. S. Department of Energy, Office of Industrial Technologies (OIT), Room 5F-065, EE-20, 1000 Independence Ave., SW, Washington, D.C. 20585. Scott Richlen, Steel: (202) 586-2078; Fax: (202) 586-9234.

EPA Energy Star Program, Atmospheric Pollution Prevention Division, 401 M Street NW, MS 6202-J, Washington, D.C. 20460. Virginia Gorsevski, Steel: (202) 564-9796; Fax: (202) 565-2254.

EPA Climate Wise Program, OPPE, 401 M Street NW, Washington, D.C. 20460. Pam Herman-Milmoe: (202) 260-4407; Fax: (202) 260-0572.

Department of Commerce, Room 4043 HCHB, Washington, D.C. 20230. Nazir Bhagat: (202) 482-3855.

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Industry by Industry

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NATIONAL ENVIRONMENTAL TRUST

1200 Eighteenth Street, NW, Fifth Floor

Washington, DC 20036

202-887-8800 • 887-8877 fax

Memorandum

To: Todd Stern
From: Phil Clapp
c/o George Abar @ 887-8800
Re: CO2 reductions through comparability
Date: March 24, 1998

Attached is a memo Phil Clapp asked me to forward to you. It discusses the issue of "comparability" in the utility sector.

LEVELING THE POWER PLANT ENVIRONMENTAL PLAYING FIELD AS A NATIONAL CO2 REDUCTION STRATEGY

Clean Air Task Force
March 1998

Background

- Due to the structure of the 1970 Clean Air Act and subsequent amendments, new power plants are required to meet significantly stricter air emissions standards for NOx and Sox than older plants.
- This "grandfathering" was in significant due in part to the belief that power plants would retire within 25-30 years of their commissioning; for a variety of reasons, this has not occurred.
- As a result, pre-1977 coal units -producing more than half of total US electric generation - will be allowed to emit NOx and Sox at 4-10 times the rate of *new coal plants*, even after full implementation of the 1990 Clean Air Act Amendments.
- Environmental groups as well as new competitors have argued that the law should be revised to require *all* competitors to meet at least the same NOx and Sox emissions rate as a new coal plant, to decrease pollutants, and to level the playing field in coming electric competition. This concept has been called "environmental comparability." At least two bills in Congress have been introduced that would have this effect.

Impact on CO2

- In addition to reducing power sector NOx and Sox emissions by 75-80% from projected 2000 levels, environmental comparability would also likely substantially reduce power sector CO2.
- The CO2 reduction effect stems from the fact that a substantial fraction of the coal fleet, faced with increased NOx and Sox control costs in a competitive environment, would find it uneconomic to continue to operate and would instead retire. The most economic replacement would be new combined cycle gas turbines, which emit 1/3 to 1/4 of the CO2 per unit of electricity as older coal units.

- The attached visual shows the estimated carbon reduction goal required from the US under the Kyoto protocol, assuming that this goal is a 7% carbon reduction from 1990 levels.¹
- In addition, the visual shows the carbon reductions resulting from coal retirements due to environmental comparability under two scenarios: wholesale generation market prices at 3 cents/kwh in 2010, and generation market prices at 2.75 cents/kwh in 2010. Other things being equal, lower market prices will accelerate coal retirements, as replacements are by definition cheaper. In the 3 cent case, about 30% of the existing coal fleet is estimated to retire; in the 2.75 cent case, about 40% of the coal fleet is estimated to retire.
- In addition, the final bar shows the carbon reductions resulting from converting the *entire* coal, oil and gas fleet to natural gas.

Conclusion

- Under credible assumptions, *we believe that between one fourth and one third of the US Kyoto commitment on carbon reduction could likely be met simply by a policy to require all US power plants to meet at least the NOx and Sox emission standard of a new coal plant - "environmental comparability."*
- This analysis may be conservative, since it reflects not only an assumption of a total carbon reduction of 7%, but also because it may assume a larger required decrease in total tons for the US economy by 2010 to reach the Kyoto target than would be the case if the environmental comparability-driven power sector reductions were incorporated into the 2010 "business as usual" carbon projection.

¹In fact, the US carbon reduction may be somewhat less, because of the Kyoto formula, which reflects contributions from other greenhouse gas reductions. Thus, this analysis may understate environmental comparability's relative contribution to the Kyoto goal.

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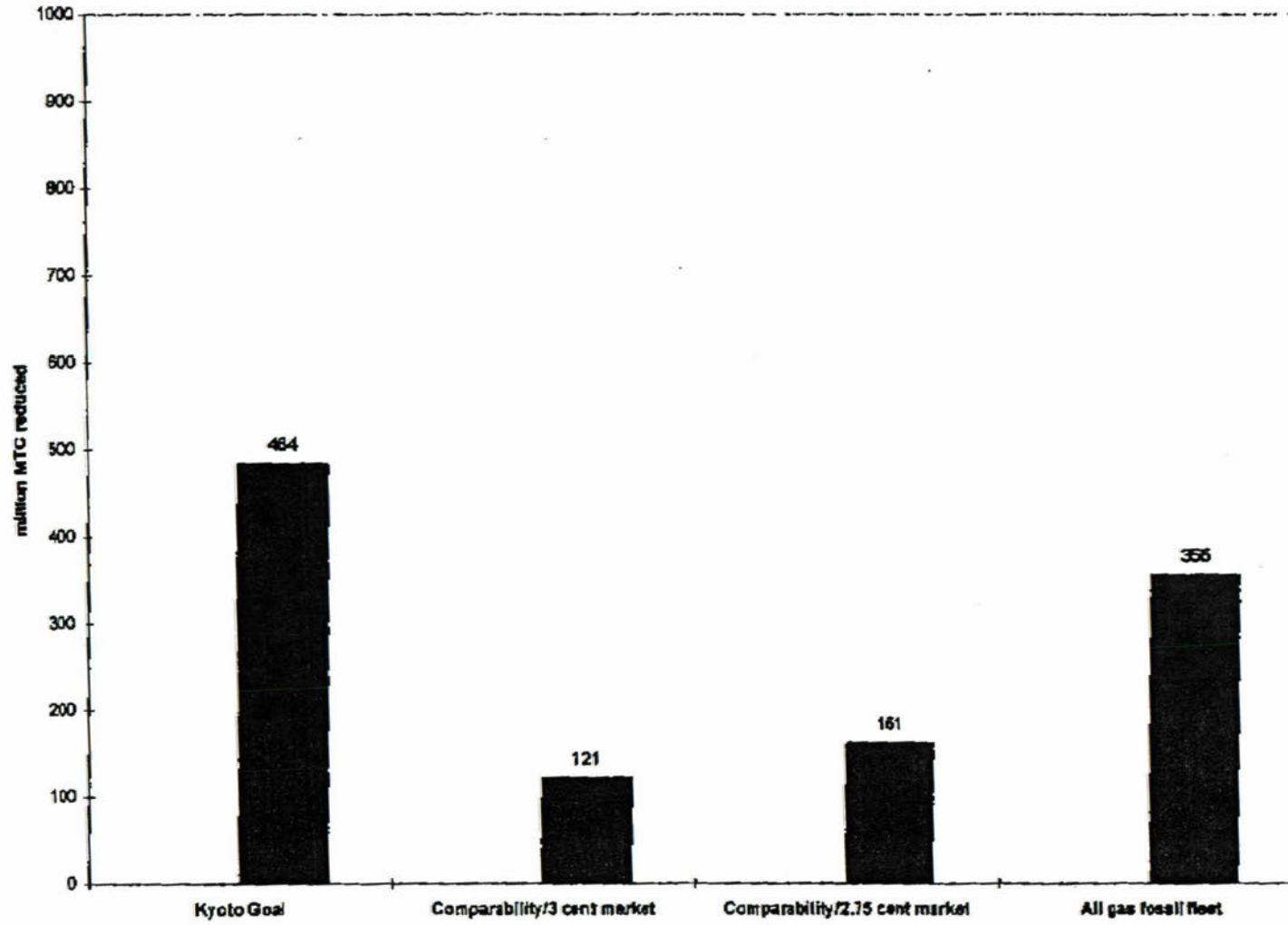
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Carbon Reductions from Environmental Comparability and Gas Conversion of the Fleet



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Industry



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White House Climate Change Task Force

734 Jackson Place, N.W. • Washington, DC 20503

FAX

To: Jonathan Todd

Organization/Title:

Fax: 456-2215

Phone:

Pages (including cover):

Date: 1-20-98

From: Mary

Phone:

Message: Attached are remarks by the Vice President of General Motors and a press release addressing global Warming concerns.

**GENERAL MOTORS CORPORATION**

General Motors Building, Detroit, Michigan 48202

NEWS

For Release Immediately, Tuesday, January 13, 1998 **Contact:** Greg Elliott
(313) 556-3214

**GENERAL MOTORS VICE CHAIRMAN ADVOCATES
BALANCED APPROACH TO OUR SHARED ENVIRONMENT**

DETROIT — Last night in a keynote speech to the 1998 *Automotive News* World Congress, General Motors Vice Chairman Harry Pearce called upon environmental and industry leaders to seek innovative solutions to address global-warming concerns that balance both environmental and economic interests.

Pearce acknowledged that while the debate continues within the scientific community on the global-warming issue, General Motors has concluded that there is enough data on global warming to have cause for concern and that the company accepts certain responsibilities with respect to its products and manufacturing processes. Pearce, however, cautioned leaders from overreacting to these concerns.

"We know people care deeply about the environment ... and are willing to make personal financial sacrifices to protect our shared environment," Pearce said. "Unfortunately, if we act precipitously, the economic costs could go well beyond most people's ability to pay, regardless of their commitment to the environment."

Pearce stressed that the effort to reduce emissions levels is more likely to succeed when driven by innovation, not regulation, but that the government can and should play a significant role in enabling the framework for the market to succeed

"Government can serve as a catalyst providing leadership and incentives, educating the public, creating rational tax and regulatory policies and supporting long-term research efforts," Pearce said. "In the end, however, corporate responsibility and resolve, not government regulations, will find the answers needed to protect the environment, and, in the process, business will prosper for having done so."

- more -

- 2 -

Underscoring his point, Pearce referred to General Motors' announcement last week at the North American International Auto Show that the company would have a production-ready hybrid by 2001 and a production ready fuel-cell vehicle by 2004.

"We do not believe that meeting market demand and protecting the environment are mutually exclusive goals," Pearce said. "As our chairman, Jack Smith, has often said, 'environmental success is critical to business success.'"

Pearce also pointed to the improvements the automotive industry has made in the last 25 years in increasing fuel-efficiency and reducing emissions.

"Fuel efficiency for GM cars has gone from an average 12 miles per gallon in 1974 to an expected 28 miles per gallon in 1997, while emissions have dropped a remarkable 96 percent for hydro-carbon and carbon monoxide and 90 percent for nitrogen oxides," said Pearce. "Fuel efficiency for GM trucks has gone from 11 miles per gallon in 1974 to an expected 20 miles per gallon in 1997, while emissions have dropped by 96 percent for hydro-carbon and carbon monoxide and 81 percent for nitrogen oxides."

According to Pearce, General Motors' new full-size pickups, the Chevy Silverado and GMC Sierra, along with their full-size sport utility derivatives are equipped with a more powerful engine, but also offer improved fuel economy and lower emissions than its predecessors'.

Technology, Pearce noted, can do much more than create new products. It also can create cleaner and more energy-efficient processes as well, from recycling to resource conservation.

"As a company, General Motors is committed to environmental leadership around the world in the development of our products and the operations of our facilities, and we will continue to use our unique talents and our international scope to promote global sustainable development."

However, Pearce commented that General Motors can't do it alone. Referring to the recent Kyoto environmental agreement, Pearce pointed out that the chasm that separates developed and developing nations on global warming is wide and very difficult to cross.

"By the end of the next century, the developing nations will account for 75 percent of all greenhouse gas emissions, and while we applaud the sincere efforts ... to find common ground, we remain committed to the principle that climate change is a global problem that demands a global solution."

- more -

- 3 -

Pearce concluded his remarks with a call to industry leaders to protect both the environmental and economic futures of the planet and future generations to come.

"If we act wisely and decisively, the shining blue marble that brought tears to the eyes of our first astronauts won't lose its luster nor will its inhabitants lose their dreams for healthy and prosperous lives. At General Motors, we believe that is a legacy worth leaving."

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Transcripts of the speech are available upon request.

General Motors Vice Chairman, Harry Pearce

1998 Automotive News World Congress Speech

THANK YOU, KEITH, FOR THOSE KIND WORDS. AS THE HOLIDAY SEASON ENDS AND WE COMMENCE A NEW YEAR, I AM HONORED TO BE HERE TONIGHT TO PARTICIPATE IN WHAT HAS BECOME ONE OF OUR INDUSTRY'S MOST IMPORTANT GATHERINGS.

MANY OF YOU PROBABLY TOURED THE AUTO SHOW LAST WEEK. I CERTAINLY HOPE SO. IT'S A GREAT OPPORTUNITY TO SEE NOT ONLY TODAY'S AUTOMOTIVE TECHNOLOGY AND DESIGN, BUT THE "WORLD OF EXCITING IDEAS" THAT WILL TAKE US INTO THE NEXT CENTURY.

WHAT I'D LIKE TO TALK TO YOU ABOUT TONIGHT IS ONE OF THE CRITICAL DETERMINANTS OF OUR INDUSTRY'S FUTURE IN THAT NEXT CENTURY -- THE ENVIRONMENT.

BUT BEFORE I DO, I'D LIKE TO TAKE YOU BACK TO THE PAST FOR JUST A MOMENT. BACK TO ANOTHER HOLIDAY SEASON ALMOST 30 YEARS AGO -- CHRISTMAS, 1968, WHEN THE WORLD, AS WE KNEW IT, CHANGED FOREVER.

HUMANS, FOR THE FIRST TIME, SAW THE EARTH FROM THE VISTA OF THE MOON, AS THE ASTRONAUTS OF APOLLO 8 MADE THEIR HISTORIC ORBIT OF THAT DISTANT SATELLITE. LOOKING AT THE EARTH THROUGH THEIR EYES, WE SAW OUR WORLD AS A SHIMMERING BLUE MARBLE SHINING IN THE VAST DARKNESS OF SPACE -- BEAUTIFUL AND PRISTINE FROM 240,000 MILES AWAY -- PROTECTED ONLY BY ITS SEEMINGLY FRAGILE ATMOSPHERE.

BUT THIS ISN'T THE FIRST TIME THAT WE'VE BEEN CHALLENGED TO CHANGE THE WAY WE VIEW OURSELVES AND THE UNIVERSE IN WHICH WE LIVE.

WHEN COPERNICUS ASSERTED IN 1514 THAT THE EARTH WAS NOT THE CENTER OF THE UNIVERSE, HE SPARKED A REVOLUTION. INQUISITIVE SCIENTISTS OF THE TIME STORMED THE INTELLECTUAL BARRICADES OF CONVENTIONAL THINKING AND SET ABOUT EXPLAINING THE WORLD AROUND THEM BY OBSERVATION AND EXPERIMENTATION.

IN ESSENCE, THAT'S WHAT WE'RE TRYING TO DO TODAY AS SCIENTISTS STRIVE IN NEW WAYS TO UNDERSTAND THE COMPLEX ISSUE OF GLOBAL CLIMATE WHICH IS RAPIDLY BECOMING ONE OF THE GREAT CONTROVERSIES IN HUMAN HISTORY. UNLIKE THE OUTCOME OF EARLIER DEBATES, HOWEVER, THIS TIME THE WORLD MAY FACE POSSIBLE CATASTROPHIC CONSEQUENCES THAT KNOW NO BORDERS; AND, FOR THOSE OF US IN THIS ROOM, THE

CONCLUSION OF THIS DEBATE MAY HAVE A DRAMATIC AND FAR-REACHING IMPACT ON OUR INDUSTRY.

SO WHAT DO THE SCIENTISTS BELIEVE TODAY? THAT DEPENDS ON THE SCIENTIST.

ONE GROUP OF INTERNATIONAL EXPERTS ARGUES THAT INCREASING LEVELS OF CARBON DIOXIDE AND OTHER GREENHOUSE GASES ARE INCREASING THE TEMPERATURE OF THE EARTH, AND THAT THESE HIGHER GREENHOUSE GAS LEVELS ARE LINKED TO HUMAN ACTIVITY. WITHOUT A SIGNIFICANT REDUCTION IN THOSE LEVELS, THEY SAY, GREENHOUSE GASES FROM HUMAN ACTIVITIES COULD CREATE RISKS THE ECOSYSTEM CAN'T HANDLE, LEAVING THE EARTH TO FACE A CATAclysmic FUTURE.

ANOTHER GROUP OF EQUALLY PROMINENT SCIENTISTS, HOWEVER, COUNTERS THAT THERE IS SIMPLY NOT ENOUGH EVIDENCE, NOR IS COMPUTER MODELING OF GLOBAL CLIMATE SUFFICIENTLY ACCURATE TO DRAW THIS CONCLUSION. THEY ARGUE THAT WE MAY WELL BE SEEING NOTHING MORE THAN A NATURAL CYCLICAL WARMING, THAT WILL PASS AS OTHER CYCLES HAVE DONE FOR MILLIONS OF YEARS, AND THEY WARN THAT OVERREACTION, RISKS AN EVEN MORE CATASTROPHIC OUTCOME.

THE GREAT PHILOSOPHER, YOGI BERRA, ONCE SAID, "WHAT GETS US INTO TROUBLE IS NOT WHAT WE DON'T KNOW, IT'S WHAT WE KNOW FOR SURE THAT JUST AIN'T SO." LISTEN FOR A MOMENT TO A LITTLE OF THE DEBATE, AND YOU GET AN IDEA OF WHAT YOGI MEANT.

FIRST, HENRY KENDALL, CHAIRMAN OF THE UNION OF CONCERNED SCIENTISTS: "THE THREAT OF GLOBAL WARMING IS REAL AND ACTION IS NEEDED IMMEDIATELY. THERE IS NOW A DISCERNIBLE HUMAN INFLUENCE ON GLOBAL CLIMATE."

DR. JOHN CHRISTY, OF THE UNIVERSITY OF ALABAMA'S DEPARTMENT OF ATMOSPHERIC SCIENCE: "THE SATELLITE AND BALLOON DATA SHOW THAT CATASTROPHIC WARMING IS NOT NOW OCCURRING."

DR. JOHN HOLDREN, HARVARD PROFESSOR, " . . . THERE IS NO UNCERTAINTY AT ALL THAT HUMANS HAVE SIGNIFICANTLY ALTERED THE GLOBAL ATMOSPHERIC CONCENTRATIONS OF GASES WE KNOW TO BE CRITICAL IN CONTROLLING CLIMATE."

FRED SINGER, PRESIDENT OF THE SCIENCE & ENVIRONMENTAL POLICY PROJECT, AND FORMER DIRECTOR OF THE U.S. WEATHER SATELLITE SERVICE: "ALMOST ALL OF THE HALF-DEGREE CELSIUS WARMING OVER THE LAST CENTURY ACTUALLY OCCURRED BEFORE 1940, BEFORE ENERGY USE ADDED APPRECIABLE CO2 TO THE ATMOSPHERE."

AND NO SURPRISE, VARIOUS PUNDITS HAVE JOINED THE FRAY, BLAMING A GRAND VARIETY OF NATURAL DISASTERS ON GLOBAL WARMING, YET, 72% OF STATE CLIMATOLOGISTS IN A RECENT SURVEY SAID THAT WEATHER EVENTS IN THEIR STATES HAVE NOT BEEN MORE SEVERE OR FREQUENT OVER THE PAST 25 YEARS.

IT'S NO WONDER LAY PEOPLE TUNE OUT THE TECHNICAL, AND NOW POLITICAL, DEBATE IN UTTER FRUSTRATION.

HOWEVER, WE KNOW PEOPLE AROUND THE WORLD CARE DEEPLY ABOUT THE ENVIRONMENT. RESEARCH HAS CONSISTENTLY SHOWN AMERICANS, GERMANS, JAPANESE, AND OTHER NATIONALITIES AROUND THE GLOBE WILLING TO MAKE PERSONAL FINANCIAL SACRIFICES TO PROTECT OUR SHARED ENVIRONMENT.

UNFORTUNATELY, IF WE ACT PRECIPITOUSLY, THE ECONOMIC COSTS COULD GO WELL BEYOND MOST PEOPLE'S ABILITY TO PAY, REGARDLESS OF THEIR COMMITMENT TO THE ENVIRONMENT. ONE LEADING U.S. FORECASTING FIRM SAID THE BINDING EMISSION TARGETS, ORIGINALLY PROPOSED BY PRESIDENT CLINTON, COULD RESULT IN A \$90 - \$350 BILLION LOSS IN GROSS DOMESTIC PRODUCT; RAISE GASOLINE PRICES BY 50 CENTS A GALLON; SIGNIFICANTLY INCREASE ELECTRICITY RATES AND COST 7% OF THE JOBS IN THE AUTO INDUSTRY ALONE. THE CURRENT TOUGHER AGREEMENT NEGOTIATED IN KYOTO COULD WELL IMPOSE EVEN HIGHER COSTS.

PROTECTING OUR ENVIRONMENT TAKES ON NEW MEANING WHEN YOU'RE STANDING IN THE UNEMPLOYMENT LINE, BUT THE POLITICAL REALITY IS THAT IMPOSING SIGNIFICANTLY HIGHER ENERGY TAXES TO CAUSE PEOPLE TO CHANGE THEIR WAYS IS ABOUT AS LIKELY TO HAPPEN AS CONGRESS UNANIMOUSLY IMPOSING TERM LIMITS.

SO, WHAT ARE GOVERNMENTS LIKELY TO DO AND WHEN ARE THEY GOING TO DO IT?

IN BETWEEN THE POLITICAL POSTURING AND THE EMOTIONAL RHETORIC LAST MONTH, THE KYOTO NEGOTIATIONS GAVE US SOME OF THE ANSWERS. BUT WE ALSO SAW JUST HOW DIFFICULT IT IS TO BALANCE UNCERTAIN SCIENCE AND ECONOMIC REALITIES. AND WE SAW THE VAST DIFFERENCE OF VIEWS AMONG VARIOUS CONSTITUENCIES. ONE REPORTER SAID BUSINESS REPRESENTATIVES AT THE CONFERENCE WERE ABOUT AS POPULAR AS "ALLIGATORS IN A KIDDIE POOL."

UNFORTUNATELY, TOO MANY INTEREST GROUPS MISUNDERSTAND WHAT BUSINESS IS REALLY SAYING TODAY. CLEARLY, WE NEED TO DO A BETTER JOB EXPLAINING OUR VIEWS ON THIS COMPLEX ISSUE.

DESPITE UNCERTAINTY ABOUT GLOBAL CLIMATE SCIENCE, GENERAL MOTORS HAS CONCLUDED THAT THERE IS ENOUGH EVIDENCE LINKING GLOBAL CLIMATE CHANGE TO MAN-MADE GREENHOUSE GASES, TO HAVE CAUSE FOR CONCERN, AND WE'VE SAID SO. AND HAVING SAID SO, WE ACCEPT CERTAIN RESPONSIBILITIES WITH RESPECT TO OUR PRODUCTS AND MANUFACTURING PROCESSES.

AS A COMPANY, WE ARE COMMITTED TO ENVIRONMENTAL LEADERSHIP AROUND THE WORLD IN THE DEVELOPMENT OF OUR PRODUCTS AND THE OPERATIONS OF OUR FACILITIES, AND WE WILL CONTINUE TO USE OUR UNIQUE TALENTS AND OUR INTERNATIONAL SCOPE TO PROMOTE GLOBAL SUSTAINABLE DEVELOPMENT. WE PART COMPANY, HOWEVER, WITH THOSE WHO BELIEVE THAT RIGID, BINDING GOVERNMENT-IMPOSED TARGETS ARE THE ANSWER.

WE'VE LEARNED THAT TECHNOLOGICAL INNOVATION DOESN'T PUNCH A TIME CLOCK. THE KYOTO AGREEMENT FAILS TO INCORPORATE THE FLEXIBILITY WE MUST HAVE, TO MEET THE MUCH LOWER EMISSIONS LEVELS IT REQUIRES, WITHOUT SEVERE ECONOMIC DISRUPTION TO SOCIETY.

WE ALSO SAW IN KYOTO THAT THE CHASM WHICH SEPARATES DEVELOPED AND DEVELOPING NATIONS ON THIS ISSUE IS WIDE AND VERY DIFFICULT TO CROSS. BY THE END OF THE NEXT CENTURY, THE DEVELOPING NATIONS WILL ACCOUNT FOR 75% OF ALL GREENHOUSE GAS EMISSIONS, AND WHILE WE APPLAUD THE SINCERE EFFORTS OF THE DELEGATES TO FIND COMMON GROUND, WE REMAIN COMMITTED TO THE PRINCIPLE THAT CLIMATE CHANGE IS A GLOBAL PROBLEM THAT DEMANDS A GLOBAL SOLUTION.

PROTECTING THE ENVIRONMENT IS A SHARED RESPONSIBILITY, AND NO AGREEMENT CAN SUCCEED IN SUBSTANTIALLY REDUCING EMISSIONS WITHOUT THE COMMITMENT OF THE DEVELOPING WORLD.

CLEARLY, THE KYOTO AGREEMENT, IN ITS PRESENT FORM, DOES NOT FULLY ADHERE TO THE PRINCIPLES LAID OUT BY PRESIDENT CLINTON'S OWN ADVISORS ON CLIMATE CHANGE. THE PRESIDENT'S COUNCIL ON SUSTAINABLE DEVELOPMENT CALLED FOR A "GLOBAL RESPONSE" THAT IS "FAIR" AND "FLEXIBLE."

YET, KYOTO, FOR ALL ITS FAILINGS, IS, NEVERTHELESS, ANOTHER STEP ON A LONG JOURNEY TOWARD A SAFER, CLEANER ENVIRONMENT. ADLAI STEVENSON DESCRIBED IT THIS WAY, "WE TRAVEL TOGETHER, PASSENGERS ON A LITTLE SPACESHIP, DEPENDENT ON ITS VULNERABLE RESERVES OF AIR AND SOIL; ALL COMMITTED FOR OUR SAFETY, TO ITS SECURITY AND PEACE; PRESERVED FROM ANNIHILATION ONLY BY THE CARE, THE WORK, AND THE LOVE WE GIVE OUR FRAGILE CRAFT."

WE MUST MOVE FORWARD BOLDLY BUT SENSIBLY AS WE GUIDE OUR SHIP, UNDERSTANDING THAT ENVIRONMENTAL PROTECTION MUST NOT THREATEN INTERNATIONAL ECONOMIC PROSPERITY. YET, WE MUST ALSO UNDERSTAND THAT PROTECTING THE ENVIRONMENT THROUGH SUSTAINABLE DEVELOPMENT COMES AT A COST. TODAY, SOME OF THE BEST SELLING VEHICLES IN AMERICA ARE THOSE WITH LARGE ENGINES AND LESS FUEL EFFICIENCY WHILE THE U.S., WITH ONLY 5% OF THE WORLD'S POPULATION, ACCOUNTS FOR 22% OF THE INDUSTRIAL EMISSIONS OF GREENHOUSE GASES. LARGER, HIGHER MASS VEHICLES AND LOW ENERGY PRICES SEEM TO BEST MEET THE DEMANDS OF THE CURRENT MARKET, BUT THEY ALSO CONFLICT WITH THE MARKET'S DEMAND FOR WHAT WE MIGHT CALL "ENVIRONMENTAL CORRECTNESS."

GM'S CHALLENGE IS TO MEET BOTH DEMANDS. OUR NEW FULL-SIZE PICKUPS, THE CHEVY SILVERADO AND GMC SIERRA, ALONG WITH THEIR FULL-SIZE SPORT UTILITY DERIVATIVES, WILL MAKE UP MORE THAN 1.2 MILLION UNITS A YEAR. THEY ARE EQUIPPED WITH A MORE POWERFUL ENGINE, WHICH CUSTOMERS WANT, BUT ALSO OFFER IMPROVED FUEL ECONOMY AND LOWER EMISSIONS THAN THEIR PREDECESSORS. IN FACT, THEY'RE EXPECTED TO OFFER THE BEST FUEL ECONOMY IN THE MARKET SEGMENT.

GOVERNMENT CANNOT AND SHOULD NOT DICTATE THE MARKET DESPITE CONSUMERS' OBVIOUS INCONSISTENCIES EVEN IN THE NAME OF ENVIRONMENTALISM. OUR JOB IS TO SATISFY THE CUSTOMER. GOVERNMENT HAS A DIFFERENT JOB. IT MUST PROVIDE THE ENABLING FRAMEWORK FOR THE MARKET TO SUCCEED. IT CAN SERVE AS A CATALYST PROVIDING LEADERSHIP AND FINANCIAL INCENTIVES, EDUCATING THE PUBLIC IN A BALANCED WAY, CREATING RATIONAL, MARKET-BASED TAX AND REGULATORY POLICIES AND SUPPORTING LONG-TERM, TECHNOLOGY RESEARCH.

IN THE END, HOWEVER, CORPORATE RESPONSIBILITY AND INNOVATION, NOT GOVERNMENT REGULATIONS, WILL FIND THE ANSWERS NEEDED TO PROTECT THE ENVIRONMENT, AND, IN THE PROCESS, BUSINESS WILL PROSPER FOR HAVING DONE SO. WE DO NOT BELIEVE THAT MEETING MARKET DEMAND AND PROTECTING THE ENVIRONMENT ARE MUTUALLY EXCLUSIVE GOALS. INDEED THEY CAN BE VERY SYNERGISTIC AS OUR NEW TRUCK/SPORT UTILITY PROGRAM ILLUSTRATES. ENERGY USAGE IS A COST FOR INDUSTRY AND A COST FOR CONSUMERS OF OUR PRODUCTS AND SERVICES. BECOMING MORE ENERGY EFFICIENT IN OUR MANUFACTURING PROCESSES, AND FINAL PRODUCTS AND SERVICES DELIVERED, REDUCES MANUFACTURING COST, AND CUSTOMERS' PRODUCT USAGE COSTS.

AS OUR CHAIRMAN JACK SMITH HAS OFTEN SAID, "ENVIRONMENTAL SUCCESS IS CRITICAL TO BUSINESS SUCCESS." THE ENVIRONMENTAL ETHIC HAS

BECOME AN INTEGRAL PART OF BUSINESS STRATEGY TODAY STRETCHING ACROSS INDUSTRIES AND BEYOND NATIONAL BORDERS.

WHETHER IT IS BRITISH PETROLEUM FUNDING RESEARCH TO PROTECT THE CLIMATE OR U.S. SUGAR CLEANING UP THE EVERGLADES, OR MANY OF OUR COLLEAGUES WITHIN THIS INDUSTRY USING TECHNOLOGY TO CREATE CLEANER, MORE FUEL EFFICIENT TRANSPORTATION, BUSINESS IS COMING TO REALIZE THAT WE ARE ALL GLOBAL CITIZENS WITH GLOBAL RESPONSIBILITIES. AND INDEED MEETING THOSE RESPONSIBILITIES CAN DELIVER COMPETITIVE ADVANTAGES IN THE MARKETPLACE.

BECAUSE OF ITS CONNECTIONS TO SO MANY INDUSTRIES, THE RANGE OF ITS TECHNICAL CAPABILITIES, ITS GLOBAL REACH, AND THE NATURE OF ITS PRODUCTS, THE AUTOMOTIVE INDUSTRY HAS A SPECIAL RESPONSIBILITY TO SERVE AS ENVIRONMENTAL STEWARDS, PARTICULARLY IN DEVELOPING COUNTRIES WHERE OUR MANUFACTURING FOOTPRINT IS BECOMING INCREASINGLY BROAD. TECHNOLOGY CAN GIVE THESE DEVELOPING COUNTRIES ENVIRONMENTAL OPTIONS THEY NEED, AND CAN HELP BRIDGE THE CHASM I SPOKE OF EARLIER -- RAISING THEIR STANDARDS OF LIVING, WITHOUT LOWERING OURS.

EVEN IF SCIENCE ULTIMATELY LEARNS GLOBAL WARMING IS JUST A NORMAL CYCLICAL PHENOMENON, FOR GLOBAL CITIZENS OF A PLANET SO DEPENDENT ON NON-RENEWABLE RESOURCES, SAVING FUEL IS NEVER A BAD IDEA, NOR IS REDUCING EMISSIONS.

SO GENERAL MOTORS HAS EMBRACED WHAT WE CALL THE GM ENVIRONMENTAL PRINCIPLES. THESE PRINCIPLES GOVERN BOTH PRODUCT AND PROCESS PROVIDING GUIDANCE TO GM PERSONNEL IN OUR FACILITIES THROUGHOUT THE WORLD. NOTHING IS MORE IMPORTANT TO OUR PRODUCT AND FACILITY ENVIRONMENTAL PROFESSIONALS, THAN ENSURING THESE PRINCIPLES ARE IMPLEMENTED.

GM IS COMMITTED TO A STRATEGY OF ENVIRONMENTALLY COMPATIBLE PRODUCT DEVELOPMENT WHEREVER WE OPERATE --WORLDWIDE. THIS MEANS BUILDING MORE FUEL EFFICIENT, LOW EMISSION VEHICLES TODAY, AND COMMITTING THE RESOURCES TO CREATE A PORTFOLIO OF ADVANCED PROPULSION OPTIONS FOR TOMORROW. YOU SAW SOME OF THE RESULTS AT COBO CENTER -- THE FIRST PROGENY OF THE EV1 -- THE WORLD'S MOST ADVANCED VEHICLE PLATFORM AND THE WORLD'S MOST ENERGY EFFICIENT PRODUCTION VEHICLE.

LET'S TAKE A QUICK LOOK AT THESE EXCITING NEW GENERATION DEVELOPMENT VEHICLES:

FIRST -- A 4-PASSENGER -- PARALLEL HYBRID -- ELECTRONICALLY COUPLING A DIRECT INJECTION TURBO DIESEL ENGINE POWERING THE REAR WHEELS, WITH AN EV1 DERIVED ELECTRIC PROPULSION SYSTEM POWERING THE FRONT WHEELS, GIVING THIS HYBRID ITS MULTI-MODE CAPABILITY AND A HIGHWAY FUEL ECONOMY OF AN AMAZING 80 MPG, AND THERE IS NO COMPROMISE OF PERFORMANCE --

0 TO 60 MPH IN 7 SECONDS. WE'LL BE INVITING THE AUTOMOTIVE PRESS TO DRIVE THIS VEHICLE AT OUR PROVING GROUNDS LATER THIS YEAR.

SECOND -- A 4-PASSENGER SERIES HYBRID USING THE WORLD'S MOST EFFICIENT 40 KW MICRO GAS TURBINE ALTERNATOR, CHARGING A NICKEL METAL HYDRIDE BATTERY PACK POWERING AN EV1 ELECTRIC PROPULSION SYSTEM -- I'VE ALREADY DRIVEN THIS VEHICLE AT OUR TEST TRACK IN WARREN. IT DELIVERS:

- A 350-MILE HYBRID RANGE, INCLUDING A 40-MILE ZERO EMISSION RANGE, 60 MPG FUEL ECONOMY AND 100 MPG EFFECTIVE FUEL ECONOMY WITH HOME RECHARGE, IT ACCELERATES 0-60 IN 9 SECONDS, AND WHEN FUELED BY CNG, IS 1/10 ULEV IN EMISSIONS.

THIRD -- A 4-PASSENGER FUEL CELL ELECTRIC VEHICLE -- USING THE EV1 PROPULSION SYSTEM POWERED BY A METHANOL FUEL CELL, THE RESULT OF SPACE AGE TECHNOLOGY, AND EXPECTED TO REACH 80 MILES PER GALLON FUEL ECONOMY.

FOURTH -- THE EV1 CNG, POWERED BY A 1-LITER, 3-CYLINDER TURBOCHARGED ENGINE FUELED BY COMPRESSED NATURAL GAS DELIVERING A 400-MILE RANGE, 1/10 ULEV EMISSIONS, AND 0 TO 60 PERFORMANCE OF 11 SECONDS.

AND FINALLY, A ZERO EMISSIONS PRODUCTION EV1, EQUIPPED WITH THE NEW GM OVONIC NICKEL METAL HYDRIDE BATTERY DELIVERING A RANGE OF 160 MILES. YOU'LL BE ABLE TO LEASE THIS VEHICLE AT SELECTED SATURN DEALERS LATER THIS YEAR IN CALIFORNIA AND ARIZONA.

I FEEL A LITTLE LIKE A PROUD FATHER WHO BRAGS ABOUT THE NEWEST OFFSPRING WHEN SOMEONE ELSE DID ALL THE HARD LABOR, BUT AT GM WE ARE PROUD OF THESE TECHNOLOGICAL ADVANCES. THE FUEL EFFICIENCIES AND EMISSIONS OF THESE VEHICLES WHEN COMBINED WITH CLEAN FUELS ARE IMPRESSIVE; AND, WE BELIEVE, ARE SECOND TO NONE; BUT THESE DESIGN AND ENGINEERING ACHIEVEMENTS DIDN'T HAPPEN OVERNIGHT -- THEY WERE YEARS IN THE MAKING. NOR WAS THE CREATIVITY BEHIND THEM THE RESULT OF ARBITRARY GOVERNMENT TIMETABLES. WE ARE NOT ALONE IN THESE EFFORTS. OUR COMPETITORS HAVE MADE SIMILAR COMMITMENTS; AND WE CONGRATULATE THEM ON THEIR SUCCESS.

FUEL EFFICIENCY FOR GM CARS HAS GONE FROM AN AVERAGE 12 MILES PER GALLON IN 1974 TO AN EXPECTED 28 MILES PER GALLON IN 1997, WHILE EMISSIONS HAVE DROPPED BY A REMARKABLE 96% FOR HYDRO-CARBON AND CARBON MONOXIDE AND 90% FOR NITROGEN OXIDES. FUEL EFFICIENCY FOR GM TRUCKS HAS GONE FROM 11 MILES PER GALLON IN 1974 TO AN EXPECTED 20 MILES PER GALLON IN 1997, WHILE EMISSIONS HAVE DROPPED BY 96% FOR HYDRO-CARBON AND CARBON MONOXIDE AND 81% FOR NITROGEN OXIDES. WE HAVE MADE THE AIR CLEANER AND OUR VEHICLES MORE MARKETABLE AT THE SAME TIME -- A PERFECT EXAMPLE OF FREE-MARKET TECHNOLOGY AT WORK.

IT'S A LITTLE LIKE THE OLD JOKE AMORY (LOVE-INS), RESEARCH DIRECTOR OF THE ROCKY MOUNTAIN INSTITUTE, TELLS -- "HOW MANY ECONOMISTS DOES IT TAKE TO SCREW IN A LIGHT BULB? NONE -- THEY ASSUME THE FREE MARKET WILL TAKE CARE OF IT." LEFT TO ITS OWN DEVICES, I BELIEVE, IT USUALLY DOES.

BUT TECHNOLOGY CAN DO MUCH MORE THAN JUST CREATE NEW PRODUCTS. IT CAN ALSO CREATE CLEANER AND MORE ENERGY EFFICIENT PROCESSES AS WELL. FROM RECYCLING TO RESOURCE CONSERVATION; FROM ENVIRONMENTAL IMPACT ASSESSMENT OF OUR PLANTS AND PROCESSES TO HAZARDOUS WASTE MANAGEMENT, GM BELIEVES IN THE INTEGRATION OF SOUND ENVIRONMENTAL PRACTICES IN EVERY FACILITY AND IN EVERY PHASE OF OUR BUSINESS CYCLE.

BECAUSE OUR STRICT ENVIRONMENTAL STANDARDS ARE GLOBAL, THEY OFTEN GO WELL BEYOND COMPLIANCE WITH LOCAL LAWS AND REGULATIONS. FOR EXAMPLE, WE ARE NEARING COMPLETION OF A NEW PRODUCTION FACILITY IN SHANGHAI BEING BUILT WITH STATE-OF-THE-ART EQUIPMENT SYSTEMS, AND ENVIRONMENTAL GOALS, THAT WILL SERVE AS A MODEL FOR CHINA. WE COULD HAVE CONSTRUCTED OUR FACILITY AT FAR LOWER COST, BUT CHINA IS ALREADY HOME OF SOME OF THE WORST POLLUTED CITIES IN THE WORLD. THE LAST THING IT NEEDS IS ANOTHER FACTORY THAT FAILS TO MINIMIZE EMISSIONS, EVEN IF ALLOWED UNDER LOCAL LAWS. WORKING WITH OUR JOINT VENTURE PARTNER, THIS WAS RECOGNIZED, AND THE STRICT OBJECTIVE WAS AGREED TO AND IS BEING IMPLEMENTED.

CHINA IS ALSO A GOOD EXAMPLE OF THE POWER OF ENVIRONMENTAL PARTNERSHIPS THAT WE BELIEVE ARE CRUCIAL TO ACHIEVING GLOBAL SOLUTIONS TO SUSTAINABLE DEVELOPMENT. GM HAS JOINED TOGETHER WITH COMPANIES, GOVERNMENTS, AND ENVIRONMENTALLY CONSCIOUS ORGANIZATIONS AROUND THE WORLD TO ADDRESS PROBLEMS OF THE ENVIRONMENT AND GLOBAL CLIMATE.

THESE PARTNERSHIPS ARE ESPECIALLY IMPORTANT IN DEVELOPING COUNTRIES WHERE OUR ADVANCED TECHNOLOGY IS HELPING THESE COUNTRIES LEAPFROG ANTIQUATED TECHNOLOGY AS THEY MOVE TOWARD INDUSTRIALIZED ECONOMIES. WE CAN HELP THESE DEVELOPING NATIONS BENEFIT FROM A 20TH CENTURY TECHNOLOGICAL REVOLUTION, WHICH IS OCCURRING IN PARALLEL WITH THEIR INDUSTRIAL REVOLUTIONS.

GM'S INVOLVEMENT IN CHINA IS ONE OF OUR MOST DYNAMIC AND IMPORTANT GLOBAL PARTNERSHIPS. THE PAST THREE YEARS HAVE SEEN LITERALLY DOZENS OF GM-CHINA RESEARCH PROGRAMS AND EXCHANGES GET UNDER WAY -- FROM SEMINARS ON EMISSIONS AND FUEL EFFICIENCY -- TO OUR UNPRECEDENTED TECHNOLOGICAL PARTNERSHIP WITH THE CHINESE GOVERNMENT TO PARTICIPATE IN AN ELECTRIC VEHICLE DEMONSTRATION PROJECT FEATURING THE EV1 AND OUR S-10 PICKUP.

SHARING INTELLECTUAL EQUITY WITH OUR CHINESE COUNTERPARTS, WORKING TOGETHER TO FIND CHINESE APPLICATIONS FOR GM TECHNOLOGY IS GOOD ENVIRONMENTAL POLICY, BUT IT'S GOOD BUSINESS TOO. THE PLANT I SPOKE OF IN SHANGHAI IS AN ENVIRONMENTAL ACHIEVEMENT, BUT IT IS ALSO THE LARGEST U.S.-CHINA JOINT VENTURE IN HISTORY -- A \$1.5 BILLION INVESTMENT. SHANGHAI GENERAL MOTORS WILL SOON PRODUCE THE FIRST WORLD-CLASS VEHICLES IN CHINA, BUICK REGALS, USING THE MOST ADVANCED MANUFACTURING PROCESSES, SYSTEMS, AND MANAGEMENT. IT'S AN INNOVATIVE APPROACH THAT WILL PROVIDE GM WITH POTENTIAL MARKETS, AND CHINA WITH POWERFUL TECHNOLOGY, TO SOLVE BOTH THE SERIOUS ENVIRONMENTAL PROBLEMS FACING THIS EXPANDING NATION, AND MEET THE GROWING CONSUMER DEMANDS OF ITS PEOPLE.

AT HOME, WE'VE JOINED WITH THE FEDERAL GOVERNMENT, FORD AND CHRYSLER IN THE PARTNERSHIP FOR A NEW GENERATION OF VEHICLES (PNGV). COMPETITION HAS TAKEN A BACK SEAT TO OUR MUTUAL COMMITMENT TO COOPERATIVELY REACH FOR A "SUPERCAR" BY EARLY IN THE NEXT CENTURY. THIS PROGRAM IS TARGETED TO DEVELOP A FAMILY VEHICLE, WHICH WILL GET 80 MILES PER GALLON AND PRODUCE LESS THAN HALF OF THE CO2 OF TODAY'S VEHICLES WITHOUT INCREASING PRICES OR DECREASING PERFORMANCE.

THE SAFE CLIMATE, SOUND BUSINESS SCENARIO COLLABORATION IS ANOTHER PARTNERSHIP THAT'S WORKING. GM, THE WORLD RESOURCES INSTITUTE, AND OTHER MAJOR GLOBAL COMPANIES ARE NOW DEVELOPING PUBLIC POLICY SOLUTIONS TO REDUCE THE RISKS OF CLIMATE CHANGE, WHILE MINIMIZING THE DISRUPTIONS IN OVERALL ENERGY AVAILABILITY AND PROTECTING THE ECONOMIC HEALTH OF NATIONS AND BUSINESSES. TODAY THE WORLD RESOURCES INSTITUTE AND GM ANNOUNCED A

COLLABORATION TO IDENTIFY MEASURES TO REDUCE GREENHOUSE GAS EMISSIONS WHILE PROTECTING THE ECONOMY.

WE ARE ALSO WORKING WITH MAJOR OIL COMPANIES TO DEVELOP ALTERNATIVE CLEANER FUELS THAT WILL POWER THE PROGENY OF EV1, AS WELL AS OTHER SUPPLIERS STRIVING TO CREATE NEW, MORE ENVIRONMENTALLY FRIENDLY MATERIALS AND TECHNOLOGIES.

FINALLY, OUR PARTNERSHIPS EXTEND TO ORGANIZATIONS LIKE THE WORLD BUSINESS COUNCIL FOR SUSTAINABLE DEVELOPMENT AND THE COALITION FOR ENVIRONMENTALLY RESPONSIBLE ECONOMIES. THESE AND OTHER ORGANIZATIONS HELP US THINK DIFFERENTLY. AND WE NEED TO DO THAT. THEY HELP US BETTER UNDERSTAND THE ECONOMIC AND CULTURAL PRESSURES FACING OTHER INDUSTRIES AND OTHER COUNTRIES, JUST AS THEY HELP US COMMUNICATE OUR ISSUES AND CONCERNS GLOBALLY.

COOPERATION AND COMPETITION ARE THE ENGINES THAT DRIVE CREATIVITY. NO WHERE IS THAT TRUER THAN IN OUR INDUSTRY, AS WE SEEK THE TECHNOLOGY THAT WILL ALLOW US TO MEET OUR OBLIGATIONS AS ENVIRONMENTAL STEWARDS, AND SIMULTANEOUSLY MEET THE EXPECTATIONS OF OUR CUSTOMERS AND OUR SHAREHOLDERS.

WE ARE ALL RESPONSIBLE FOR THIS PLANET, BUT BUSINESS MUST TAKE THE LEAD, BECAUSE ONLY BUSINESS HAS THE GLOBAL REACH, THE INNOVATIVE CAPABILITY, THE CAPITAL, AND MOST IMPORTANTLY, THE MARKET MOTIVATION TO DEVELOP THE TECHNOLOGIES THAT WILL ALLOW THE WORLD TO TRULY ACHIEVE SUSTAINABLE DEVELOPMENT.

ALUMINUM, STEEL, PAPER, COAL, OIL, CHEMICAL, POWER GENERATION, CONSTRUCTION MATERIAL, AUTOMOTIVE -- THESE ARE INDUSTRIES WHICH MUST JOIN TOGETHER WITH GOVERNMENTS -- LEADERS TO LEADERS -- TO POOL OUR ENORMOUS TECHNICAL RESOURCES AND DRIVE RELENTLESSLY TOWARDS EVER GREATER ENERGY EFFICIENCY AND BEST ENVIRONMENTAL PRACTICES WORLDWIDE. THE INEVITABLE RESULT IS A CLEANER, HEALTHIER WORLD. WHAT BETTER LEGACY CAN WE LEAVE OUR CHILDREN AND GRANDCHILDREN? WE CAN MAKE ENVIRONMENTAL GOOD SENSE AND REWARD OUR SHAREHOLDERS AT THE SAME TIME.

AND THE TIME FOR ACTION IS NOW.

THERE'S A STORY ABOUT AN OLD MAN WHO ASKED HIS GARDENER TO PLANT AN OAK TREE IN A FIELD NEAR HIS HOUSE. THE GARDENER OBJECTED TELLING THE MAN THAT IT WOULD BE A HUNDRED YEARS BEFORE ANYONE COULD SIT IN ITS SHADE. "IN THAT CASE," THE OLD MAN REPLIED, "THERE IS NO TIME TO LOSE. PLANT IT THIS AFTERNOON."

THIS WAS ONE OF JOHN KENNEDY'S FAVORITE STORIES. SO, IT'S NO SURPRISE THAT IT WAS THIS PRESIDENT IN 1962, ON A SUNNY AFTERNOON IN HOUSTON, WHO CHALLENGED THE AMERICAN PEOPLE TO SUMMON THEIR SPIRIT AND CREATIVITY TO REACH THE MOON BEFORE THE DECADE WAS GONE "NOT BECAUSE IT IS EASY," HE SAID, "BUT BECAUSE IT IS HARD."

JOHN KENNEDY HAD A DREAM THAT SEEMED TO MANY . . . A DREAM TOO DISTANT. BUT HE INSTINCTIVELY KNEW THAT IF THIS CHALLENGE COULD BE MET, ITS LEGACY WOULD LAST A THOUSAND YEARS. HE WAS RIGHT.

TODAY, WE FACE A CHALLENGE OF OUR OWN -- UNDERSTANDING THE COMPLEXITY OF OUR GLOBAL CLIMATE UPON WHICH THE ENTIRE HUMAN RACE IS SO DEPENDENT.

LIKE JOHN KENNEDY AND THE OLD MAN IN HIS GARDEN, THE ACTIONS WE TAKE TO PROTECT BOTH THE ENVIRONMENTAL AND ECONOMIC FUTURE OF THIS PLANET, MAY WELL AFFECT THE LIVES OF GENERATIONS TO COME. AS GLOBAL CITIZENS, THAT IS A RESPONSIBILITY WE ALL SHARE.

IF WE ACT WISELY, AND DECISIVELY, THE SHINING BLUE MARBLE, THAT BROUGHT TEARS TO THE EYES OF OUR FIRST ASTRONAUTS, WON'T LOSE ITS LUSTER NOR WILL ITS INHABITANTS LOSE THEIR DREAMS FOR HEALTHY AND PROSPEROUS LIVES. AT GENERAL MOTORS, WE BELIEVE THAT IS A LEGACY WORTH LEAVING.

* * *

1/12/98, FINAL

CLIMATE OR U.S. SUGAR CLEANING UP THE EVERGLADES, OR MANY OF OUR COLLEAGUES WITHIN THIS INDUSTRY USING TECHNOLOGY TO CREATE CLEANER, MORE FUEL EFFICIENT TRANSPORTATION, BUSINESS IS COMING TO REALIZE THAT WE ARE ALL GLOBAL CITIZENS WITH GLOBAL RESPONSIBILITIES. AND INDEED MEETING THOSE RESPONSIBILITIES CAN DELIVER COMPETITIVE ADVANTAGES IN THE MARKETPLACE.

BECAUSE OF ITS CONNECTIONS TO SO MANY INDUSTRIES, THE RANGE OF ITS TECHNICAL CAPABILITIES, ITS GLOBAL REACH, AND THE NATURE OF ITS PRODUCTS, THE AUTOMOTIVE INDUSTRY HAS A SPECIAL RESPONSIBILITY TO SERVE AS ENVIRONMENTAL STEWARDS, PARTICULARLY IN DEVELOPING COUNTRIES WHERE OUR MANUFACTURING FOOTPRINT IS BECOMING INCREASINGLY BROAD. TECHNOLOGY CAN GIVE THESE DEVELOPING COUNTRIES ENVIRONMENTAL OPTIONS THEY NEED, AND CAN HELP BRIDGE THE CHASM I SPOKE OF EARLIER -- RAISING THEIR STANDARDS OF LIVING, WITHOUT LOWERING OURS.

EVEN IF SCIENCE ULTIMATELY LEARNS GLOBAL WARMING IS JUST A NORMAL CYCLICAL PHENOMENON, FOR GLOBAL CITIZENS OF A PLANET SO DEPENDENT ON NON-RENEWABLE RESOURCES, SAVING FUEL IS NEVER A BAD IDEA, NOR IS REDUCING EMISSIONS.

SO GENERAL MOTORS HAS EMBRACED WHAT WE CALL THE GM ENVIRONMENTAL PRINCIPLES. THESE PRINCIPLES GOVERN BOTH PRODUCT AND PROCESS PROVIDING GUIDANCE TO GM PERSONNEL IN OUR FACILITIES THROUGHOUT THE WORLD. NOTHING IS MORE IMPORTANT TO OUR PRODUCT AND FACILITY ENVIRONMENTAL PROFESSIONALS, THAN ENSURING THESE PRINCIPLES ARE IMPLEMENTED.

GM IS COMMITTED TO A STRATEGY OF ENVIRONMENTALLY COMPATIBLE PRODUCT DEVELOPMENT WHEREVER WE OPERATE --WORLDWIDE. THIS MEANS BUILDING MORE FUEL EFFICIENT, LOW EMISSION VEHICLES TODAY, AND COMMITTING THE RESOURCES TO CREATE A PORTFOLIO OF ADVANCED PROPULSION OPTIONS FOR TOMORROW. YOU SAW SOME OF THE RESULTS AT COBO CENTER -- THE FIRST PROGENY OF THE EV1 -- THE WORLD'S MOST ADVANCED VEHICLE PLATFORM AND THE WORLD'S MOST ENERGY EFFICIENT PRODUCTION VEHICLE.

LET'S TAKE A QUICK LOOK AT THESE EXCITING NEW GENERATION DEVELOPMENT VEHICLES:



Alex Trotman
Chairman of the Board

Ford Motor Company
The American Road
P.O. Box 1899
Dearborn, Michigan 48121-1899

January 6, 1998

The President
The White House
1600 Pennsylvania Avenue, NW
Washington, DC 20500

Dear Mr. President:

I wanted to let you know about a couple of Ford environmental initiatives that were recently announced.

All Ford sport utility vehicles -- including the Ford Explorer, Mercury Mountaineer, Ford Expedition and Lincoln Navigator -- and the Ford Windstar minivan will be sold nationally as Low Emission Vehicles starting next fall.

This means every Ford Windstar and Ford, Lincoln and Mercury sport utility vehicle sold -- totaling about 800,000 each year -- will emit only half of the smog-related emissions of today's vehicles. These vehicles will not only surpass the standards for trucks, but they also will be cleaner than most passenger cars on the road today.

This announcement is only part of Ford's ongoing clean vehicle strategy. Ford accounted for 95 percent of the alternative-fuel vehicles sold in the U.S. in 1997. For the 1998 model year, Ford will offer the industry's broadest array of alternative fuel vehicles. Our 12 vehicles, which run on electricity, ethanol, methanol, natural gas and propane, are described in the attached brochure. Ford is working closely with energy producers and organizations to develop the infrastructure needed to make these alternative fuel vehicles as convenient as their gasoline-powered counterparts. Also, I hope you noted Ford's \$400 million investment in a fuel cell partnership with Ballard and Daimler-Benz.



Ford will continue to pursue these initiatives as part of our environmental commitment. It also has become a competitive imperative -- you have only to tour an auto show or pick up a newspaper to see how fast the industry is moving. It's important that post-Kyoto policies not interfere with this competitive technology momentum, which is the best path to long-term progress, by establishing artificial mandates and deadlines. Instead, Administration policy should stay focused on voluntary initiatives and on encouraging advanced R&D on affordable energy-saving technology.

Sincerely,

A handwritten signature in black ink, appearing to read 'Alex Trotman', with a stylized flourish at the end.

Alex Trotman

Attachment

MEMORANDUM

SUBJECT: Labors' Activities Related to Climate Change

'98 JAN 20 PM3:32

FROM: Steve Seidel
Dirk Forrister

TO: Todd Stern
Katie McGinty

While you may already have gotten wind of several upcoming activities concerning labor on the issue of climate change, we wanted to pass along some information we've recently picked up.

A meeting between representatives of labor unions and environmental groups has been scheduled for January 21st. This meeting will have a number of sessions related to follow-up to Kyoto, including discussions on technology, emissions trading, and worker/community transition assistance.

The Executive Council of the AFL-CIO is scheduled to meet on January 28-29th. They may be taking up another resolution, in part, critical of the Administration because of the potential impact on workers from the Kyoto agreement and the absence of any dialogue on how these impacts might be addressed. The latter point seems to be most troubling to those in labor.

We have attached as background for you a set of possible recommendations contained in a recently released report on labor unions and climate change prepared by a research center at Cornell.

Please let us know if there are any follow-up actions on this issue you'd like us to take based on your January 8th meeting with union representatives.

cc: Beth Viola
David Sandalow

Labor, Climate Change, and the Environment



Cover of American Federationist
June, 1927 Vol 34 No. 6

Prepared by:
Work and Environment Initiative
Center for the Environment
Cornell University
Ithaca, NY
November, 1997



7.0 CONCLUSION: CLIMATE CHANGE AND OPPORTUNITIES FOR LABOR

From the evidence gathered for this report, several broad observations about climate change, labor, and unions, can be made. First, climate change is an extremely complex issue that has and will continue to cross many traditional boundaries. Solutions to climate change will likely require effort in a number of broad areas including science and engineering, economics, social and cultural understanding, domestic politics, and international affairs. Second, there is widespread opposition to current elements of the Berlin Mandate, especially over the differing responsibilities between Annex I and non-Annex I countries.

However, despite widespread opposition to current elements of the Berlin Mandate, many groups, especially unions, are willing to work on potential solutions to the problem of greenhouse gas emissions. In the United States and the international community, unions, and their members are contributing to environmental improvement. From these emerging activities, energy, knowledge, and experience could be channeled towards seeking solutions to the globally important issue of climate change.

The previous two sections of this report (5.0 and 6.0) discuss a number of ways trade unions and their members are contributing to environmental improvement. It is by no means a complete list of all activities. It provides a framework or starting point to design additional activities to resolve the climate change problem.

The next century will be one of transition to a new economy whose characteristics will likely include greater globalization of markets, and more attention to resource efficiency and environmental impacts. Therefore regardless of a treaty, strategies that prepare America for success in the next century will need to be developed in anticipation of these changes. The labor movement can be a leader in that transition by using influence within companies already organized, by offering capital and skills as incentives to work cooperatively with companies, and by aggressive organizing in emergent sectors.

The American labor movement believes that solutions to the climate change issue must be within the context of really fixing the environmental problem, keeping the economy strong, and effective transition for affected workers and communities.

Policy Involvement at All Levels

The establishment of policy and implementation strategies on climate change occurs at all levels. In order to fully make a positive contribution, labor needs to be involved at all levels as well. The American labor movement should: (1) continue to participate in various policy forums addressing climate change, sustainable development, and the environment as well as (2) become involved in additional organizations and activities that deal with these issues. The efforts should squarely take aim at the future, participating in plans that benefit that benefit American workers in the century ahead.

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- Labor representatives should participate throughout the international process of negotiating a protocol to the United Nations Framework Convention on Climate Change. Labor should be actively consulted as part of the US delegation and in preliminary development of positions. Labor's views should be strongly put forth as part of the negotiations leading up to and then at Kyoto. U.S. labor's cooperation with other international trade unions including the ICFTU and other trade union federations should be part of the overall strategy for addressing global issues.
- Labor should be involved, along with other stakeholder organizations, in the design of domestic climate change policies. President Clinton has asked all Departments and additional agencies to contribute to solutions that take action on international and domestic implementation. The American labor movement should be consulted by these departments, agencies, and interagency groups as they design and undertake their tasks.
- Encourage environmental and labor protection agreements linked to international trade agreements. The debate over climate change highlights the long standing AFL-CIO concerns around adequate trade side-agreements on labor and environmental protection. The weak approaches to these issues in current trade agreements has undermined labor's support of a treaty on climate change. The fear of losing jobs overseas to countries where labor is exploited or the prospect of shifting pollution to developing countries are part and parcel of this debate.
- The President's Council on Sustainable Development (PCSD) was organized by President Clinton in order to "recommend a national action strategy for sustainable development." Trade unions are not currently represented on the PCSD and should seek a Council seat. Until 1995, Tom Donohue, past president of the AFL-CIO, sat on this body which includes high level government officials, business and community leaders. Labor needs a continuing voice on the PCSD.
- Unions could establish state and local forums for dialogue to seek common ground with community representatives, environmental organizations, business, and labor (see Section 6.0). The Canadian Roundtable on Environment and the Economy is such a forum for systematically encouraging this dialogue. Many unions and the AFL-CIO have participated in forums where common understanding has been developed. While talk alone will not be sufficient, it is a part of an overall strategy.
- State and local AFL-CIO Councils should be involved in efforts at all levels to respond to the climate change challenge. Agenda 21 implementation and policy development is encouraged at the state and local levels. At these levels, the voice of the AFL-CIO is from the Central Labor Bodies and these organizations need to be part of the climate change discussion.
- International activities on climate change especially those of the US should demonstrate fundamental respect for workers rights and help create capacity especially among trade unions

in developing countries to play a positive role in sustainable and equitable economic development while assuring worker and community health.

- Further progress should be made on bringing the US labor movement together (1) to develop dialogue, understanding and consensus; (2) to seek a common perspective and a broadly agreed action plan; and (3) to build capacity in the US labor movement to contribute in this arena as outlined above.

Economic Sectors

Government policy discussions regarding the impact of climate change policies on particular economic sectors should include the relevant union(s) and/or the AFL-CIO as part of the dialogue. The impact of climate change action will vary across the economy and thus different strategies will be called for in different industries. For unions to be part of the solution the representatives of workers in those industries must be at the table.

- Unions and workers should participate in R&D strategies in order to bring their experience and knowledge to the design of technologies and production processes that aid in reducing greenhouse gases, contribute towards sustainable development, and help protect worker, community, and ecosystem health.
- Through collective bargaining, unions could ensure that involvement with strategic and operational environmental issues as part of any agreement signed with management. A number of countries have developed model contract language on environmental activities including the right to refuse environmentally unsafe work.
- Union pension funds can provide investment capital for converting older industries or developing new industries willing to work cooperatively with labor. Pension funds, derived from union contracts, are currently the largest source of investment capital in the U.S., valued at over 600 billion dollars. Prudent investments that protect pension assets and contribute to converting older industries or growing new green industries have a strong investment return record. Labor has capital to bring to the table, in addition to skills, for the right kind of investments.
- Several economic sectors could face significant restructuring and transitioning as policies are put into place to combat climate change. These are likely to include transportation industries, certain types of manufacturing, electrical utilities, wood products, and coal mining. Unions could work with these and other sectors to design strategies for: (1) reducing greenhouse gas emissions and (2) transitioning to new economic activities that have minimal climate change impacts. Included in this section are public or private sector investments that can better preserve and create new jobs, enhance the environment, and help speed the transition. Examples might include:

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1. working with railroads to reduce environmental impacts and to identify ways to offset the potential loss of coal traffic;
2. working with the trucking industry to look at energy efficiency and possible alternative fuels;
3. working with utilities to improve and enhance energy efficiency programs and facilitate conversions to new fuel sources with lower environmental impacts;
4. assisting airlines in finding ways to avoid large fare increases due to rising fuel costs;
5. working with the automobile industry to produce passenger, fleet, and industrial vehicles with higher gas mileage or alternatively fueled vehicles;
6. working with the forestry industry to enhance CO₂ sinks through reforestation efforts. The traditionally low pay and poor conditions for those jobs need to be changed;
7. work with the paper industry to capture waste heat, reduce sewer loss, and examine options for alternative fiber use;
8. encourage mass transit programs and conversion to alternative fuels to reduce bus emissions;
9. encourage reclamation of coastline to counter erosion due to climatic events. Encourage environmental improvements in port facilities and improved safety for shipping in coastal area;
10. increase the commitment to remediation and reuse of brownfield locations and increase the stringency of training requirements for workers working with hazardous materials;
11. increase support for the maintenance and improvement of national state and local parks;
12. increase support for effective weatherization projects, especially in poor residential communities;
13. support policies that provide adequate protection for the poor to maintain necessary heating in their homes;
14. support eco-industrial parks as a means for promoting clean, new industrial development.

Just Transition

Transition is an easy idea to put forward but very difficult to put into practice. Some of the affected energy intensive and resource extraction industries are highly unionized. Historically, jobs created through transition programs have led to substantial downgrading of income and benefits and often to non-union workplaces. The challenge for the labor movement is to actually organize these new industries in order to assure decent standards of living.

Just Transition involves a hierarchy of response. The first effort must be to find ways to retain jobs within an industry by significant internal improvement. The next effort should be to find or create comparably paying jobs through local development to minimize economic disruption. Alternately, involve displaced workers locally in comparably paying environmental remediation work. A further possibility is to provide training and transition assistance to those who seek work in other industries or locations. A final backstop for workers affected by climate change policy is

to assure income maintenance and pension protection. The OCAW proposal for a "Superfund for Workers" provides a basis for discussion of effective 'just transition' measures. The following are further examples:

- Focus on retaining jobs in existing industries by reorienting the technological capacity towards new, cleaner technologies and products. For example, in the utility industry, there are a series of technologies that can burn coal more cleanly and/or capture the carbon dioxide. Additionally, shifting fuel sources in utilities, industrial power plants, transit vehicles and automobiles, and energy intensive industries will improve performance as well as generate new skills, new products, and new jobs.
- The US would benefit from developing an overall framework for the growth of green jobs including the priority transition of workers negatively effected in other industries into these jobs. The Labour Government in Australia created a "Green Jobs" program working with trade unions and environmentalists to create new employment in promising sectors. The Australian trade union movement also set up a union led training authority which focused first on land reclamation and had a broad mandate as well, to train and place workers in green jobs.
- Work with federal, state, and local governments and industry to develop programs for the safe shut down of polluting or aging industries or the implementation of remediation projects that will give priority employment to displaced workers. For example, mines will need to be decommissioned in ways that do not lead to groundwater contamination. Land and forest reclamation projects are being developed with the goal of providing work at wages commensurate with former employment. Unfortunately much of the work is currently contracted out to low wage contractors. This kind of transition is not just—family wages and decent working conditions must be part of the picture.
- Encourage adequate retraining and relocation assistance for affected workers with particular focus on union-based education programs. Economic disruptions are not a new phenomenon and organizations such as the Human Resources Development Institute of the AFL-CIO have been actively involved in counseling, training and finding workers new positions for nearly 40 years. Many union training programs and retraining programs include superior instruction and hands on applications, including the fields of environmental remediation.
- Establish income maintenance programs for senior, retiring, and disabled workers that are impacted by climate change policies. Some people will not be able to make the transition to new jobs either because of age, physical ability or other factors. They must not be abandoned but should be respected and helped to make whole their losses. Income maintenance programs are not new in America. When containerization came to the docks, a special fund was established to help those longshoremen affected. Agricultural support aids farmers during disasters and stabilizes incomes during transitional times. Workers compensation is a form of insuring that injured workers don't become destitute.

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- Encourage the establishment of funds for sustainable community redevelopment efforts in areas that could be especially hard hit by climate change policies. When the company gets shut down or cuts back in a mining town, local merchants and the local tax base are affected, thus impacting all local services and jobs. Those communities, will have an acute need for transition assistance for economic redevelopment. When federal or state dollars are being used for new environmentally friendly industries these communities should have priority in their location.
- To be able to pay for these efforts requires a hard look at various funding options, whether from special revenues raised as part of the effort to encourage reduction of greenhouse gases, or through specific appropriations at a level sufficient to get the job done.

Changing the Workplace

- Union health and safety committees could be expanded to include the environment. There are hundreds of thousands of joint union-management health and safety committees across the country. A small percentage of them have environmental concerns as part of their mandate. Using this intact structure, which has demonstrated success in the lower accident rate in union versus non union shops, can be a vehicle for change. The UAW and General Motors are working with their joint health and safety representatives at the plant level to roll out an ambitious environmental quality program. In some locations, there may be local unions who prefer to set up a separate environment committee to consider these issues.
- Require eco-auditing with union and workforce involvement in companies of over 15 employees. Workers often know best what is going on inside their workplaces. With the advent of ISO 14000, outside auditors are brought in when corporations want certification of their environmental process. Although this is a start, it misses real opportunities. Cornell University's Work and Environment Initiative has done a convincing analysis of the role of worker participation in toxic chemical source reduction. It showed more than triple the reduction when workers are actively involved as opposed to relying on external advice or technology alone. Workers make a direct and measurable difference. If this is applied across the economy then significant emission, economic, and environmental benefits can accrue. Requiring this examination is not a command and control approach but a recognition of the basic responsibility of all workplaces to examine their activities and do better.
- Eco-auditing in the workplace has been advocated internationally by organizations such as the ILO and the ICFTU and a number of union national bodies throughout the world. An eco-audit is designed to highlight the things a company is doing well as well as things that could be done better. Audits can reveal production, energy, or environmental shortcomings and show where pollution prevention and energy efficiency measures could have a dramatic effect on the bottom line. The Swedish Labor Federation, TCO, has a significant staff, referred to above as the 6E program, designed for comprehensive eco-auditing.

- Improve the overall energy efficiency and environmental performance of residential, commercial, industrial, and public buildings. Building trade unions and contractors should be consulted and adequate programs and continuously improving standards developed. Energy loss from buildings is a major factor contributing to greenhouse emissions. There are a number of job generating possibilities for union workers including manufacture and installation of photo-voltaic panels (including the President's million solar roof objective) or wind turbines, changing windows to much higher R values, installation of solar roofs, and use of alternative building materials. The Bricklayers and Allied Craftworkers Union and the Sheet Metal Workers International Union are among those advocating wide scale use of new environmentally preferable materials and processes. The Bricklayers are working with a new aerated concrete process that is faster to install, higher insulation value, flexible in application and environmentally sound. New approaches tearing down buildings involve "deconstruction" through reclaiming useable materials and reusing them rather than destroying the through wholesale demolition.
- Following the lead of the UAW, other unions could examine the entire production chain of their particular industries in order to increase environmentally responsible manufacturing throughout the life-cycle of goods and services, "product stewardship." Product stewardship includes being aware of where products go and how they are used. Beginning in the design process, many ideas can be shared which avoid downstream waste including emissions. This can impact the next stop of a production process or use by a customer. For example, the aluminum industry has found ways to recycle end products which leads to much lower energy and life cycle costs. Concurrent with resource efficiency issues is the reduction of toxic materials and waste to improve worker and public health. A similar review of the entire production process can design out and safely handle toxic materials.
- The teacher's unions could be used as part of the educational process on climate change, environmental protection and preservation, and sustainability. Teachers unions and their members play a vital role in educating, from the young to college students, across a variety of disciplines regarding the importance of climate change action and how it can be accomplished. Schools, as working places, have their own energy issues. When more of the budget goes to pay fuel bills then less is available to pay teachers and aides to provide general education. Unions are concerned about these developments and want to see real energy conservation in their school districts and post-secondary institutions.
- Local unions and Central Labor Councils can take action themselves by establishing environment committees within locals, that monitor employer performance while seeking solutions, informing and educating members and their families, and doing community service in their local areas.



White House Climate Change Task Force

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FAX

Industry
by
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98 MAR 6 PM 3:34

To: Todd Stern / Shelby Fidler

Organization/Title:

Fax: 456-2215 / 456-2710 Phone: 3/6

Pages (including cover): 11 Date:

From: Lisa McNeilly

Phone: 343-1091

Message:

A new version of the Industry consultation paper.

SCOPING PAPER: INDUSTRY CONSULTATIONS

Draft: March 6, 1998

"We must continue to encourage key industry sectors to prepare their own greenhouse gas reduction plans. And we must...remove the barriers to the most energy efficient usage possible. There are ways the federal government can help industry to achieve meaningful reductions voluntarily, and we will redouble our efforts to do so."

-- President Clinton, October 22, 1997

Background:

In his climate change address at the National Geographic Society auditorium on October 22, 1997, President Clinton challenged American industries to develop their own action plans, and he pledged for his Administration to work with state and local governments to remove any barriers to greater energy efficiency. In urging companies to take early action, the President also committed to ensure that firms receive appropriate credit for their achievements.

There are a number of industrial sectors that have expressed interest in working with the Administration on climate change policy, although some are more advanced in their thinking than others.

- The Task Force convened interagency meetings last fall with three sectors that were prepared to make proposals to the Administration: steel, cement and airlines. Natural gas, renewable and energy efficiency firms continue to want to play a key role.
- Task Force and agency staff had very productive individual meetings last fall with electric utilities, pulp and paper, natural gas and a couple of petroleum companies. Although they are still trying to evaluate their posture toward the issue in the wake of the Kyoto agreement, there are progressive companies in each sector that we should engage soon to help influence the evaluations others are making.
- Since the Kyoto Conference, other key sectoral players have stepped forward to express interest in being involved: appliance manufacturers, chemicals and aluminum.
- Additionally, the Administration has good relations with a set of industry leaders active in the President's Council on Sustainable Development, DOE's Industries of the Future and Climate Challenge programs and EPA's "Green" and Climate Wise partnerships.

Besides these groups, there are other important industries that are likely to be interested in participating as this effort matures.

This paper outlines a process to deliver agreements with industries that volunteer to enter emission reductions agreements. This approach is attractive to both sides:

- Participating industries will be able to jump start their search for low cost reductions, benefit from federal support in such efforts, and be poised to help shape and take advantage of

credit for early actions.

- The Federal government gets a head start on emission reductions and a cooperative audience to help inform remaining policy and implementation decisions.

I. PROCESS

A. In General --

- 1. Goals**

The consultations should maintain a clear focus on enabling industries to meet the President's challenge of developing early voluntary action plans within nine months. Industries will be encouraged to make commitments as close as possible to the Kyoto target. Also, firms will be the most forthcoming if meetings are designed to --

 - strategize on removing barriers;
 - assure early credit;
 - and inform federal climate policy development (e.g. the \$6.3 billion incentive package; the emissions trading program design; federal energy use; and the ongoing international negotiations).
- 2. CEO Vision**

The consultations will be most successful if those active in the discussions have directions from their CEO's. (The alternative -- if they do not have CEO cover for what they are doing, they will be conservative.) Prior to sectoral meetings, a senior White House or Cabinet official (or a high-level former CEO) should speak with at least two key CEO's about the talks in order to assure their engagement.
- 3. Crosscutting**

There will be a crosscutting effort to cut across all groups on some overall design questions. This could assure that each group benefits from lessons of the others, and it could help us achieve a coherent overarching policy structure. The issue of credit for early action and perhaps emissions trading will be discussed in separate, expedited inter-agency fora.
- 4. Agencies**

From the onset, the effort needs to take advantage of agency expertise and abilities, particularly their strengths to carry out follow-up actions.
- 5. Strategy**

This approach is designed to empower firms ready to begin addressing their greenhouse gas responsibilities to get started with the assurance that they will not be penalized for acting early and, in fact, will be rewarded.

B. Operational Considerations

- 1. Background Analyses**

Documents will be prepared for each sector compiling background information currently available in the agencies. These papers will be used

to inform the Federal teams and provide some basis for discussions with the private sector.

2. **Scoping Mtg.** We should convene a small "scoping group" to plan each consultation. It should contain a few select industry leaders combined with a few federal experts. This group can help strategize about the best way to frame questions, how the effort should be defined for that sector, and how to ensure the best outcomes.
3. **Attendance** We should be inclusive of as many companies as possible. Pending review of FACA requirements, the meetings would be more constructive if they were "off the record." It might also be useful to have a follow up meeting to vet any ideas with others involved with the sector (academics, labor leaders and public interest groups).

On the federal side, we should assemble expert teams from relevant agencies (Energy, EPA, Commerce, Agriculture, Transportation, Defense, Interior, NASA, State, USTR, AID) and White House offices (NEC, CEQ, OSTP, OMB, NSC). We should select a leader for each sectoral team to help focus activities, drive the process and serve as a point of contact.
4. **Guidance** Sectors will be asked to prepare in advance of the consultations information on industry historical emissions, future trends, and potential reductions. For example, they could determine what the industry's baseline was in 1990 (or 1995 for those gases), what the scenarios are for 2008 to 2012 and what actions could bring the greatest improvements on those scenarios. It could also be beneficial to review the industries' competitive situation in the international economy, its business trends (including energy and environment) and its research and development plans. The ultimate goal is to reach agreement on a voluntary reduction plan, either collectively or individually.
4. **Industry Kick-Off** After the scoping meetings, the next activity will be a kick-off meeting with industry. The Federal teams will invite the wider industry membership to participate and set the timeline for action. When industry has had time to draft a preliminary response, the Federal teams will follow-up, review the plans and respond to agency requests.
5. **Follow Up** The federal team should ensure that ideas are submitted for expedited consideration in the policy process. Agencies should have primary responsibility to carry out follow-up activities, pursuant to their proper authorities, under coordination by White House offices.
6. **Phases** Because some industries have already begun to think in terms of early action, the consultations will proceed in at least 3 overlapping phases. At the end of scoping meetings with one phase, not only will consultations

begin with those industries, but a new set of sectors will begin scoping meetings. This will give some industries more time to learn about opportunities for emission reductions and will help moderate the burden on Federal resources.

C. Time Line

A time line has been developed to describe the actions and responsible parties for the tasks required to develop agreements with several industry sectors by October.

1. **Initial Preparations (present -- early March)**
The goal of the initial phase is to prepare the Federal government to effectively engage the private sector. Tasks will include the preparation of planning documents (including sector analyses), the establishment of the Federal leadership structure, and the finalization of the list of sectors.
2. **Scoping Meetings (Phase 1 -- March; Phase 2 -- April - May; Phase 3 -- May - June)**
The goal of the second stage is to plan industry consultations in conjunction with representatives of each sector. Tasks will include contact with selected sector CEOs and Cabinet members or other senior White House personnel, scoping meetings with a subgroup of each industry sector leaders, a roll-out event, and input from labor and environmental groups.
3. **Industry Consultations (April -- August)**
The goal of the third stage is to encourage voluntary emissions reductions commitments from the industry sectors, improve understanding of technology opportunities, and identify and reduce barriers to these reductions. The focus will be on holding industry consultations through a series of meetings: an industry kick-off to present charge to full industry membership and then meetings with Federal teams to review commitment plans and plan implementation.
4. **Agreements and Follow-Up (September -- October)**
The goal of the final phase is to ensure agreements are finalized and set into motion. Draft agreements will be prepared with responsibilities/activities for both industry and Federal agencies. There will be a roll-out event before work continues on remaining industries, beginning a second phase of scoping meetings and full industry consultations.

II. SPECIFIC GROUPS

There are specific players in key industries that can provide important inroads into most of the major emissions sectors. I would recommend that we begin consultations with the groups that have already expressed interest (Phase I). As we build a track record of success, it will be easier to bring others on board.

Phase I Sectors

Energy Intensive Industries

The industrial sector represents one-third of all end use emissions. Seven highly energy intensive industries emit 80 percent of the greenhouse gases from industrial manufacturing. Four of these are being considered for inclusion in the first phase of consultations. In addition, the cement industry is among the highest ranking industrial carbon emitters, due to carbon dioxide released during the calcification process and a high energy intensity.

1. Steel
2. Aluminum
3. Pulp and Paper
4. Chemicals
5. Cement

Electric Power

Electric utility emissions comprise one-third of U.S. source emissions.

6. Electric Power

Transportation

The transportation sector represents a final third of U.S. end use emissions. Autos and light trucks constitute the bulk of the transportation sector emissions (52%), with airlines emitting an additional 15%. Freight trucks bring the total highway emissions to 74%.

7. Airlines
8. Fleets

Future Growth Industries

Industry sectors whose emissions are projected to rise in the future also need to be a part of the consultations.

9. Telecomm/ Electronics

Phase II & III Sectors

The remaining industries in the broad sectoral categories above will be covered in subsequent phases.

Energy Intensive Industries

10. Glass
11. Foundries
12. Refineries

Electric Utilities/Fuels/Buildings

- 13. Buildings
- 14. Natural Gas
- 15. Renewables
- 16. Efficiency
- 17. Mining

Transportation

- 18. Automobiles
- 19. Railroads

Other

- 20. Appliances
- 21. Vendors
- 22. Agriculture

III. Addendum

- A: Industry Plans for Early Reductions -- A one-page summary description
- B: Time Line -- Details on the activities planned through October

ADDENDUM A: INDUSTRY PLANS FOR EARLY REDUCTIONS

Draft: March 4, 1998

We must continue to encourage key industry sectors to prepare their own greenhouse gas reduction plans. And we must ...remove the barriers to the most energy efficient usage possible. There are ways the federal government can help to achieve meaningful reductions voluntarily, and we will redouble our efforts to do so."

-- President Clinton, October 22, 1997

GOAL:

Develop plans of action to achieve early voluntary reductions in greenhouse gas emissions in key sectors of the economy with the goal of making as much progress as possible toward the targets set in Kyoto.

RATIONALE:

To the extent that cost-effective reductions in greenhouse gases can be achieved in the near to medium-term through voluntary efforts, the burdens associated with meeting future targets will be reduced and the rate of build-up of greenhouse gases will be slowed.

INDUSTRY'S ROLE:

To develop a plan for reducing greenhouse gas emissions beyond "business as usual." Building on existing government-industry partnerships, the plan should identify:

- an emissions reduction goal;
- the path forward for achieving that goal using cost-effective measures;
- barriers to achieving reductions that could be removed;
- incentives that could be created to encourage such reductions;
- possible changes in federal procurement or practices;
- options for reducing emissions through trading or sequestration;
- opportunities for achieving reductions abroad; and
- a longer-term research and development strategy.

FEDERAL GOVERNMENT'S ROLE:

To facilitate the development and implementation of industry plans by:

- inventorying existing programs and resources with the potential to reduce greenhouse gas emissions;
- where appropriate, provide collaborative support to facilitate a broad based industry dialogue, to contribute technical and analytic assistance, and to provide other assistance in the development of industry plans for early action;
- working cooperatively, wherever possible, to remove barriers and create new incentives for reducing emissions; and
- developing guidelines for early credit for qualifying reductions.

WHY PARTICIPATE:

Participating industries will be able to jump start their search for low cost reductions, benefit from federal support in such efforts, and be poised to help shape and take advantage of credit for early actions.

TIMETABLE:

Kick-Off Meetings with Initial Sectors	March-April
Plan Preparation	April-August
Initial Sector Plans Presented	September-October
Additional Plans and Implementation.....	November and beyond

ADDENDUM B: TIME LINE

Draft: March 6, 1998

I. Initial Preparations (present -- early March)

Goal: To prepare the Federal government to effectively engage the private sector.

- (1) Prepare planning documents that will be used as templates to guide the consultations for all sectors.
 - Finalize template for Sector Analyses; analyses will include sections on sector emissions, options for emissions reductions, current sector activities, and barriers to or opportunities for emissions reductions. [WHCCTF: 3/2]
 - Draft Sector Analyses for 1-2 sectors; assignments made for agency leads for remaining sectors [Agencies (DOE/EPA): 3/2]
 - Draft questions to be addressed in consultations [WHCCTF: 3/2]
- (2) Establish Federal leadership structure
 - Assemble an Assistant Secretary Council, with representatives of each relevant agency, to give oversight and guidance. [WHCCTF/Agencies: late February/early March]
 - Establish technical teams from the agencies to be responsible for each sector [WHCCTF/Agencies: late February/early March]
- (3) While consultations will occur with the full list of industries categorized in the scoping paper, initial meetings will proceed in a phased manner to immediately address those industries who are already close to making voluntary commitments to reduce emissions.
 - Narrow the list of industries to 6-8 for Phase I of scoping meeting and full consultations; determine broad strategy for remaining sectors on the list [WHCCTF/Agencies: early March]

Preliminary list: steel, airlines, electric utilities, aluminum, pulp & paper and cement; possibly buildings, autos, chemicals, fleets, electronics
 - Select a member of the Assistant Secretary Council to join each sector group [WHCCTF/Agencies: early March]

- Draft Sector Analyses for 6-8 sectors prepared and approved [Agency leads: second week of March]
- (4) Present work to Assistant Secretaries Council for discussion [WHCCTF/Agencies: second week of March]

II. Scoping Meetings (Phase 1 -- March; Phase 2 -- April - May; Phase 3 -- May - June)

Goal: To plan industry consultations in conjunction with representatives of each sector.

- (1) Establish contact with selected sector CEOs through calls and/or meetings with Cabinet members or other senior White House personnel. Timing might vary from sector to sector and could be held before or parallel to scoping meetings.
 - Contact at least two CEOs from each sector to assure their engagement. [WHCCTF: varies]
- (2) Hold a preliminary, scoping meeting with a subgroup of each industry sector leaders to help plan the full industry consultations. It will be important to have appropriate industry people at these meetings who have the ability to at least informally speak for their CEOs and/or industries.
 - Identify a small number of principal players in each sector from the private sector [Agency leads: early March]
 - Draft agenda for scoping meeting to include discussions on the structure of the consultations (agenda, questions, etc.), participants, and review of draft sector analyses [WHCCTF: early March]
- (3) The scoping meetings could probably be done in two weeks, holding about three each week. [WHCCTF/Agency teams: 3/15 - 3/30]
- (4) Roll-out event to lay out plans (vision, scope, time table)
 - Two parts: POTUS or VPOFUS meeting with CEOs followed by a larger briefing of DC representatives from key sectors [WHCCTF: mid to late March]
- (5) Input from labor and environmental groups is also highly desirable. Teams for these "sectors" will also be assembled, and their efforts will be incorporated into the industry consultations.

III. Industry Consultations (April -- August)

Goal: To encourage voluntary emissions reductions commitments from the industry sectors, improve understanding of technology opportunities, and identify and reduce barriers to these reductions.

- (1) Before the start of the Phase I consultations, the input from the scoping meetings should be incorporated into the Sector Analyses.
 - Finalize questions for industry and other inputs for consultations [WHCCTF/Asst Sec Council: 4/15]
 - Using the other documents, draft an options workbook matching barriers and potential opportunities with existing options available to sectors (inventory of Federal "carrots") [WHCCTF/Asst Sec Council: 4/15]
- (2) The actual industry consultations will involve as broad a participation within each sector as possible. The consultations will require a series of meetings. First, an industry kick-off to present charge to full industry membership. Second, meetings with Federal teams to review commitment plans and plan implementation. [Agency teams/WHCCTF: 1st set, end April - late May; 2nd set, July - early Aug.]
- (3) At the earliest appropriate time, the labor and environmental groups will be incorporated into the process. Their exact participation may vary from sector to sector.
- (4) We will also convene consultations with industries offering technological solutions in a way that informs and enhances the emission reduction agreements with emitting industries. These may take the form of separate meetings, depending on what works best with a given sector.
- (5) Industry teams will present draft agreements to the Assistant Secretary Council. [Agency leads: end August]

IV. Agreements and Follow-Up (September -- October)

Goal: To ensure agreements are finalized and set into motion.

- (1) The draft agreements will include responsibilities/activities for both industry and Federal agencies. The industry section will include their commitments on emissions reductions. The Federal agency section would include the help already available to sectors and potential agency actions to address barriers identified. Ideally, endorsements from labor, environments and some relevant state agencies will be

solicited. [Agency teams: September]

- (2) A roll-out event by senior administration officials with presentations by industry and by agencies. [Mid-October]
- (3) Continue work on remaining industries, beginning a second phase of scoping meetings and full industry consultations. [End of October]



White House Climate Change Task Force

734 Jackson Place, N.W. • Washington, DC 20503

FAX

To: Jonathan

Organization/Title:

Fax: 6-2215

Phone:

Pages (including cover): 11

Date:

From: Lisa McNeilly

Phone: 343-1091

Message:

Dirk promised a draft to Todd tonight.

INDUSTRY BY INDUSTRY CONSULTATIONS GAME PLAN

Draft: February 20, 1998

"We must continue to encourage key industry sectors to prepare their own greenhouse gas reduction plans. And we must...remove the barriers to the most energy efficient usage possible. There are ways the federal government can help industry to achieve meaningful reductions voluntarily, and we will redouble our efforts to do so."

-- President Clinton, October 22, 1997

I. INITIAL PREPARATIONS (present -- early March)

Goal: To prepare the Federal government to effectively engage the private sector.

(1) Prepare Sector Analyses to inform and guide the industry consultations, to coordinate agency interaction and to demonstrate the Federal commitment to this process.

- Finalize template for Sector Analyses (see attached document); analyses will include sections on sector emissions, options for emissions reductions, current sector activities, and barriers to or opportunities for emissions reductions.

WHCCTF: 2/23

- Draft Sector Analyses for 1-2 sectors; assignments made for agency leads for remaining sectors

Agencies (DOE/EPA): 2/23

- Draft questions to be addressed in consultations

WHCCTF: 2/23

(2) Establish Federal leadership structure

- Assemble an Assistant Secretary Council, with representatives of each relevant agency, to give oversight and guidance.

WHCCTF/Agencies: late February

- Establish technical teams from the agencies to be responsible for each sector

WHCCTF/Agencies: late February

(3) While consultations will occur with the full list of industries categorized in the scoping paper, initial meetings will proceed in a phased manner to immediately address those industries who are already close to making voluntary commitments to reduce emissions.

- Narrow the list of industries to 6-8 for Phase I of scoping meeting and full consultations; determine broad strategy for remaining sectors on the list

WHCCTF/Agencies: early March

Preliminary list: steel, airlines, electric utilities, aluminum, pulp & paper and cement; possibly buildings, autos, chemicals, fleets, electronics

- Select a member of the Assistant Secretary Council to chair each sector group

WHCCTF/Agencies: early March

- Draft Sector Analyses for 6-8 sectors prepared and approved

Agency leads: first week of March

- (4) Present work to Assistant Secretaries Council for discussion

WHCCTF/Agencies: early March

II. SCOPING MEETINGS WITH PHASE I INDUSTRY SECTORS (March)

Goal: To plan industry consultations in conjunction with representatives of each sector.

- (1) Hold a series of meetings with selected sector CEOs and Cabinet members or other senior White House personnel. Timing might vary from sector to sector and could be held before or parallel to scoping meetings.

- Meetings with at least two CEOs from each sector to assure their engagement.

WHCCTF: varies

- (2) Hold a preliminary, scoping meeting with a subgroup of each industry sector leaders to help plan the full industry consultations. It will be important to have appropriate industry people at these meetings who have the ability to at least informally speak for their CEOs and/or industries.

- Identify a small number of principal players in each sector from the private sector

Agency leads: early March

- Draft agenda for scoping meeting to include discussions on the structure of the consultations (agenda, questions, etc.), participants, and review of draft sector analyses

WHCCTF: early March

- (3) The scoping meetings could probably be done in two weeks, holding about three each week.

- Major outcomes: identify plan of action for sectors; draft "homework assignment" that would be completed by industry participants for each sector prior

to the consultations; tasks might involve bringing more information than is available in the Federal sector analyses or proposed new actions that could be taken

WHCCTF/Agency teams: 3/15 - 3/30

(4) Initially, the scoping meetings would be limited to those sectors identified for Phase I, although some preliminary work on additional sectors could proceed in a parallel, but protracted, time frame.

(5) Input from labor and environmental groups is also highly desirable. Teams for these "sectors" will also be assembled, and their efforts will be incorporated into the industry consultations.

III. INDUSTRY CONSULTATIONS (April -- August)

Goal: To encourage voluntary emissions reductions commitments from the industry sectors and identify and reduce barriers to these reductions.

(1) Before the start of the Phase I consultations, the input from the scoping meetings should be incorporated into the Sector Analyses.

- Finalize agendas, "homework assignments," and all other inputs for consultations
WHCCTF/Asst Sec Council: 4/15

- Using the other documents, draft an options workbook matching barriers and potential opportunities with existing options available to sectors; might also include general guidelines or minimum commitments desired
WHCCTF/Asst Sec Council: 4/15

(2) The actual industry consultations will involve as broad a participation within each sector as possible. The consultations will probably require a series of meetings, including possible sub-group meetings, for each sector, with agency and industry teams working in between meetings.

- A relatively detailed summary of each session will be prepared and made available to all participants.
Agency teams/WHCCTF: 1st set, end April - late May; 2nd set, July - early Aug.

(3) At the earliest appropriate time, the labor and environmental groups will be incorporated into the process. Their exact participation may vary from sector to sector.

(4) Industry teams will present draft agreements to the Assistant Secretary Council.
Agency leads: end August

IV. AGREEMENTS AND FOLLOW-UP (September -- October)

Goal: To ensure agreements are finalized and set into motion.

(1) The draft agreements will include both responsibilities/activities for industry and Federal agencies. The industry section will include their commitments on emissions reductions. The Federal agency section would include the help already available to sectors and potential agency actions to address barriers identified.

Agency teams: September

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Mid-October

(3) Continue work on remaining industries, beginning a second phase of scoping meetings and full industry consultations.

End of October

February 19, 1998
Predecisional Draft -- Not for Attribution

INDUSTRY BY INDUSTRY CONSULTATIONS

Background:

In his climate change address at the National Geographic Society auditorium on October 22, 1997, President Clinton challenged American industries to develop their own action plans, and he pledged for his Administration to work with state and local governments to remove any barriers to greater energy efficiency. In urging companies to take early action, the President also committed to ensure that firms receive appropriate credit for their achievements.

There are a number of industrial sectors that have expressed interest in working with the Administration on climate change policy, although some are more advanced in their thinking than others.

- The Task Force convened interagency meetings last fall with three sectors that were prepared to make proposals to the Administration: steel, cement and airlines. Renewable and energy efficiency firms continue to want to play a key role.
- Task Force staff had very productive individual meetings last fall with electric utilities, pulp and paper, natural gas and a couple of petroleum companies (BP, Sun). Although they are still trying to evaluate their posture toward the issue in the wake of the Kyoto agreement, there are progressive companies in each sector that we should engage soon to help influence the evaluations others are making.
- Since the Kyoto Conference, other key sectoral players have stepped forward to express interest in being involved: appliance manufacturers, chemicals and aluminum.
- Additionally, the Administration has good relations with a set of industry leaders active in the President's Council on Sustainable Development, DOE's Industries of the Future and Climate Challenge programs and EPA's "Green" and Climate Wise partnerships.

Besides these groups, there are other important industries that are likely to be interested in participating as this effort matures.

I. PROCESS

A. In General --

1. Goals

The consultations should maintain a clear focus on enabling industries to meet the President's challenge of developing voluntary action plans within nine months. *In fact, we could create a forum in the fall for firms to offer voluntary commitments to the President -- or the Vice President -- at a White House ceremony.*

Also, firms will be the most forthcoming if meetings are designed to --

- strategize on removing barriers;
- assure early credit;
- and inform federal policy development on --
 - the \$5 billion incentive package;
 - the emissions trading program design;
 - electric utility restructuring;
 - federal energy use; and
 - the ongoing international negotiations.

2. **CEO Vision** The consultations will be most successful if those active in the discussions have directions from their CEO's. (The alternative -- if they do not have CEO cover for what they are doing, they will be conservative.) Prior to meetings, a senior White House or Cabinet official [or a high-level former CEO] should speak with at least two key CEO's about the talks in order to assure their engagement.
3. **Crosscutting** We may need to consider a crosscutting effort to cut across all groups on some overall design questions. This could assure that each group benefits from lessons of the others, and it could help us achieve a coherent overarching policy structure. This particularly makes sense when thinking of the credit for early action and emissions trading discussions.
4. **Agencies** From the onset, the effort needs to take advantage of agency expertise and abilities, particularly their strengths to carry out follow-up actions.
5. **Time Line** A plan of action has been drafted that outlines actions and the responsible parties for four major activities: initial preparation, scoping meetings, industry consultations, and agreements and follow-up (see attached).

B. Operational Considerations

1. **Scoping Mtg.** We should convene a small "scoping group" to plan each consultation. It should contain a few select industry leaders combined with a few federal experts. It would review options for agenda, presenters and background materials -- although final decisions should be left to the federal team. This group can help strategize about the best way to frame questions, how much the effort should be defined in advance and how to ensure the best outcomes.
2. **Attendance** In these meetings, we should be inclusive of as many companies as possible -- although if it got above a dozen, we should develop a set of presenters, at-the-table participants and observers. Depending on our FACA requirements, the meetings would be more constructive if they were "off the record." It might also be useful to have a follow up meeting to vet any ideas with others involved with the sector (academics, labor leaders and public interest groups).

On the federal side, we should assemble expert teams from relevant

agencies (Energy, EPA, Commerce, Agriculture, Transportation, Defense, Interior, NASA, State, USTR, AID) and White House offices (NEC, CEQ, OSTP, OMB, NSC). We should select a leader for each federal sectoral team to help focus activities, drive the process and serve as a single point of contact.

3. **Homework** It would be best if we could provide each group with a "homework assignment" to complete prior to the meetings. They could determine what the industry's baseline was in 1990 (or 1995 for those gases), what the scenarios are for 2008 to 2012 and what actions could bring the greatest improvements on those scenarios. It could also be beneficial to review the industries' competitive situation in the international economy, its business trends (including energy and environment) and its research and development plans. Finally, given the high profile of "credit for early action" in the President's October speech, we need to consider whether to provide a clear signal of our thoughts at the outset -- in the form of general guidelines or minimum program standards.
4. **Agenda** Advance drafts of agendas should be crafted for each meeting. These should maximize opportunity for outside input -- encouraging the federal team to listen, question and learn.
5. **Reports** Each session should have a note-taker who writes a summary available for use by all participants and their superiors.
6. **Follow Up** The federal team should ensure that good ideas are submitted for expedited consideration in the policy process. Agencies should have primary responsibility to carry out follow-up activities, pursuant to their proper authorities, under coordination by White House offices.

II. SPECIFIC GROUPS

There are specific players in key industries that can provide important inroads into most of the major emissions sectors. I would recommend that we begin consultations with the groups that have already expressed interest (Phase I). As we build a track record of success, it will be easier to bring others on board.

Phase I Sectors

Energy Intensive Industries

Seven industries emit 80 percent of the greenhouse gases from the industrial sector (which is a full third of the emissions from end use sectors). Four of these are being considered for inclusion in the first phase of consultations. In addition, the carbon dioxide released during the calcification process means that the cement industry is also included here.

1. **Steel** The industry -- led by Bethlehem, USX, Inland, LTV, North Star-- already offered 10% cut by 2010 conditioned on flexibility to do it in any gas, source or sink, at home or abroad.
2. **Aluminum** This industry has an R&D partnership with DOE and a voluntary reduction program with EPA on N_2O . Alcoa has already asked to be involved in consultations.

3. **Pulp and Paper** Georgia Pacific and Weyerhaeuser seem to be leading the industry toward a progressive stance, especially given their unique position as sink enhancers and biomass cogenerators.
4. **Chemicals** The "Kevin Fay" group, including Dupont, ICI Klee, Allied Signal and BP Chemicals, should be a natural. And in the non-CFC world, Dow and Air Products seem interested in working with us.
5. **Cement** Two key manufacturers -- Holnam and Southdown -- already advocate changes in federal cement specifications and state/local building and road construction code changes that could save 5 - 15% below 1990.

Electric Utilities/Fuels/Buildings

Electric utility emissions comprise one-third of U.S. source emissions. The fuels producer and building sectors crosscut all the industry sectors listed, but none of the fuels producers are likely to be addressed during this first phase.

6. **Electrics** The "Climate Challenge" has several hundred electric utilities already participating in voluntary reduction programs. In addition, with utility restructuring on the horizon -- or actually in progress in some states -- most progressive utilities are interested in working out a deal that provides certainty for their investors and brandishes their "brand name" with a green image. There are some great companies to work with -- AEP, PacifiCorp, Niagara Mohawk, PSE&G, Tucson Electric, WEPCO, Duke, Texas Utilities, Arizona Public Service Co., Entergy, LA Dept. Of Water and Power, to name a few. Climate Challenge benefitted from involvement from the Large Public Power Council as well as the three major trade associations (EEL, APPA and NRECA). We also need to engage the independent power producers -- like Enron, Trigen, AES and US Generating-- and the rural electric cooperatives.
7. **Buildings** The buildings sector also represents about one-third of U.S. emissions, and there are currently several government efforts (DOE, EPA) underway to reduce emissions (e.g., Energy Star, PATH, Green Lights, etc.). This crosscutting sector might require a slightly different framework for these consultations.

Transportation

The transportation sector represents a final third of U.S. end use emissions. Especially in the case of automobiles, the presence of so many individual emitters will prove extremely challenging.

8. **Airlines** Their major concern (referral of airplane specifications to the International Civil Aeronautics Organization) was taken care of in Kyoto, and we need to move forward on follow up. Also, this industry proposed some significant reductions that could be achieved with some air traffic control upgrades. A Mitre Corp. analysis concluded that a 10% reduction below 1990 was possible. It is currently under evaluation by expert agencies, and it would be worth consultations regarding follow-up action. We could build on support apparent from US Air, United, UPS and Boeing.
9. **Automobiles** Recent changes are encouraging -- and we should continue to take advantage of every opportunity to integrate climate into the PNGV work. Also, we should engage

the wide variety of manufacturers that will be covered by our policy work, including Nissan, Toyota, Honda, etc.

10. **Fleets** Federal and state governments, the Postal Service and several private firms (e.g. UPS, Fed Ex) have large fleets of vehicles whose emissions could be improved and who have various programs already in place.

Future Growth Industries

Industry sectors whose emissions are projected to rise in the future also need to be a part of the consultations.

11. **Telecomm/ Electronics** On the opportunity side, information technologies tend to show up on among the solutions to climate change -- whether it be from advanced energy controls, telecommuting or manufacturing advances (remember, Northern Telecom's action on CFCs). They use the CFC substitutes and like to cultivate "green" images -- so it may be possible to build on the commitments between EPA and AT&T, Motorola, Intel, IBM, Northern Telecom, Lockheed Martin and others.

Phase II Sectors

Energy Intensive Industries

12. **Glass** This industry has an R&D partnership with DOE, and it has an interesting role on the products side with energy efficient windows and fiberglass insulation.
13. **Foundries** This industry recently entered one of the DOE R&D partnerships, but it is more difficult to penetrate. These firms tend to be small "mom and pop" outfits, and they are in greater number than some of the other energy intensive industries. The Foundrymen organizations to provide a good entry point, and they should not be left out.
14. **Refineries** This sector has changed a great deal over the past several years. BP and Sun are important players that have offered support for our policies. Most of this sector will oppose us instinctively, but we should be able to interest Arco, Amoco, Chevron and Citgo. I think Texaco, Mobil and Ultramar/Diamond Shamrock (now one of our largest domestic refiners) will be tougher -- and Exxon may be impossible, especially with its coal holdings.

Electric Utilities/Fuels/Buildings

15. **Natural Gas** The American Gas Association, led by Brooklyn Union, PSE&G and Pacific Enterprises (So. Cal. Gas), offered a proposed action plan for the gas sector. The Interstate Natural Gas Association (the major pipeline group that includes Enron, Columbia, Pan Energy/Duke, Coastal) adopted a set of climate principles that corresponded closely with the President's own agenda. INGA also supported the President's announcement and has asked for a chance to come in to work with us on specific policies.
16. **Renewables** These groups -- solar, wind, geothermal, biomass (and to a lesser extent hydro) -- support the President's plan and want to be helpful. As part of the Sustainable Energy Coalition, they have offered several proposals for federal incentives. We should follow up.

17. Efficiency These groups -- including firms like Honeywell, Johnson Controls, 3M, Owens Corning, Johns Manville, American Standard/Trane, Allied Signal and the Polysyanurate Insulation Manufacturers -- are likely supporters. Some of these firms should be more open to offering support as our incentive program details get firmed up -- and in light of the new posture of some automobile manufacturers (who tend to be big customers of efficiency technology firms).

18. Mining There is some progressive thinking apparent at Kennecott, A.T. Massey and PacifiCorp (in addition to being a progressive utility, they are the #10th largest coal mining company in the US -- and they are poised to by #1 Peabody, subject to approvals). Although the total picture is dim for coal, there are opportunities for them to ease the degree of impact -- with methane capture, tree planting, international offsets, etc.

Transportation

19. Railroads The impact on coal is a major concern for them -- but they have interests in advanced locomotives, mass transit and high speed rail.

Other

20. Appliances This is one of the few sectors where DOE retains significant regulatory authority under the Energy Policy Act -- and the American Home Appliance Association (GE, Whirlpool, Maytag, Electrolux/Frigidaire, Amana) have offered a proposal to improve capital stock turnover by consumers. We should follow up.

21. Vendors There are a number of firms with expertise as energy and environmental technology vendors -- like Westinghouse, General Electric, Sargent & Lundy, Lockheed Martin, CH2M Hill, Babcock & Wilcox, etc. They could have great advice for us on a wide range of industrial operations -- including advanced gas turbines, nuclear power and clean coal technologies. It may be useful to find a way to use this group in a constructive way with some of the other sectors.

22. Agriculture This sector has instinctively opposed us, even though their climate risks could be large (droughts, floods, etc.). They have some interesting opportunities with biofuels. They deserve special attention as we plan our outreach. We should try to include fertilizer suppliers (Monsanto, DuPont), processors (ADM, Cargill), distributors (J.B. Hunt trucking?), retailers, wholesalers and producers (rice, livestock, poultry, pork, etc.).

Ind. by Ind. ~~Antitrust~~
Steel

Global Climate Change and the Steel Industry

Why is the issue important to steel?

What are the key steel industry issues for U.S. global climate policy?

What has the industry done to help reduce greenhouse gas emissions?

What additional voluntary reductions can the steel industry achieve?

What can government do to help the industry achieve emission reduction goals?

Why is the issue important to steel?

Steelmaking is energy intensive and largely coal-based

- ◆ 3% of U.S. energy consumption; 10% of industrial consumption
- ◆ 60% derived from coal to produce coke for conversion of iron ore to iron
- ◆ No feasible alternatives to coal or other carbon-based fuels
- ◆ Electricity another 7% of industry energy consumption, >50% at some EAF plants
- ◆ Coal-based power plants generate much of the electricity consumed
- ◆ Energy purchases represent 15-20% of steel manufacturing costs

Steel industry has made major investments in energy conservation

- ◆ **Steelmaking is heavily capital intensive with long capital stock turnovers**
- ◆ **Improvements achieved principally through large capital investments**
 - **Phased out Open Hearth furnaces**
 - **Increased continuous casting**
 - **Blast Furnace substitutes for coke**
 - **New ironmaking technologies**
 - **Increased use of Electric Furnaces**
 - **New Electric Furnace processing technologies**
 - **Improved reheat furnace technology**
- ◆ **Reductions also from better energy management**
- ◆ **Industry has accomplished 45% reduction in energy consumption since 1975**
- ◆ **Reductions accomplished without mandates or energy taxes**

But pace of reductions is slowing, further reductions more difficult to obtain

- ◆ Continuous casting approaching 100%
- ◆ Scrap availability & quality may limit use of Electric Furnaces
- ◆ Wider use of scrap substitutes will limit Electric Furnace energy benefits
- ◆ Blast furnace coke substitution has limits
- ◆ Investment costs compete with need to modernize, meet customer demands
- ◆ Demand for higher value steel products
- ◆ Raw steel production has been flat, growth expected
- ◆ Additional environmental control requirements

Economic consequences could be devastating for domestic steel industry

- ◆ Increased energy prices suggested as only way to achieve significant national reductions
- ◆ Steel industry energy prices would double (>\$5 billion/year)
- ◆ Argonne study
 - Substantial increase in manufacturing costs (\$39-128/ton)
 - Significant shift of production to developing countries (30%)
 - Commensurate loss of U.S. steelmaking jobs (100,000)
 - Distorts balance between steelmaking sectors
- ◆ ESI study
 - Reduced domestic demand (21%) and shipments (30%)
 - Decreased exports (26%), increased imports (14%)

Developing countries are major competitors for U.S. steel makers

- ◆ 4 of top 10 steelmaking countries are not Annex 1 countries
- ◆ China, Korea, India, Brazil (plus Mexico, not in top 10)
- ◆ China largest, among least energy efficient, fastest growing
- ◆ Shifting production has no positive environmental benefit, likely negative
- ◆ Major trade problems with former Soviet bloc
- ◆ Concerns with EU bubble

What are the key steel industry issues for U.S. global climate policy?

A global solution is needed

- ◆ Commitments needed from both developed and developing countries
- ◆ Major steel competitors are developing nations

Maximum flexibility is needed in achieving any goals

- ◆ Voluntary programs/commitments
- ◆ Emission trading schemes - monitoring, enforcement issues
- ◆ Joint implementation, technology transfer, R&D incentives
- ◆ Recognition of progress to date

Taxes and energy reduction mandates should be avoided

- ◆ Distort markets
- ◆ Threaten competition
- ◆ Reduce capital, self-defeating

Science must lead policy

What has the industry done to help reduce greenhouse gas emissions?

More effective utilization of materials

- ◆ Recycling of waste oxides - sinter plants, other processes
- ◆ Coke substitutes in Blast Furnaces
- ◆ Recycling of coke oven wastes to coke ovens
- ◆ Increased utilization of slags
- ◆ Increased scrap utilization - dezincing, e.g.
- ◆ Recovery of waste heat & energy

Improved energy efficiency in existing processes

- ◆ Increased utilization of continuous casting - approaching 100%
- ◆ Moved toward more continuous processing generally
- ◆ Energy conservation projects, better energy mgt. - info transfer, measurement

Other in-plant efforts to reduce emissions

- ◆ **Reduced energy for lighting (Green Lights)**
- ◆ **Improved environmental performance generally**
- ◆ **Reduction of in-plant traffic**

Development & implementation of new technology

- ◆ **Development of new ironmaking technologies**
- ◆ **Development of waste oxide smelting process**
- ◆ **Development of strip casting and thin strip casting**
- ◆ **Electric Furnace processing advances**
 - **DC furnaces, shaft furnaces**
 - **Ladle refining**
 - **Oxygen injection, oxy-fuel burners**
- ◆ **Refractory research**

Employee & community awareness & education programs

Product-related emission reduction efforts

- ◆ **Auto-Steel Partnership, USAMP life-cycle activities**
- ◆ **Participation in PNGV**
- ◆ **Development of ultra-light steel auto body (ULSAB)**
- ◆ **Promotion of steel recycling - formation of Steel Recycling Institute**
- ◆ **Promotion of steel in residential housing - more energy efficient, saves trees**
- ◆ **Improved electrical efficiencies for steels in electrical equipment**

What additional voluntary reductions can the steel industry achieve?

More effective utilization of materials

- ◆ Increased waste oxide utilization
- ◆ Greater scrap utilization
- ◆ Fuel substitution

Improve energy efficiency of existing processes

- ◆ More direct hot charging of mills
- ◆ Progress toward more continuous processing
- ◆ Increased waste heat recovery, co-generation
- ◆ Other low-grade energy recovery
- ◆ Install variable speed drives where feasible
- ◆ Fuel substitution

Other in-plant efforts to reduce emissions

- ◆ Increase participation in existing voluntary programs
- ◆ Reduce plant traffic
- ◆ Convert plant vehicles to low-emission units
- ◆ Plant vegetation

Develop and install new technologies

- ◆ Install more alternative ironmaking processes
- ◆ Increase R&D to reduce energy or CO₂ emissions
- ◆ Retire & replace existing processing units with more efficient technologies

Increase employee & community awareness & education of energy reduction & recycling

Product-related emission reduction efforts

- ◆ **Seek energy reductions through steel solutions**
 - **Autos**
 - **Construction, Infrastructure**
 - **Appliances**
 - **Containers**
- ◆ **Reduce energy associated with transportation of steel products**
- ◆ **Promote life-cycle benefits of steel**
- ◆ **Increase emphasis on steel recycling**

**Overall steel industry expectation
of at least 10% greenhouse gas emission reduction
below 1990 levels by 2010
through voluntary efforts**

What can government do to help the steel industry achieve emission reduction goals?

- ◆ Recognize uncertainties; avoid overstatement, exaggeration
- ◆ Work toward more cost-effective environmental controls, laws, & regulations
- ◆ Support electricity competition & customer choice
- ◆ Recognize the benefits of and promote voluntary programs
- ◆ Provide assistance and incentives for R&D and installation of energy-efficient & CO2 reduction processes/technologies
- ◆ Provide incentives for development of renewable energy, CO2 sinks
- ◆ Promote joint implementation, technology transfer, flexibility
- ◆ Promote energy efficiency labeling
- ◆ Promote life-cycle analysis in procurement policies
- ◆ Develop safe, economical nuclear power
- ◆ Include all greenhouse gas emissions in efforts to address issue

Domestic
Industry &
Industry**White House Climate Change Task Force**

333 Jackson Place, N.W. • Washington, DC 20503

FAX

To: Dirk Ferrister ^{Guest} (pls. hold if he has not yet arrived)

Organization/Title:**Fax:** 970 496 4215**Phone:****Pages (including cover):** 10**Date:****From:** Lisa McNeilly**Phone:** 202 343 1091**Message:**

A work in progress

cc: Jonathan
456-2215

INDUSTRY BY INDUSTRY CONSULTATIONS GAME PLAN

Draft: February 19, 1998

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Agencies (DOE/EPA): 2/23

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Agency leads: first week of March

- (3) Present work to Assistant Secretaries Steering Board for discussion
WHCCTF/Agencies: early March

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- Identify a small number of principal players in each sector from both the private and Federal sectors

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- Finalize agendas, "homework assignments," and all other inputs for consultations
Federal lead, WHCCTF and Asst Sec group: 4/15

- Using the other documents, draft an options workbook matching barriers and potential opportunities with existing options available to sectors; might also include general guidelines or minimum commitments desired
Federal lead, WHCCTF and Asst Sec group: 4/15

(2) The actual industry consultations will involve as broad a participation within each sector as possible. The consultations will probably require a series of meetings, including possible sub-group meetings, for each sector, with agency and industry teams working in between meetings.

Federal lead, WHCCTF: 1st set, end April - late May; 2nd set, July - early Aug.

(3) At the earliest appropriate time, the labor and environmental groups will be incorporated into the process. Their exact participation may vary from sector to sector.

(4) Industry teams will present draft agreements to the Assistant Secretary Steering Board.

Agency leads: end August

IV. AGREEMENTS AND FOLLOW-UP (September -- October)

Goal: To ensure agreements are finalized and set into motion.

(1) The draft agreements will include both responsibilities/activities for industry and Federal agencies. The industry section will include their commitments on emissions reductions. The Federal agency section would include the help already available to sectors and potential agency actions to address barriers identified.

Agency teams: September

(2) A roll-out event with presentations by industry and by agencies.

Mid-October

(3) Continue work on remaining industries, beginning a second phase of scoping meetings and full industry consultations.

End of October

February 19, 1998
Predecisional Draft -- Not for Attribution

INDUSTRY BY INDUSTRY CONSULTATIONS

Background:

In his climate change address at the National Geographic Society auditorium on October 22, 1997, President Clinton challenged American industries to develop their own action plans, and he pledged for his Administration to work with state and local governments to remove any barriers to greater energy efficiency. In urging companies to take early action, the President also committed to ensure that firms receive appropriate credit for their achievements.

There are a number of industrial sectors that have expressed interest in working with the Administration on climate change policy, although some are more advanced in their thinking than others.

- The Task Force convened interagency meetings last fall with three sectors that were prepared to make proposals to the Administration: steel, cement and airlines. Renewable and energy efficiency firms continue to want to play a key role.
- Task Force staff had very productive individual meetings last fall with electric utilities, pulp and paper, natural gas and a couple of petroleum companies (BP, Sun). Although they are still trying to evaluate their posture towards the issue in the wake of the Kyoto agreement, there are progressive companies in each sector that we should engage soon to help influence the evaluations others are making.
- Since the Kyoto Conference, other key sectoral players have stepped forward to express interest in being involved: appliance manufacturers, chemicals and aluminum.
- Additionally, the Administration has good relations with a set of industry leaders active in the President's Council on Sustainable Development, DOE's Industries of the Future and Climate Challenge programs and EPA's "Green" and Climate Wise partnerships.

Besides these groups, there are other important industries that are likely to be interested in participating as this effort matures.

L PROCESS

A. In General --

1. **Goals**

The consultations should maintain clear focus on enabling industries to meet the President's challenge of developing voluntary action plans within nine months. *In fact, we could create a forum in the fall for firms to offer voluntary commitments to the President -- or the Vice President -- at a White House ceremony.*

Also, firms will be the most forthcoming if meetings are designed to --

- strategize on removing barriers;
- assure early credit;
- and inform federal policy development on --
 - the \$5 billion incentive package;
 - the emissions trading program design;
 - electric utility restructuring;
 - federal energy use; and
 - the ongoing international negotiations.

2. **CEO Vision** The consultations will be most successful if those active in the discussions have directions from their CEO's. (The alternative -- if they do not have CEO cover for what they are doing, they will be conservative.) Prior to meetings, a senior White House or Cabinet official [or the Industry Czar] should speak with at least two key CEO's about the talks in order to assure their engagement.
3. **Crosscutting** We may need to consider a cross-cutting effort to cut across all groups on some overall design questions. This could assure that each group benefits from lessons of the others, and it could help us achieve a coherent overarching policy structure. This particularly makes sense when thinking of the credit for early action and emissions trading discussions.
4. **Agencies** From the onset, the effort needs to take advantage of agency expertise and abilities, particularly their strengths to carry out follow-up actions.
5. **Time Line** A plan of action has been drafted that outlines actions and the responsible parties for four major activities: initial preparation, scoping meetings, industry consultations, and agreements and follow-up (see attached).

B. Operational Considerations

1. **Scoping Mtg.** We should convene a small "scoping group" to plan each consultation. It should contain a few select industry leaders combined with a few federal experts. It would review options for agenda, presenters and background materials -- although final decisions should be left to the federal team. This group can help strategize about the best way to frame questions, how much the effort should be defined in advance and how to ensure the best outcomes.
2. **Attendance** In these meetings, we should be inclusive of as many companies as possible -- although if it got above a dozen, we should develop a set of presenters, at-the-table participants and observers. Depending on our FACA requirements, the meetings would be more constructive if they were "off the record." It might also be useful to have a follow up meeting to vet any ideas with others involved with the sector (academics, labor leaders and public interest groups).

On the federal side, we should assemble expert teams from relevant

agencies (Energy, EPA, Commerce, Agriculture, Transportation, Defense, Interior, NASA, State, USTR, AID) and White House offices (NEC, CEQ, OSTP, OMB, NSC). We should select a leader for each federal sectoral team to help focus activities, drive the process and serve as a single point of contact.

3. **Homework** It would be best if we could provide each group with a "homework assignment" to complete prior to the meetings. They could determine what the industry's baseline was in 1990 (or 1995 for those gases), what the scenarios are for 2008 to 2012 and what actions could bring the greatest improvements on those scenarios. It could also be beneficial to review the industries competitive situation in the international economy, its business trends (including energy and environment) and its research and development plans. Finally, given the high profile of "credit for early action" in the President's October speech, we need to consider whether to provide a clear signal of our thoughts at the outset -- in the form of general guidelines or minimum program standards.
4. **Agenda** Advance drafts of agendas should be crafted for each meeting. These should maximize opportunity for outside input -- encouraging the federal team to listen, question and learn.
5. **Reports** Each session should have a note-taker who writes a summary available for use by all participants and their superiors.
6. **Follow Up** The federal team should ensure that good ideas are submitted for expedited consideration in the policy process. Agencies should have primary responsibility to carry out follow-up activities, pursuant to their proper authorities, under coordination by White House offices.

II. SPECIFIC GROUPS

There are specific players in key industries that can provide important in-roads into most of the major emissions sectors. I would recommend that we begin consultations with the groups that have already expressed interest (Phase I). As we build a track record of success, it will be easier to bring others on board.

Phase I Sectors

Energy Intensive Industries

Seven industries emit 80 percent of the greenhouse gases from the industrial sector. Four of there are being considered for inclusion in the first phase of consultations as industries that have expressed early interest. In addition, the carbon dioxide released during the calcification process means that the cement industry is also included here.

1. **Steel** The industry -- led by Bethlehem, USX, Inland, LTV, North Star-- already offered 10% cut by 2010 conditioned on flexibility to do it in any gas, source or sink, at home or abroad.
2. **Aluminum** This industry has an R&D partnership with DOE and a voluntary reduction program with EPA on N_2O . Alcoa has already asked to be involved in consultations.

3. **Pulp and Paper** Georgia Pacific and Weyerhaeuser seem to be leading the industry toward a progressive stance, especially given their unique position as sink enhancers and biomass cogenerators.
4. **Chemicals** The "Kevin Fay" group, including Dupont, ICI Klee, Allied Signal and BP Chemicals, should be a natural. And in the non-CFC world, Dow and Air Products seem interested in working with us.
5. **Cement** Two key manufacturers -- Holnam and Southdown -- already advocate changes in federal cement specifications and state/local building and road construction code changes that could save 5 - 15% below 1990.

Electric Utilities/Fuels/Buildings

Utility emissions comprise one-third of U.S. emissions. The fuels producers and buildings sectors cross-cut all the sectors listed, but none of the fuels producers will probably be addressed during this first phase.

6. **Electrics** The "Climate Challenge" has several hundred electric utilities already participating in voluntary reduction programs. In addition, with utility restructuring on the horizon -- or actually in progress in some states -- most progressive utilities are interested in working out a deal that provides certainty for their investors and brandishes their "brand name" with a green image. There are some great companies to work with -- AEP, PacifiCorp, Niagara Mohawk, PSE&G, Tucson Electric, WEPCO, Duke, Texas Utilities, Arizona Public Service Co., Entergy, LA Dept. Of Water and Power, to name a few. Climate Challenge benefitted from involvement from the Large Public Power Council as well as the three major trade associations (EEL, APPA and NRECA). We also need to engage the independent power producers -- like Enron, Trigen, AES and US Generating-- and the rural electric cooperatives.
7. **Buildings** The buildings sector also represents about one-third of U.S. emissions, and there are currently several government efforts underway to reduce emissions at DOE and EPA (Energy Star, PATH, Green Lights, etc.).

Transportation

The transportation, with so many individual emitters, will prove extremely challenging.

8. **Airlines** Their major concern (referral of airplane specifications to the International Civil Aeronautics Organization) was taken care of in Kyoto, and we need to move forward on follow up. Also, this industry proposed some significant reductions that could be achieved with some air traffic control upgrades. A Mitro Corp. analysis concluded that a 10% reduction below 1990 was possible. It is currently under evaluation by expert agencies, and it would be worth consultations regarding follow-up action. We could build on support apparent from US Air, United, UPS and Boeing.
9. **Automobiles** Recent changes are encouraging -- and we should continue to take advantage of every opportunity to integrate climate into the PNGV work. Also, we should engage the wide variety of manufacturers that will be covered by our policy work, including

Nissan, Toyota, Honda, etc.

10. **Fleets** Federal and state governments, the Postal Service and several private firms (e.g. UPS, Fed Ex) have large fleets of vehicles whose emissions could be improved.

Future Growth Industries

Industry sectors whose emissions growth are projected to rise in the future also need to a part of the consultations.

11. **Telecomm/ Electronics** On the opportunity side, information technologies tend to show up on among the solutions to climate change -- whether it be from advanced energy controls, telecommuting or manufacturing advances (remember, Northern Telecom's action on CFCs). They use the CFC substitutes and like to cultivate "green" images -- so it may be possible to build on the commitments between EPA and AT&T, Motorola, Intel, IBM, Northern Telecom, Lockheed Martin and others.

Phase II Sectors

Energy Intensive Industries

12. **Glass** This industry has an R&D partnership with DOE, and it has an interesting role on the products side with energy efficient windows and fiberglass insulation.
13. **Foundries** This industry recently entered one of the DOE R&D partnerships, but it is more difficult to penetrate. These firms tend to be small "mom and pop" outfits, and they are in greater number than some of the other energy intensive industries. The Foundrymen organizations to provide a good entry point, and they should not be left out.

Electric Utilities/Fuels/Buildings

14. **Natural Gas** The American Gas Association, led by Brooklyn Union, PSE&G and Pacific Enterprises (So. Cal. Gas), offered a proposed action plan for the gas sector. The Interstate Natural Gas Association (the major pipeline group that includes Enron, Columbia, Pan Energy/Duke, Coastal) adopted a set of climate principles that corresponded closely with the President's own agenda. INGA also supported the President's announcement and has asked for a chance to come in to work with us on specific policies.
15. **Refineries** This sector has changed a great deal over the past several years. BP and Sun are important players that have offered support for our policies. Most of this sector will oppose us instinctively, but we should be able to interest Arco, Amoco, Chevron and Citgo. I think Texaco, Mobil and Ultramar/Diamond Shamrock (now one of our largest domestic refiners) will be tougher -- and Exxon may be impossible, especially with its coal holdings.
16. **Renewables** These groups -- solar, wind, geothermal, biomass (and to a lesser extent hydro) -- support the President's plan and want to be helpful. As part of the Sustainable Energy Coalition, they have offered several proposals for federal incentives. We should follow up.
17. **Efficiency** These groups -- including firms like Honeywell, Johnson Controls, 3M, Owens

Corning, Johns Manville, American Standard/Trane, Allied Signal and the Polysulfate Insulation Manufacturers -- are likely supporters. Some of these firms should be more open to offering support as our incentive program details get firmed up -- and in light of the new posture of some automobile manufacturers (who tend to be big customers of efficiency technology firms).

18. Mining

There is some progressive thinking apparent at Kennecott, A.T. Massey and PacifiCorp (in addition to being a progressive utility, they are the #10th largest coal mining company in the US -- and they are poised to buy #1 Peabody, subject to approvals). Although the total picture is dim for coal, there are opportunities for them to ease the degree of impact -- with methane capture, tree planting, international offsets, etc.

Transportation

19. Railroads

The impact on coal is a major concern for them -- but they have interests in advanced locomotives, mass transit and high speed rail.

Other

20. Appliances

This is one of the few sectors where DOE retains significant regulatory authority under the Energy Policy Act -- and the American Home Appliance Association (GE, Whirlpool, Maytag, Electrolux/Frigidaire, Amana) have offered a proposal to improve capital stock turnover by consumers. We should follow up.

21. Vendors

There are a number of firms with expertise as energy and environmental technology vendors -- like Westinghouse, General Electric, Sargent & Lundy, Lockheed Martin, CH2M Hill, Babcock & Wilcox, etc. They could have great advice for us on a wide range of industrial operations -- including advanced gas turbines, nuclear power and clean coal technologies. It may be useful to find a way to use this group in a constructive way with some of the other sectors.

22. Agriculture

This sector has instinctively opposed us, even though their climate risks could be large (droughts, floods, etc.). They have some interesting opportunities with biofuels. They deserve special attention as we plan our outreach. We should try to include fertilizer suppliers (Monsanto, DuPont), processors (ADM, Cargill), distributors (J.B. Hunt trucking?), retailers, wholesalers and producers (rice, livestock, poultry, pork, etc.).

Domestic Policy /
~~Domestic~~
Industry by Industry
Aluminum

Attach
- company
statements

**GLOBAL CLIMATE CHANGE:
TECHNICAL ASSESSMENT OF NEEDS
AND ISSUES**

Jonathan -
we need to
talk ~~back~~
to get
straight
on this
T

Prepared by the staff of
The Aluminum Association
900 19th Street, N.W.
Washington, DC 20006



February 2, 1998

Global Climate Change: Technical Assessment of Needs and Issues

Background

In October 1996, then Secretary of Energy Hazel O'Leary and David Parker, president of The Aluminum Association acting on behalf of the aluminum industry, signed a collaborative agreement to work together under the Industries of the Future Program. This industry-led partnership enables the aluminum industry and the federal government to align their R&D efforts to achieve common objectives. The partnership focuses on the development of precompetitive efforts in the general areas of process, health and safety, enabling technologies, and the growth of new applications for aluminum.

In outlining its long-term vision, the industry established a goal "To maintain and grow the aluminum industry through the manufacture and sale of competitively priced, socially desirable and ecologically sustainable products."

Under the sponsorship of The Aluminum Association's Technical Advisory Committee, the industry worked collaboratively with stakeholders from the government, the national laboratories, the academic community and consultants to establish a technology roadmap for the next 25 years. Following a workshop in November 1996, the association published an Aluminum Roadmap Workshop Report in February 1997, and a more conventional Technology Roadmap in May 1997.

Technology Roadmap - Key R&D Activities

The production of aluminum utilizes an electrolytic process which is energy intensive. In fact, electricity accounts for about one-third of the cost of production and is one of the primary factors in product affordability. It is not surprising, therefore, that one of the key long-term issues identified in the technology roadmap is the development of technologies to reduce the amount of energy required to produce a kilogram of molten aluminum. This, in turn, would result in lower emissions of greenhouse gas, i.e. carbon dioxide. Specifically, the roadmap establishes an energy target of 11kWh/Kg (5kWh/LB) for the production of aluminum by the year 2020.

To achieve this target, it was envisioned that the industry would require improved process sensors, better models for cell operation and control, improved materials for cell insulation, and advanced anode and cathode technology which could be retrofittable into existing potlines. In fact, the development of an inert anode and/or a wettable cathode was considered the most critical.

Global Climate Change: Technical Assessment of Needs and Issues

Inert Anode Technology Workshop

The successful development of an inert anode technology would have other major benefits: it would eliminate the need to process carbon anode materials, which has related environmental issues, and it would eliminate the formation of PFCs during anode effects.

Adopting the format of a facilitated workshop, the association convened a panel of experts on December 11, 1997, to define the critical R&D needs for inert anode technology. A draft workshop report will be available in late January.

This report will define the key criteria for a successful anode material as well as establish a step by step program for the development of inert anode technology. The workshop participants concluded that once a program was started, the successful demonstration of inert anode technology could be achieved somewhere in a time frame of 9 to 14 years.

Wettable Cathode Technology

The development of a wettable cathode material is the other major advancement that would significantly improve the energy efficiency of aluminum smelting, and, hence impact global climate change. The cathode can be made wettable by the incorporation of refractory hard materials such as titanium diboride, TiB_2 , into its structure. This can be achieved either as a monolithic or composite material. Such a material would enable the development of cell designs incorporating drained cathodes where the molten metal pad could be eliminated, the anode cathode distance significantly reduced without any adverse effect on current efficiency, and the energy efficiency improved.

Building on earlier work first by Kaiser and later by Martin Marietta Aluminum, it now appears that Comalco has made major progress in the development of advanced cathodes. It is understood that Comalco has achieved successful operation of low energy cells through the use of cells containing TiB_2 cathodes. No information is yet available on the economics of this development.

In the discussions of inert anode technology outlined above, the anode development was considered as a separate entity. However, it is likely that the cathode technology will precede the anode developments, and that some combined novel cell design will be possible. It has been estimated that the combination of a successful inert anode with a drained cathode technology could result in an energy efficiency improvement of approximately 25%. This would enable the industry to reach the roadmap target of 11kWh/Kg (5kWh/LB). Operation of this type of cell would also eliminate the formation of greenhouse gases, such as CO_2 , CF_4 , and C_2F_6 .

Global Climate Change: Technical Assessment of Needs and Issues

A Potential Roadmap for Automotive Technologies

Based on the understanding that the industry/government partnership can result in the successful definition of integrated R&D plans, the Department of Energy, through its Office of Transportation Technology, is now requesting the development of a more specific technology roadmap for aluminum automotive applications.

This can be undertaken using the same workshop format. It will require the convening of several groups of technical experts in areas such as sheet formability, joining, simulation and modeling, design, etc., to define a roadmap. The Aluminum Association's Auto and Light Truck Committee endorses this activity. It is anticipated that the Auto and Light Truck Committee, working with the Department of Energy and USCAR, will sponsor this effort.

The use of increasing quantities of light weight aluminum in automotive applications could have a major beneficial impact on efforts to reduce the production of carbon dioxide from cars. An industry-wide program to address the increasing amounts of automotive scrap and its separation should also be developed.

The Need for Metrics

These potential developments, together with the debate on global climate change, underscore the need for a system of metrics to measure the energy efficiency of our processes and the environmental burdens created during production operations. In this regard, the study being conducted by the Life Cycle Task Force will be most timely in providing a comprehensive baseline of the present status of the industry.

Under Co-Chairs Ken Martchek (Alcoa) and Steve Pomper (Alcan), this task force has almost completed its life cycle inventory; only a peer review of the methodologies remains to be conducted. The analysis will provide the most comprehensive data base yet produced on energy and environmental issues for the industry from bauxite mining through the production of ingot and rolled and extruded products. It includes information from 10 companies and some 213 process/location sites out of a possible 253 sites.

Another excellent source of information concerning the industry is the recent publication by the Department of Energy entitled "Energy and Environmental Profile of the U.S. Aluminum Industry," which was published in July 1997.

Global Climate Change: Technical Assessment of Needs and Issues

Concluding Remarks

To date, two conclusions are apparent:

- The Industries of the Future Partnership has provided a vehicle for the precompetitive collaboration and definition of generic technology needs. A focused, long-term R&D agenda is emerging and is supported by the DOE.
- With the light weight and other properties of aluminum, the industry appears to have great potential to provide solutions to societal needs relating to climate change.

Government and industry efforts to address Global Climate Change should not be focused only on extending the limits of existing technologies. All industries should assess the theoretical limits of technological changes that could be made in their operations. In the aluminum sector, direct reduction of bauxite or a continuous smelting process are examples of revolutionary technologies that should be explored.

February 11, 1998
Predecisional Draft -- Not for Attribution

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15. Aluminum This industry has an R&D partnership with DOE and a voluntary reduction program with EPA on N_2O . Alcoa has already asked to be involved in consultations.
16. Glass This industry has an R&D partnership with DOE, and it has an interesting role on the products side with energy efficient windows and fiberglass insulation.
17. Foundries This industry recently entered one of the DOE R&D partnerships, but it is more difficult to penetrate. These firms tend to be small "mom and pop" outfits, and they are in greater number than some of the other energy intensive industries. The Foundrymen organizations to provide a good entry point, and they should not be left out.
18. Agriculture This sector has instinctively opposed us, even though their climate risks could be large (droughts, floods, etc.). They have some interesting opportunities with biofuels. They deserve special attention as we plan our outreach. We should try to include fertilizer suppliers (Monsanto, DuPont), processors (ADM, Cargill), distributors (J.B. Hunt trucking?), retailers, wholesalers and producers (rice, livestock, poultry, pork, etc.).
19. Mining There is some progressive thinking apparent at Kennecott, A.T. Massey and PacifiCorp (in addition to being a progressive utility, they are the #10th largest coal mining company in the US -- and they are poised to by #1 Peabody, subject to approvals). Although the total picture is dim for coal, there are opportunities for them to ease the degree of impact -- with methane capture, tree planting, international offsets, etc.
20. Railroads The impact on coal is a major concern for them -- but they have interests in advanced locomotives, mass transit and high speed rail.

Attachments:

This meeting structure is informed by the historic profile of U.S. greenhouse gas emissions. The attached charts illustrate this profile, which shows the following:

- **Industrial plants** produced a third of US Greenhouse Gas Emissions in 1990.
Over 80% of this third of US emissions comes from 8 sectors: Aluminum, Steel, Chemicals, Pulp & Paper, Refining, Foundries, Glass and Cement.
- **Electric utility emissions** made up another third of US Greenhouse Gases in 1990
This sector's emissions break down roughly evenly between residential, commercial and industrial customers -- making the industrial sector's responsibility even greater than the third it emits directly.
Natural gas distributors and pipelines and other emerging local energy competitors have stakes in and around this sector as well.
- **Transportation emissions** makes up the final third, which includes automobiles, trucks, buses, aircraft and railroads.
- **Agriculture** is another important sector, with interests in emissions and sinks.
- **Fuels producers** serve all of these sectors. Important players include coal, oil, gas, nuclear and renewable energy firms (solar, wind, geothermal, biomass, hydro).

Labor

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FAX TRANSMISSION

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Date: *9/5*

Fax #: *456-2215*

Pages: *7*, including this cover sheet.

From: DAVID A. SMITH, DIRECTOR
PUBLIC POLICY

Subject:

COMMENTS:

Re our telephone conversation.

American Federation of Labor and Congress of Industrial Organizations



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July 30, 1997

Mr. Daniel Tarullo
Deputy Assistant to the President/International Economic Policy
National Economic Council
Old Executive Office Building
Washington, DC 20506

Dear Dan,
and appreciated your time. We look forward to continued communication on
climate change and many other topics of common concern.

You have asked me to summarize our thoughts about our global climate
change problems. This note builds on our conversation with you and also
reflects additional conversations which many of us have had with your
colleagues.

Assure Global Environment Repair

The AFL-CIO is eager to participate in climate change solution talks
that have the objective of moving the United States and all of our global
partners in the direction of iron-clad assurances that the environment we share
will absolutely, measurably, be better off as a result of our collective efforts.
Such assurances will require a comprehensive international conversation about
this problem that brings all participants into the dialogue on equal footing in
terms of responsibility and specific, although not necessarily identical,
commitments to participate in a comprehensive response.

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To build broad support among American workers for the necessary investments in the United States and to enlist their support for rather difficult measures, American workers will want to know that there will be fundamental reductions in concentration levels of carbon in the global atmosphere as a result of specific actions on the part of all nations -- at some future time. We welcome creative, flexible approaches to this, but those approaches must deliver the environmental solution we all seek. These approaches need to be both universal and mindful of our various levels of development, and then adopted by the international community in ways that are formal, reportable and enforceable.

To do this requires first that all global partners identify the acceptable concentration level that we are endeavoring to reach. This, to us, seems to be the logical starting place for such an endeavor. If we collectively agree on the goal we all share for our planet, then we can begin the arduous task of fitting the nations of the world into a scheme of development and emissions reductions that allows us to rationally reach that goal in an appropriate time period. In this process, it is critical that every nation play as seriously as the next. We are concerned that emission reductions in the United States not simply mean that there are unchecked growth opportunities elsewhere so that at the end of the day, we cannot be assured that the global environment will be better off. To have our support, and to be successful in achieving global goals, every nation has to be in the regime, abiding by mutually agreed upon reduction regimes.

Our experience with domestic job impacts from global trade policies over the past several years informs and underscores our concern that the United States government defines our objectives in such a way that the economic security of American workers is a major part of the solution conversation. We will not leave those concerns to chance in this discussion.

Provide No Perverse Incentives

Whatever the regime for carbon emission reductions that we employ here or internationally, there must be no mechanisms put into place that provide incentives for, or encourage the transport of pollution or jobs from the United States to other countries. Instead, the mechanisms we create must simultaneously reduce pollution here and create global opportunity for higher

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standards that protect all the world's future generations, both environmentally as well as economically.

If some countries are "in" the climate change solution regime and required to meet specific targets and some are "out" by not having to meet any specific commitments, we think we know from recent trade experiences what will happen. This set-up may create a climate where rational business executives will seek ways to shift industrial production to areas of less expensive energy, more relaxed environmental obligations, as well as fewer and weaker labor standards. This condition encourages capital flight. That is the beginning of a further unraveling of our industrial base that we cannot, and the administration should not, accept.

We have learned these lessons well from our global trade experiences, and those fresh experiences guide us here. We want you to understand our point of view based on these experiences and then hope that this experience will inform government policy setting on this climate change challenge. There are enough sanctions in our laws already that prove to provide powerful incentives for competitive, productive capacity to move. Addressing climate change must not create another.

The absence of international environmental and wage rules invites market forces to move where the regulation is most lax. Built into any mechanisms that manage a carbon emissions reduction strategy there have to be thoughtful considerations for parity in developing countries, protections at our borders that create disincentives for moving productive capacity or capital offshore, and strict rules that create disincentives for American corporations to abandon United States facilities and communities in favor of pollution or low wage havens.

We have supported your efforts to include core labor standards in trade agreements and continue to do so. The same logic must apply to our multilateral environmental undertakings. The AFL-CIO does not favor lowering the environmental standards in our country. If anything, we favor raising them, but not at a further cost of jobs or community economic security.

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Create A Just Transition

The AFL-CIO wants the United States to be true equity partners with the rest of the world's nations in solving our global climate change problems. We want the United States government to protect, by design, the integrity of our industrial base in any policies or mechanisms employed in the design of a climate change regime that fixes the impending problem. We also want to be assured in no-nonsense terms, that individual workers will not be asked to sacrifice their economic security as we find pathways to new fuels, new work, new approaches and new challenges as we create an economy that is less carbon dependent.

will suffer as a result of what could be the largest policy driven transition ever attempted by a modern society.

Workers and communities will need to be convinced by a clear, easy to articulate transition plan, that our government wishes to maintain the industrial base in our country, along with current wage scales and standards of living. We seek a transparent regime that promises and then delivers good jobs for American workers.

We know that this is a high hurdle, but believe it is the key to real progress.

We want to engage in talks that fix this onerous climate change problem, that clearly show the ways we will create good jobs, that develop regional development strategies where they are required, that guarantee job and income protections for every affected worker, that promise no one is overlooked or left behind in this process.

We know that the industrial landscape created at the end of this process will likely be quite different from our current circumstances. And in this regard, we want to make it perfectly clear that given the experiences of our various affiliated unions in the AFL-CIO, it will not be an easy task to gain the trust of some of these brothers and sisters on this piece of this equation. The

AFL-CIO is willing, however, to put this question on our own agenda and pursue it with you in earnest.

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We believe that this is a most serious issue and wish to engage with all who share our goal to protect the global environment and the economic stability of American families. We assure you that we will do everything we can to keep all parties to this climate change problem in the conversation, and to build trust among us.

Posture in Kyoto

We understand that it was a very long, difficult road from Rio to Berlin, and that the last stretch to Kyoto will not be easy either. We also recognize that this issue is a particularly challenging one to address.

To have Kyoto make sense in terms of winning a solution to our global climate problem, our negotiators need a clear set of negotiating objectives and they must be prepared to reject an agreement in Kyoto that does not meet them. Obviously, we hope they will be guided by the concerns we've expressed here.

Just as any union negotiator needs to approach a bargaining table ready to walk away from a bad deal for her members, we think our government negotiators need to be prepared to walk away from Kyoto without a treaty in hand if the one they could obtain does not address all of the issues we outlined above. That is not to say we think we, as a nation should be any less moved to examine ways to address this problem in the absence of such a treaty. We should. If it takes another round of conversation and negotiations to find the right solution mix with our global partners -- the right balance, the right equitable mix -- then take the time to find the best solution. Find one that can be convincingly presented to the American people. No treaty at this time will serve us better than a divisive, public argument over one that does not address all of our national concerns.

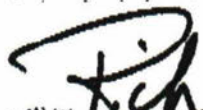
We are ready to work with you and the President towards these comprehensive goals, and we are committed to staying in a process that is solution-oriented to the finish.

There is a caveat, however, and I hope that we have made it clear. If the policy path the negotiators take omits any of the three crucial pieces of this problem, and either assured environmental repair, sensible incentives or just transition are not key features of the solutions that the President embraces,

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then the AFL-CIO will most likely be put in a position to "just say no" to the entire effort, by our affiliates. It is not our desire to be in that all too familiar place, so we hope that we can, together, fashion a plan that does protect the global environment, does keep jobs here and does provide for a just transition as we move to more sensible and safe environmental practices. We think this is achievable and certainly worth our collective best efforts.

Sincerely,



Richard Trumka
Secretary-Treasurer

American Labor Unions'
Resolutions on Climate Change

American Federation of Labor-
Congress of Industrial Organizations
(AFL-CIO)

Transportation Trades Department,
AFL-CIO

Industrial Union Department,
AFL-CIO