



DEPARTMENT OF
TRANSPORTATION

NEWS

FEDERAL HIGHWAY ADMINISTRATION

WASHINGTON, D.C. 20590

HIGHWAY TRANSPORTATION'S RESPONSE
TO ENERGY CONSERVATION

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ADDRESS BY DEPUTY FEDERAL HIGHWAY ADMINISTRATOR J. R. COUPAL, JR., AT A CONFERENCE ON ENERGY CONSUMPTION IN TRANSPORTATION AND CONSTRUCTION, TERRACE GARDEN INN, ATLANTA, GEORGIA, DECEMBER 3, 1975

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GOOD MORNING. I AM GLAD TO BE HERE IN ATLANTA WITH YOU TODAY, AND I BRING GREETINGS FROM SECRETARY OF TRANSPORTATION WILLIAM T. COLEMAN, JR., AND FEDERAL HIGHWAY ADMINISTRATOR NORBERT T. TIEMANN, ALONG WITH THEIR WISHES FOR A MOST SUCCESSFUL AND PRODUCTIVE CONFERENCE.

WHEN I WAS ASKED TO PARTICIPATE IN THIS MEETING I ACCEPTED ENTHUSIASTICALLY, BECAUSE FINDING SOLUTIONS TO OUR ENERGY PROBLEMS IS SOMETHING THAT MUST CONCERN ALL OF US. IF THE TIME WE SPEND HERE MOVES US EVEN A LITTLE BIT IN THAT DIRECTION IT WILL BE WELL SPENT.

WHILE I WAS CONSIDERING THE SUBJECT ASSIGNED TO ME, IT OCCURRED THAT THERE ARE TWO DICHOTOMIES THAT SHOULD BE DISCUSSED:

1. THE DICHOTOMY OF ENERGY CONSERVATION VS. PETROLEUM CONSERVATION; AND
2. THE DICHOTOMY OF OUR SHORT TERM VS. LONG TERM RESPONSES.

I WOULD LIKE TO BRIEFLY SHARE WITH YOU MY THOUGHTS IN EACH OF THESE AREAS.

I. ENERGY CONSERVATION VS. PETROLEUM CONSERVATION.

A. PETROLEUM CONSERVATION. HERE WE MUST START WITH TWO BASIC PREMISES: (1) THAT AS FAR INTO THE FUTURE AS WE CAN NOW FORESEE, HIGHWAY TRANSPORTATION IS GOING TO REMAIN THE DOMINANT MODE OF TRANSPORTATION, SIMPLY BECAUSE THERE IS NOTHING ON THE HORIZON TO REPLACE IT, AND (2) IN THE UNITED STATES TRANSPORTATION CONSUMES ABOUT 52 PERCENT OF ALL THE PETROLEUM USED ANNUALLY, WITH THE HIGHWAY MODE BY FAR THE MOST OMNIVOROUS USER. EACH DAY--AND EVERY DAY--THE 108 MILLION AUTOMOBILES, 25 MILLION TRUCKS AND HALF MILLION BUSES USE UP NEARLY 7 MILLION BARRELS OF GASOLINE AND DIESEL FUEL!

FROM THESE PREMISES IT IS NOT DIFFICULT TO PROCEED TO THE CONCLUSION THAT WE MUST SUBSTANTIALLY REDUCE THESE FIGURES, THAT WE MUST CONSERVE. THERE ARE SEVERAL WAYS OF ACCOMPLISHING THIS.

THE 55 MPH NATIONAL SPEED LIMIT. CONGRESS ENACTED THIS LAW TO CONSERVE FUEL--AND IT HAS BEEN AMPLY DEMONSTRATED BY NOW THAT LOWER SPEEDS DO SAVE FUEL. THEY ALSO SAVE LIVES, AS THE DRAMATIC DECREASE IN THE HIGHWAY DEATH TOLL ATTESTS. HOWEVER, THE SPEED LIMIT MUST BE ENERGETICALLY ENFORCED

IF IT IS TO HAVE ANY EFFECT, AND SOME STATES HAVE BEEN LESS THAN ENTHUSIASTIC ABOUT DOING SO. AS A RESULT, THE LAW NOW REQUIRES THAT EACH STATE GOVERNOR MUST ANNUALLY CERTIFY TO THE FEDERAL HIGHWAY ADMINISTRATION THAT HIS STATE IS ACTIVELY AND SERIOUSLY ENFORCING THE 55 MPH SPEED. ANY STATE THAT DOES NOT DO SO RISKS LOSING ALL OF ITS FEDERAL-AID HIGHWAY FUNDS. THAT IS THE SANCTION PROVIDED, AND ONE THAT I ASSURE YOU WILL BE INVOKED, IF NEED BE. HOWEVER, I AM SURE THAT NO STATE WANTS TO RISK LOSING ITS FEDERAL-AID HIGHWAY FUNDS, SO I AM HOPEFUL THAT THIS SANCTION WILL NEVER HAVE TO BE APPLIED.

ENCOURAGING MORE ENERGY EFFICIENT VEHICLES. FOR TOO LONG, UNFORTUNATELY, BOTH CONSUMERS AND AUTOMAKERS IN THIS COUNTRY WERE OBSESSED WITH THE THOUGHT THAT BIGGER WAS BETTER AS FAR AS CARS ARE CONCERNED. NOT TOO MUCH REFLECTION WAS GIVEN, IN THE DAYS OF ABUNDANT FUEL SUPPLIES, TO THE FACT THAT THESE LARGE VEHICLES WERE GETTING FEWER AND FEWER MILES TO THE GALLON OF GASOLINE. THE EUROPEANS AND JAPANESE BEAT US TO THE REALIZATION THAT SMALLER IS SMARTER IN TERMS OF GAS ECONOMY, BUT THE SAME MESSAGE NOW SEEMS TO HAVE GOTTEN THROUGH BOTH TO THE AMERICAN CONSUMERS AND AUTO MANUFACTURERS. OF LATE, THERE HAVE BEEN ENCOURAGING--AND EMPHATIC--MOVES IN THIS DIRECTION IN DETROIT. THERE IS NO QUESTION ABOUT IT, SMALLER VEHICLES THAT PROVIDE MANY MORE MILES TO THE GALLON OF GASOLINE ARE GOING TO BE AN INDISPENSABLE FACTOR IN OUR FUTURE.

ENCOURAGING CARPOOLS. A PRIME AREA OF ATTACK IN REDUCING

FUEL USAGE MUST BE COMMUTING. WE HAVE NO CHOICE BUT TO GET AWAY FROM THE ONE CAR-ONE OCCUPANT CONCEPT IN GETTING TO AND FROM WORK. THIS CAN BE DONE IN A COUPLE OF WAYS.

ONE IS TO MAKE GREATER USE OF EXISTING MASS TRANSIT FACILITIES, AND TO PROVIDE CITIES WITH NEW OR EXPANDED TRANSIT CAPABILITIES. THE DEPARTMENT OF TRANSPORTATION IS ACTIVELY ENGAGED IN DOING THIS. I SHOULD NOTE HERE THAT MOST OF THE MASS TRANSIT FACILITIES IN THIS COUNTRY ARE GOING TO BE HIGHWAY-RELATED, IN THE FORM OF BUSES OR OTHER SPECIAL VEHICLES. THIS IS BECAUSE RAIL RAPID TRANSIT SYSTEMS, FOR THE MOST PART, WOULD SIMPLY BE TOO EXPENSIVE AND TIME-CONSUMING TO CONSTRUCT.

THE OTHER WAY OF REDUCING INDIVIDUAL TRAVEL DURING RUSH HOURS IS THROUGH CARPOOLING. THIS IS INEXPENSIVE, QUICK AND EASY TO IMPLEMENT, AND--MOST OF ALL--EFFECTIVE. AT DOT AND FHWA, WE ARE ACTIVELY PROMOTING CARPOOLING ON A NATIONWIDE SCALE. WE PARTICULARLY WANT EMPLOYERS TO ENCOURAGE THEIR EMPLOYEES TO USE CARPOOLS BY PROVIDING THEM WITH INCENTIVES, SUCH AS FREE OR PREFERRED PARKING, USE OF COMPANY-PURCHASED VANS, AND SO ON. WE ARE HAVING ENCOURAGING SUCCESS WITH THIS, AND WE EXPECT EVEN MORE IMPRESSIVE RESULTS IN THE FUTURE.

WHY IS CARPOOLING SO IMPORTANT? WELL, SIMPLY "DOUBLING-UP" IN COMMUTING AUTOMOBILES--RAISING THE OCCUPANCY RATE TO 2 PERSONS PER CAR--COULD SAVE 500,000 BARRELS OF GASOLINE DAILY. IT ALSO WOULD REMOVE 15 MILLION CARS FROM

THE TRAFFIC STREAM. INCREASING THE OCCUPANCY RATE TO 3.2 PERSONS PER CAR WOULD SAVE ONE MILLION BARRELS OF GASOLINE DAILY.

EMPHASIS ON TRAFFIC MANAGEMENT. SINCE AUTOMOBILES ARE GOING TO REMAIN OUR PRIMARY SOURCE OF TRANSPORTATION, WE MUST LEARN TO MANAGE THEM, AND OUR HIGHWAY SYSTEM, MORE EFFICIENTLY. THIS MEANS REDUCING TRAFFIC CONGESTION WHICH, IN TURN, WASTES FUEL. AS I JUST MENTIONED, THIS CAN BE DONE THROUGH USE OF CARPOOLS AND MASS TRANSIT; ALSO, BY STAGGERED WORK HOURS, BETTER SIGNALIZATION SYSTEMS, ONE-WAY STREETS, STREETS ON WHICH PARKING IS PROHIBITED, AND SO ON. A COMPUTERIZED SIGNALIZATION PROGRAM WHICH GIVES TRANSIT BUSES PREFERENCE AT INTERSECTIONS, AND WHICH PROVIDES MAXIMUM GREEN TIME TO THE HEAVIEST FLOW OF TRAFFIC, IS PRESENTLY IN OPERATION IN WASHINGTON, D.C. IF IT PROVES SUCCESSFUL, OTHER CITIES ALSO WILL BE ABLE TO TAKE ADVANTAGE OF THIS TECHNOLOGICAL BREAKTHROUGH.

IN ANOTHER ACTIVITY AIMED AT REDUCING CONGESTION, FHWA AND THE URBAN MASS TRANSPORTATION ADMINISTRATION ARE COOPERATIVELY STUDYING "CONGESTION PRICING," WHICH CAN BE DEFINED AS A FINANCIAL DISINCENTIVE TO USING LOW OCCUPANCY VEHICLES. THIS MIGHT, IN PRACTICE, INVOLVE CHARGES FOR SUCH VEHICLES USING BUSY STREETS DURING PEAK HOURS OF TRAVEL, WHILE AT THE SAME TIME EXPANDING SERVICE BY TRANSIT BUSES, SHARED TAXIS, AND OTHER TRANSPORTATION MODES WHICH OCCUPY RELATIVELY LITTLE SPACE PER PASSENGER CARRIED.

JUST RECENTLY, FHWA AND UMTA TOOK A MAJOR STEP TOWARDS

BETTER TRAFFIC MANAGEMENT BY PROMULGATING JOINT GUIDELINES FOR THE TRANSPORTATION SYSTEMS MANAGEMENT ELEMENT, WHICH IS GOING TO BE PART OF OUR NEW DIRECTION IN URBAN PLANNING. THE NAME, TRANSPORTATION SYSTEMS MANAGEMENT, DESCRIBES EXACTLY WHAT IT IS, AN EFFORT TO BETTER MANAGE ALL OF THE TRANSPORT MODES THAT SERVE OUR CITIES SO THAT WE CAN REDUCE ENERGY WASTE, PROVIDE BETTER SERVICE, AND GENERALLY IMPROVE THE EFFICIENCY OF PEOPLE MOVEMENT AND GOODS MOVEMENT. BASICALLY, THIS MEANS THAT STATE AND LOCAL OFFICIALS SHOULD TAKE A PRETTY GOOD LOOK AT STREAMLINING THEIR EXISTING SYSTEMS BEFORE INVESTING HEAVILY IN NEW EQUIPMENT AND ROADS. WE WANT THEM TO LOOK AT CARPOOLS, EXPRESS BUS LANES, STAGGERED WORK HOURS, FRINGE PARKING--ANYTHING AND EVERYTHING TO IMPROVE ON WHAT WE ALREADY HAVE.

I ASSURE YOU THAT WE WILL CONTINUE TO PUT INCREASING EMPHASIS ON BETTER TRAFFIC MANAGEMENT AS TIME GOES ON.

B. ENERGY CONSERVATION. IN HIGHWAY OPERATIONS THEMSELVES, WE HAVE BEEN ABLE TO MAKE SOME SAVINGS OF ENERGY OTHER THAN IN PETROLEUM--AND WE HOPE TO MAKE MORE IN THE FUTURE. THESE SAVINGS RESULT FROM:

1. REDUCED STREET LIGHTING. DURING THE PAST 2½ YEARS, THE STREET AND HIGHWAY LIGHTING BRANCH OF FHWA'S OFFICE OF TRAFFIC OPERATIONS CONDUCTED HIGHWAY LIGHTING SCHOOLS IN 47 STATES. ONE OF THE MAIN PURPOSES OF THESE SCHOOLS WAS TO ACQUAINT FHWA AND STATE PERSONNEL WITH THE LATEST AND MOST EFFICIENT LIGHT SOURCES AVAILABLE, AND TO ENCOURAGE THE USE

OF THESE NEW SOURCES ALONG WITH THE LATEST TECHNIQUES IN THE DESIGN OF LIGHTING INSTALLATION.

WE HAVE LEARNED THAT HIGH PRESSURE SODIUM VAPOR LAMPS ARE 2 TO 2½ TIMES MORE ENERGY EFFICIENT THAN THE MERCURY VAPOR TYPE, WHILE PROVIDING THE SAME AMOUNT OF ILLUMINATION. THE FEDERAL ENERGY ADMINISTRATION HAS ESTIMATED THAT 1/10TH OF 1 PER CENT OF TOTAL ENERGY CONSUMPTION IN THE UNITED STATES, OR ABOUT 40,000 BARRELS PER DAY (BPD) OF OIL EQUIVALENT, IS CONSUMED BY HIGHWAY AND STREET LIGHTING. THUS, A 50 PER CENT REDUCTION IN THIS RATE WOULD SAVE 15,000 TO 20,000 BPD OF OIL EQUIVALENT. A SIMPLE CHANGEOVER TO THE HIGH PRESSURE SODIUM VAPOR LAMPS WOULD ACCOMPLISH THIS. HOWEVER, AT THE PRESENT TIME ONLY 5 PER CENT OF HIGHWAY LIGHTING IS THE HIGH PRESSURE SODIUM TYPE, AS COMPARED TO 75 PER CENT OF THE MERCURY VAPOR AND 20 PERCENT OF FILAMENT OR INCANDESCENT.

WE ARE ENCOURAGING THE STATES TO SWITCH TO THE HIGH PRESSURE SODIUM LAMPS AND, AS THE STATES DO SO, WE EXPECT TO SEE SOME SIGNIFICANT ENERGY SAVINGS.

IT MIGHT ALSO BE OF INTEREST TO MENTION THAT FHWA AND FEA ARE JOINTLY SPONSORING A CONTRACT TO DETERMINE THE RELATIONSHIP OF ACCIDENTS TO VISIBILITY CONDITIONS AT NIGHT ON ARTERIAL STREETS. THE PURPOSE IS TO DETERMINE IF WE CAN REDUCE THE EXISTING LEVEL OF LIGHTING ON HIGHWAYS AND NOT HAVE AN INCREASE IN ACCIDENTS--AND IF SO, TO LEARN WHAT THE SAFE LEVEL OF REDUCTION IS.

REDUCED ENERGY CONSUMPTION IN OFFICES. HIGHWAY OPERATIONS, BOTH AT THE FEDERAL AND STATE LEVELS, ARE THEMSELVES CONSERVING

ENERGY BY TAKING NEW LOOKS AT OFFICE BUILDING HEATING, COOLING AND LIGHTING. AT THE DEPARTMENT OF TRANSPORTATION, FOR EXAMPLE, THE LEVEL OF LIGHTING HAS BEEN REDUCED BOTH IN OFFICES AND IN HALLWAYS, WITH NO APPRECIABLE PROBLEMS. THERMOSTATS HAVE ALSO BEEN SET HIGHER IN THE SUMMER AND LOWER IN THE WINTER TO CONSERVE ENERGY--AGAIN WITH NO ADVERSE EFFECTS. THESE SAME ACTIONS HAVE BEEN TAKEN IN MANY, IF NOT ALL, STATE HIGHWAY AND TRANSPORTATION DEPARTMENTS.

INNOVATIVE MATERIALS AND CONSTRUCTION METHODS.

INCREASINGLY, THE TYPES OF DESIGNS AND THE SELECTION OF MATERIALS AND CONSTRUCTION METHODS HAVE BEEN INFLUENCED BY ENERGY FACTORS.

ONE OF THE AREAS OF GREATEST INTEREST IS THE RECYCLING OF OLDER PAVEMENTS FOR NEW CONSTRUCTION WORK. FHWA IS LOOKING CLOSELY AT A NUMBER OF WAYS OF RECYCLING ASPHALT PAVEMENTS. WE HAVE PARTICIPATED IN A NEVADA PROJECT WHERE THE EXISTING ASPHALT PAVEMENT WAS RECYCLED BY MEANS OF A UNIQUE HEATER-DRYER PROCESS THAT MADE A MAXIMUM CONSERVATION OF THE EXISTING PAVEMENT MATERIALS AND REQUIRED A MINIMUM AMOUNT OF ADDITIONAL ASPHALT. PROMOTIONAL MATERIAL, INCLUDING A NEW FILM, IS BEING DISTRIBUTED WHICH DESCRIBES THIS PROJECT.

WITHIN FHWA, A TASK FORCE HAS BEEN FORMED TO INVESTIGATE THE VARIOUS MEANS OF RECYCLING ASPHALT PAVEMENTS. THE GOAL IS TO DEVELOP A DEMONSTRATION PROJECT, IF FEASIBLE. FHWA WOULD PROVIDE TECHNICAL AND FINANCIAL ASSISTANCE TO HIGHWAY AGENCIES INTERESTED IN CONSTRUCTING A PROJECT UTILIZING ONE

OF THE RECYCLING TECHNIQUES.

ADDITIONALLY, FHWA, WITH THE COOPERATION OF THE ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION, IS LOOKING INTO THE USE OF SPECIAL ADDITIVES WHICH SHOW PROMISE OF REDUCING ASPHALT REQUIREMENTS FOR PAVEMENTS. WE HAVE PROMOTED THE USE OF LOWER HEATING AND PLACING TEMPERATURES FOR ASPHALT PAVEMENTS AS AN ENERGY CONSERVATION MEASURE. AND IN OUR NATIONAL EXPERIMENTAL AND EVALUATION PROGRAM, WE ARE ENCOURAGING COLD MIX DESIGNS UTILIZING EMULSIONS WHICH CONTRIBUTE TO A GENERAL LOWERING OF ENERGY REQUIREMENTS.

CURTAILING THE USE OF HIGHWAY VEHICLES. BY MINIMIZING TRAVEL AND USING COMMON CARRIERS WHENEVER POSSIBLE FOR NECESSARY TRAVEL, IN SUPPORT OF THE PRESIDENT'S PROGRAM TO REDUCE ENERGY CONSUMPTION, FHWA HAS REDUCED OFFICIAL VEHICLE USE BY 8,200,000 MILES SINCE JULY 1974. ASSUMING A CONSUMPTION RATE OF 15 MILES PER GALLON, THIS REPRESENTS A SAVINGS OF 545,000 GALLONS OF FUEL. THIS ACCOMPLISHMENT HAS BEEN WITH A MINIMAL IMPAIRMENT OF FHWA OPERATIONAL FUNCTIONS.

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II. THE SHORT TERM RESPONSE VS. THE LONG TERM RESPONSE

A. THE SHORT TERM RESPONSE. MOST OF THE MEASURES I HAVE BEEN DISCUSSING ARE SHORT TERM RESPONSES TO THE ENERGY PROBLEM. AS A MATTER OF FACT, CONSERVATION ITSELF SHOULD BE REGARDED AS A SHORT TERM RESPONSE.

OBVIOUSLY, IN THE SHORT RUN IT IS NECESSARY THAT WE CONSERVE OUR FINITE FUEL SOURCES AND SPREAD THEM AS EQUITABLY AS WE CAN AMONG ALL THE WORLD'S POPULATION. WE CANNOT BE WASTEFUL WITH THESE LIMITED RESOURCES. IF THE WHOLE WORLD CONTINUED TO USE PETROLEUM AT THE RATE WE HAVE FOR THE LAST 10 YEARS OR SO, UNDOUBTEDLY WE WOULD RUN OUT OF IT SOMETIME BETWEEN 25 AND 50 YEARS FROM NOW. (NOBODY KNOWS EXACTLY WHEN.) OBVIOUSLY, THESE ARE PROBLEMS WITH WHICH WE MUST CONTEND.

ON THE OTHER SIDE OF THE COIN THOUGH, I WANT TO EMPHASIZE THAT THE U.S. DID NOT BECOME A GREAT NATION BY CONSERVING ENERGY! IT BECAME GREAT BY UTILIZING HUGE QUANTITIES OF ENERGY TO HELP FEED THIS NATION AND THE WHOLE WORLD, TO HELP DRIVE THE ENGINES OF INDUSTRY AND TECHNOLOGY, AND TO HELP MAKE OUR PEOPLE MORE MOBILE THAN ANY PEOPLE IN THE HISTORY OF THE WORLD.

IT IS POPULAR IN SOME QUARTERS TODAY TO ENGAGE IN CONDEMNATION BECAUSE THE UNITED STATES, CONSTITUTING 6 PERCENT OF THE WORLD'S POPULATION, HAS BEEN UTILIZING 30 PERCENT OF THE WORLD'S ENERGY. THERE IS JUST NO JUSTIFICATION FOR ANY SUCH REACTION! WE DID NOT USE ENERGY THAT SHOULD HAVE BEEN UTILIZED BY OTHER NATIONS. THERE HAS BEEN, UNTIL ONLY VERY RECENTLY, ADEQUATE SUPPLIES OF ENERGY TO MEET ALL THE NEEDS. THE FACT THAT OTHER COUNTRIES DIDN'T USE AS MUCH AS WE WAS NOT A RESULT OF ANY ENERGY SHORTAGE! WE WEREN'T USING OTHER PEOPLE'S ENERGY--THEY JUST DIDN'T HAVE THE DEMAND THAT WE DID BECAUSE OF OUR ADVANCED TECHNOLOGY! ACTUALLY, BY UTILIZING

ENERGY AS WE DID, WE IMPROVED THE QUALITY OF LIFE NOT ONLY FOR OURSELVES BUT FOR THOSE OTHER NATIONS WHICH ENJOYED THE RESULTS OF OUR ADVANCED TECHNOLOGY.

THEREFORE, I WOULD HOPE THAT ENERGY CONSERVATION ITSELF SHOULD BE CONSIDERED A SHORT TERM RESPONSE. WE SHOULD STRIVE TO ONCE AGAIN REACH A POINT WHERE WE DO NOT NEED TO CONSERVE ENERGY, BUT RATHER CAN USE HUGE QUANTITIES OF IT WITHOUT HURTING THE ENVIRONMENT OR ENDANGERING FINITE RESOURCES.

THE SHORT TERM RESPONSE TO OUR ENERGY SITUATION IS ABSOLUTELY NECESSARY, OF COURSE--BUT AS AN ECONOMIC SOLUTION RATHER THAN AN ENERGY SOLUTION. THE REASON IS THAT WE REALLY CANNOT AFFORD TO BUY THE PETROLEUM WE ARE IMPORTING FROM THE ORGANIZATION OF OIL EXPORTING COUNTRIES (OPEC).

UP UNTIL 1973, AMERICA SPENT A LITTLE OVER \$3 BILLION FOR OIL IMPORTS. NOW WE ARE SPENDING \$25 BILLION ANNUALLY. AND OPEC'S LATEST PRICE BOOST WILL ADD ANOTHER \$2 BILLION.

CONSIDER THAT: \$27 BILLION A YEAR GOING OUT OF THIS COUNTRY FOR FOREIGN OIL AND FOREIGN PAYROLLS!

NOT ONLY DOES IT PLACE US IN AN EXTREMELY PRECARIOUS POSITION CONCERNING OUR VULNERABILITY TO ANOTHER POSSIBLE OIL BOYCOTT BY THE OPEC NATIONS, BUT IT ALSO POSES A VERY SERIOUS ECONOMIC PROBLEM. OPEC'S SURPLUS FOREIGN EXCHANGE--THE MONEY LEFT OVER AFTER THEY HAVE PAID FOR THEIR IMPORTS AND DOMESTIC IMPROVEMENTS--IS RUNNING AT A RATE OF \$70 BILLION ANNUALLY. THIS BREAKS DOWN TO ALMOST \$8 MILLION AN HOUR, OR MORE THAN \$22,000 EVERY SECOND.

WITH THIS KIND OF PURCHASING POWER, OPEC COULD BUY ALL OF THE COMPANIES ON THE NEW YORK STOCK EXCHANGE IN A LITTLE OVER 9 YEARS. OF COURSE, I AM NOT SUGGESTING THAT THIS WILL ACTUALLY HAPPEN, BUT IT DOES GIVE AN IDEA OF SOME OF THE PROBLEMS WE COULD ENCOUNTER IF THIS MASSIVE REDISTRIBUTION OF THE WORLD'S WEALTH CONTINUES FOR A SIGNIFICANT PERIOD OF TIME. SO IT CERTAINLY BEHOOVES US TO CONSERVE AS A SHORT-RANGE TACTIC.

B. THE LONG RANGE RESPONSE. BUT WHAT SHOULD BE OUR LONG TERM RESPONSE? I BELIEVE THAT WE CAN AND WILL DEVELOP INFINITE SOURCES OF CLEAN ENERGY SO THAT WE CAN CONTINUE TO USE HUGE QUANTITIES OF IT TO EASE THE BURDENS OF MANKIND WITHOUT ANY DANGER OF CONTAMINATING THE ATMOSPHERE OR RUNNING OUT OF ENERGY AT SOME TIME IN THE FUTURE. OBVIOUSLY, THE GREATEST POTENTIALS FOR THIS KIND OF SOLUTION LIE IN THE FIELD OF SOLAR, NUCLEAR, GEOTHERMAL, HYDRAULIC OR MAGNETIC ENERGY--OR MOST LIKELY A COMBINATION OF ALL OF THEM.

I, FOR ONE, AM NOT CONTENT TO SIT BACK AND SAY WE MUST, FOREVER AND EVER, REDUCE THE AMOUNT OF ENERGY THAT WE HAVE BEEN USING. I SAY THAT WE ARE GOING TO BE ABLE TO DEVELOP THESE NEW SOURCES OF ENERGY AND CONTINUE TO USE HUGE QUANTITIES OF IT TO MAKE LIFE BETTER.

WE HAVE THE EXPERTISE, WE HAVE THE ORGANIZATIONS, AND I BELIEVE THAT WE HAVE THE WILL TO SOLVE THE PROBLEMS THAT WE FACE.

IT'S GOING TO REQUIRE DEDICATION AND INNOVATION, BUT MOST OF ALL, IT'S GOING TO REQUIRE COOPERATION BY ALL OF US!

I THINK THAT WE ARE UP TO IT. NOW, LET'S ALL GET ON WITH THE JOB!

THANK YOU.

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