

CORPORATE RESEARCH PROGRAM IN CLIMATE/CO<sub>2</sub>-GREENHOUSE

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## CORPORATE RESEARCH PROGRAM

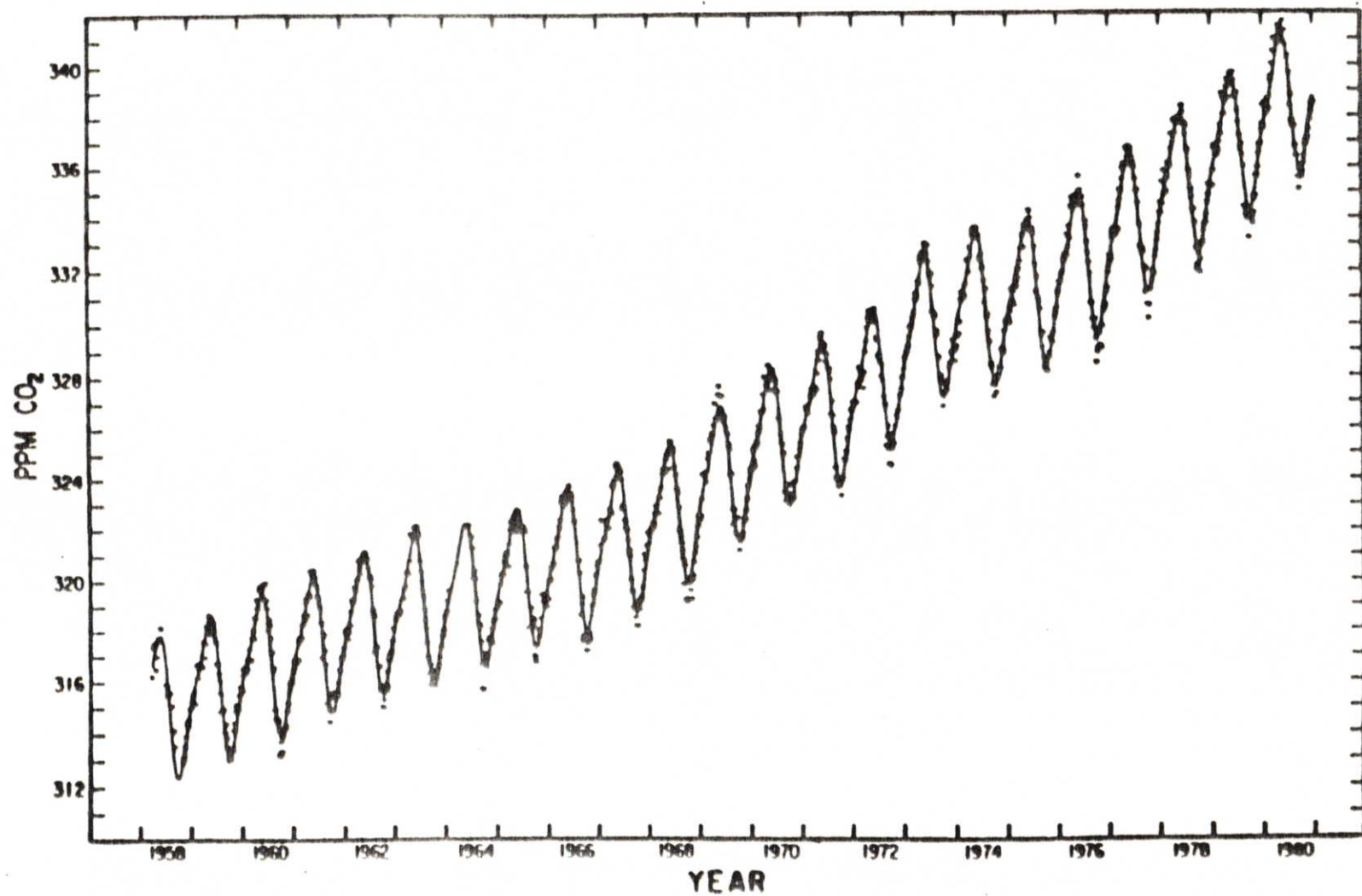
- OBJECTIVES

- PROVIDE EXXON WITH A SOURCE OF EXPERTISE IN AN AREA WHICH COULD HAVE MAJOR IMPACT ON FUTURE BUSINESS ENVIRONMENT
- HELP STIMULATE AND CONTRIBUTE TO A BROAD SCIENTIFIC INVESTIGATION OF CO<sub>2</sub> EFFECTS

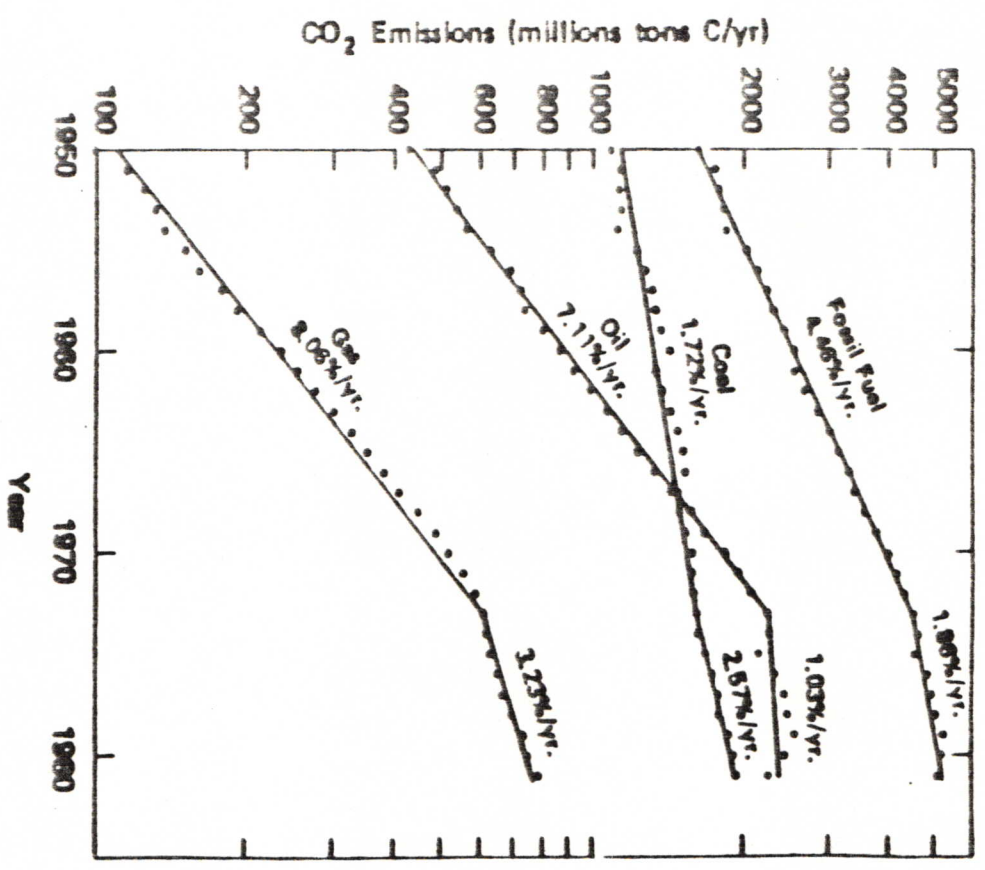
- APPROACHES

- ESTABLISH A SCIENTIFIC PRESENCE THROUGH RESEARCH PROGRAM IN CLIMATE MODELING
- SELECTIVE SUPPORT OF OUTSIDE ACTIVITIES
- MAINTAIN AWARENESS OF NEW SCIENTIFIC DEVELOPMENTS

# CONCENTRATION OF ATMOSPHERIC CO<sub>2</sub> AT MAUNA LOA OBSERVATORY, HAWAII

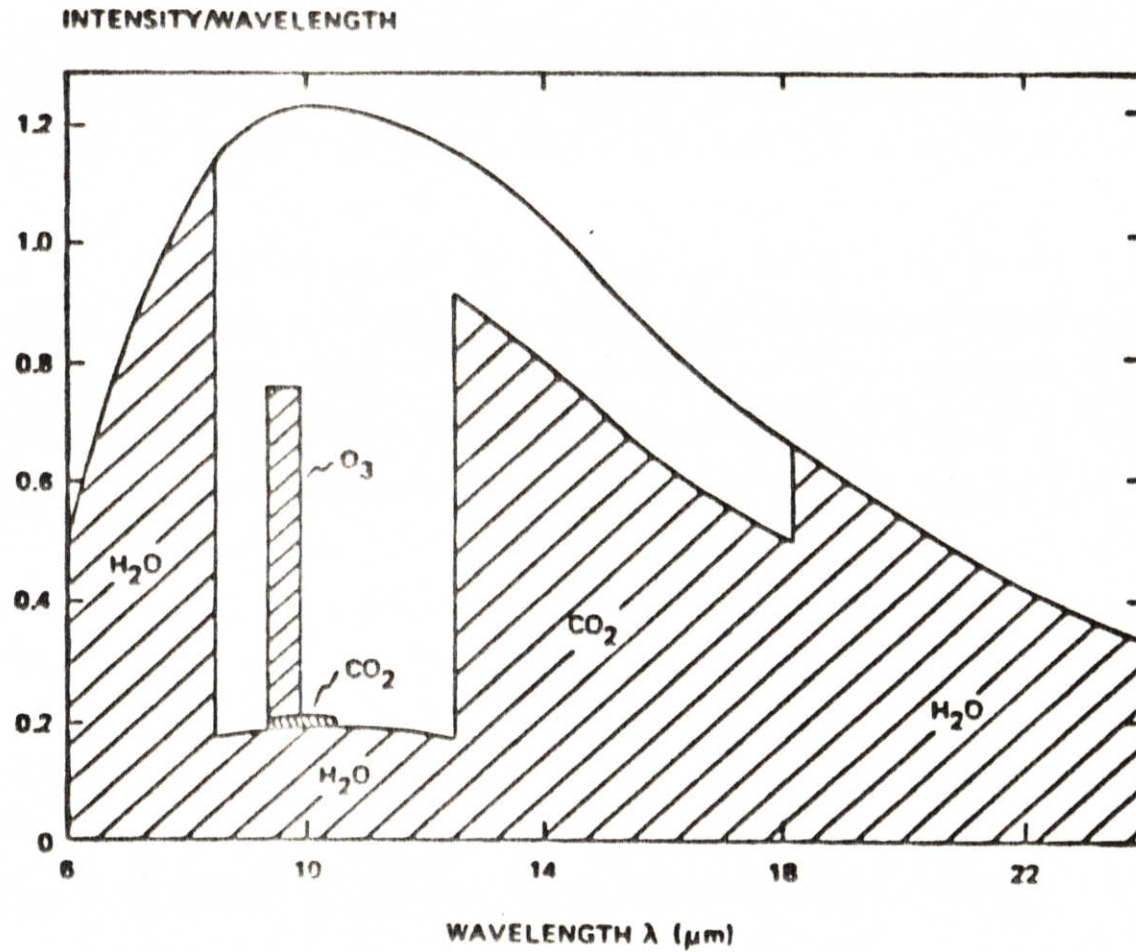


INDUSTRIAL CO<sub>2</sub> PRODUCTION



### BASIS FOR CO<sub>2</sub>-GREENHOUSE EFFECT

- ATMOSPHERIC ABSORPTION OF INFRARED RADIATION INCREASES EARTH'S TEMPERATURE BY ~35°K
- INCREASING CO<sub>2</sub> AND OTHER TRACE GASES ABSORB IN THE REMAINING ATMOSPHERIC WINDOWS



## ROLE OF MATHEMATICAL MODELING

- MODELS ARE BEING USED TO EXPLORE PHYSICAL EFFECTS (SCENARIOS) AND AS A PREDICTIVE TOOL
  - CARBON CYCLE MODELING TO DETERMINE FATE OF FOSSIL-FUEL CO<sub>2</sub> EMISSIONS
  - CLIMATE MODELING TO STUDY EFFECTS OF ATMOSPHERIC CO<sub>2</sub> INCREASES ON THE EARTH'S CLIMATE
  
- VALIDITY OF MODELS NOT ESTABLISHED
  - COMPLEXITY OF CARBON CYCLE AND CLIMATE SYSTEM REQUIRE MANY APPROXIMATIONS AND PARAMETERIZATIONS
  - GEOLOGICAL AND HISTORICAL DATA ARE INADEQUATE FOR VALIDATION OF MODELS