

## PREAMBLE (L. McFadden)

The discovery of petroleum in the U.S. in the 19<sup>th</sup> century resulted in the development of the fossil fuel industry and helped stimulate dramatic growth in the American economy. The emergence of this fossil fuel-based energy economy also played an important role in supporting the growth of the American middle class, which in turn aided in the development of science and technology. In many respects, the fossil fuel industry played a critical role in the emergence of the United States as a great world power. The fossil fuel industry has also been especially beneficial to New Mexico, mainly because the crust beneath the state contains enormous quantities of the fossil fuels (coal, oil, and natural gas). The activities required to extract these energy resources not only provide employment for thousands, but also, through state taxation and royalties from the industry, provide as much as a third of New Mexico's annual budget. Currently, this is almost \$1.4 billion for education overall, including education and research at New Mexico's institutions of higher learning.

At the University of New Mexico, New Mexico's largest public university, some of these funds have supported support world-class faculty and student research in the Earth, atmospheric and biological sciences. For example, UNM's researchers in these areas play leading roles in research directed towards the goals of understanding the nature of the Earth's climate, both it's present climate state and changes in climate over the geologic past (a field of research referred to as paleoclimatology). Their research has appeared in many prominent journals, presented it in numerous scientific meetings and to the public through articles in the Albuquerque Journal, local TV stations reports and several other venues. This research demonstrates, as do the results of the research of thousands of climate scientists around the world, that the emission of enormous amounts of greenhouse gases (mainly carbon dioxide and methane created by the burning of fossil fuels) has caused a significant increase in average global temperatures in the last 150 years. Increases in the concentration of these gases in the atmosphere is directly responsible for many related and significant changes in climate. The environmental calamities attributable to human-caused climate change are many, but just a few examples provide insights into the problems humanity now faces: increasing average global temperatures have caused enormous increases in loss of ice from glaciers worldwide, resulting in increases in global sea level. This in turn is largely responsible for increases in coastal flooding, and in many third world countries, the loss of an important source of fresh water. Global warming has also raised the temperature of oceans, which not only contributes to the rise in sea level, but also is now regarded as increasing the frequency and intensity of hurricanes. Research conducted by UNM scientists show that in New Mexico, human-caused climate change is causing a dramatic decline in mountain snow pack, which in turn has diminished the discharge in our biggest rivers and decreased the flow of water to our reservoirs. Coupled with increased warmth, increases in drought intensity is reducing rangeland grass cover, which ultimately will very likely trigger a new dust bowl in New Mexico's extensive eastern plains. Already, these environmental changes have had highly negative consequences for the non-fossil fuel components of New Mexico's economy; ranching, agriculture and tourism/recreation are all directly suffering the effects of climate change.