an executive overview

A variety of factors converged last year which triggered energy, specifically coal, to once again become a topic of great national interest. Gas price hikes, power shortages, and concerns about energy self-sufficiency contributed to the resurgence of energy awareness. However, along with this awareness often did not follow recognition of the significant progress being made in achieving cleaner air emission standards, especially regarding coal-fired power stations. Although these achievements do not yet get the credit they deserve, they are fundamental to the future of the clean coal industry.

The facts about U.S. power generators' reliance on coal are well known. The challenge, even more so than in the past, is to provide technologies to ensure the viability of coal as a source for affordable clean energy.

Over the years CAER has made many meaningful contributions in the field of coal, carbon, and hydrocarbon technologies and in the period covered by this review, the work focused primarily on those areas. Environmental concerns were integral to the projects. In each of these areas there were successful project awards and achievements in line with and beyond the expectations of the projects. Some of these highlights are reported in greater detail in this review.

In light of the increasing prominence of clean coal and the environmental considerations associated with coal use, this area has been consolidated and given more impetus in the near term. An area of current expertise is in the technologies to generate useful products from streams traditionally called "waste", but that can be upgraded with economical and environmental benefits. In parallel the expertise in the carbon materials and catalysis fields will be strengthened and focused on a combination of detailed research projects with a view on the practical application of the expertise.

Emerging opportunities that are being considered for exploring, include combining the areas of catalysis and nanomaterials for thermal fluids and for fuel cell applications. We plan to strengthen our catalysis work by a greater degree of diversification of topics, including: syngas production, microreactor syngas generation, and hydrogen production.

Long term collaborations with UK faculty and students form an important basis for extending the width and depth of CAER's scientific endeavors. The CAER serves as a focal point in anchoring the University of Kentucky as a preeminent energy research institution, both nationally and internationally. Given the importance of energy to the Kentucky and national economies, and the intellectual and physical facilities at CAER, we are poised to make energy a strong component of UK's research agenda.

This valued interaction, combined with close and growing ties with industry and funding agencies, form the basis for our ability to ensure that the essential resources are available for continuing our pursuit to serve our stakeholders.