

# Research Institute for Environment, Energy and Economics



APPALACHIAN STATE UNIVERSITY

## Operating Plan

Creating Change through Research, Outreach and Education

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### Submitted by

John C. Pine  
Director, Research Institute for Environment,  
Energy and Economics (RIEEE)  
Professor, Department of Geography and  
Planning  
College of Arts and Sciences

Jeff Ramsdell  
Director, Appalachian Energy Center  
Professor, Department of Technology and  
Environmental Design  
College of Fine and Applied Arts

Howie Neufeld  
Director, Southern Appalachian Environmental  
Research and Education Program (SAERE)  
Professor, Department of Biology, College of  
Arts and Sciences

Todd Cherry  
Director, Center for Economic Policy and  
Analysis (CERPA)  
Professor, Department of Economics, Walker  
College of Business

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## I. INTRODUCTION

The Research Institute for Environment, Energy and Economics at Appalachian State University was established to enhance our understanding of natural, human, economic and built systems, their interrelationships and impacts on and contributions to human and environmental wellbeing. The connections between these systems is seen in the unprecedented global quest for energy options; our goal is to avoid potential adverse impacts on our environment or our economy. We are determined to preserve our environmental resources and ensure that future generations can enjoy adequate environmental resources. Our economy continues as a driving force and a system that is significantly impacted by the cost of energy and our use of environmental resources (air, water and earth). Our natural, economic and human systems are thus interdependent and each influenced by our use of energy resources.

There is a demand for leadership and engagement by our campus community and external collaborators to understand our options for building a sustainable future. We believe that universities play a central role in addressing these issues because they generate new knowledge and technology and are willing to be engaged in identifying the nature of the issues that are part of building a sustainable future. Our universities also nurture future leaders who will shape society and determine the paths taken that will ultimately form a sustainable society. Therefore, we are obligated to involve students in our research and outreach initiatives. In order to accomplish these goals, we must tap the expertise on our campus and organize multidisciplinary groups of scholars both on and off-campus. Since the RIEEE was established four years ago, we believe that Appalachian State University has built upon the expertise of its faculty and students to address local and regional issues and is building innovative solutions to preserving our natural environment, while also finding affordable energy alternatives, and enhancing our human and cultural environment.

We draw on faculty and staff from 15 academic units within five colleges, and administrative entities. Together, we coalesced around three interdependent areas:

1. *Conservation*: Energy Efficiency, Renewable Energy and Public Policy.
2. *Sustainable Natural and Social Systems*: Assessment, Conservation and Restoration of Natural and Human Systems.
3. *Economic and Community Outreach and Development*: Economic and Environmental Education and Policy.

We face complex social, economic and ecological challenges. These complexities require the university to undertake a determined approach in addressing these very difficult problems. RIEEE serves as a catalyst to support these broad-based approaches on behalf of our students, faculty, staff, and partners who engage in the inquiry and problem solving required for creating and sustaining human and natural systems.

## II. MISSION AND GOALS

Appalachian's Research Institute for Environment, Energy, and Economics (RIEEE) was established in November 2008 to enhance research opportunities for faculty and students whose interests are associated with environmental science, renewable energy and economics. The Institute serves as an umbrella organization for three centers including The Appalachian Energy Center, the Center for Economic Research and Policy Analysis (CERPA), which currently exist, and the proposed Southern Appalachian Environmental Research and Education Center (SAERE). The Centers represent the three major elements of research and educational outreach that cover issues related to the environment, energy, and economics.

Because of its setting, Appalachian State University has attracted faculty and students to the campus who have a strong commitment and interest in environmental issues. This commitment on the part of our students is symbolized by their support of renewable energy (Renewable Energy Initiative, a student sponsored program) and strong academic programs as illustrated by undergraduate and graduate degree otion in Appropriate Technology, the interdisciplinary Environmental Sciences degree, the Sustainable Development Program, the Masters concentration in Environmental Policy, and the collaborative Masters in Appalachian Studies. All of these are high quality multi-disciplinary programs and symbolize Appalachian's commitment to the environment, energy and economics.

The University has built a reputation that attracts scholars and highly motivated students who are interested in the environment. Today, many faculty members across several colleges and from multiple disciplines focus on research at the nexus of energy, the environment and economic policy.

### Who We Are

- The RIEEE Centers, faculty, staff, students, and partners contribute to our broader and deeper understanding of complex problems associated with the environment, energy and economics by conducting multidisciplinary research which is of value to our region and beyond.
- We emphasize in our research and scholarly activities renewable energy, energy efficient and healthy buildings, atmospheric and water monitoring, environmental conservation, preservation and resource management, economic policy, environmental ethics, and community development.
- We encourage our faculty and staff to join multi-disciplinary research clusters to influence change through innovation and engagement with our partners in public agencies and businesses and with individuals both locally and abroad.
- Our faculty members and staff are a valuable resources as mentors to graduate and undergraduate students, engaged community members, and potential collaborators with public and non-profit agencies and businesses in our state and region.

- We support sustainability on our campus by collaborating with the ASU Office of Sustainability, Office of Business Affairs, academic units throughout the campus and supporting research in labs associated with renewable energy, survey research, and environmental sciences.

### **What We Need**

- Opportunities to form lasting linkages between faculty, staff and students in the natural, socio-cultural and economic sciences which cross traditional academic disciplines in order to foster innovative, or trans-disciplinary research efforts.
- Financial resources to support multidisciplinary research inquiry that examines the linkages between our our natural, human / cultural, built, and economic systems.
- Appropriate institutional support and promotion of research from Business Affairs to Academic Programs within our academic units and colleges, The Graduate School and Office of Research and Sponsored Programs, and the Office of Academic Affairs.

### **What We Strive to Achieve**

- Knowledge that motivates positive change locally, regionally and internationally.
- Internal and external collaborations that support Appalachian's research and outreach initiatives.
- A culture of inquiry and discovery that engages our entire campus and examines issues of importance locally, regionally, nationally and internationally.
- Productive multidisciplinary research teams that are dedicated to a broader understanding of complex problems that affect our society, economy, and environment.
- New ways of understanding environmental, economic and energy challenges and most importantly, of communicating this understanding within our campus and externally.
- Raising both the quantity and quality of research at Appalachian State University so that it can compete on a national and international scale.
- Engagement of Appalachian's students with faculty members and staff in the analysis of complex problems.
- Increased innovation through research that supports community and economic development in our region and state.
- Greater levels of collaboration and engagement with public, private and non-profit organizations.

### **Mission**

Research on our campus is conducted to enhance our understanding of natural, human, economic and built systems, their interrelationships, impacts on and contributions to our human and environmental wellbeing.

*The Institute's mission is to build an internationally recognized multi-disciplinary research entity that supports the development of knowledge, technology and leadership to build and sustain prosperous, productive and resilient communities. We seek to foster a deeper understanding and appreciation of the sustainable use of our social, cultural, economic and natural capital.*

The Institute serves as a point of contact, facilitator, catalyst, and supporter of multidisciplinary research and outreach activities for:

- Graduate and undergraduate academic programs, faculty and students at Appalachian State University and other universities in our state, nationally or internationally;
- K-12 student populations, teachers and educational systems;
- Local, regional, state and national public and non-profit agencies;
- Decision makers in business and industry; and
- The general public.

## **Goals**

The primary aim of the RIEEE is to facilitate the highest quality research and creative activities, as well as application and outreach initiatives that bridge disciplines associated with the environment, energy and economics. The RIEEE will accomplish this by bringing together faculty, staff and students from throughout the university in partnership with external collaborators. The intent is to create a holistic perspective to examine problems and issues associated with a changing environment, economy and society. The Institute supports research and outreach efforts through financial administration, funding and proposal development, project logistics and operations, and dissemination of project results.

## **What we do**

The RIEEE and its Centers attempt to meet this goal by:

- Facilitating collaborative efforts across departmental, college and administrative structures;
- Supporting extramural funding opportunities for faculty and student research and the development of future research facilities and acquisition of equipment.
- Providing a point of contact for outside agencies and possible collaborators.
- Disseminating knowledge and information from project and program initiatives.
- Assisting Appalachian State University in efforts to improve energy efficiency, environmental conservation, and sound public policy.
- Developing community, regional, and international research and outreach partnerships that complement our research priorities and capabilities as well as our geographic attributes.

## **Collaboration is key**

We believe that the pressing problems today are global in nature; we benefit from partnerships that allow us to reach beyond our regional and national boundaries. We also see that in order to contribute

to change, we must have strong partnerships with public agencies at all levels, non-profit entities and businesses. These collaborations build stronger research initiatives by providing avenues to reach policy makers, access research data and resources, reach diverse audiences, and provide a base to build a broader, more encompassing perspective on problems and issues of such global import.

### III. STRATEGIC INITIATIVES

#### A. Enhance Research by Supporting Multi-Disciplinary Research Initiatives

We are interested in addressing questions that fall within each of the academic disciplines within our Centers but also that are multi-disciplinary in nature. Since the Institute was established four years ago, faculty members have been engaged in focused research clusters. Faculty in each of these clusters are encouraged to focus their efforts on their own areas of interest but to also look beyond these boundaries and draw upon the broader group to devise research projects that cross traditional boundaries. Our intent is to answer the complex questions that are inherent in environmental, energy and economic situations.

Linking research initiatives between the environment, energy and economics recognizes that our search for knowledge is not bounded in single disciplines or perspectives. A broader examination joining these three perspectives stresses a balanced view and an appreciation of our natural environment, our need for sustainable energy, and a concern for social, cultural and economic priorities. Sustainable economies at all levels must address our social, cultural, and economic needs while ensuring that we are in harmony with our environment.

We will continue to support existing and new multi-disciplinary research initiatives in an effort to address challenges presented by issues at the heart of growing energy demands, increasing environmental impacts and tough economic conditions. It is only through the collaboration of faculty from different disciplines and outlooks that we will be able to build research teams that can address these complex problems, and often competing public policy priorities.

<b>Related Tasks and Actions</b>
Facilitate ongoing opportunities for RIEEE Internal Advisory Board members to assess and monitor the nature of multi-disciplinary research clusters
Support existing and new faculty clusters that examine the linkages between natural, constructed, economic, technological and human systems
Support a research cluster that examines issues associated with vulnerable population groups and disasters
Enhance faculty clusters that address regional economic development initiatives including small agriculture enterprises, eco-tourism, and sustainable development practices.
Provide ongoing mini-grants to research clusters
Support faculty member research forums by: 1) providing opportunities for faculty to share the results of their multi-disciplinary or collaborative research initiatives; 2) host presentations by government, business and non-profit funding agency representatives; and 3) invite potential collaborators from the private sector, non-profits and public agencies to visit and tour our campus research laboratories and explore potential research projects
Continue Support of Multidisciplinary Research Initiatives such as: 1) Appalachian Atmospheric Interdisciplinary

Research (AppalAIR). Funding provided by the National Science Foundation and NASA.; 2) What are people breathing? A research project funded by HUD; 3) The design and feasibility of efficient environmental and climate policy(NASA).; 4) Appalachian Biofuels and Biomass Initiative is an effort to encourage and support economic expansion of bio-fuels and biomass sectors in North Carolina; and 5) Building Energy Efficient Affordable Housing

**B. Continue to Support Graduate and Undergraduate Research**

The RIEEE and the Appalachian Energy Center have provided *Seed Grants and Research Opportunities to Students and Faculty* since 2009. These small research grants will be continued in collaboration with the Office of Undergraduate Education. Seed grants for undergraduate and graduate students working under the guidance of faculty members will provide an opportunities to propose research projects. Funds may be used to purchase supplies, equipment or data. Students are asked to provide a summary of their research results to the ASU campus.

Related Tasks and Actions
Continue to provide seed grants to students in collaboration with the Office of Undergraduate Research
The Appalachian Energy Center and the RIEEE have offered to continue this type of support for student research for the International Solar Decathlon initiative proposed by ASU Department of Technology
Offer opportunities for students to showcase the results of their research efforts

**C. Facilitate Broader Collaborations with our Public, Private and Non-profit Partners**

Our intent is to make the Institute and its Centers agents for change. An indicator of our success is not just in obtaining resources to support research but in the partnerships that we establish with public agencies, universities, non-profit organizations and private businesses. Our engagement with our partners is not just at home but internationally, extending our reach beyond our borders into Mexico, to South America, Africa, and the Far East. While we strive to publish our research results in academic journals, books, and conferences, we believe that successful research evolves from the strong partnerships that we establish as we conduct our research and reach out to the public and the academic community to share our results.

Related Tasks and Actions
Increase the interactions between RIEEE external Advisory Board members and ASU faculty
Provide support to faculty participating in national and international conferences. an initiative with other universities in our region to develop and implement a multi-state water resources monitoring and management initiative
Assessments of the economic and social impacts of large scale disasters in collaboration with U.S. and international insurance groups, FEMA, USDA, USGS and other federal agencies
The ASU Landcover and Ecological Impacts cluster will host a one day meeting in Raleigh during the spring of 2013 at the Natural Science Museum
Initiate additional research collaborations with other universities, non-profit as well as public entitites, and private businesses



**D. Facilitate Broader Communication with Appalachian Faculty Members, Partners and the Public**

A major outcome of research initiatives is a broader understanding and appreciation of the complexity of our natural, human/cultural, economic and constructed systems. We will stimulate this understanding by providing increased opportunities for discussion on and off our campus by facilitating communication through faculty forums and lectures, internet-based, live streaming presentations, and up-to-date web sites for the RIEEE and its centers.

<b>Related Tasks and Actions</b>
Continue to facilitate productive forums that engage faculty members and students on the campus
Continue to arrange for off-campus partners to engage on campus with faculty and students and explore opportunities for research and engagement with these partners
Arrange for faculty and off-campus partners to participate in live, internet-based streaming presentations (available to the public)
Continue to update and enhance the RIEEE and center web sites to reflect resources on the campus and contributions to solving local, regional and national problems

**E. Enhance the Financial Resources and Administrative Processes**

The RIEEE currently provides administrative support in the preparation and implementation of research projects conducted by staff and faculty. The university makes a contribution to this function by providing partial salary for one staff member. Our intent is to expand this function to include a broader set of services to faculty in proposal preparation and dissemination of results. Enhancements in our administrative processes and services can be supported by the use of a portion of the indirect cost returns provided to the RIEEE and its centers. Investment in services to support faculty research benefits all faculty across the campus rather than serving single academic areas or colleges.

<b>Related Tasks and Actions</b>
Assist the Office of Academic Affairs in developing and implementing critical institutional processes and policies that impact faculty research
Pilot test administrative processes and policies to assess the impact on faculty research productivity and potential impacts on academic programs and institutional activities

## IV. CONCEPTUAL BASIS FOR RIEEE PROGRAMS AND ACTIVITIES

The Research Institute for Environment Energy and Economics was established in 2008 to enhance research activities and academic programs especially in fostering interdisciplinary research addressing environment, energy and economic issues. The centers within the RIEEE represent natural, socio-economic, and constructed systems and provide a base from which to structure research activities that examine the nature and mutual impacts of coupled systems. Figure #1 below suggests that natural, socio-economic and constructed systems impact one another and may influence the characteristics of each other.

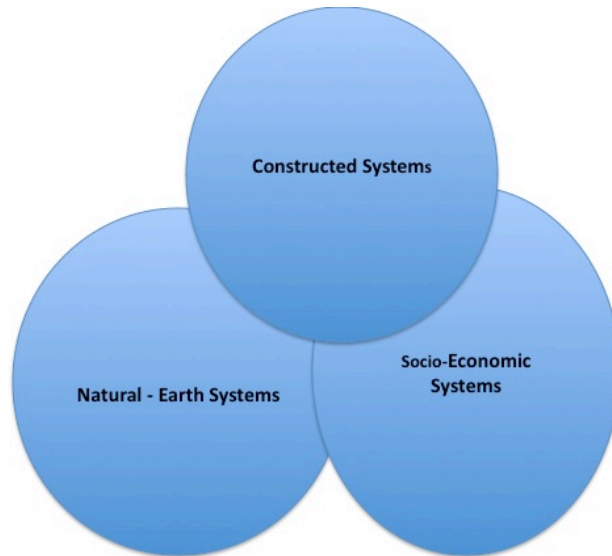


Figure #1: Coupled systems addressed by the RIEEE

Questions that we can address associated with coupled systems include:

- What are the dynamic interactions within natural, socio-economic and constructed systems? How do these interactions compare over time or when they are examined at various scales (local, regional, national etc.)?
- What are the interactions and dynamics between natural, socio-economic and constructed systems? How are the systems interdependent? What are the key drivers or shocks?
- What models or conceptualizations help us to understand the dynamic between natural, socio-economic and constructed systems?
- What incentives, structures or strategies (markets, rules, norms, or information) allow us to guide interactions between natural, socio-economic and constructed systems? What goals or values drive our strategies and structures?

- How do we support research, planning, monitoring, assessment or decision support to better integrate adaptive management and societal learning?

We view these systems as sources of capital that are built on multiple disciplines and areas of specialization. These areas involve an extensive set of concepts, principles, laws and processes; each having the potential to influence other systems and to be impacted by drivers evolving from other systems. A closer look at each of the systems suggests that they have many elements. Figure #2 provides a more detailed view of Natural, Socio-economic and Constructed Systems and describes the characteristics of the elements of the coupled systems.

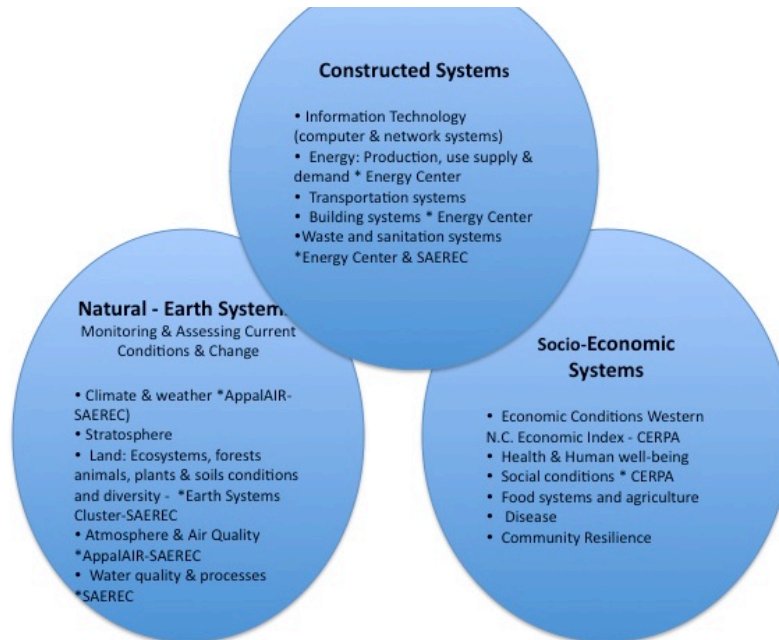


Figure #2: Characteristics of Coupled Systems

Figure #2 provides a more detailed description of parts of the coupled systems and in many areas notes research centers that have active clusters examining the characteristics and dynamics of parts of each of the systems.

The research activities within each of the systems are in many cases focused on the development of management and adaptive strategies to address problems or issues at the local, regional, national or global scale. Research may be organized to address conservation issues associated with the production or use of energy, sensitive natural resources, or social / economic conditions. Figure #3 below shows that we have alternative themes, strategies, tools or processes available to us to support our research initiatives and use to understand the interactions between natural, socio-economic and constructed systems. Because of the nature of the academic expertise reflected in these systems, we have the capacity to better understand what can be done to address problems and issues that impact sustainable ecosystems, communities and families.

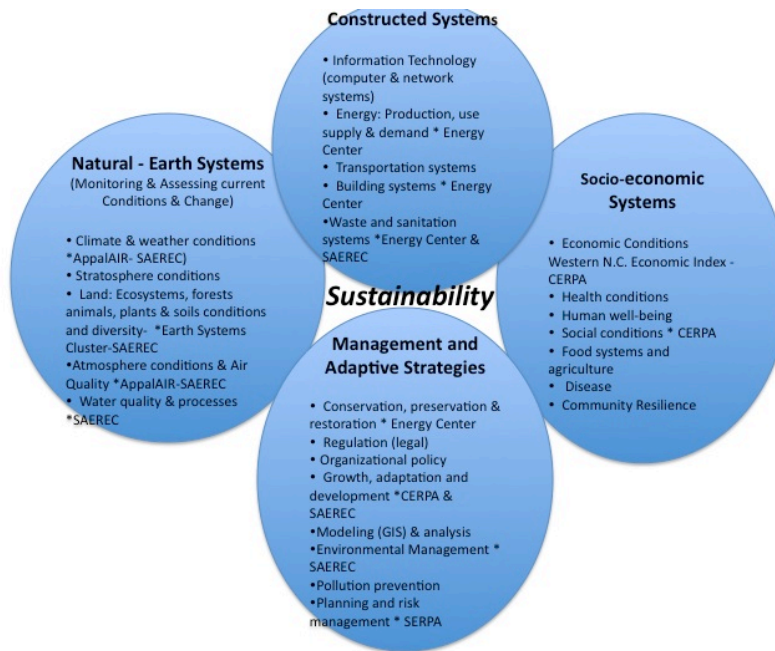


Figure #3: Management and adaptive strategies associated with coupled systems

It should be recognized that research that attempts to understand the interrelationships between coupled systems often requires external collaboration and partnerships. These external resources may complement university expertise and allow us to understand the complexity of the problems that we address in our research.

### Research Themes

The limited resources available to the RIEEE and its centers are used to support research initiatives that draw faculty resources from multiple disciplines and utilize their diverse knowledge, research tools and strategies to strengthen campus research. We welcome suggestions on research themes that are built on our capacity to conduct coupled systems research that examines issues and problems facing our region, nation or internationally.

We look forward to articulating over the next year, a clear set of research themes with ASU faculty members, staff and administrators as well as our external partners. The following themes provide a base from which we will establish key research focus areas.

- What are the socio-economic or environmental impacts of climate change? How might climate change influence how we design, build and use residential or commercial structures, enhance local agriculture and tourism or reduce poverty?
- How might growth and development in our region (including planning strategies or conservation practices) impact our natural environment and related ecosystem services including water resources, recreation and tourism or waste and sanitation?

- How do changes in ecosystem services in our region impact community and economic development as well as human wellbeing?
- How do changes in our constructed environments (from buildings and roads) impact human health, community resilience and economic sustainability?
- How might we use the natural resources in our region to support long-term economic growth and stability and avoid adverse environmental and social impacts?
- What forecasting and analytical tools can be used to clarify the contribution of social, natural and economic capital to community and economic development in our region?
- What developments in science and technology are best suited to support energy conservation and the implementation of clean energy strategies by businesses, citizens, communities and agencies? What public policy strategies must be in place to support innovation in energy conservation and the use of renewable energy technologies?

## V. BUDGET

Appalachian State University provides financial support to cover the full time twelve month salary for the Director of the RIEEE and 50% of the salary for the RIEEE Financial Management Specialist. Limited travel support was also provided during FY 2010 and 2011 for the Director and one of the Center Directors.

The Institute's primary source of funding comes from a portion of the 'indirect charges' made to contracts and grants that are associated with the RIEEE. In November 2008, the University Board of Trustees approved an allocation of the University's grants and contracts indirect charges. University Research Institutes were designated to receive 20% of indirect charges for contract and grants. For FY 2011, this amounted to approximately \$10,000; for FY 2012 the indirect cost funds returned to the RIEEE and its Centers amounted to \$75,000. The allocation of these funds within the RIEE is:

- 25% to the RIEEE;
- 25% to the Center that sponsors the contract or grant; and
- 50% to the individual principal investigator.

Support for Center Directors: The College of Arts and Sciences, the College of Fine and Applied Arts, and the Walker College of Business provide financial resources to support the time and effort of the Directors of CERPA, SAEREC and the Appalachian Energy Center.

Registration fees associated with workshops, institutes and conferences sponsored by units of the RIEEE are processed through the Division of Outreach and Summer Programs (DOSP) within the University. All expenditures are paid by the DOSP and any surplus or remaining funds are then transferred to the Institute's operating unit.

The Appalachian Energy Center has received financial support from funds appropriated through the Dept. of Commerce, State Energy Office. These funds provide programmatic support for research and outreach activities of the Energy Center and are used to cover a portion of the Energy Center's operating expenses. Funding for the Energy Center from the State Energy Office amounted to \$562,545 for FY 2009, \$612,750 for FY 2010, and \$512,340 for FY 2011.

Financial gifts and donations have been made to support specific research or outreach efforts including the Solar Decathlon. Special funds are established to meet the requirements associated with these funds.

## **VI. ORGANIZATION AND GOVERNANCE**

### **A. RIEEE Physical Location**

The Institute is located throughout the campus with directors offices provided by the Departments of Geography & Planning (RIEEE Director), Department of Biology (SAERE Director), Department of Technology & Environmental Design (Energy Center), and the Department of Economics (CERPA). The Energy Center is located at 130 Poplar Grove Connector in the Appalachian Enterprise Center. This space is provided by Watauga County. Meeting areas are provided by collaborating Colleges and Departments (Geography & Planning, Biology, Technology & Environmental Design, and Economics). Special campus events are held in public meeting space at the Student Union, Belk Library or other large auditoriums on the ASU campus.

#### RIEEE Faculty Members and Affiliates

Institute and Center faculty members and affiliates are housed within their academic unit. Research labs are also located within the faculty member's academic unit and off campus.

### **B. Facilities**

The facilities noted in the following text have been supported by the RIEEE and its centers and included in projects supported by both University funds and external grants and contracts. Each of these facilities is also a part of academic units throughout the university. The RIEEE and its centers are thus partners in these collaborative initiatives.

#### Appalachian Experimental Economics Laboratory

The Appalachian Experimental Economics Laboratory (AppEEL) is located at 2021 Raley Hall and supported by the Department of Economics and the Walker College of Business. The lab consists of 25 subject stations, a monitor station, and an audio and video projection system. The lab is set up with one stationary server and



multiple mobile servers that are assigned to individual researchers. An online recruitment system manages a subject pool that includes students and non-students. AppEEL is directed by Michael McKee, Professor of Economics.

### Appalachian Survey Research Laboratory

The Appalachian Survey Research Laboratory (AppSRL) receives support from the Department of Government and Justice Studies, the College of Arts and Sciences, CERPA, the Appalachian Energy Center and the RIEEE. The Lab conducts public opinion research about social, political, and economic issues, both regionally and nationally. It supports survey research for Appalachian faculty, staff, and students, researchers at other academic institutions, local, state, and federal agencies, and others working in the public interest. We have the ability to conduct multi-mode surveys to reach respondents by telephone, mail, and/or Internet. AppSRL is directed by Todd Hartman, Assistant Professor of Political Science.

### Special Off-Campus Research Laboratories

Several laboratories associate with Institute and Center research projects are located off campus. The following are some of the off-campus research sites.

Catawba County Eco-Complex, Hickory, NC: This site is located near Hickory, N.C. at the Catawba County Landfill. Catawba County provided funding for the \$1.5 million facility which houses the Bio-Diesel Research Laboratory (including offices, laboratory, vehicle emissions laboratory, and bio-diesel production facility). The research conducted at this site is funded by a grant from the Golden Leaf Foundation through the Appalachian Energy Center.

## **C. Programs**

We are interested in addressing questions that fall within each of the academic disciplines at Appalachian State University but also that are multi-disciplinary in nature. Since the Institute was established four years ago, we have invited faculty to be engaged in focused research clusters. Faculty in each of these program areas are encouraged to focus their efforts on their own areas of interest but also to look beyond these boundaries and draw upon the broader group to devise research projects that cross traditional boundaries. We believe that we position ourselves to examine more complex questions that are inherent in environmental, energy and economic situations.

Linking research initiatives between the environment, energy and economics recognizes that our search for knowledge is not bounded in single disciplines or perspectives. A broader examination joining these three perspectives stresses a balanced view and an appreciation of our natural environment, our need for sustainable energy and a concern for social, cultural and economic priorities. Sustainable economies at all levels must be based on a balance that meets our social, cultural, and economic needs while ensuring that we are in harmony with our environment.

## Appalachian Energy Center

*Building Energy Efficiency:* Focus topics within this section include Low Income Housing, High Performance Residences, High Efficiency Existing Homes, Commercial Buildings, and Policy Analysis. The Center facilitated a statewide program to support residential adoption of energy upgrades as part of the Save ENERGY STAR Rebates. It also facilitated the NC ENERGY STAR and RESNET national conference in which there were over 950 attendees. Research initiatives focus on Radiant Barrier for residential insulation, testing protocols for assessing the impacts of energy efficiency measures, testing Structural Energy Panels as part of the development of solar energy technologies, and completion of the N.C. Energy Policy Council (energy code development).

*Renewable Energy:* Focus topics within this section include Solar Thermal and Photovoltaics, Wind Energy, and Renewable Energy Resources. This group is engaged in the development of an extensive photovoltaic materials and device characterization facility which will provide the tools and training for ASU students and faculty to develop, fabricate and characterize PV devices. These facilities will serve as a user facility where PV researchers, fabricators, and users can have their PV materials and devices fabricated and tested. A Solar Training and Research Facility is in place providing for performance testing of solar equipment. The Small Wind Energy Test Facility provides performance assessment of wind turbines.

*Alternative Fuels:* Focus topics within this section include Cell-Free Ethanol Production & NIR Monitoring of Biodiesel, Appalachian Biofuels and Biomass Initiative, Emissions Analysis for Different Biodiesel Feedstocks, Algae Oil Production, Harvest, & Extraction, Microwave-Assisted Synthesis of Biodiesel & Materials for Making Solar Cells, and Landfill Gas Research and Development.

*Policy, Markets, and Economic Development:* Focus topics within this section include Assess Carbon Market Opportunities in North Carolina, New Policy Developments and Analysis, State Energy Plan, Economic Development Analysis and Outreach – Parts A & B, Hydrogen & Fuel Cell Industry Development & Commercialization, and Student Energy Research Development.

## Center for Economic Research and Policy Analysis (CERPA)

*Environment & Energy:* Promotes research and policy analysis on critical environmental and energy issues, such as conservation and land-use policy, benefit-cost analysis of renewable energy, invasive species management, non-market valuation of green energy programs, and the impact of climate change on the NC coast. CERPA researchers employ a diverse set of approaches with a comprehensive perspective that considers the interdependence of economics, energy and the environment.

*Experimental Economics:* Applies the laboratory method of inquiry to better understand how society and policy work. Experiments, in the lab and the field, allow for a more precise investigation of how individual, social and institutional characteristics influence individual



behavior and aggregate outcomes. Consequently, the lab can serve as a wind tunnel for policy analysis to better predict the responses and outcomes of competing policies. Such policy simulation increases the power of economic inquiry and policy analysis. The program is centered on 6 experimental economists that constitute one of the largest and strongest experimental groups in the country.

*Economic Development:* Facilitates research and policy analysis that promotes higher standards of living and improved economic and social conditions. The program addresses a wide range of economic and social issues, such as the urban-rural divide, workforce development, health care, income and job growth. The program maintains an area of work that focuses on Western North Carolina economic and social issues. WNC initiatives attempt to improve conditions in the region by providing relevant, time and accurate information to people in the private and public sectors.

*Survey Research:* Provides critical capacity to conduct research and analyses on current social and economic issues. The program has already contributed to projects such as assessing the disparities in economic and social conditions across different segments of North Carolina, investigating the benefits of marine wildlife conservation, and estimating the impact of off-shore wind turbines on NC coastal tourism. The new survey research program hit the ground running. With just an investment of \$1300, the new survey lab supported four research projects that entailed 2,427 hours of interviews and 1,833 completed surveys. The cost per completed interview was \$17.42, which is quite low relative to outside providers. Over \$30,000 was paid to students for interviewing and supervising.

#### SAERE - Environmental Programs

*Atmospheric Issues:* (AppalAIR – Appalachian Atmospheric Interdisciplinary Research Group) The group was formed within the College of Arts and Sciences in 2008. Its primary mission is to understand the role of atmospheric processes in affecting ecosystems in the southern Appalachian Mountain region. The initial research focus is on aerosols, which can greatly affect radiative forcing and in turn, temperatures in this part of the country. A second goal is to educate the public about the importance of atmospheric research and climate change.

*Water Resources:* The Water Resource Planning Committee is a group of faculty that share interests in water quality issues. This highly diverse group is already addressing issues related to streams on campus, and hydrological issues in the region, but no particular research initiatives have been started that pertain to SAEREC. However, the group is informed about SAEREC, and future proposals are anticipated.

*Earth Systems:* Faculty from Biology, Geology, and Geography examine the dynamics of earth systems including external forces for change and how these systems adapt. Members of this group are examining the impacts of exurban development on our natural systems and what strategies might be initiated to sustain our fragile mountain environments.

*Conservation Ecology:* This research group examines the nature and status of the Earth's biodiversity with the intent of protecting species, habitats and ecosystems from harmful external forces. Emphasis is placed on natural resource and environmental management practices as potential strategies for environmental protection and conservation.

### Institute-Wide Initiatives

*Educational Outreach Programs:* In July 2010 the RIEEE contracted with two ASU faculty members to identify potential strategies for building an Institute wide environmental education initiative. During that summer, Carla Ramsdell and Laura England identified ASU faculty engaged in environmental science education initiatives and off-campus collaborators. During the 2010 Fall and 2011 Spring semesters, two proposals were submitted. This environmental education program team continues to review opportunities for external funding and build collaborations that position ASU to develop a comprehensive multi-disciplinary environmental education program. One of the proposals is currently under review by the Regional U.S. EPA office.

*Small Agri-Business Research and Outreach:* A group of faculty representing the ASU Sustainable Development Program, Departments of Computer Science, Banking and Finance, the Appalachian Energy Center, and the Watauga County Extension Office has met to explore common research and outreach interests. This group continues to examine opportunities to assist small agri-businesses operations in Western North Carolina and partner with external funding agencies to support the region's economic base, small agri-business operations, and university partnerships. The group will continue to expand its connections throughout the ASU campus and explore projects that address economic, energy and environmental questions.

### **D. Organizational Structure**

Effective governance includes both effective leadership but also an organizational structure that facilitates the accomplishment of expressed goals and objectives. The Institute has worked to establish a structure for internal operations that supports quality, sustainable research activities that build on the established research and outreach initiatives throughout the campus and provide value added outcomes that were not part of the campus before the establishment of the Institute. Our intent is to build solid research initiatives that engage a wide representation of faculty from our campus, support graduate and undergraduate student research experiences, and involve staff from throughout the campus in research activities.

**Institute Director:** Appointed by the University Provost with concurrence of the faculty member's Dean and Department Chair. The first director is John C. Pine. Responsibilities of the director include: (1) Managing the daily Institute activities; (2) Serving as the primary contact for the Institute; (3) Managing the process of setting the Institute's strategic direction; (4) Developing the Institute's competency: partnering, governance, management, measurement and advocacy through public engagement and outreach. The director reports to the Provost and serves as a member of the Provost Council.

**Center Directors:** Each of the Center Directors is appointed by the Provost upon the recommendation of the Director of the Institute and with the concurrence of the Center Director's Dean and Department Chairperson. The Center Directors are responsible for establishing the strategic direction of their Center, selecting and mentoring Research Cluster Leaders, monitoring the operations of their Centers, and recruiting and mentoring faculty and staff to participate in the Center's activities.

**Center Associate Directors:** Research program leader within each center, first to step in for the center director, appointed by the center director and the RIEEE director

**Assistant Directors:** Serve as leaders for focused research clusters or programs within a center or in an Institute-wide capacity (Education and Outreach). They are appointed by the center director and the RIEEE director and serve with the concurrence of the faculty member's Dean and Department Chair. These leaders: (1) Guide individual areas and integrate each strategic imperative and provide direction with the overall Center direction; (2) Engage in active resource solicitation to support of the area; (3) Select and provide incentives to faculty, students, staff, and other stakeholders.

**Research Professors** (Professor, Associate Professor and Assistant Professor): Faculty members with terminal degrees in their discipline with a demonstrated track record of excellent research. They work under the direction of a center director or the principle investigator of a sponsored research project. They maintain an academic appointment in an academic unit but do not vote or serve on departmental committees.

**Research Partners, Research Fellows or Adjunct Fellows:** Appalachian faculty or staff member who is a co-investigator on center research projects. Faculty and staff association with research projects are approved by center directors and the Institute director along with the appropriate academic unit or university operational unit. Research Adjunct Fellows are individuals not employed by ASU but are active collaborators in a center research activity. Fellows may serve as paid or non-paid personnel on a research activity. Adjunct Fellows may be paid or non-paid and are recommended by the research project principle investigator and approved by the Center Assistant Director (research cluster or program lead) in consultation with the Center and Institute Directors. The designation as 'Senior' is made when a research associate, assistant or affiliate has 5 or more years of continuous service or \$500,000 in external funding through the center during a five year period.

**Research Associates:** Researchers who are associated with a Center research project or cluster.

**Research Assistant:** Pre-doctoral researchers assigned to a center program activity and paid by the center or by a grant through the center.

**Research Affiliate:** Research collaborators who are not employed by Appalachian State University but are engaged in the research activities of a center. Research Affiliates are recommended by principle investigators of research projects and approved by the Center and Institute Directors in consultation with ASU faculty, Deans and Chairs.

## E. External Advisory Board

The External Advisory Board was established to provide consultation in the development and operation of the Institute and its Centers. The membership is composed of federal, state and local public agency officials, non-profit agency directors and individual citizens whose interests or agency mission is aligned with those of the Institute. Members of the Advisory Board are called on by the Director of the RIEEE on a quarterly basis to provide updates on Institute activities and to solicit input on program activities. The Advisory Board members have been extremely helpful in providing assistance in making contacts with potential funding agencies or collaborations in external funding proposals.

Philip Berke, Ph.D.  
Professor, Department of City and Regional  
Planning  
Deputy Director, Institute for the Environment  
Director, Center for Sustainable Community  
Design  
University of North Carolina, Chapel Hill  
UNC-CH New East Building  
Campus Box #3140  
Chapel Hill, NC 27599-3140  
919.962.4765 (phone)  
pberke@email.unc.edu

Rebecca Benner, Ph.D.  
Director of Science  
The Nature Conservancy  
North Carolina Chapter Office  
4705 University Drive, Suite 290  
Durham, NC 27707  
Phone: (919) 794-4369  
Fax: (919) 403-0379  
rbenner@tnc.org

Ward Lenz  
Director  
State Energy Office  
North Carolina Department of Commerce  
301 North Wilmington Street  
Raleigh, North Carolina 27601-1058  
1-800-662-7131  
wlenz@nccommerce.com  
www.energync.net

Margaret D. Lowman, Ph.D.  
Director, Nature Research Center  
North Carolina Museum of Natural Sciences  
Research Professor, Physical & Mathematical  
Sciences  
NC State University  
121 W. Jones St, Raleigh NC 27603  
Email: canopymeg@gmail.com  
Cell: (941) 266-0817  
Work: (919) 707-9288

Dr. Marjorie McGuirk  
Special Adviser to the Director  
NOAA's National Climatic Data Center  
Veach-Baley Federal Building  
151 Patton Avenue  
Asheville, N.C. 28801-5001  
Point of contact for NOAA's NCDC (National  
Climatic Data Center in Asheville, NC.)

Kier Klepzig  
Assistant Director – Research  
Southeastern Research Station  
U.S. Forest Service  
200 W.T. Weaver Boulevard  
Asheville, NC 28804-3454  
(828) 257-4306  
FAX 828-257-4313

David K. Ray  
Southern Appalachians Field Coordinator  
The Open Space Institute  
Conservation Capital and Research Program  
The Flatiron Building, Suite 514 20 Battery Park  
Avenue Asheville, NC 28801  
[www.osiny.org](http://www.osiny.org) [dray@osiny.org](mailto:dray@osiny.org)  
828-252-4520 (office)  
828-450-0138 (mobile)  
[dray@osiny.org](mailto:dray@osiny.org)

Miles Silman, Ph.D.  
Director, Center for Energy, Environment and  
Sustainability (CEES)  
Associate Professor, Department of Biology  
Wake Forest University  
1834 Wake Forest Road  
Winston Salem, N.C. 27109  
(336) 758-2337 (CEES)  
Office phone: (336) 758-5596  
email: [silmanmr@wfu.edu](mailto:silmanmr@wfu.edu)

Linda B. Rimer, Ph.D.  
Liaison to North and South Carolina  
Office of the Regional Administrator  
Environmental Protection Agency  
109 TW Alexander Dr.  
Durham, NC 27711  
[rimerlinda@epa.gov](mailto:rimerlinda@epa.gov)  
919 541-0785

## F. Faculty Advisory Committee

The Internal Advisory Board was established to increase communication between academic and research units on the Appalachian campus. Ongoing meetings with the members of this Advisory Board are held to discuss specific issues with faculty within these units and their association with Institute research centers. The members of the Advisory Board provide essential input on issues involving faculty time, research support, external collaborations, and multi-disciplinary funding opportunities. The Advisory Board meets during the Fall and Spring semesters.

William Anderson, Professor and Chair  
Geology

Sue Edwards, Professor and Chair  
Biology

Zack Murrell, Associate Professor  
Biology

Brett Taubman, Associate Professor  
Chemistry

Jim Sherman, Associate Professor  
Physics and Astronomy

James Wilkes, Professor and Chair  
Computer Science

Jay Fenwick, Professor  
Computer Science

Eric Marland, Professor  
Mathematical Sciences

John Whitehead, Professor and Chair  
Economics

David Dickinson, Professor  
Economics

Brian Ellison, Professor and Chair  
Government & Justice Studies

Tatyana Ruseva, Assistant Professor  
Government & Justice Studies

Jeff Tiller, Professor and Chair  
Technology and Environmental Design

Chad Everhart, Associate Professor  
Technology & Environmental Design

Kathleen Schroeder, Professor and Chair  
Geography and Planning

Chris Badurek, Assistant Professor  
Geography and Planning

Mary Sheryl Horine, Interim Director  
Blue Cross and Blue Shield of N.C. Institute for  
Health and Human Services

Sandra Lubarsky, Director  
Sustainable Development Program

## **VII. Contribution to the University's Strategic Plan \***

**Priority 1: Create and maintain superior curricula, programs, financial incentives, and intellectual environments to attract, educate, and graduate an exceptional and diverse community of students.**

**Initiative 3: Appalachian will continually assess and conduct research to improve academic programs and administrative services and identify new program initiatives.**

- Conduct research and prepare policy analyses to inform university decision makers.

The Center for Economic Policy and Analysis (CERPA) completed a study supported by the UNC General Administration concerning the impact of external funding on the state of North Carolina. The information provided by this study influences university system and campus policy decisions especially in light of state fiscal climate of budget reductions. Clarifying the economic impacts from institutional research efforts is critical in making sound governance decisions for institutions of higher education.

**Priority 2: Provide resources that enable all faculty members to perform quality research and creative activities, and enhanced resources in successive, focus areas of strength to enable Appalachian to make sustained and major contributions in those fields.**

A fundamental responsibility of a university is the advancement of knowledge through research and creative activities, and great universities are recognized for the scholarly accomplishments of their faculty. To become a nationally recognized university and engage the best students, Appalachian must significantly advance its overall research profile and achieve prominence in research that is associated with environmental, energy and economic issues.

**Initiative 1: Appalachian will foster success in scholarship across the university increasing:**

- Sponsored program support to \$18 million.
- Discipline-appropriate scholarly or creative performance (e.g., peer-reviewed publications/ products, presentations, performances, student theses, honors).
- Graduate research assistantship stipends by 15 percent.

External funding from new grants and contracts for the RIEEE and its Centers has grown from \$469,577 in FY 2009 when the Institute was created to \$1,238,862 in FY 2010 and \$4,425,907 in FY 2011. Ongoing funds from multi-year projects as well as from state general funds from the State Energy Office (N.C. Department of Commerce), grew from a total of \$2,385,736 in FY 2009 to \$5,219,767 in FY 2011. External funding provides the resources to support faculty release time for research, graduate student assistantships, and undergraduate student support funds.

\* It should be noted that the University Strategic Plan is currently undergoing review and revision. The

RIEEE will be fully engaged in this effort and look for ways to support strategic effort on and off the campus.

**Initiative 2: Appalachian will build nationally competitive research programs in focus areas (environment, energy and economics).**

- Establish the Research Institute for Environment, Energy, and Economics.
- Hire high-profile faculty members.
- Increase sponsored program awards in each focus area to \$5 million.
- Establish research partnerships with other institutions.

The Research Institute for Environment, Energy and Economics (RIEEE) was established in November 2008 by the Appalachian State University Board of Trustees. At that time the RIEEE included the Appalachian Energy Center which had an interim Director to oversee the activities of the Energy Center. The Center for Economic Policy and Analysis (CERPA) was formed within the Walker College of Business Administration and moved to the RIEEE in July 2009. During FY 2010, a Director was appointed for the Appalachian Energy Center from ASU faculty, CERPA was moved to the RIEEE, and a Director from the ASU faculty was appointed for Environmental Programs.

CERPA is a highly productive and internationally recognized research entity with a number of high-profile faculty members. The department has strategically focused on environmental and experimental economics—two complementary fields for the study of environmental policy—and has developed into one of the strongest groups in these areas in the world. According to Research Papers in Economics (RePEc), a well-known and objective ranking system, the Department of Economics is ranked in the top 5% of institutions in the world in the fields of environmental economics (<http://ideas.repec.org/top/top.env.html>) and experimental economics (<http://ideas.repec.org/top/top.exp.html>). This specialized strength translates to broader recognition with RePEc ranking the department among the top 25% of all economics departments in the United States (<http://ideas.repec.org/top/top.usecondept.html>). This ranks the department ahead of many PhD granting departments at research institutions, including NC State University, University of Kentucky, University of Georgia, University of South Carolina and the University of Georgia; and it ranks the department only behind UNC Chapel Hill among the state's public universities. The department is one of only a few non-graduate program departments to achieve such success.

Submissions to external agencies and organizations for sponsored research increased from \$907,451 in FY 2009 to \$19,555,597 in FY 2011; a total of \$,636,227 (9 proposals) were submitted in FY 2012 but not funded. External funding awarded rising from \$369,577 in FY 2009 to \$4,425,907 in 2011 and \$1,084,876 in FY 2012. Total grants and contracts with the RIEEE and its centers include 45 projects with funding of \$6,710,811. Multi-year funding submissions (of larger amounts) to external agencies and organizations grew extensively from FY 2009 through FY 2011 reflecting more complex proposals involving greater numbers of faculty and partnerships with external organizations.

Collaborations reflecting ongoing partnerships with external groups have grown since the formation of the RIEEE. These partnerships include many within the UNC System (N.C. State, UNC Chapel Hill, East



Carolina University, UNC Charlotte, Western Carolina, UNC Asheville, and N.C. A & T. University). Other university partnerships were initiated with Dartmouth University, Texas A. & M. University, the University of Minnesota Duluth, University of California Chico, the City University of New York, Auburn University, and Clemson University. Federal and state agency collaborations include U.S. E.P.A., NASA, NOAA, USGS, US AID, the NSF and DOE.

Partnerships with nongovernmental organizations (NGO's) have also been established including the National Committee for the New River, Grandfather Mountain Stewardship Foundation, and Lowe's Inc. These partnerships provide essential financial resources but also the engagement of key personnel that promote quality research activities.

**Priority 4: Apply our intellectual, academic, cultural, and research resources to promote sustainable economic growth, prosperity, and quality of life throughout this region and state.**

**Initiative 1: Appalachian will address the state's workforce needs by recruiting and graduating students in areas of need.**

The Appalachian Energy Center and the Department of Technology and Environmental Design have supported undergraduate and graduate interns and graduate fellows in placements with regional energy companies and entities including local and state government agencies and non-profit organizations. Other students have worked closely with ASU faculty and staff on research and technical assistance projects and then gone on to employment positions in our state. These former students are demonstrating the successful experiences that come from internships, fellowships and employment with our research projects and partners.

**Initiative 2: Appalachian will provide constructive public service to this region, state and nation.**

- Strengthen community program offerings.
- Expand K-12 outreach activities.

Research activities are also engaged in outreach to area schools including support for science clubs for area elementary schools and energy audits for the new Watauga County High School. Campus engagement has stretched from outreach efforts locally and regionally to efforts internationally in Brazil, South Africa, and Mexico.

**Priority 5: Develop and implement a comprehensive plan to protect and enhance our distinctive historical, geographical, and cultural identity associated with our location in the Appalachian Mountains.**

Two hallmarks of Appalachian are our location in an aesthetically pleasing as well as culturally and recreationally rich, mountain environment and a campus that attracts faculty, staff, and students seeking a high quality of life. We are committed to conscientious stewardship of these important

resources and leadership by promoting sustainable policies and practices. Faculty, staff, and student interest and expertise, along with our location, compel us to provide leadership in sustainability and conservation.

**Initiative 1: Appalachian will enhance our sustainability efforts.**

- Office of Sustainability.
- Campus-wide sustainability plan.

The RIEEE has supported the Office of Sustainability since its creation by having Center Directors serve on the Sustainability Council. The Directors of the Energy Center, CERPA and SAERE Program serve on Council Committees and are a part of this campus-wide effort to build a strong organizational sustainability program.

**Initiative 2: Appalachian will develop a master plan that promotes our intimate residential campus character.**

Institute Center staff and faculty serve on ASU facility committees providing discipline-specific expertise to campus operational units. The types of consultation and technical support range from emergency management, flood modeling of campus creeks, energy efficiency for buildings, renewable energy initiatives, stream restoration, economic cost-benefit studies, hazards analysis, policy analysis, and program assessment.

## APPENDIX I

### EXTERNAL COLLABORATIONS

#### Local Governments

Catawba County Eco-Complex (Hickory, NC)  
Watauga County School System (Boone, NC)  
Landfill Gas Collaborations (Edgecombe,  
Robeson, Rockingham, Scotland, Wilkes,  
Gaston, Caldwell, Rutherford, and Haywood  
Counties)

#### Federal Agencies

National Science Foundation  
National Climatic Data Center (NOAA)  
Asheville, NC  
NASA  
U.S. Environmental Protection Agency,  
Research Triangle  
U.S. Department of Interior  
Fish and Wildlife Service  
U.S. Department of Energy (DOE)  
Wind Powering America  
Oak Ridge National Laboratories  
National Renewable Energy Laboratory  
U.S. Geological Survey  
U.S. Housing & Urban Development  
Mountain Research Initiative (Swiss NSF)

#### Non-Profit Entities

Rural Economic Development Center, Inc.  
Golden LEAF Foundation  
Z. Smith Reynolds Foundation  
N.C. Farm Center for Innovation and  
Sustainability  
Society for Human Resource Management  
Foundation  
Discovery Place, Charlotte, NC  
N.C. Nature Conservancy  
N.C. Audubon Society  
Grandfather Mountain Stewardship  
Foundation  
Cape Fear Resource Conservation and  
Development

N.C. Farm Center for Innovation &  
Sustainability  
N.C. Fuel Cell Alliance  
Advanced Energy Corporation

#### State Agencies

N.C. Department of Environmental and  
Natural Resources  
N.C. Museum of Natural Sciences  
N.C. State Parks  
N.C. Wildlife Resources Commission  
Division of Air Quality  
N.C. Department of Commerce, State Energy  
Office  
N.C. Biofuels Center  
N.C. Rural Economic Development Ctr.  
N.C. Space Grant Consortium  
Virginia Marine Resources Commission

#### Universities

University of North Carolina, Charlotte  
Carnegie Mellon University  
University of North Carolina, Chapel Hill  
North Carolina State University  
Western Carolina University  
University of North Carolina, Asheville  
East Carolina State University  
Auburn University  
Arizona State University  
George Mason University  
Texas A. & M University  
Dartmouth  
University of California, Chico  
University of Minnesota, Duluth  
George Mason University  
City University of New York, Hunter College  
Bridgewater State University  
University of Wyoming  
University of Houston Clear Lake  
University of California, San Diego

UDLAP in Puebla, Mexico  
The University of the Free State in  
Bloemfontein, South Africa.  
CICERO – University of Oslo

Southern Energy Management  
International Centre for Hydrogen Energy  
Technologies (UNIDO-ICHET) (United Nations)  
Mission Health

**Business**

Lowes Inc.

## APPENDIX II Director Biographical Sketches

John C. Pine, Ed.D.  
Director, Research Institute for Environment, Energy and Economics (RIEEE)  
Professor, Department of Geography and Planning  
College of Arts and Sciences

John C. Pine has served for the past two and one-half years as Director of the Research Institute for Environment, Energy & Economics (RIEEE) and Professor, Department of Geography and Planning, Appalachian State University, Boone, NC. He joined the Appalachian faculty after serving thirty years at Louisiana State University in Baton Rouge where he directed the graduate and undergraduate Disaster Science and Management Program, and as Professor in the Department of Geography and Anthropology and the Department of Environmental Sciences. His research on disasters and emergency management centers on emergency planning, hazards and risk assessment, and risk management. He has worked with many federal, state and local entities to identify strategies to enhance community preparedness and ensure the resilience of communities impacted by disasters. His recent publications include *Natural Hazards Analysis: Reducing the Impact of Disasters* from Taylor Francis Publishers in 2009, *Technology and Emergency Management* by John Wiley (2007) and *Tort Liability Today* by the Public Risk Management Association (2005). He has served on the Board of Visitors for FEMA's Emergency Management Institute in Emmitsburg, MD; his publications have been included in: *The Journal of Disaster Studies, Policy and Management, Disasters, Journal of Race and Society, International Journal of Mass Emergencies and Disasters, Oceanography, Journal of Emergency Management, Natural Disaster Review, Journal of Environmental Health and the Journal of Hazardous Materials*. He received his Doctorate in Higher Education Administration and Public Administration from the University of Georgia, Athens in 1979. E-Mail: [pinejc@appstate.edu](mailto:pinejc@appstate.edu) Phone: (828) 262-2764

Jeff Ramsdell, Ph.D., PE  
Director, Appalachian Energy Center  
Professor, Department of Technology and Environmental Design  
College of Fine and Applied Arts

Dr. Ramsdell has served as the Director of the Appalachian Energy Center at Appalachian State University since January, 2010. He is also a Professor in the Department of Technology and Environmental Design. Dr. Ramsdell came to Appalachian State University in 2003 after 13 years in industry as a project manager and engineer. In his current position, Dr. Ramsdell teaches materials science, building science, and renewable energy courses at both the undergraduate and graduate level, and directs the renewable energy and energy efficiency related activities of the Center. He is a full member of the graduate faculty at Appalachian and has also developed international summer courses to Latin American countries with a focus on sustainable construction and energy production. Recent scholarly activity includes research and application of alternative fuels for the State of North Carolina. Dr. Ramsdell earned a Ph.D. in Materials Science and Engineering from the University of Central Florida, where he was awarded a full fellowship from Lucent Technologies. He also earned a Master of

Business Administration from Rollins College and a Bachelor of Science in Mechanical Engineering from the University of Florida. Dr. Ramsdell is a licensed Professional Engineer in the State of Florida.

Dr. Ramsdell has extensive industry experience, having held engineering and management positions with Georgia Pacific, Lucent Technologies, Boston Whaler, and Motorola, among others. He has also worked as a professional engineering consultant in the areas of materials characterization and testing, and alternative fuels. In the area of nanotechnology, Dr. Ramsdell has performed extensive research in the surface characterization of nanostructures. This work includes extensive use of atomic force microscopy (AFM), x-ray photoelectron spectroscopy (XPS), static secondary ion mass spectrometry (SSIMS), nanoindentation and scratching, as well as other atomic-scale characterization techniques. Dr. Ramsdell is a member of the Board of Directors for the Biofuels Center of North Carolina, the North Carolina Biomass Council, the North Carolina Alternative Fuels Consortium, and the North Carolina Nanotechnology Initiative Planning Committee.

Howie Neufeld, Ph.D.

Director, Southern Appalachian Environmental Research and Education Center (SAERE)  
Professor, Department of Biology, College of Arts and Sciences

Dr. Neufeld is currently a Professor in the Department of Biology at Appalachian State University, Boone, NC. He received a B.S. in Forestry from Rutgers University in 1975, a M.F. in Forest Sciences from the Yale School of Forestry and Environmental Science in 1977, and a Ph.D. in Botany from the University of Georgia in 1984. After his first postdoctoral position at New Mexico State University (where he studied light interception by creosotebushes and salt tolerance in range grasses), he began a National Research Council post-doctoral appointment under Drs. Dave Tingey and Bill Hogsett at the EPA Lab in Corvallis, OR, where he worked on the effects of ozone on root growth of tree seedlings. He has served as President of both The Association of Southeastern Biologists (ASB) and the Southern Appalachian Botanical Society and is now Chair of AppalAIR, the interdisciplinary atmospheric research group here at ASU. He recently became the first Director of the Southern Appalachian Environmental Research and Education Center which resides within ASU's Research Institute for the Environment, Energy and Economics.

Dr. Neufeld's research expertise is in the area of plant physiological ecology and includes work on desert plants, forest understory plants, and the role of anthocyanins in vegetative tissues in plants. For over 25 years, he has been active in air pollution effects research; he was the principal investigator of a National Park-U.S. EPA sponsored research project on the effects of ozone on plants native to Great Smoky Mountains National Park, and since 1992, his research group has investigated the impacts of ozone on native wildflowers in the Park. He has published 36 papers and one book chapter, and mentored 20 graduate students, six of which have either completed or nearly completed their Ph.Ds at other institutions. He is the recipient of several awards at ASU for his research, including the Wachovia Award for Achievement in Environmental Research, the Faculty Research Award from the Association of Southeastern Biologists, the local Sigma Xi Chapter Outstanding Researcher Award, and most recently, the 100 Scholars Award for Research from the ASU Office of Research and Graduate Education. In 2009, he organized the two-semester long Darwin Bicentennial Celebration at ASU,

which involved bringing in 14 distinguished Darwin Scholars in what was the largest such speaker series in the country.

Todd Cherry, Ph.D.

Director, Center for Economic Policy and Analysis (CERPA)

Professor, Department of Biology, Walker College of Business