

Strategic Plan of the School of Energy Resources at the University of Wyoming 2017-2022

Preamble

The School of Energy Resources (SER) partners with the University of Wyoming (UW) colleges, with the state government, and with the energy sector to develop solutions to energy challenges in Wyoming and elsewhere, and to strengthen and diversify Wyoming's economy and UW's energy brand.

Vision

SER pursues the creation, sharing and implementation of technology and knowledge for sustainable economic production of Wyoming's natural resources to generate additional employment and revenue opportunities for the state that include supply of clean energy and materials, and products.

Mission

SER develops and deploys expertise to solve critical energy challenges, add value to the Wyoming energy sector, and position UW as a primary provider for energy innovation at the national level. In pursuit of this mission, the SER facilitates internal and external interdisciplinary coalitions and builds institutional capacity in energy education, research and outreach.

SER distinguishes its programs in areas of strategic importance to Wyoming's economy by focusing technology development and academic activities primarily in four strategic areas of concentration:

- Maximizing the economic recovery of fossil energy and mineral resources;
- Protecting existing markets for fossil fuels;
- Creating new markets – traditional and value-added – from Wyoming energy and mineral resources; and
- Educating the workforce and stakeholders to facilitate diversification of the energy sector through addition of value-added activities.

We seek to develop and deploy new technologies, and to educate the workforce and stakeholders in these areas to deliver broad and significant benefits to the state and the energy industry. Chief among these benefits are:

- Growth in energy-based revenue streams for Wyoming
- A hedge against boom and bust economic cycles
- A well-trained, homegrown workforce
- Enhanced competitiveness at UW for student and faculty recruiting, corporate partnerships, and funding
- Mutual gain for UW and industry from cooperative relationships
- Improved performance in monetizing Wyoming's most valuable energy assets

Values

Leadership

Sharing a clear vision for the future of Wyoming's energy and mineral resources guides our provision of technology, knowledge and processes for stakeholders to create value in new and innovative ways.

Innovation and Application

Motivating collaborative, creative thinking leads to new knowledge, inspires student and faculty achievement, and brings practical, innovative solutions to challenges in the energy sector.

Focus on Commercial Outcomes

An eye towards eventual benefits to growth, diversification, and sustainability of Wyoming's economy guides our investment of resources.

Engagement and Partnership

Engagement with local, state, national, and global constituencies inspires and informs our work. We seek to collaborate broadly with experts in all sectors to bring together the skills and knowledge required to solve problems.

Thinking Locally, Acting Globally

SER recognizes that solutions for Wyoming's challenges are not unique and may have their genesis in foreign settings. We seek global partnerships in pursuit of our mission.

Disciplinarity and Interdisciplinarity

Knowledge advances through intense and focused study, and also in the intersection of ideas and disciplines. SER supports both in pursuit of solutions.

Goals and Objectives

SER has four focus areas, as described below.

Education

1. Develop the workforce for a more diverse energy economy. Work with deans and faculty in the UW colleges to:
 - a. Motivate development of energy curricula consistent with the needs of the state.
 - b. Keep energy curricula relevant to the needs of employers.
 - c. Design new curricula in carbon engineering, manufacturing, and material science.
 - d. Grow enrollment in energy degree programs by recruiting and graduating a diverse community of students.

- e. Graduate creative thinkers capable of meeting the unpredictable and complex challenges of our future energy needs.
 - f. Achieve improved employment outcomes for graduates.
2. Advance energy literacy in Wyoming and beyond
 - a. Disseminate knowledge that improves understanding and decision-making about issues currently facing Wyoming's energy activities.
 - b. Become a reliable resource for information about potential solutions to energy issues.

Research

1. Continue to support a strong culture of relevant, innovative research that fosters innovation in line with the needs of the energy sector in Wyoming.
2. Partner with the energy industry to ensure relevance and to address critical issues.
3. Motivate and support Centers of Excellence that bring together interdisciplinary research teams to address critical issues in the energy arena.
4. Provide seed funding for faculty research on key topics, and financial support for graduate and undergraduate student research.
5. Distinguish energy programs at UW over the next five years by concentrating research funding in three strategic areas:
 - A. Maximizing the economic recovery of fossil energy and mineral resources
 - i. Improving recovery of oil and gas from unconventional and mature reservoirs through fundamental knowledge of flow through porous media,
 - ii. Developing process and materials to enhance recovery of oil, gas, and minerals,
 - iii. Reducing cost of producing oil, gas, and minerals through geomechanical, petrophysical and modeling studies.
 - B. Protecting existing markets for coal, oil, gas and other energy resources
 - i. Carbon dioxide capture, utilization and geologic storage technology innovation, improvement and implementation,
 - ii. Air and water quality studies,
 - iii. Efficiency improvements in energy production (fossil and renewable),
 - iv. Assessment of energy regulation and policy impacts Wyoming resources.
 - C. Creating new markets – traditional and value-added – for Wyoming energy and mineral resources
 - i. New export markets for Wyoming energy and mineral resources.
 - ii. Carbon engineering – value-added products from coal and low-value petroleum.
 - iii. Rare Earth Element recovery and separations.
 - iv. Exploitation of oil shales for silica-based materials production.
 - v. Explore new markets and applications for renewable energy resources.

Energy Regulation and Policy

1. Develop a plan of operations for SER and UW in this important new area. The overriding premise is that better informed policy-making will reduce the occurrence of unintended consequences for the energy sector, the economy, and the environment.
2. Develop a research protocol for generation and analysis of policy options.

3. Convene an annual forum for discussion among global experts in this area that will result in a proceedings publication.
4. Over time, engage directly with policy makers through briefings and/or formal testimony.

Technology Deployment & New Ventures

This new enterprise will be undertaken in collaboration with:

- UW Vice President for Research and Economic Development
 - Wyoming Technology Business Center
 - Director of Economic Diversification Strategy and Initiative
 - CEO of Wyoming Business Council
-
1. Motivate and enable researchers to develop their energy technologies to higher levels of readiness, to the point where they are attractive for commercialization;
 2. Identify and engage with individuals, companies, and agencies that may invest in, license, and otherwise support development and commercialization of said technologies;
 3. Work with the inventors to strategically publicize and otherwise increase the awareness of the most promising energy technologies; and
 4. Collaborate with the above-mentioned entities to evaluate ways that these technologies can be exploited for diversification of Wyoming's economy.