

School of Energy Resources Update
September 14, 2022

1. The SER Academics program continues to focus on recruiting, evaluating its offerings and supporting student success. Select updates include:
 - a. SER's proposed undergraduate certificates (carbon capture, use and storage and land management) have moved on to Academic Affairs feasibility studies.
 - b. SER is now advertising the 3+3 with College of Law, including with this video: <https://www.youtube.com/watch?v=iDI8GaSncQE> and a 3+3 website will go live in September. This was part of the special group of websites with an Institutional Marketing project.
 - c. SER has updated an International Articulation agreement with SAIT in Canada and have a new Articulation in place with Lille Catholic School after their visit over the summer.
 - d. SER has 3 students admitted already for 2023 (1 in spring, two in fall).

2. The SER Outreach program has been exceptionally busy recently with the following major events:
 - a. Hosted at Gillette College: Annual CORE-CM (Carbon Ore, Rare Earths and Critical Minerals) meeting
 - b. Hosted at Atlas Carbon in Campbell County: Groundbreaking for the carbon engineering (i.e., coal to products) field demonstration
 - c. Laramie: Wyoming's Energy Future Conference (Sept 15)

3. The SER research program continues to grow and diversify. During the summer months the SER research team has added 6 new staff members. These new researchers bring expertise in energy law and policy, critical minerals and rare earth elements, petrophysics and geologic modeling.
 - a. SER recently received funding from the Wyoming Energy Authority to research the Mowry Shale. The goal of the program is to bring together a multidisciplinary UW team to focus on Wyoming's largest untapped unconventional oil and gas resource. The following steps have been taken in this program:
 - i. SER issued a Request for Proposals in late summer
 - ii. Six faculty proposals originating from four different UW departments were selected for awards
 - b. Each BOT update, SER highlights at least one faculty-led center of excellence. This quarter we are pleased to provide an update on the Center for Produced Water Management (CEPWM), which is under the leadership of Dr. Jonathan Brant in the Department of Civil and Architectural Engineering. CEPWM is a national leader in high salinity water treatment and brine-based mineral recovery. Highlights from the CEPWM include:
 - i. CEPWM researchers are developing novel membrane materials for a range of applications relevant to Wyoming. These new membranes facilitate low energy desalination and an ability to selectively recover critical materials, like lithium, from mixed brines (produced water).
 - ii. CEPWM researchers have developed and are testing a new technology, incorporating multi-directional magnetic fields for destroying so called forever chemicals in drinking water. This technology avoids the usage of chemical oxidants and external energy inputs to mineralize per- and polyfluoroalkyl

Substances (PFAS) thereby greatly reducing the costs that must be incurred by municipalities. This is particularly important for Wyoming's many small municipalities.

4. SER's Center for Economic Geology Research (CEGR) continues its research on CO₂ storage, hydrogen and critical minerals research. Select highlights include:
 - a. Under the SER's flagship CO₂ storage project, Wyoming CarbonSAFE, a commercial-scale storage hub is being developed that will provide carbon management solutions for the northern Powder River Basin. Currently, the project team is finalizing permitting and commercial strategies to prepare for the next project phase.
 - b. The CORE-CM projects, which are focused on building new industries in carbon ore, rare earths and critical minerals in the Powder River Basin and the Greater Green River Basin, have held stakeholder outreach events to identify high value collaborations.
 - c. CEGR, in conjunction with H₂ERC, continues to expand its research focus to support Wyoming industries, through two industry-led projects assessing the commercialization of hydrogen technologies around existing energy hubs.

5. SER's Center of Excellence for Carbon Capture and Conversion (CCCC) continues to progress research and technology development associated with the future of Wyoming coal.
 - a. On September 2, there was a ground breaking ceremony in Gillette for the field demonstration plant being built as the next step for the commercialization of the Coal Refinery in Wyoming.
 - b. The students working on the UW pyrolysis pilot plant are making great progress on the parametric information needed for the detailed design of the pyrolysis unit that is part of the field demonstration plant.
 - c. Provisional patents are being pursued for other building materials: foam and concrete.

6. The Center for Energy Regulation and Policy Analysis (CERPA) is focused on supporting other SER centers, state elected and appointed officials and leading its own research programs. Select updates include:
 - a. A search is underway for a CERPA director.
 - b. A paper was recently published on the economic development opportunities associated with a Wyoming rare earth element industry. It has been published on the CERPA website: <http://www.uwyo.edu/ser/research/centers-of-excellence/energy-regulation-policy/publications.html>
 - c. SER commissioned the Center for Business and Economic Analysis in the College of Business, to complete a study on the impact of federal land on wind energy development. In summary, wind projects on state and private land can be permitted in about 12 months, while over four years are required to permit wind energy projects on federal land – resulting in substantial loss of revenue to Wyoming given the large amount of federal land in the state. The report will be posted as a working paper on CERPA's website soon and will be submitted to a peer-reviewed journal.

7. SER's Hydrogen Energy Research Center (H₂ERC) is now up and running with the following highlights:
 - a. Research projects are underway with Tallgrass MLP and Williams to focus on hydrogen produced from natural gas (blue) and water electrolysis (green)

- b. The DOE-funded study titled 'A Mid-Century Net-Zero Scenario for the State of Wyoming and its Economic Impacts' is helping H₂ERC to a baseline for the future of the hydrogen economy in the state of Wyoming.
- c. H₂ERC is creating an ecosystem for research and development in Hydrogen Energy at the University of Wyoming. An internal RFP was released and seven proposals from faculty were funded to research the production, storage, movement, and use of hydrogen.
- d. SER and H₂ERC continue building the Western Interstate Hydrogen Hub with the four-state coalition members in preparation for the hydrogen hub funding to be released under the Infrastructure Investment and Jobs Act (IIJA)