

Strategic **REVIEW**

2020

ACCELERATED STRATEGIC PROGRAM REVIEW

School of Energy Resources
Prepared for Academic Affairs

December 2020



ACADEMICS

RESEARCH

OUTREACH



UNIVERSITY
OF WYOMING

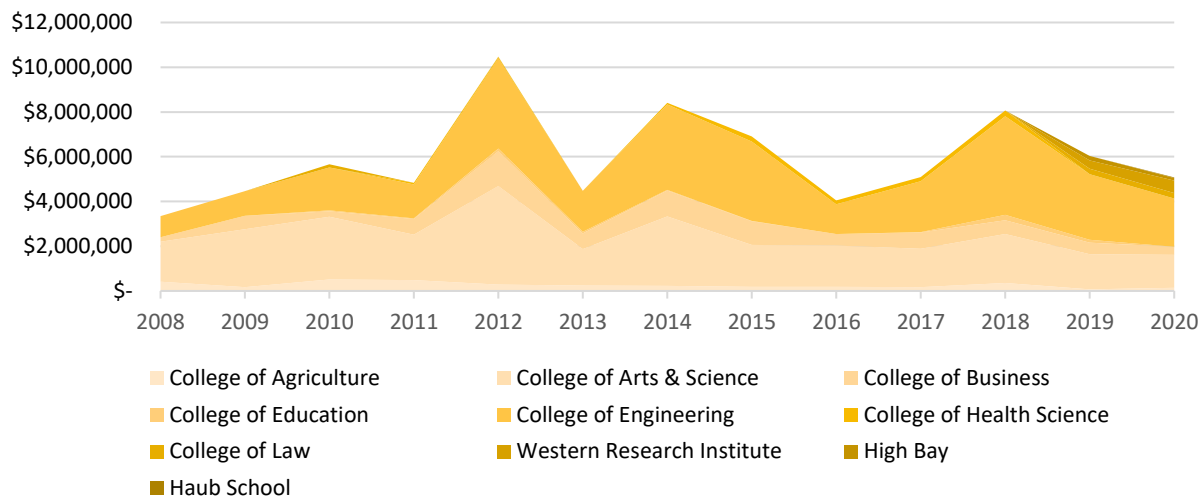
School of
Energy Resources

School of Energy Resources Accelerated Strategic Review

Overview and Recommendations: The School of Energy Resources is separately funded by the Wyoming Legislature and receives very limited support from the income generated by its research and academic programs. Thus, SER is not requesting any support from UW's block grant or other sources currently, with recognition that SER may be able to generate revenue through potential future online programs as well as growing enrollment (if SER eventually receives some of the revenue from tuition).

SER believes collaboration – which is the foundation of SER's interdisciplinary, energy-focused nature – will enable the School to expand its research program as well as the impact of its academic program. This ongoing collaboration is demonstrated by SER's outlay of financial support across UW, as shown in the figure below.

College Funding By Fiscal Year



SER's recommendation is that UW continue to support SER, indirectly by

- Robustly supporting research across the University of Wyoming, including SER, through growing support of the Office of Research and Economic Development and Office of Sponsored Programs, and
- Allow SER to grow its academic impact through interdisciplinary collaboration, including low or no-cost offerings, such as minors, online certificate programs and more

There are several reasons for making these recommendations:

- SER's research program is funded separately by the state and, importantly, increasingly supported through external grants from federal sources, foundations, and other entities. SER staff working on these grants are largely supported by these grants, while at the same time paying indirects and overhead to the university. In addition, SER's research staff are focused exclusively on Wyoming-centric issues and serve as a pillar toward meeting UW's land-grant mission.

- Energy interest is considerably higher than enrollment in SER's energy-focused academic program. Based upon recent polling of 529 incoming freshman, 72% expressed an interest in energy, but only a small fraction of those students enrolled in SER's academic program.
- Through increased recruiting for SER's existing program as well as the development of low-cost options, such as minors and unique interdisciplinary offerings, SER aims to grow its impact across campus.
- Other recommendations from a recent voluntary academic strategic review include
 - The curriculum of the current Land Management concentration contains law classes designed for undergraduates. Accordingly, a key recommendation from the review is that the ERM degree should be promoted more aggressively as a pre-law degree and a 3+3 program (BS plus JD in 6 years) should be pursued with the Law School
 - Include information on the academic program in SER marketing materials
 - Consider increased flexibility through fewer required hours and other curriculum modifications
 - Consider curriculum modifications to improve student retention
 - Increase content and advertising of renewable energy
 - Continue to develop relationships with the Wyoming community colleges to develop student pipelines. Establish degree completion amendments for the universal MOUs between UW and the Wyoming community colleges
 - Consider offering an online, part-time graduate degree in land management
 - Pursue a set of energy-related minors that would create interest for both STEM (quantitative) and non-STEM (qualitative) majors

In summary, while enrollment has declined over the past several years, it has begun to stabilize. SER has found that the outcomes for its graduates are excellent. Since 2011, average starting salary is \$57,845, the fifth highest at the university. The impact of SER's academic program can be increased through increased recruiting, which is already underway, as well as unique interdisciplinary offerings established through collaboration.

Research Program Background:

The School of Energy Resources research program is highly interdisciplinary and effective. SER's faculty are distributed across the university in their mainstream academic units. These faculty's research output will be included in their mainstream academic units, so it is not duplicated here other than at a high level, but several of UW's top researchers in terms of external funding are SER faculty and staff, as indicated by the active external grants below:

- Amount of active external grants for SER constituents:
 - SER staff: \$29,643,181
 - Enhanced Oil Recovery Institute: \$5,223,448
 - SER faculty: \$46,284,262
 - SER affiliates (faculty that are not SER faculty, but have research funded by SER through Centers of Excellence and the Carbon Engineering program): \$7,585,625
 - Total: **\$88,736,516**

The staff contribution above is from 26 FTE staff members, but only about 8 staff members are researchers focused on external grants – a number expected to grow in the next six months, principally

funded by federal grants, further increasing SER's ability to grow its research program. Other SER research staff are state funded through an appropriation separate from the UW block grant. Both the externally-funded research staff as well as the state-funded research staff are highly collaborative with UW faculty. In fact, SER would be unable to deliver its research program at its current scale and impact without the interdisciplinary collaboration that is the foundation of our approach.

Importantly, SER's research program is focused on Wyoming issues and economic development for the state and thus aims to support the land-grant mission of UW.

Academic Program Background:

Graduates from the Energy Resource Management and Development (ERMD) degree have broad employment opportunities. Industry and alumni emphasize the wide array of options available to graduates, including employment with electric and gas utilities, renewable power developers, pipelines, mining, municipalities, government, railroads, telecommunications, real estate, and others. The breadth of these opportunities needs to be more strongly communicated to the students.

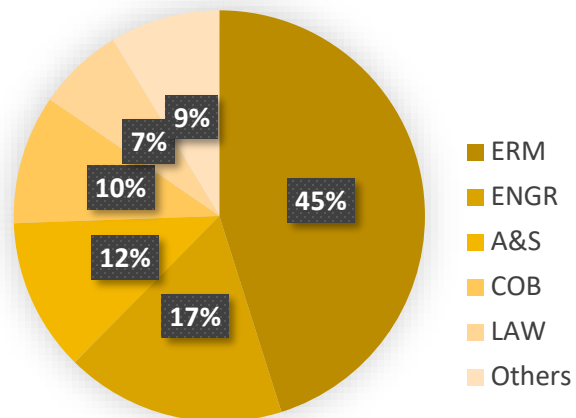
The SER academic advising staff are also dedicated to the program – having developed an outstanding advising center and a new recruiting program that, hopefully, will show results in the next few years. The students indicate a high degree of satisfaction with their advising, their courses, the faculty with whom they interact, and the small number of students in the major; allowing them to create a tight-knit group of friends and colleagues.

The SER faculty, particularly those who teach in the ERMD program, are dedicated to the curriculum and continue to revamp the curriculum to make it more beneficial to our students. SER faculty, many in conjunction with their mainstream academic units, generated the following student credit hours in Fall 2019, Spring 2020 and Summer 2020.

Faculty teaching in ERMD	Credit Hours	
	Faculty	Student
Field, Robert A. (non-SER faculty)	3	33
Koski, Kristopher C.	14	131
Righetti, Tara K.	16	165
Douglas, Craig C.	12	114
Grana, Dario	15	143
Considine, Timothy J.	15	240
Parkinson, Bruce A.	20	167
Sub-total	95	993
Faculty not teaching in ERMD		
Fan, Maohong	22	96
Mallick, Subhashis	14	143
Piri, Mohammad	49	270
Chen, Po	30	229
Kaszuba, John P.	17	132
Sub-total	227	1,863
Grand total	322	2,856

While 45% of the students in ERMD classes (for the AY19-20 year) were SER majors, 55% were from other majors. Effectively, this means that SER serves nearly twice as many students as those who are formally enrolled in the program. The figure above shows the distribution of students in these classes by college. Thus, even though there were only 44 SER majors during this academic year, the ERS courses provide very important credit hours for students outside of the program.

AY19-20 Enrollment in ERS Classes



Program Enrollment by Concentration. The program was established in 2009 without concentrations. Concentrations were added in 2012 based on demand from students and employers. The fossil fuels and renewable energy concentrations are being taught out due to the similarity to engineering programs and students are no longer being accepted in those concentrations. Currently, SER has 44 students enrolled in the program, 29 in land management, 13 in energy land and water and 2 in renewable energy.

New First Time Students Fall-to-Fall Retention. Of the 114 new first time students entering SER's program since 2009, 38.6 percent have been retained in SER, 29.8 percent remained at UW in a different college, and 31.6 percent left the University. Retention within the program continues to be a challenge. Adjustments have been made in SER's recruiting approach with the development of a career brochure providing information about job opportunities for each concentration. The brochure includes an exercise for prospective students to learn their interests using the Holland Code system. SER's goal is to pre-advise students during the recruitment process to be sure the program is a good fit. SER started using the career brochure in 2019 for the incoming Fall 2020 class and is closely monitoring retention for the cohort.

Transfer Students Fall-to-Fall Retention. Of the 24 students who transferred to SER since 2009, 29.2 percent have been retained, 20.8 percent moved to another college, and the remaining 50 percent left the university. Another initiative to increase enrollment is through transfer students. SER is working with the UW Transfer Success Center to establish degree completion documents under the new universal MOU program with the Wyoming community colleges.

Time to Graduation. Of new first time students, 18 percent graduated in 4 years, 18 percent graduated in 5 years and 4 percent took 6 years to graduate. Among the students who changed majors out of SER's program, 10 percent took 4 years to graduate, 8 percent 5 years, and 3 percent took 6 years to graduate. SER reviewed the earned hours for its graduates and found 48% had earned 150 or more credit hours. In 2018, SER reduced the total number of credit hours from 128 to 120 and has moved catalog years forward for current students to allow them to graduate in 4 to 4.5 years.

Graduates First Destination Information. Over the life of the program, 84.5% of SER graduates were employed full-time within six months of graduation and 7.8% continued their education. All 9 graduates

in AY2019 received job offers prior to Commencement. Average starting salary is \$57,845 beginning with SER's first graduating class in fall 2011, the fifth highest starting salary at the University of Wyoming. A large percentage of SER graduates find employment in Wyoming, 47 percent, or Colorado at 29 percent.

Energy Land & Water Management: The Energy Land and Water Management concentration focuses on environmental issues surrounding energy development projects. Students take classes in air quality, water quality management, and reclamation. As of Spring 2020, it represents approximately 30% of SER's enrollment.

Enrollment in the Energy Land and Water concentration shows a decrease and can be tied to the implementation of the Environmental Systems Science program by the Haub School of Environment and Natural Resources. The concentration needs to be reviewed for curriculum content and needs to have a faculty member as a program champion – based on information and conclusions from SER's voluntary academic strategic review conducted early in FY21, these improvement steps are currently underway.

Professional Land Management: SER's Professional Land Management Concentration is accredited by the American Association of Professional Landmen (AAPL), whose leadership promotes our program as a model. UW graduates were recognized as outstanding graduates by AAPL in 2018 and 2019.

Presidential Themes:

Interdisciplinary. SER's nature is inherently interdisciplinary. The state funds received by SER are distributed across campus to encourage Wyoming energy-focused instruction and research.

SER's faculty reside in mainstream academic units, including Law, Economics, Geology and Geophysics, Chemical Engineering, Petroleum Engineering, Mathematics, and Chemistry. This group also meets monthly to discuss SER issues. While some aspects of the faculty model could be improved, SER's diverse expertise and training makes us stronger and a UW leader in interdisciplinarity.

Digital. Not mentioned elsewhere in this document, SER's 3D Visualization Center is an interdisciplinary gem already collaborating across campus and could serve as a foundational building block for a UW College or School of Computing (shown right).

Entrepreneurial. As discussed previously, SER faculty, staff and collaborators are highly effective at obtaining external grant funding. This is an area of growth for SER. In addition, SER has a nearly \$13 million endowment with additional planned estate gifts.

Inclusive. Like much of UW, SER could improve its diversity and inclusiveness. Notably, SER faculty are taking initiative in this field, led by Prof. Dario Grana, who has created a glass on Diversity and Inclusion in the Geosciences.

