



## **WGEESIT PROGRAMMATIC IMPLEMENTATION**

### **Proposed Program Funding Request for FY2015-2016**

College of Engineering  
& Applied Science

October 23, 2013

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## Summary

A programmatic funding request for FY2015 and FY2016 is proposed herein. A total biennium budget of \$17,812,000 is outlined. The State portion of the biennium budget request totals \$8,599,000 with annual funding of \$2,693,000 and \$5,906,000 for FY 2015 and 2016, respectively. The balance of the funds, \$9,213,000 is provided by UW. Specifically, the School of Energy Resources is cost sharing \$4,514,000, and Academic Affairs and CEAS are providing \$4,699,000. This significant level of cost sharing amplifies UW's commitment to the success of the Tier-1 initiative and a productive integration of its programs.

Tangible progress, quantified through well-articulated metrics of excellence, requires a sustained effort over a 5-10 year period and beyond. The funds requested for FY2015-2016 will be invested in several critical areas aimed at jump-starting this historical initiative. The expected benefits from the requested funding include (a) progress toward Tier-1 goals and minimizing the lag time associated with facility development, building completion, and laboratory development; and (b) the opportunity to complement existing technical skill sets of current faculty with strategic hires, who will help in developing the niche research areas and other areas of inquiry as well as offer required technical leadership in some cases.

The near-term impact of the current allocation of resources and similar investments in the next five years is significant. Specifically, we anticipate that by 2020, CEAS will:

- Be a fully integrated, multidisciplinary educational and research environment that is focused on problem solving and economic engagement
- Offer an outstanding educational experience supported by effective curricula and modern delivery methods
- Double its current productivity in scholarship, funding, and number of graduating PhDs
- Significantly increase the number of industrial partnerships and outreach activities
- Show clear indications of success in advancing UW toward Tier-1 excellence in areas of importance to Wyoming and beyond

## Introduction

Governor Mead and the State legislators have articulated a vision to propel the College of Engineering & Applied Science (CEAS) and the University of Wyoming (UW) to the realms of excellence in instruction, research, and service. President Sternberg, the University leadership, and faculty are committed to this vision; and equally important, our industry partners have embraced this vision and will help actualize it. Working together, we will have world-class facilities and the required resources to excel in critical elements of our land-grant mission.

We have an unprecedented opportunity to build a premier college populated with educators, researchers, and practitioners who are focused on educating and mentoring our students at the highest of levels, advancing science and engineering, and catalyzing the economic development of Wyoming and beyond.

As asserted in the Governor's letter of August 23, 2013, *it is time to execute the Tier-1 vision and turn it into reality. It is time to achieve full internal and external integration of UW operations, where seamless programmatic and asset integration is accompanied by lasting and productive partnerships with the state and national agencies as well as industry.*

Herein, the rationale, the program specifics and budget details are outlined for a funding request for FY2015 and FY2016. The programs outlined and the funding mechanisms proposed are intended to ramp up the educational and research programs of the Tier-1 Engineering Initiative and the integration of UW's research capabilities. Also, presented are the significant outcomes expected as a result of the availed resources.

### **An Overview of Progress to Date**

On May 21, 2013, the University of Wyoming issued an Engineering Initiative (EI) Report to the Governor's Task Force that articulated a compelling vision for the future of the College of Engineering & Applied Science. The report outlined the strategy to advance UW's engineering school to national prominence. Specifically, a number of recommendations and goals were formulated to move CEAS and UW toward Tier-1 productivity and excellence.

Recently, the Engineering Initiative Working Group (EIWG) has developed a planning mechanism to implement the recommendations and goals of the Engineering Initiative Report. As indicated in the last Task Force meeting, this working group is comprised of the following stakeholders: the CEAS leadership, representatives of the faculty, staff, students, CEAS National Advisory Board, School of Energy Resources, College of Arts & Sciences, Energy Research Council, and other industry partners. The implementation plans will be developed collectively by EIWG in collaboration with the Task Force. The initial draft of the implementation plan will be submitted to the Task Force by January 15, 2014. This operational plan will propose detailed timelines, clear milestones, and measures of accountability. Feedback and guidance will be sought from the Task Force and appropriate revisions will be made accordingly. Table 1 presents a proposed timeline for the implementation plan. Likely, adjustments will be made as work progresses.

Meanwhile, a University-level Program Coordinator will be hired to join efforts among colleges, schools, external constituencies including industry, and state agencies, and ensure the success of the Engineering Initiative (EI). Until such time that a Project Coordinator is hired, an Implementation Team (IT) comprised of the Interim Provost, Interim Dean of Engineering, Director of the School of Energy Resources, and President of UW the Foundation will provide leadership and guidance.

### **The Need to Begin Tier-1 Program Development**

Tangible progress, quantified through well-articulated metrics of excellence, requires a sustained effort over a 5-10 year period and beyond. To fulfill the state's aspirational goals in this endeavor in a timely manner, it is imperative to launch this program as soon as possible. We, therefore, respectfully request that that funding for the Tier # 1 program begin in FY2015.

Following the recommendations of the Engineering Initiative Report, we plan to stage the funding for the educational and research programs over a five-year period, as outlined in Figure 1. Refining and expanding the academic programs in parallel with facility development will enable us to (a) ramp up our efforts in a carefully planned manner in synergy with infrastructure development, and (b) reach a reasonable degree of fruition for the educational and research programs intended to move us to Tier-1 productivity and excellence.

Table 1. Timeline for Developing Implementation Plan				
	Task	Target Date for Completion	Status	Comments
1	Form the Engineering Initiative Working Group (EIWG). The group will be composed of the CEAS leadership team, Chair of the NAB, representatives from SER, ERC, undergraduate students (Joint Engineering Council), graduate students, and staff.	10/15/2013	done	
2	Prepare budget request for programmatic funding in FY2015 and FY2106	10/18/2013	done	
3	Conduct initial analysis at the department (unit) level, including:	10/31/2013		
a	Review current college operations, resources and outcomes and outline the performance profile of each unit			
b	Identify strengths, weakness, opportunities and threats of each unit.			
c	Review CEAS input to the Task Force			
d	Review the Engineering Initiative Report and provide input on how we actualize this conceptual framework			
4	Identify potential areas of integration and growth within the selected niche areas. Also, identify other areas of research that build on our existing capabilities. Here, coordinating efforts with colleagues across campus is essential.	11/21/2013		See Integration & Niche Area Guidelines
5	Conduct a thorough analysis of all input received from all stakeholders.	11/21/2013		
6	Synthesize a working plan that actualizes the goals of the Task Force and incorporates the CEAS, NAB, SER, and ERC inputs and priorities.	12/15/2013		
7	Prepare initial draft of the Implementation Plan	12/20/2013		
<b>EIWG will coordinate with the Implementation Team and iterate on the plan development.</b>				

Under optimal conditions, we envision that these programs will become housed in a new engineering complex by the end of 2018. Inevitably, minimizing the lag time associated with (a) facility development, building completion, and laboratory development; and (b) with new faculty hires is a critical aspect of making expedited progress toward Tier-1 goals.

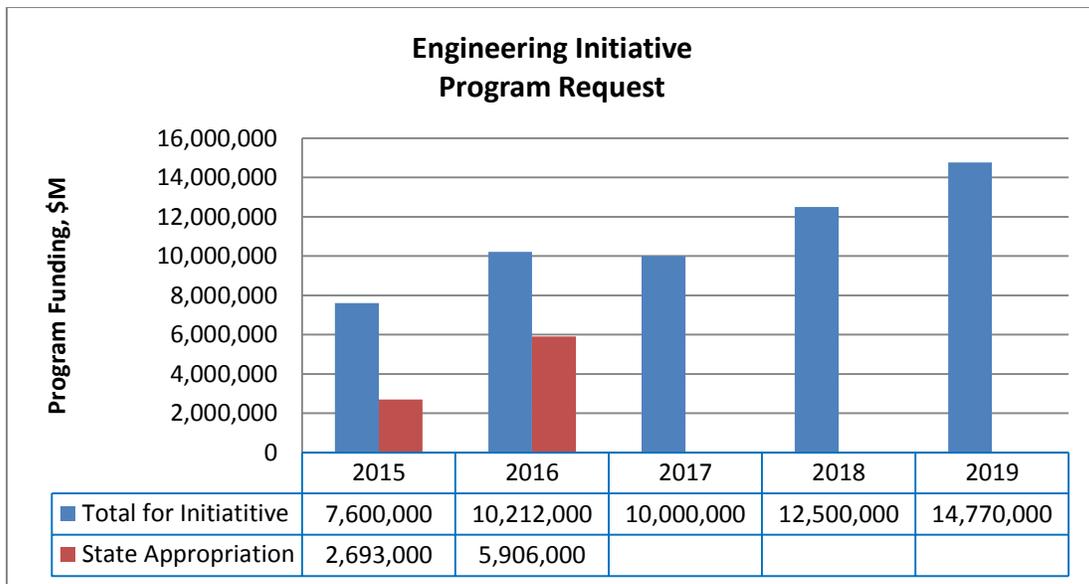


Figure 1. Program Funding Request



current faculty with strategic hires who will add depth, enhance the scope of some identified research areas, and in some cases offer required technical leadership.

- Develop several research initiatives relying mainly on current faculty members supported in part by graduate students funded through the fellowship program and 10--15 postdoctoral fellows. We anticipate the formation of 4-8 multi-disciplinary research clusters, which will integrate our research capabilities across the UW campus. These research clusters will involve multidisciplinary teams of faculty and researchers aimed at addressing relevant areas of research within the selected niche areas and other areas of high-impact research that are well aligned with State or national initiatives. We envision these clusters as strong candidates for attracting funding and building industry-university partnerships leading to self-sustaining funding in three-five years. The desired outcome sought is economic growth of the State of Wyoming and beyond.
- Create two research clusters dedicated to advancing undergraduate curriculum and STEM education across the K-16 educational experience (K-12 and college level). These clusters will (a) help develop state-of-the-art curricula that will serve the 2020 engineers and beyond, and (b) identify and help implement best practices and innovations in STEM education.
- Provide 45 nationally competitive graduate fellowships to support research leading to Tier 1 prominence. UW's proposed graduate fellowship program is comparable to the NSF-GRFP, the gold standard in graduate education. Funding fellowships at this level will position the college to compete for the best academic talent in the nation. The infusion of graduate student talent, combined with depth of faculty numbers and the state's unique resources, will ensure major contributions to the research enterprise and national recognition will naturally follow.
- Provide 90 Engineering Undergraduate Scholarships aimed at attracting the brightest students from Wyoming and the Rocky Mountain Region. Outstanding students have immeasurable positive impacts on the program; they attract other outstanding students, they enhance the reputation of the school and are a powerful and quantifiable metric, they allow the faculty to elevate expectations in the program, and finally, they go on to do wonderful things for society.
- Develop an effective marketing campaign. The ambitious goals of the Engineering Initiative cannot be achieved without effective marketing of the initiative and the college. This marketing must be sustained and at the highest professional quality. The marketing effort must touch a broad spectrum of audiences. First and foremost, a statewide effort must be undertaken to elevate our citizens' pride in the college and bring awareness to the college and the Initiative underway.

### **Requested 2015-2016 Programmatic Budget**

Table 2 presents the budget for FY2015-2016 programmatic funding request. A total biennium budget of \$17,812,000 is outlined. The State portion of the biennium budget request totals \$8,599,000 with annual funding of \$2,693,000 and \$5,906,000 for FY 2015 and 2016, respectively. The balance of the funds, \$9,213,000 is provided by UW. Specifically, the School of Energy Resources is cost sharing \$4,514,000, and Academic Affairs and CEAS are providing \$4,699,000. The \$4.669 million allocation from the UW budget represents a re-evaluation of institutional priorities and a redistribution of indirect cost returns from federal research awards received by UW faculty. This significant level of cost sharing amplifies UW's commitment to the success of the Tier-1 initiative and a productive integration of its programs.

**Table 2. Projected Biennium Budget for FY2015-2016**

Budget Category	Resource Allocation	Projected Long-Term Operations		2015					2016				
		Number	Amount	Number	Requested Funding	Number	UW Funding	Total Funding	Number	Requested Funding	Number	UW Funding	Total Funding
1	Faculty Positions	25	\$5,600,000	1	\$224,000	3	\$672,000	\$896,000	4	\$896,000	3	\$672,000	\$1,568,000
	" " "					1	\$224,000	\$224,000			1	\$224,000	\$224,000
2	Faculty Support			24	\$360,000	0	\$0	\$360,000	45	\$675,000	0	\$0	\$675,000
3	Graduate Fellowships	100	\$4,000,000	24	\$960,000	0	\$0	\$960,000	45	\$1,800,000	0	\$0	\$1,800,000
4	Undergraduate Scholarships	500	\$3,000,000	48	\$288,000	0	\$0	\$288,000	90	\$540,000	0	\$0	\$540,000
5	Research Scientist			1	\$200,000	1	\$200,000	\$400,000	1	\$200,000	1	\$200,000	\$400,000
6	Postdocs	17	\$1,190,000	4	\$280,000	4	\$280,000	\$560,000	8	\$560,000	7	\$490,000	\$1,050,000
7	Support Staff	8	\$330,000	4	\$165,000	4	\$165,000	\$330,000	8	\$330,000	4	\$165,000	\$495,000
8	Professional Marketing & Support		\$400,000		\$0		\$150,000	\$150,000		\$0		\$150,000	\$150,000
9	Major equipment maintenance		\$250,000		\$120,000		\$120,000	\$240,000		\$225,000		\$225,000	\$450,000
10	Supplies				\$60,000		\$60,000	\$120,000		\$112,500		\$112,500	\$225,000
11	Professional Development and Travel				\$36,000		\$36,000	\$72,000		\$67,500		\$67,500	\$135,000
12	Faculty Start UP Funds					3	\$2,000,000	\$2,000,000	1	\$500,000	2	\$2,000,000	\$2,500,000
	" " "					2	\$1,000,000	\$1,000,000					
	<b>Annual Total Budget</b>		<b>\$14,770,000</b>		<b>\$2,693,000</b>		<b>\$4,907,000</b>	<b>\$7,600,000</b>		<b>\$5,906,000</b>		<b>\$4,306,000</b>	<b>\$10,212,000</b>
	<b>2015-2016 Total Budget</b>									<b>\$8,599,000</b>		<b>\$9,213,000</b>	<b>\$17,812,000</b>

**Budget Notes and Highlights**

1	Faculty Positions	Strategic hires to complement existing technical skill sets, add depth, and in some cases offer required technical leadership	<b>SUMMARY</b>	<b>Total requested biennium State funding</b>	<b>\$8,599,000</b>
2	Faculty Support	One month of salary support per year per faculty		<b>Total UW funding</b>	<b>\$9,213,000</b>
3	Graduate Fellowships	One PhD candidate per faculty		<b>Total SER bridge funding</b>	<b>\$4,514,000</b>
4	Undergraduate Scholarships	Two <i>Undergraduate Engineering Scholars</i> per faculty		<b>Total Academic Affairs &amp; CEAS</b>	<b>\$4,699,000</b>
5	Research Scientist	Non-tenure track researchers		<b>Total biennium funding</b>	<b>\$17,812,000</b>
6	Postdocs	One postdoctoral fellow per three faculty members to anchored cluster operations			
7	Support Staff	One support staff per six faculty members			
8	Professional Marketing & Support	Allocation to help fund a marketing campaign			
9	Major equipment maintenance	Resources to help maintain and service existing equipment			
10	Supplies	Laboratory and computational supplies			
11	Professional Development and Travel	Allocation for training, attending conference, and networking with state and national agencies as well as the private sector			
12	Faculty Start UP Funds	Research start up funds for new faculty			

The budget includes 12 categories for resource allocation. The budget notes below elaborate on each. Note that FY2016 funding and personnel target numbers for categories 1-7 are cumulative.

The budget request given below reflects a 90% execution confidence level. This means we project with 90% confidence that the programmed tasks will be completed within the time frame stated, and that the resources requested will be spent accordingly. A budget request with 50% execution confidence level is included in Appendix A for your consideration.

Specific steps will be undertaken to assure the full implementation of the plans outlined in this budget request, including:

- A workload model will be developed to streamline CEAS operations.
- CEAS will add additional staff for student recruitment. Specifically, each department will be provided with a dedicated graduate coordinator to focus on recruiting, admission, and support of students.
- The office of Associate Dean for Research will be provided with two staff members to support the expanded research operation.
- A marketing campaign will be undertaken this fall to help recruit undergraduate students, PhD candidates, and postdocs.
- Each CEAS department will recruit 2-3 additional PhD students for Fall 2014. That would avail the graduate programs of about 10-12 additional PhD students. The balance of 12 students will be recruited for Spring 2015 when the funds are available.
- SER funds will be used to hire 4 postdocs for Fall 2014, and then State funds will be used to hire 4 more for Spring 2015.
- Similarly, SER funds will be used to hire the first 3 faculty members, with searches starting this fall. Additional faculty positions will be filled next fall when State funds are received.

The resource sharing demonstrated in this budget request and the companion request for the High Bay Research Facility highlight significant actions toward integration of CEAS and SER operations and programmatic excellence.

## **Expected Outcomes**

We anticipate that by 2020, CEAS will:

- Be a fully integrated, multidisciplinary educational and research environment that is focused on problem solving and economic engagement
- Offer an outstanding educational experience supported by effective curricula and modern delivery methods
- Double its current productivity in scholarship, funding, and number of graduating PhDs
- Significantly increase the number of industrial partnerships and outreach activities
- Show clear indications of success in advancing UW toward Tier-1 excellence in areas of importance to Wyoming and beyond