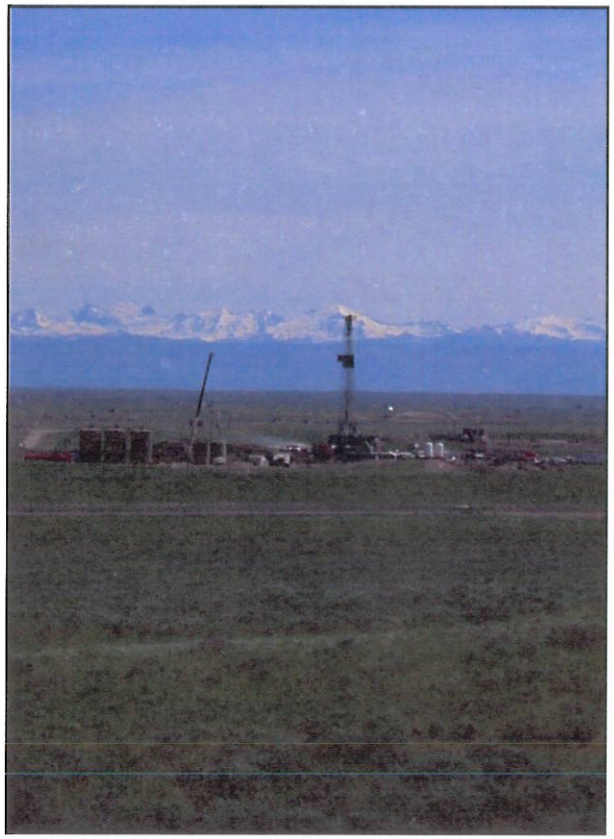
**Appendix A**

# University of Wyoming
# School of Energy Resources



Myron B. Allen
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1. The School's Mission
2. The School's Structure
3. Budget

# 1. The School's Mission

1. **Academics**: prepare undergraduate and graduate students for Wyoming's energy economy, through an array of curricular measures.*
2. **Research**: Expand the Institute for Energy Research into a diverse, world-class research unit.
3. **Service**: Support Wyoming's energy economy, through an Energy Outreach Center.

## 2. The School's Structure

Rationale:

1. Not a separate college, isolated from and competing with other colleges for resources.
2. Director reporting to UW's chief academic officer.
3. Incentives for existing colleges to strengthen their existing energy-related expertise and curricula.
4. Flexibility to establish (and sunset) externally funded research centers as technology evolves.
5. Significant input from industry at several levels.

Main point:

To maximize the impact of the school, it must influence faculty hiring and curriculum in several colleges and key departments.

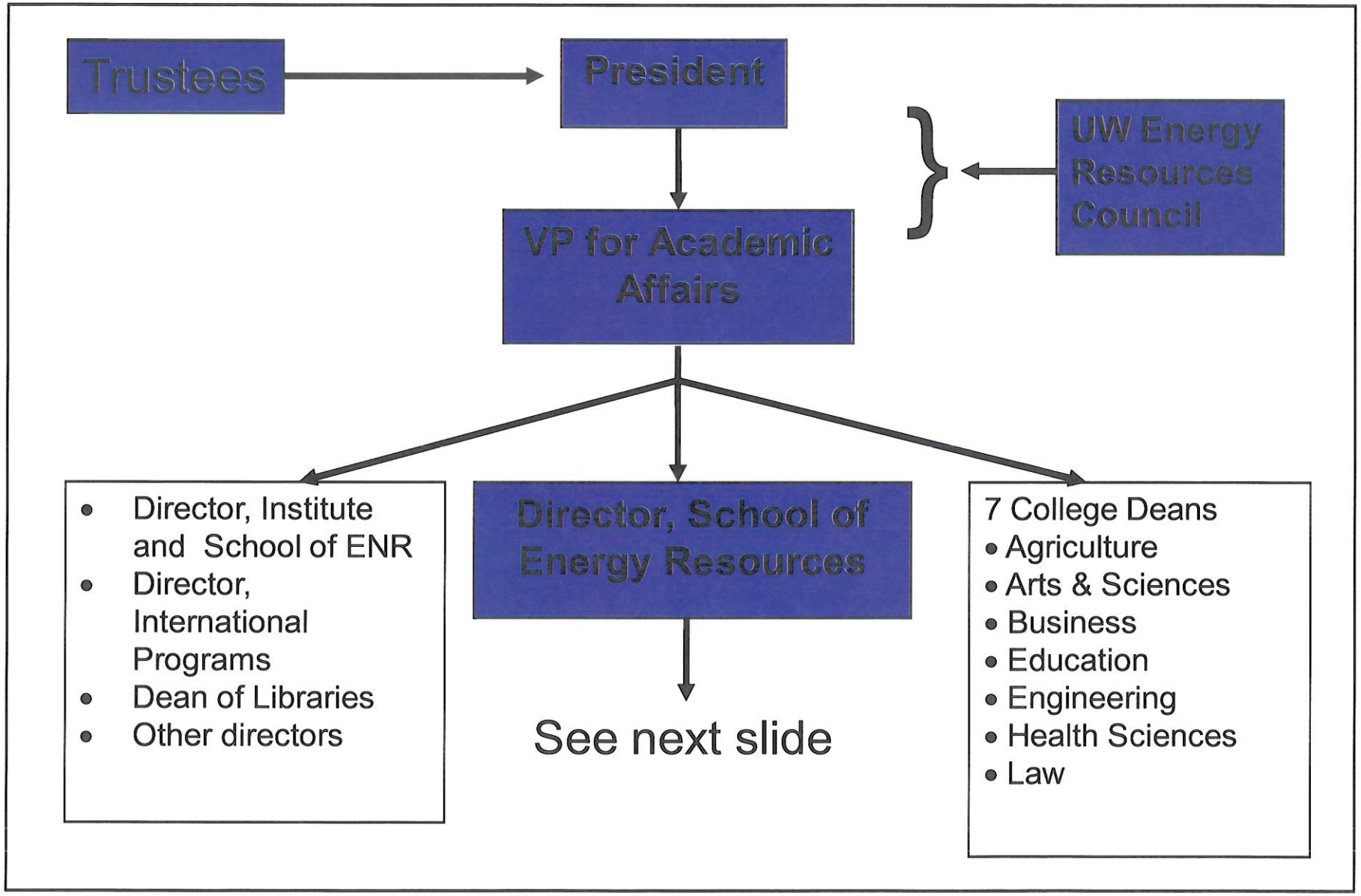
A separate college would isolate UW's energy expertise from such key disciplines as chemical engineering, petroleum engineering, geology and geophysics, mathematics, economics, and others.

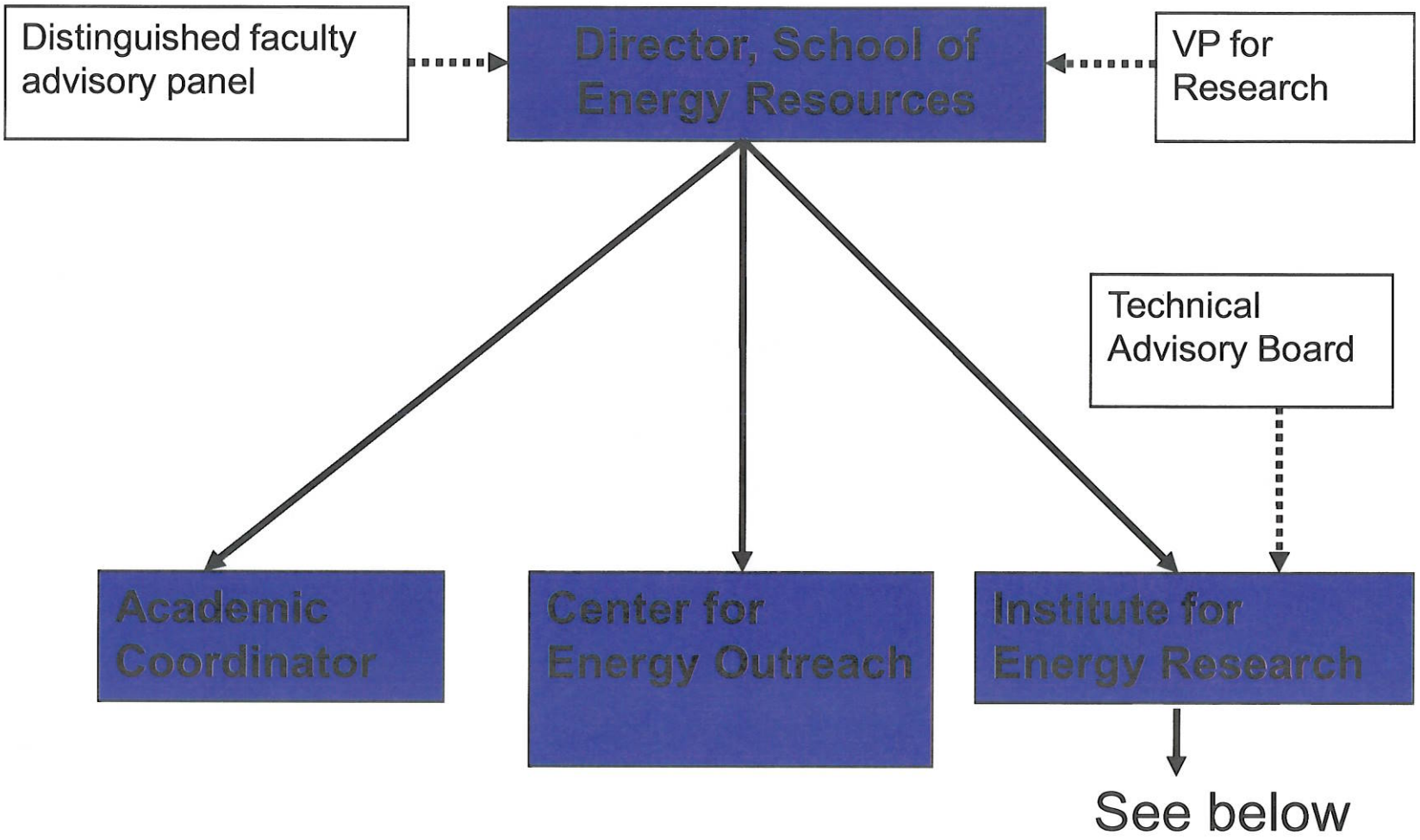
## Distinguished faculty positions

- 12 fully funded senior faculty lines
- Targeted at teachers and researchers with national and international reputations, new to the existing faculty, not necessarily from academia.
- Assigned to mainstream departments through a bidding process, overseen by the director of the school, VPAA, and VPR.
- Assignments aren't permanent but can be moved

Departments likely to bid:
Geology & Geophysics
Chemical & Petroleum Engineering
Economics & Finance
Mathematics
Renewable Resources
Electrical & Computer Engineering
Chemistry

# Top-level view:




Distinguished faculty advisory panel
Director, School of Energy Resources
VP for Research
Technical Advisory Board
Academic Coordinator
Center for Energy Outreach
Institute for Energy Research
See below

**Academic enhancements**:

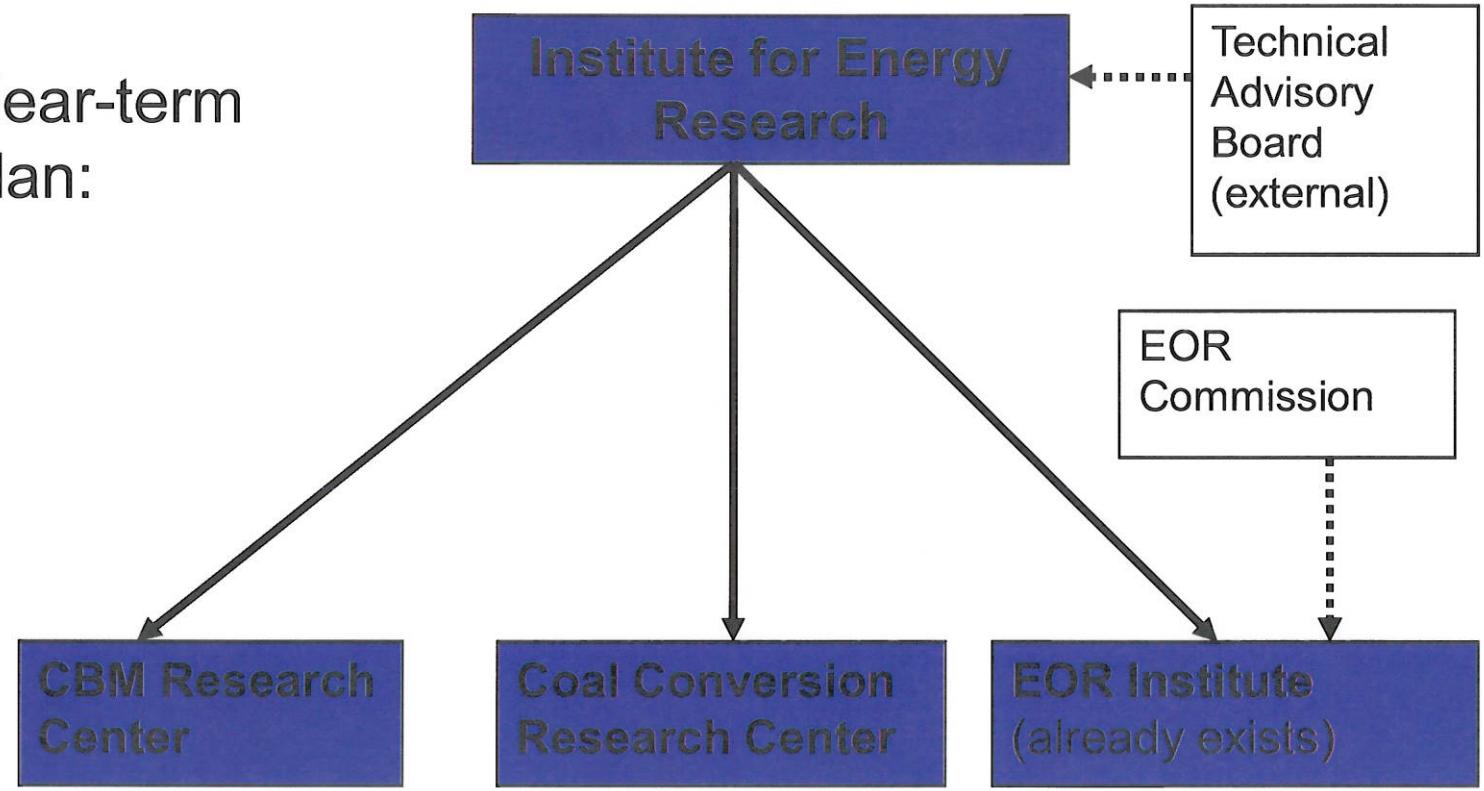
- Interdisciplinary curricula involving
  - Geology & Geophysics
  - Chemical & Petroleum Engineering
  - Mathematics
  - Economics & Finance
  - Renewable Resources
- Other initiatives:
  - Undergraduate industry internships
  - Summer programs
  - New certificate programs
  - Links with high schools, community colleges, graduate education, industry

**Center for Energy Outreach** (new to UW)

1. Consulting specialists (scientists, engineers, economists, etc.) for Wyoming's energy industry.
2. Statewide symposia and workshops.
3. Applied publications on energy technology.
4. Data sharing with industry groups and state agencies.

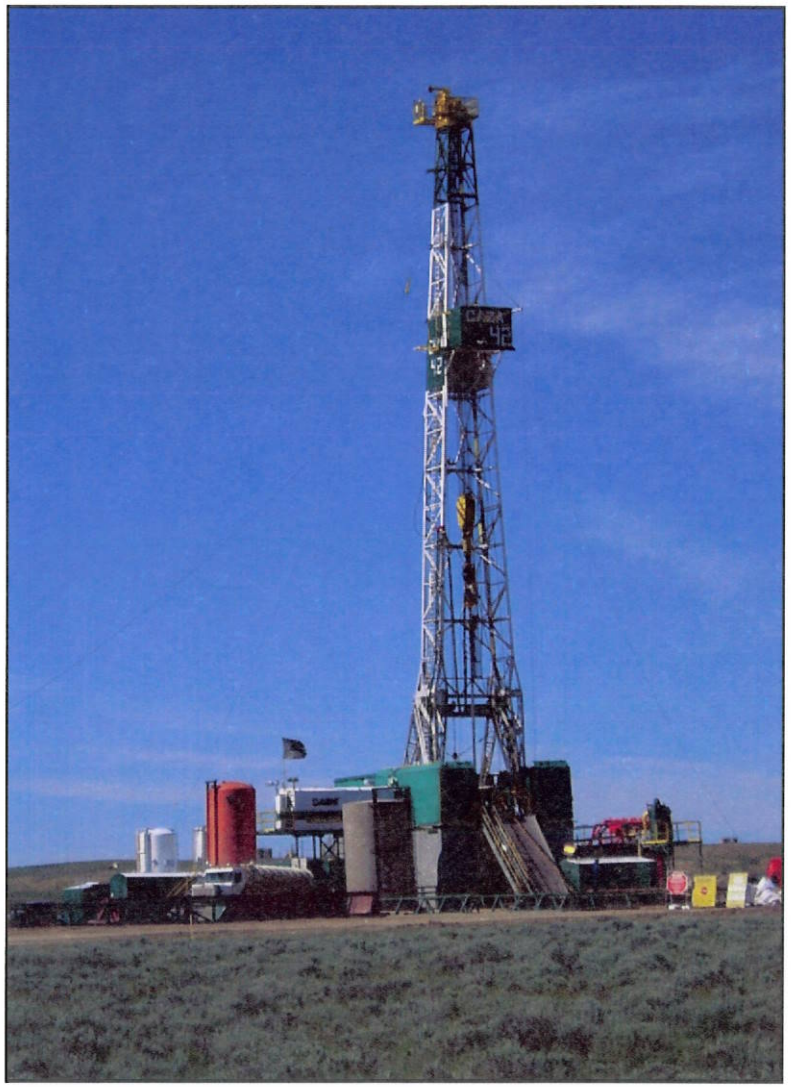
# Institute for Energy Research

Near-term plan:




Specific centers can change over time in response to emerging technologies, energy markets, and external funding

# QUESTIONS?



# Academics

| CATEGORY | BRIEF DESCRIPTION | ANNUAL BUDGET |
|---|---|---|
| Academic Coordinator's office | Academic Coordinator, staff, 18 undergraduate fellowships & 18 graduate assistantships | $765,900 |
| Distinguished faculty chairs in energy resources | 12 distinguished chairs, with fringe & discretionary funds | $3,312,000 |
| Visiting professorships | 2 visitors from industry or national labs, with moving and travel allowances | $600,000 |
| Distinguished teaching internships | 3 teaching interns from Wyoming schools or community colleges, with moving and travel allowances | $303,000 |
| Subtotal | | $4,980,900 |

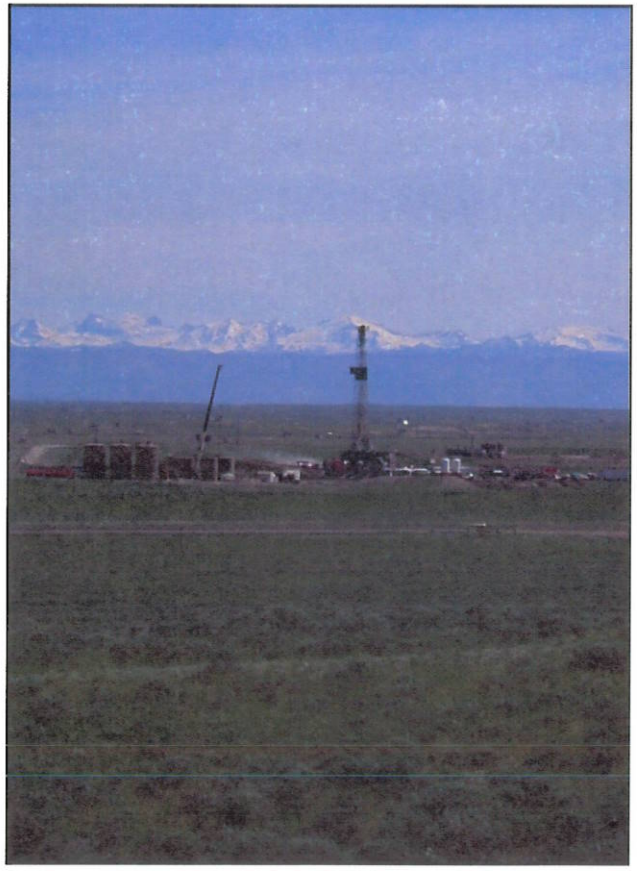
# Research

| CATEGORY | BRIEF DESCRIPTION | ANNUAL BUDGET |
|---|---|---|
| Center incubator support | Postdocs, technicians, equipment, grant matching funds, and office support | $518,550 |
| Half-time faculty appointments | 9 half-time appointments, with summer stipends and fringe | $1,230,296 |
| Startup assistance | Funds to help college deans to hire in targeted areas | $500,000 |
| Grant matching pool | Funds to provide institutional matching required for research grants from some federal agencies | $1,000,000 |
| Subtotal | | $3,248,846 |

# Statewide service & outreach

| CATEGORY | BRIEF DESCRIPTION | ANNUAL BUDGET |
|---|---|---|
| Center for Energy Policy and Technology Outreach | Director, editor, staff, released time, with fringe and support | $561,000 |
| Consulting specialists | 4 full-time scientists and engineers to provide technical consulting, run short courses & workshops | $432,000 |
| Director's office | Director, staff, fringe, support. (Director also administers IER) | $513,100 |
| Subtotal | | $1,506,100 |

# University of Wyoming School of Energy Resources: Institutional Setting



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1. UW's Mission & Structure
2. Colleges
3. Academic Planning
4. Role of the Faculty
5. Energy-Related Facilities

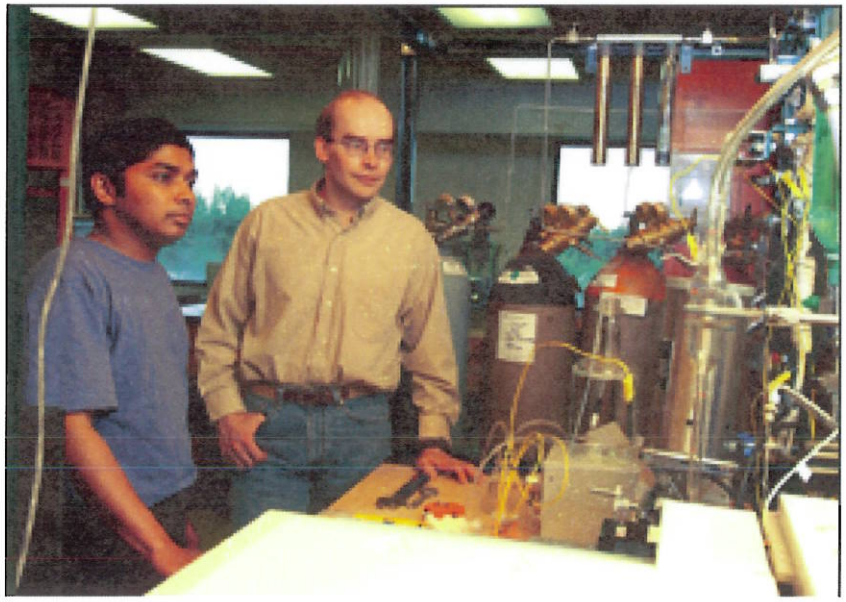
# 1. UW's Mission

From the mission statement:

The University of Wyoming aspires to be **one of the nation's finest public land-grant research universities**, dedicated to serving as a statewide resource for **accessible and affordable higher education** of the highest quality, **rigorous scholarship, technology transfer, economic and community development, and responsible stewardship of our cultural, historical, and natural resources.**

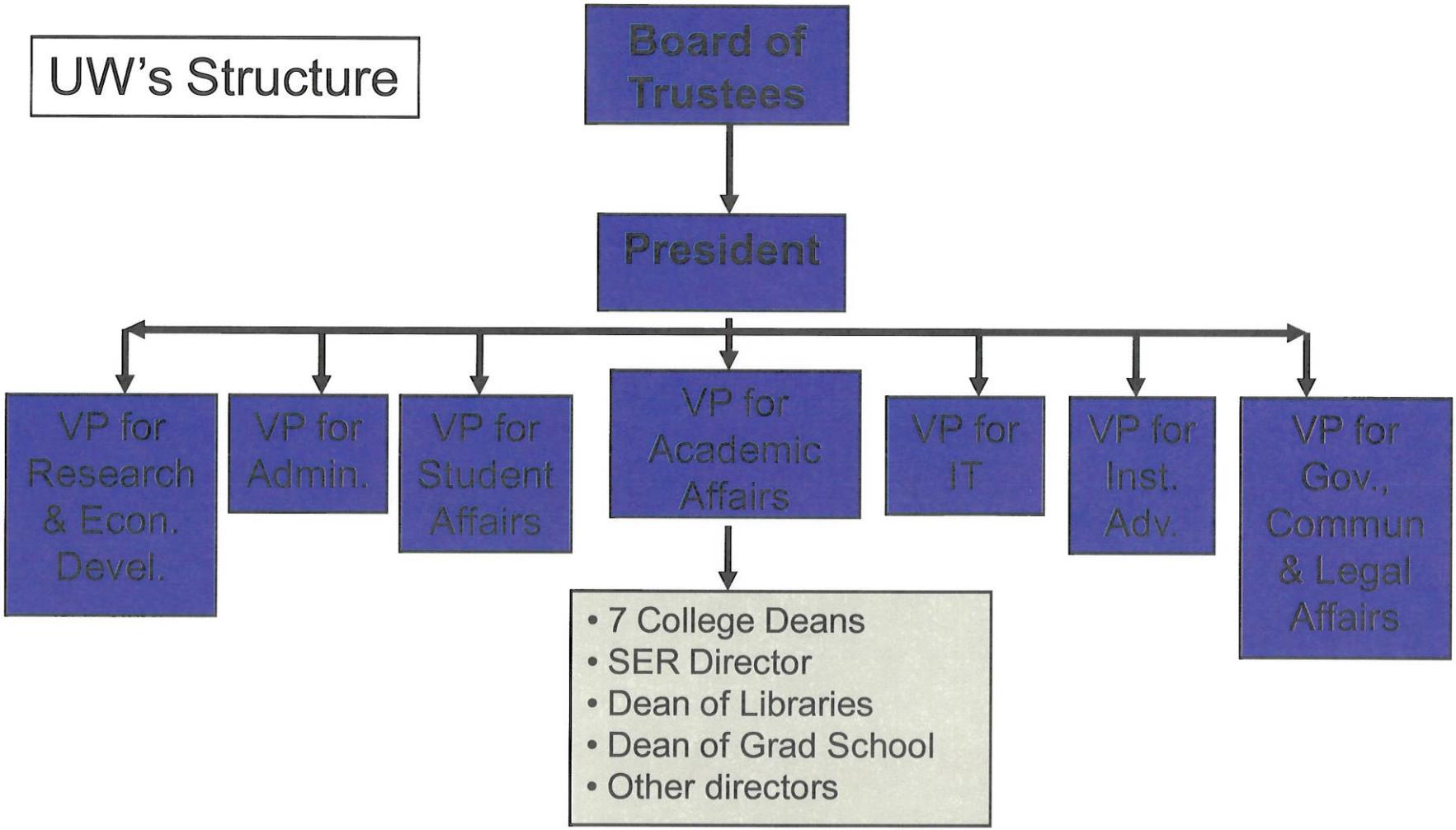
**Key elements**:

1. Public land-grant institution
2. Commitment to teaching, research, service
3. Wyoming's only public baccalaureate institution
4. Commitment to graduate & professional education
5. Unusual level of state funding and support
6. Tension between breadth and focus
7. Unique setting and the need to capitalize on it



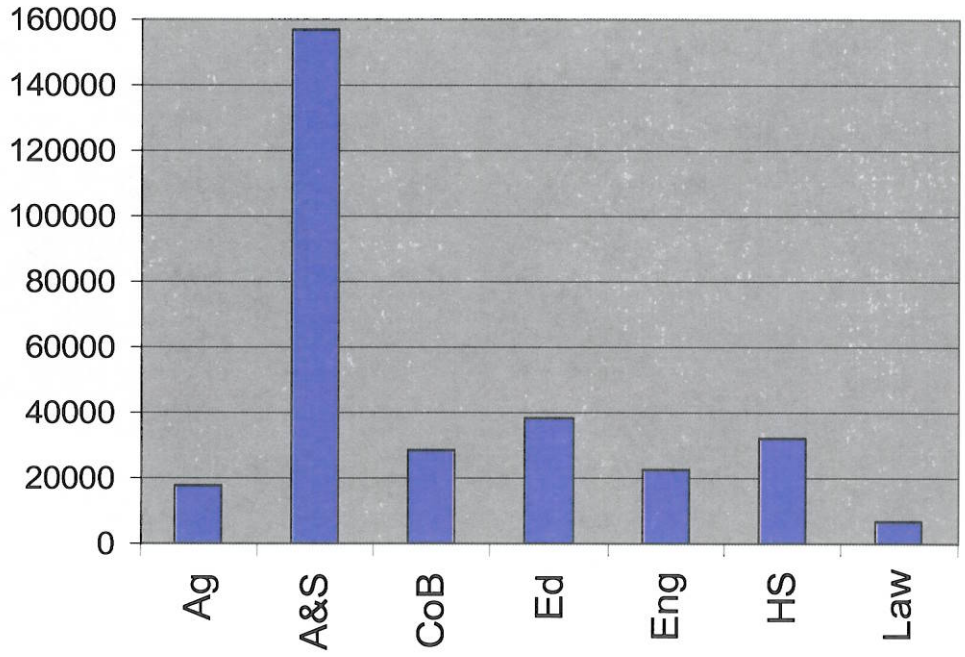
| FY 2005 - FY 2006 Biennium Funding Sources | |
|---|---|
| Total Biennium Funding: | $615M |
| State's General Fund: | $276M (44%) |
| Tuition Income & Other Revenue: | $116M (19%) |
| Self-Generated Funding | $229M (37%) |

# UW's Structure



# 2. Colleges

Agriculture
Arts & Sciences
Business
Education
Engineering
Health Sciences
Law




Student credit hours, AY 2004

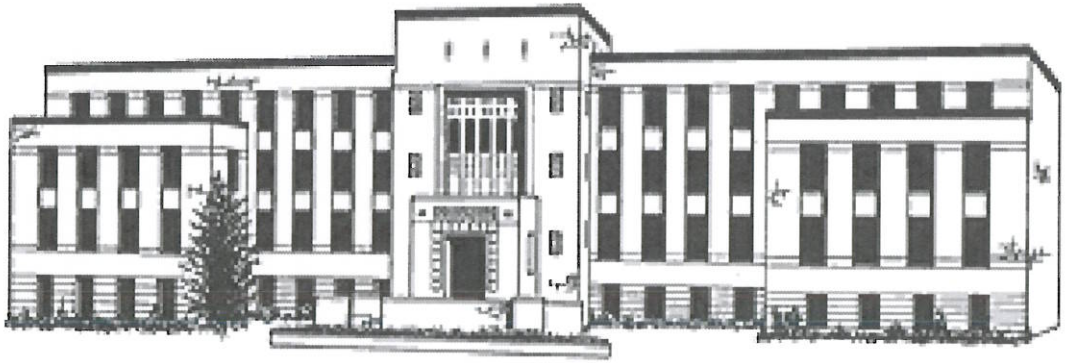
## Another asset: Western Research Institute

**Alternative fuels** (alcohol, biorefining, hydrogen, solid-fueld turbines)

**Coal** (coal drying, combustion testing, hazardous air pollutant mitigation, carbon sequestration)

**Coalbed methane** (CBM modeling)

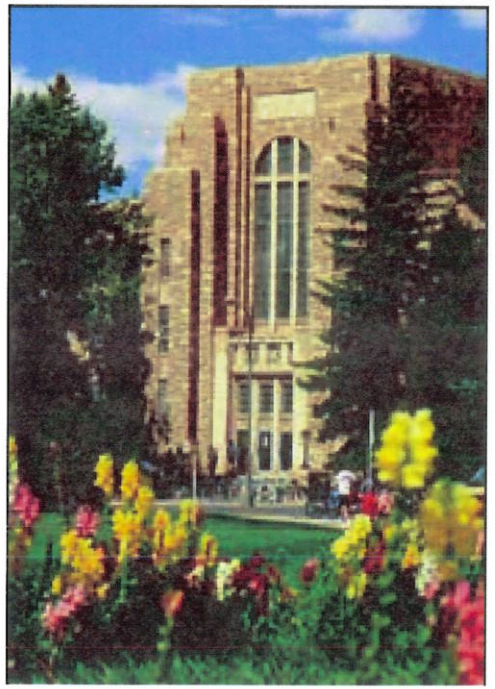
**Oil & Gas** (EOR process feasibility, reservoir analysis)



# 3. Academic Planning

- Identify key *academic* directions and areas of emphasis
- Guide budget requests and budget allocation decisions
- Provide foundation for other plans:
  - → Support Services Plan
  - → Capital Facilities Plan
  - → Athletics Plan

| | |
|---|---|
| Academic Plan I: | 1999-2004 |
| Academic Plan II: | 2004-2009 |



**Areas of Distinction:**

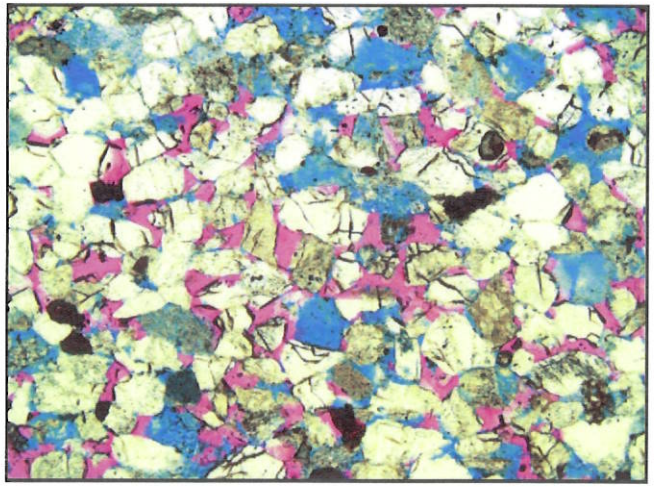
1. Cultural Endeavors, Arts, & Humanities
2. Environment & Natural Resources
3. History & Culture of Wyoming & the Region
4. Life Sciences
5. Professions Critical to the Region
6. Science & Technology
   - Energy & Earth Sciences
   - Computational Science
   - Materials Science

Areas to build through budget increases, faculty position allocations, new degree programs

Almost all departments can contribute somewhere

***Action Item 32 (complete a feasibility study for a center for earth and energy science).*** *The Vice President for Academic Affairs, in cooperation with the UW President, will appoint a task force to explore the feasibility of a legislative budget request to establish a university center for teaching and research in earth and energy science.*

Report submitted in October 2005
Legislature funded SER in March 2006



The School of Energy Resources:

- is in the bull's eye of our academic plans
- builds on existing institutional strengths
- takes advantage of UW's unique geographic setting

# 4. Role of the Faculty

Typical faculty job description in a PhD-granting department:

50% Teaching (two 3-credit courses/semester)
40% Research (refereed publications, external grants)
10% Service

- UW expects excellent performance in all 3 areas
- We look for links between research and teaching
- Undergraduates & graduate students participate in research

## Faculty hiring: Qualifications

- Terminal degree (PhD, MD, JD, MFA)
- Demonstrated potential for excellence in teaching
- Proven ability to conduct original research
- Evidence of intellectual leadership capacity
- Search of national or international scope
- Extraordinary competition: 60-80 applicants/position

Most hiring is at the entry level (assistant professor)

## Faculty hiring: process

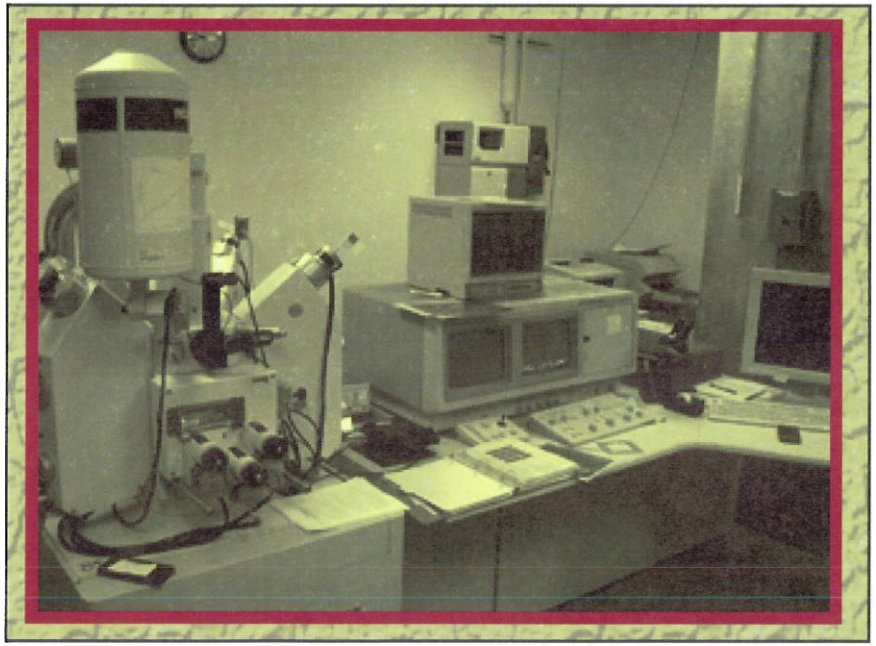
| | |
|---|---|
| July: | Authorization and funding for position |
| August: | Search committee & position announcement |
| November: | Due date for applications |
| January: | Screening & phone interviews |
| February: | On-campus interviews & letter of offer |
| March: | Responses due |
| August: | Reporting date |

## 5. Facilities

- Discipline-specific labs in
  - Geology-Geophysics,
  - Chemical & Petroleum Engineering,
  - Renewable Resources,
  - Chemistry,
- Research computers in Math, Geology, Mechanical Engrg
- Wyoming Geographic Information Science Center
- Enhanced Oil Recovery Institute
- Microscopy Center
- Labs and facilities in many other disciplines

A new building to house SER-related faculty and labs would help unify the school's activities

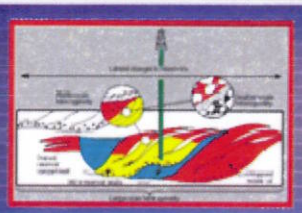
Rough cost estimate: $40M



# UW's Research Enterprise

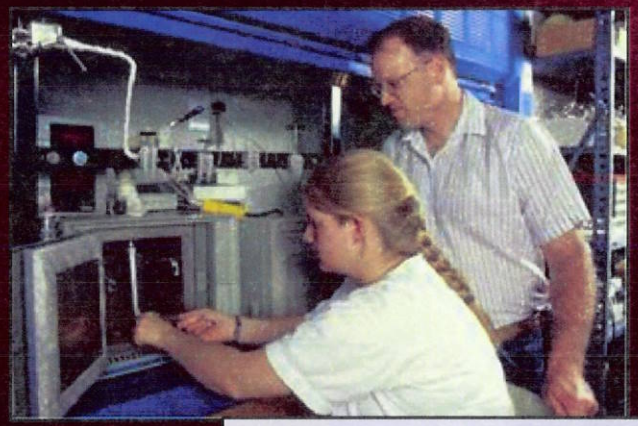
## Presentation to UW Energy Resources Council

## August 10-11, 2006


# Creation of Knowledge Defines a Research University

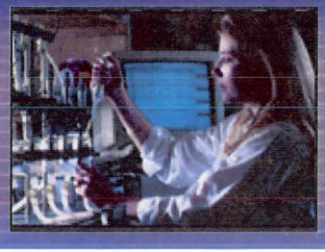
- At research universities, faculty are expected to pursue scholarship
- Every tenure track faculty member's job description has a research component
  - in some disciplines this is done with little or no external support
  - in others, particularly science, technology, engineering and math, scholarship is supported with external funding
- It is how faculty demonstrate they are current



# Research Facts

- Carnegie Classification: Doctoral STEM
  - Award > 50 doctorates /year
  - 15 or more Doctoral Degree Granting Programs
  - UW probably is the smallest public university in this distinguished class
- Nationally competitive faculty
- External Funding by College
  - A&S
  - Agriculture
  - Engineering
  - Health Sciences
  - Non-College Units

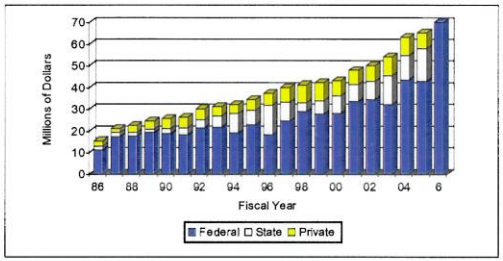
- National Science Foundation Facility – King Air Research Aircraft
- National Science Foundation Facility – Wyoming Cloud Radar System

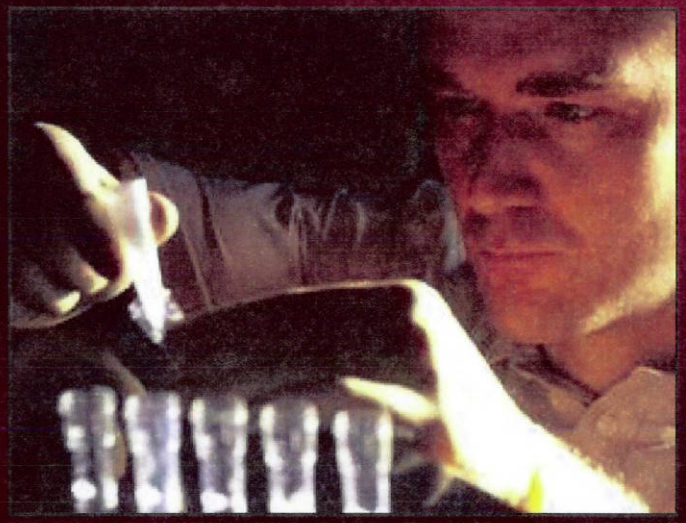


# Total Sponsored Contracts & Grants 1986-2005

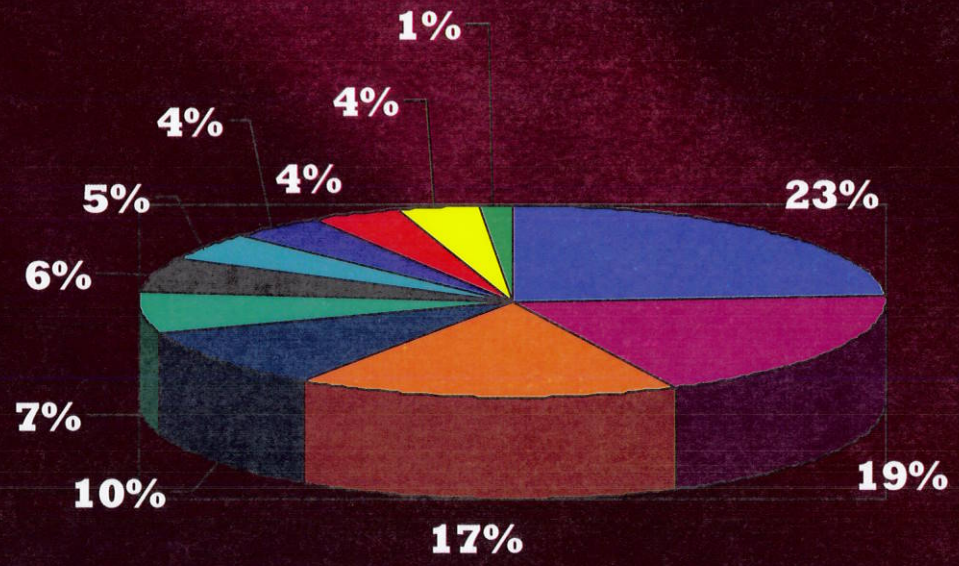
**Total Sponsored Contracts and Grants Obligated to the University of Wyoming FY 1986-2005**

Note: Totals listed represent sponsored projects accounted for through the Research Office.

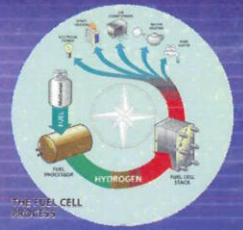


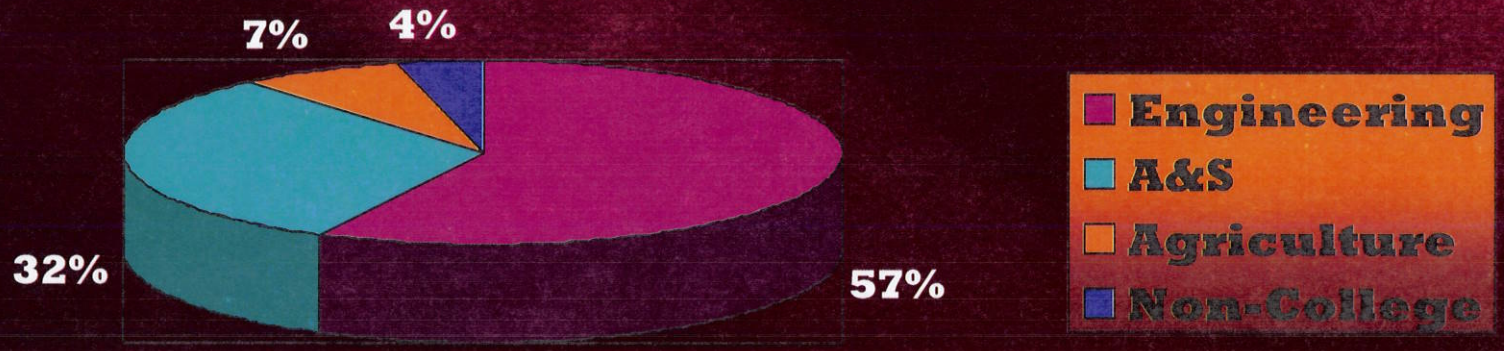
# Energy Funding by Area

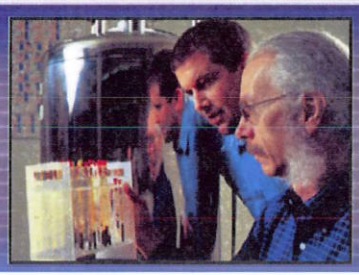



- Oil & Gas
- Wind/Ren
- CBNG
- Fundamental
- Power
- Geology
- Bio
- Process
- Coal
- Fuel Cells
- Environmental



# Energy Funding by College

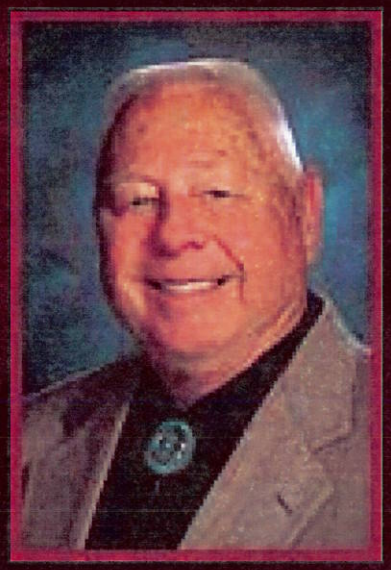


# Everything Starts With a Great Faculty and---

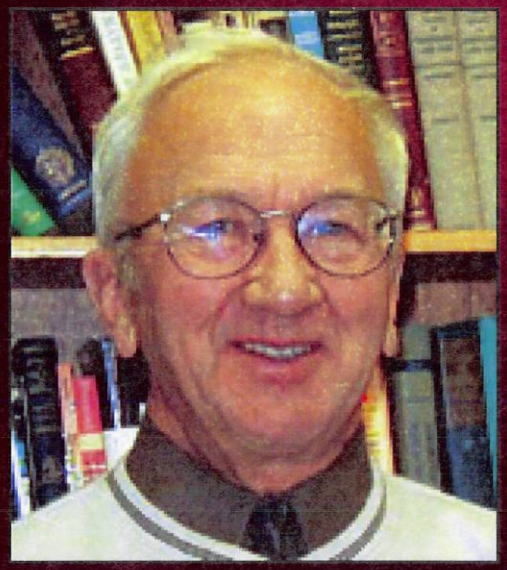
**George Frison**

**National Academy of Sciences**



**Leon Borgman**

**National Academy of Engineering**



**Norm Morrow**

**National Academy of Engineering**

THE NATIONAL ACADEMIES

*Advisers to the Nation on Science, Engineering, and Medicine*

# Infrastructure

- **Developing Infrastructure**
  - Major equipment
  - Special facilities
  - Providing staff support

# Research Model

- UW's research enterprise is based on three interlocking "models"
  - Supporting land grant missions
  - Supporting state research needs including statewide economic development through an integrated research – commercialization – outreach effort
  - Supporting the U.S.'s critical technologies
- Research growth is directly tied to Academic Plan II areas of distinction
- School for Energy Resources is at the heart of each



# Land-Grant Universities: Three Major Functions

**Teaching** – graduate and undergraduate students

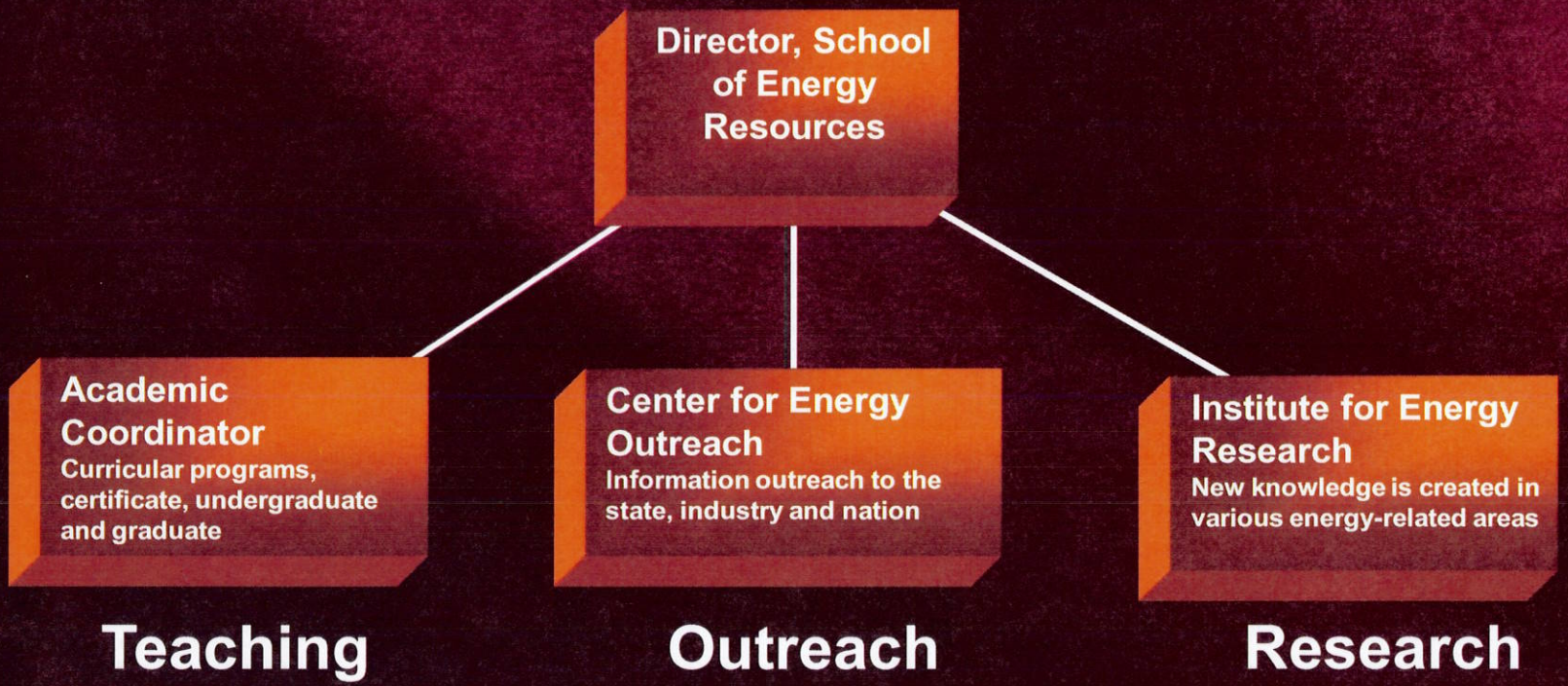
**Research**

**Service** – state/national outreach

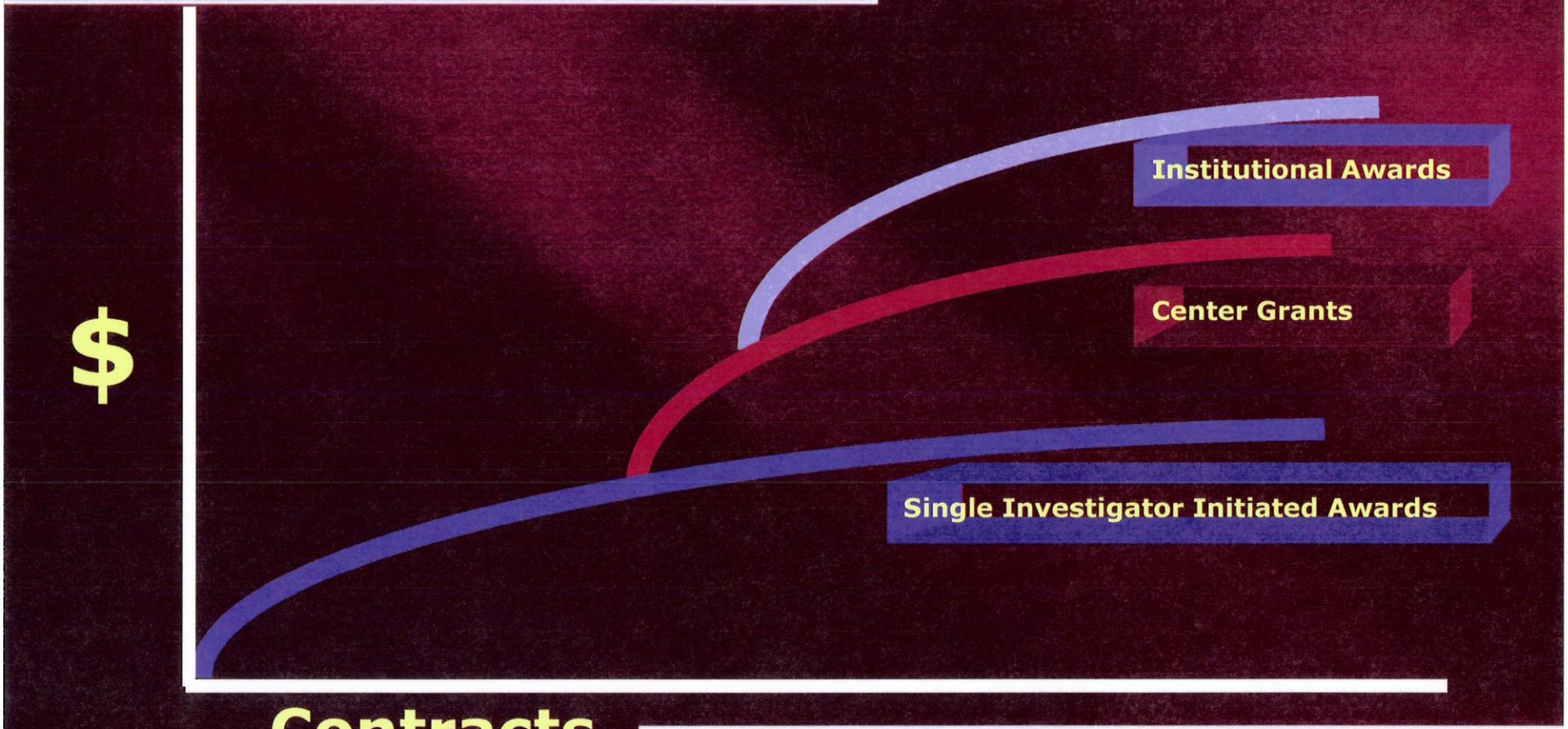
**Research integrates these into the learning model:**

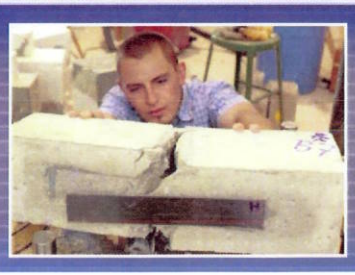
- **Produces new knowledge**
- **Immediately transferred to the classroom**
- **Assists energy sector through information and technology transfer - outreach**
- **Assists in decision-making**
- **Leads to licensing and spin-out formation**

# Energy School Model:
## Looks the same



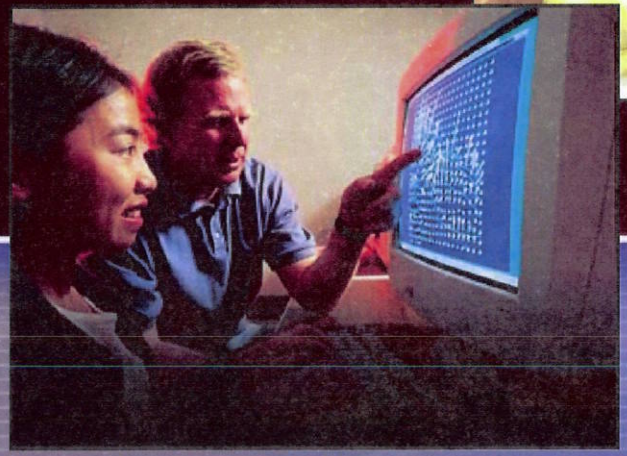
# Research Funding Builds on Itself



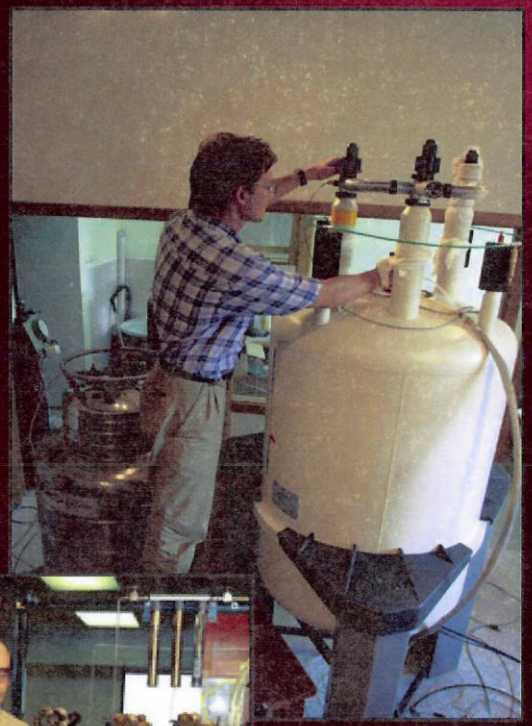
# Major Areas of Challenge

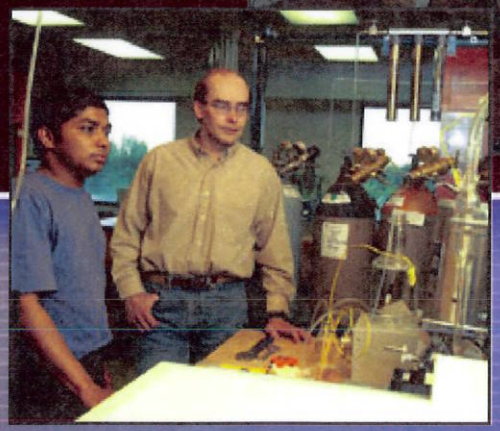
- Start-up
- External funding
- Access to graduate studer
- Support to core facilities



# Grand Challenges for Continued Research Growth

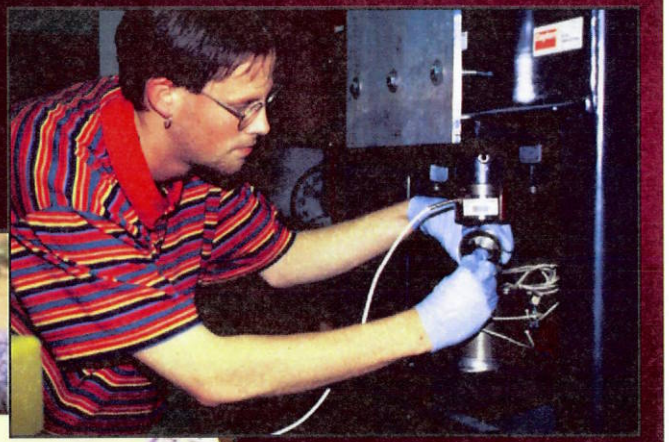
- The School for Energy Resources plan supports all our major research growth challenges:
  - Infrastructure
  - Faculty and
    - Start-up
  - Students
  - Building external support

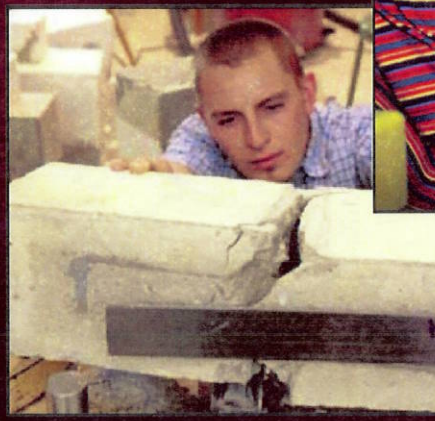


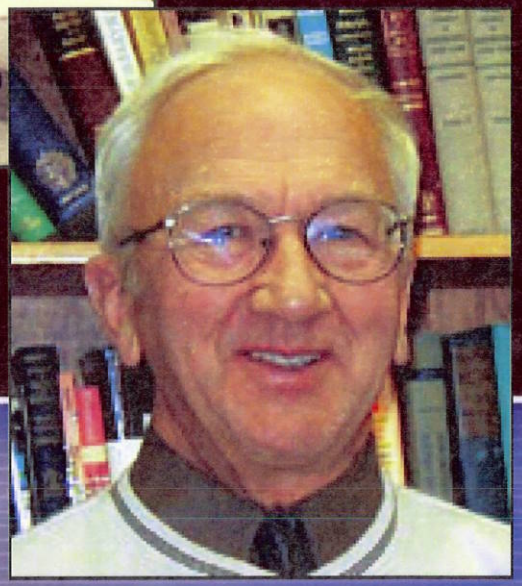


# What will the Energy School add?

- New Faculty
- New infrastructure
- More support to the state
- Economic development
- Should take the university between $90 and $100 million in external funding yearly
- Fully funded $10 million in state funding per year will provide us additional leverage to the remaining UW base budget







# 2. Search for a Director

**Important principles:**

- Must have unusually broad intellectual & scientific vision
- Must connect well with industry and government officials
- Must be capable of leading a diverse set of faculty
- Must be hired through fair, open, international search

**Search mechanics:**

- Appoint a search committee
- Post position announcement in prominent venues
- Actively solicit nominations and applications through contacts
  → including industry contacts, UW ERC members
- Run a colloquium speakers' series to get advice from experts
- Involve industry representatives
- Screen applicants (~60?) to get a short list (~10)
- Conduct phone interviews with and about these candidates
- Invite a slate of interviewees (~4) to visit
  → UW faculty & administrators, key industry reps, UW ERC
- Make an offer

**Expectations:**

- All administrative appointments are at will
- Director may hold a faculty position in a “home” department
- Career track may look different from traditional professors

# Elements of the position description

Report to VP for Academic Affairs
Proven intellectual and academic ability

Preferred:
Earned doctorate
Internationally recognized teaching and research
Industry experience
Proven leadership
Managerial ability, communication skills, vision
Creative leadership needed to create synergy
Commitment to integrating academics, research, outreach

"The University of Wyoming is an equal opportunity - affirmative action employer with an institutional commitment to diversity. We encourage women and members of under-represented groups to apply."

**Aggressive time line:**

| | |
|---|---|
| August 2006 | Appoint search committee |
| | Place advertisements |
| | Make professional contacts |
| | Make personal solicitations |
| Fall 2006 | Hold colloquium series |
| November 2006 | Begin screening applications |
| | Develop short list |
| December 2006 | Conduct phone interviews |
| | Develop interview list |
| January 2007 | Begin interviewing |
| February 2007 | Make offer |
| | |
| ASAP afterward | New director assumes duties |

**Appendix E**

# Director
# University of Wyoming School of Energy Resources

The University of Wyoming School of Energy Resources is a newly founded academic unit dedicated to energy-related teaching and research and dissemination of scientific, engineering and economic information to support energy-related activities of relevance to the state and nation. With new annual funding from the Wyoming Legislature, the School provides an outstanding opportunity for a visionary leader to build an interdisciplinary organization that will address the globally critical field of energy resources in a higher education setting. We welcome applicants from industry, academia, and other sectors.

The School of Energy Resources has three dimensions: 1) education, 2) research, and 3) outreach and service. The School has permanent funding for up to 12 distinguished professorships, to be allocated by the Director in an array of academic disciplines. Funding is also available for year-long distinguished visiting professorships, to be selected by the Director. Together with faculty from other academic departments, these faculty members will offer curriculum leading to interdisciplinary degrees in energy science and certificate programs in energy-related fields. The research arm of the School includes the Institute for Energy Research, which currently houses the Enhanced Oil Recovery Institute and which will establish other research centers related to the energy economy. An Energy Outreach Center will respond to the needs of Wyoming industry groups and state agencies for state of the art information about energy resources and technologies. For more information about the School, please visit http://www.uwyo.edu/SER/.

The Director will report to the Vice President for Academic Affairs. We seek an energetic leader with proven scientific and administrative skills who will work with the faculty in related academic units, who will develop the School of Energy Resources to its full potential as one of the world's top institutions in energy resources, and who will represent the School effectively to the university administration, to the energy industry, to state and national political leadership, and to the public.

Preferred qualifications include: 1) an earned doctorate; 2) an internationally recognized record of teaching and research in energy-related fields; 3) administrative experience that demonstrates vision, managerial ability, and communication skills; 4) the creative leadership needed to create synergy with other university programs and with industry; and 5) a commitment to integrating academics, research excellence, and the outreach mission of the School.

Applications should include a letter describing the applicant's qualifications and experience related to the position. Applicants should also include a curriculum vitae. For finalists, the search committee will ask for the names and addresses of three references. Review of applications will begin in November 2006, but applications will be accepted until the position is filled. The University of Wyoming is an equal opportunity - affirmative action employer with an institutional commitment to diversity. We encourage women and members of under-represented groups to apply.

Please send applications and nominations to:

SER Director Search, c/o Dr. Myron B. Allen
Vice President for Academic Affairs
University of Wyoming
1000 E. University Ave. Dept. 3302
Laramie, WY 82071

# 3. First 4 Faculty Positions

**Type of people sought:**

- Internationally recognized contributors to energy R&D
- Talented teachers
- Industry, national lab, or academic backgrounds
- Sensitivity to interdisciplinary teaching and research

**Rationale for searching in AY 2006-7:**

- Senior faculty searches typically take 8-10 months
- Most starting dates are in September
- Need to have leadership in place no later than AY 2007-8

## Proposed position authorizations

1. **Chemical & Petroleum Engineering**: Clean coal and coal conversion technologies
2. **Economics & Finance:** Energy economics, market and regulatory analysis
3. **Geology & Geophysics**: Reservoir imaging and petrophysics
4. **Mathematics**: Porous media flow and process modeling

**Coordinated hiring plan by 4 department heads:**

- Draft position announcements
- Proposed advertising venues and search strategies
- Contributions to coherent body of expertise
- Department commitments to future related hiring
- Proposed job descriptions
- Space needs, estimated startup, computational requirements

**Objective**: begin to build more integrated energy-related curricula and more vigorous research interaction among departments in energy-related areas.

# 4. Academic Coordinator

Prof. Andy Hansen (Mechanical Engineering) has agreed to serve as Academic Coordinator in AY 2006-7.

# Academic Coordinator

- Survey UW Energy Landscape
- *Academic* Energy School Council
- Summer Institute for HS / Jr. HS Students
- Interdisciplinary Undergraduate and Graduate Curriculum Development
- Undergraduate & Graduate Research Fellowships
- Teaching Internships

# UW Energy Landscape

- Sciences
- Engineering
- Economics
- Policy Analysis
- Broad umbrella of energy related research and teaching.

# *Academic* Energy School Council

- Allocation of undergraduate and graduate fellowships
- Summer Institute for K12 students
- HS / CC Teaching Internships
- Curricular development at the undergraduate and graduate levels

# Summer HS / Jr. HS Institute

- Specific age group to target
- Length and timing of the institute
- Subject content
- General exposure to the UW (higher education) environment

# Interdisciplinary Curriculum Development: Undergraduate

Possible model:

- Haub School of Environment and Natural Resources

# Features of Haub School:

- Model effectively addresses the issues of curriculum depth versus breadth that all interdisciplinary programs face
- Fluid enough to allow studies in the sciences, engineering, economics, or policy related matters
- Model would primarily utilize *existing* UW courses
- Model allows for interaction with industry and/or government through an internship course

# Interdisciplinary Curriculum Development: Graduate

Questions Abound:

- What degrees or certificates should be offered?
- The role of the Outreach School?
- What might a professional masters degree look like:
  Options in sciences, engineering, economics, policy analysis, law?
- What are the educational needs as viewed from industry as well as Wyoming's citizens?

# Internships & Fellowships

- RFP's for undergraduate and graduate fellowships.
  - Establish criteria and advertise in the spring of 2007.
  - Awards made in the fall of 2007 for summer 2008 and AY 2008-09
- HS / CC teaching internships.
  - Advertise in the spring of 2007 for the 2007-08 AY.

# Academics

| CATEGORY | BRIEF DESCRIPTION | ANNUAL BUDGET |
|---|---|---|
| Academic Coordinator's office | Academic Coordinator, staff, 18 undergraduate fellowships & 18 graduate assistantships | $765,900 |
| Distinguished faculty chairs in energy resources | 12 distinguished chairs, with fringe & discretionary funds | $3,312,000 |
| Visiting professorships | 2 visitors from industry or national labs, with moving and travel allowances | $600,000 |
| Distinguished teaching internships | 3 teaching interns from Wyoming schools or community colleges, with moving and travel allowances | $303,000 |
| Subtotal | | $4,980,900 |

# Research

| CATEGORY | BRIEF DESCRIPTION | ANNUAL BUDGET |
|---|---|---|
| Center incubator support | Postdocs, technicians, equipment, grant matching funds, and office support | $518,550 |
| Half-time faculty appointments | 9 half-time appointments, with summer stipends and fringe | $1,230,296 |
| Startup assistance | Funds to help college deans to hire in targeted areas | $500,000 |
| Grant matching pool | Funds to provide institutional matching required for research grants from some federal agencies | $1,000,000 |
| Subtotal | | $3,248,846 |

# Statewide service & outreach

| CATEGORY | BRIEF DESCRIPTION | ANNUAL BUDGET |
|---|---|---|
| Center for Energy Policy and Technology Outreach | Director, editor, staff, released time, with fringe and support | $561,000 |
| Consulting specialists | 4 full-time scientists and engineers to provide technical consulting, run short courses & workshops | $432,000 |
| Director's office | Director, staff, fringe, support. (Director also administers IER) | $513,100 |
| Subtotal | | $1,506,100 |

# 3. BUDGET

| Fiscal Year | New Funding Required | Sustaining Funding | Totals |
|---|---|---|---|
| FY 2007 | $4.4M | - | $4.4M |
| FY 2008 | $3.3M | $4.4M | $7.7M |
| FY 2009 | $2.1M | $7.7M | $9.8M |

**Ramp-up of state funding:**

| Fiscal Year | New Funding Required | Sustaining Funding | Totals |
|---|---|---|---|
| FY 2007 | $4.4M | - | $4.4M |
| FY 2008 | $3.3M | $4.4M | $7.7M |
| FY 2009 | $2.1M | $7.7M | $9.8M |


Key point: structure of the school will promote leverage. $9.8 M/year will influence a much larger fraction of UW's budget.

## Original proposal ("steady state" funding)

| | |
|---|---|
| Academic Coordinator's office | $132,300 |
| Teaching internships | $101,000 |
| Summer high school programs | $63,600 |
| Distinguished faculty positions | *$1,104,000* |
| Institute for Energy Research staffing | $ 518,550 |
| Faculty support, startup, grant matching | $1,410,099 |
| Energy Outreach Center | *$ 561,000* |
| Director, staff, support | *$ 513,100* |
| TOTAL BUDGETED (1st year) | **$4,403,649** |

## Proposed FY 2007 spending

| | |
|---|---|
| Academic Coordinator's office | $132,300 |
| Travel, publicity, curricular survey | $101,000 |
| Summer high school programs | $63,600 |
| *Faculty search expenses, interim teaching & research, colloquia* | *$577,000* |
| Institute for Energy Research staffing | $518,550 |
| Faculty support, startup, grant matching | $1,342,600 |
| *Energy Outreach Center & conferences* | *$ 242,500* |
| *Director search, staff, support* | *$ 403,800* |
| TOTAL BUDGETED (1st year) | **$3,381,350** |

Carry-over to FY08 (startup): $4.4M - $3.4M ≈$1M

# 6. Fundraising

| | |
|---|---|
| **Partnerships for Facilities** | |
| School of Energy Resources | $40,000,000 |
| Teaching Labs and Equipment | $2,000,000 |
| Classrooms (each) | $1,000,000 |
| | |
| **Partnerships for Endowments** | |
| School of Energy Resources | $30,000,000 |
| Director's endowment | $10,000,000 |
| Energy Research Centers | $6,000,000 |
| Energy Professorships | $3,000,000 |
| Graduate Fellowships in Energy | $1,000,000 |
| | |
| **Industrial subscriptions** | |
| Annual support for student research | $25,000/year |

**Strategy:**

- Pursue corporate gifts for facilities as highest near-term need
- Pursue other gifts (director's endowment, graduate fellowships) from wide array of donors
- Pursue annual corporate subscriptions to support research and student training