

Global Need for Education and People in the Petroleum Industry

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TEXAS A&M



THE HAROLD VANCE DEPARTMENT OF

**PETROLEUM
ENGINEERING**

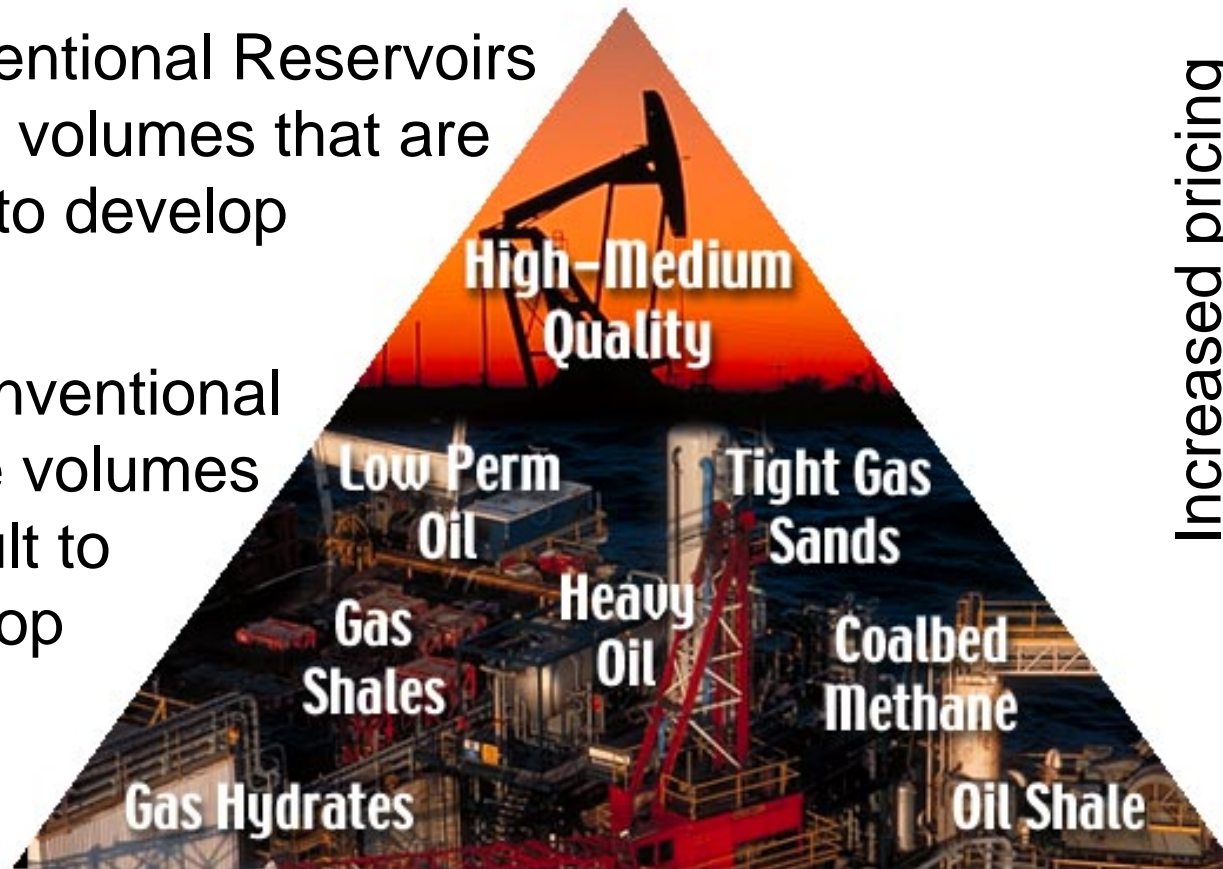
The message

- The oil and gas industry is
 - A growing business
 - A high technology business
 - A global business
- Technology is the key to
 - To finding the 3rd trillion barrels
 - To producing the 3rd trillion barrels
- Now is a great time to enter the upstream oil and gas industry

Resource Triangle

Conventional Reservoirs
Small volumes that are
easy to develop

Unconventional
Large volumes
difficult to
develop



Increased pricing
↓
Improved technology
↓

HPHT – Ultra-Deep Water – Arctic

What should universities do?

- Teach students to think
- Teach students to learn
- Conduct research both basic and applied

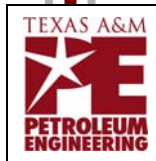
However, we also need to teach PEs to

- Drill wells
- Log wells
- Complete wells
- Analyze log, core and well test data
- Analyze reservoir performance
- Compute reserves
- Economic evaluation of projects

Success in Industry also requires soft skills

- Technical writing
- Presentation skills
- Knowledge of diversity issues
- Knowledge of environmental issues
- Team building skills

What has happened over the last few decades?



Petroleum Engineering at Texas A&M

Year	Total Hours	Chem, Phys	Geol	Math	Other	PE
1960	152	37	14	17	57	27
1970	142	23	15	15	57	32
1980	141	15	11	15	54	46
1990	136	12	8	13	57	46
2000	129	12	7	14	47	49
2005	129	12	7	14	45	51
Future	120					

Why do we need post-graduate degrees?

- There is more to learn than ever before
 - Horizontal and multilateral wells
 - 4-D seismic and reservoir simulation
 - Multi-zone hydraulic fracturing
 - Complex well test analyses
 - How to develop
 - Heavy oil
 - Coal bed methane
 - Gas Shales
- There is too much to learn in 4 years



The Focus Needed for the Future

- Continued emphasis on basic education at the undergraduate level
- Graduate programs to teach how to solve problems
 - That are complex
 - That require teamwork
 - That include environmental components
 - That are important to the industry

University – Industry Partnerships

- Industry needs to spend more time on campus
- Industry needs to work with teams to help define research needs
- Industry needs to help provide the data and equipment required to conduct meaningful research
- Universities need to produce useful results



Summary

- BS students take fewer courses now than ever before
- Technology is becoming more complicated
- There is too much to learn in 4 years

Summary

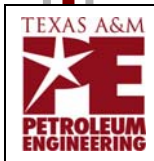
- More BS students need to continue into graduate school
- Graduate students should learn to think and solve problems – both independently and in a team environment
- Industry needs to encourage, guide and support the university research efforts

Conclusion

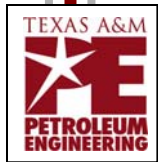
If industry wants to find and produce the 3rd Trillion barrels of oil, it needs both entrepreneurs and high level technical employees (engineers and scientists with advanced degrees)

Recommendation

To hire these high level technical employees, the oil and gas industry needs to support graduate programs, then recruit and hire the students who earn advance degrees



Thank you



TAMU PE Students still looking for jobs

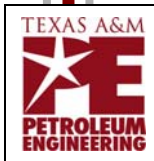
	Full Time	Internship
Phd	1	6
Masters	20	10
Seniors	14	1
Juniors		7
Sophomores		25
Freshmen		22



There is a disconnect

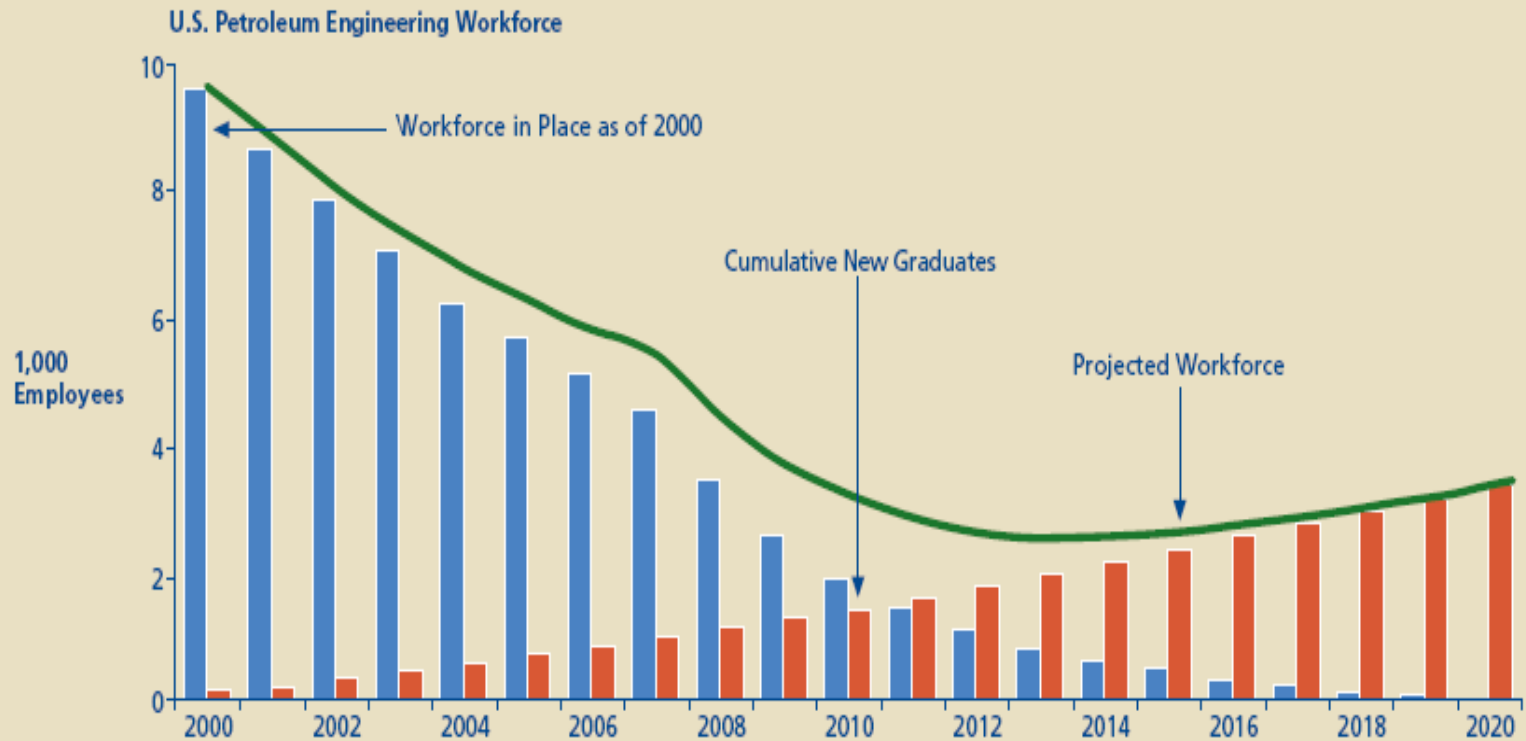
Our PE student body is growing,
but there are still a lot of
students looking for jobs

If industry is so concerned, why
are so many students still
looking for jobs?



Workforce Constraints

Exhibit 2. Oil & Gas Workforce Projections

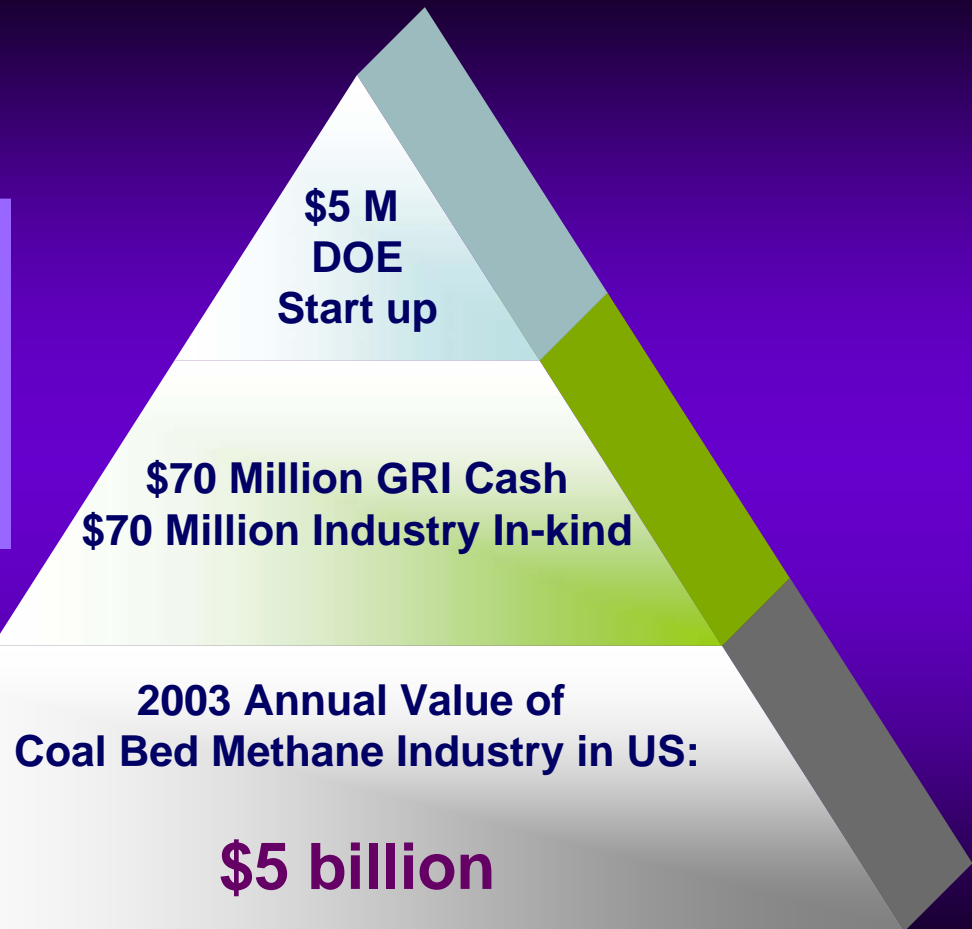


Source: PetroStrategies Inc.

Coalbed Methane: Small Investment, Large Return

Return on R&D
investment:

34 to 1



Research
Partnership to
Secure Energy
for America

We need to increase number of MS degrees

- To equal a BS degree in 1970
- 120 hours for a BS plus 24 hours of class work for an MS equals the BS 30 years ago, but without all the chemistry, physics and geology
- Plus, the business is so much more technical now, there is more to learn

Q&A

- Q. Does one become more marketable with an advanced degree?

A. **They should** but many recruiters have BS degrees and do not recognize the benefits of a graduate education.

- Q. Does a post graduate have more knowledge required to solve tough problems?

A. **Yes, without question**

Q&A

- Q. Why is a post graduate degree strategically important?

A. If one understands the reservoir and the technology better, one will do better work, make better decisions, find more oil and be more valuable.

Also, the best engineer is usually the one first chosen to move into management

Q&A

- Q. Are engineers with post graduate degrees more prepared for the increasingly complex problems being faced by industry?

A. Yes, with out a doubt

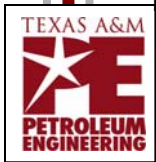
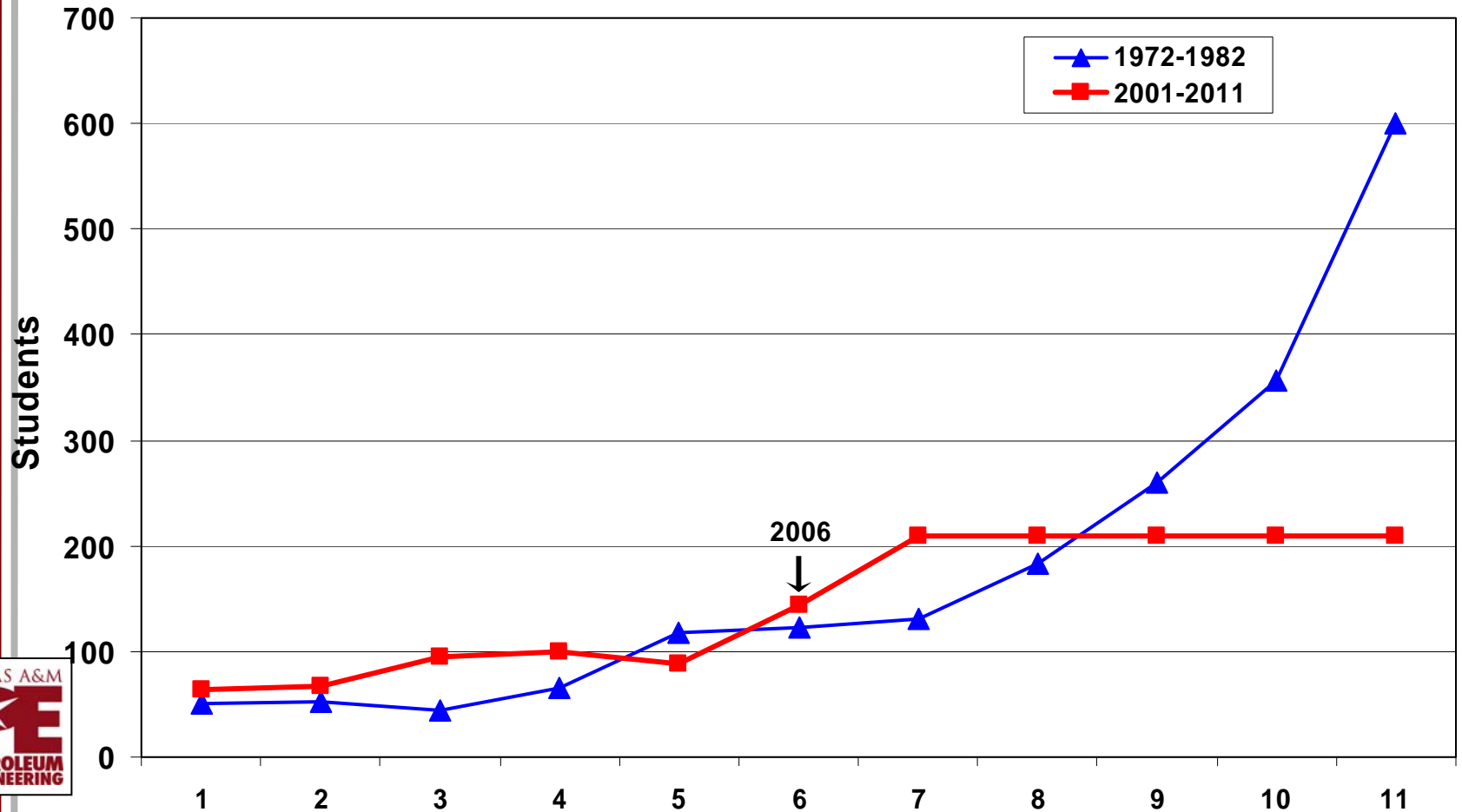
Plus, they learn to do independent research and solve problems on their own.

Student Enrollment Projections 2007-2010

2006 actual

	College Station Campus								Qatar		Total
FY	Fr	So	Jr	Sr	Total UG	Master	PhD	Total Grads	Under grads	Grads	Both Locations
2006	144	75	69	50	338	141	50	191	29	0	558
2007	209	100	70	76	455	157	55	212	52	0	719
2008	210	150	90	80	530	162	60	222	90	5	847
2009	210	150	125	90	575	166	65	231	105	10	921
2010	210	150	125	115	600	170	70	240	120	10	970

Freshmen



Total Undergrads

