# The Future Need for Petroleum Geoscientists

Future of Earth Scientists Committee AAPG House of Delegates Donald W. Lewis

## What will the Demand for Petroleum Geoscientists Be to the Year 2020?

## <u>Approach</u>

- Add AAPG + SEG membership, eliminate overlap and use only members working in petroleum industry
- Project current membership to 2020, assuming retirement at 65
- Relate membership to oil & gas production and project to 2020
- Compare geoscientist demand to supply at current rate of people obtaining geoscience degrees and entering petroleum industry

## Estimates of 21st Century World Energy Supplies



## Estimates of 21st Century United States Energy Supplies



## AAPG + SEG Members in Worldwide Petroleum Industry



## AAPG + SEG Members in U.S. Petroleum Industry



**Excludes SEG - AAPG overlap** 

## Worldwide AAPG +SEG Membership in 2001



### **United States AAPG +SEG Membership in 2001**



## AAPG + SEG Members in Worldwide Petroleum Industry

#### 1978 - 2020 (Overlap Excluded)



## AAPG + SEG Members in U.S. Petroleum Industry

#### 1978 - 2020 (Overlap Excluded)



# Worldwide Oil & Gas Production and AAPG + SEG Members in Petroleum Industry



#### U.S. Oil & Gas Production and

## AAPG + SEG Members in Petroleum Industry



#### **Worldwide O&G Production per**

## AAPG + SEG Member in Worldwide Petroleum Industry



Assumes improvements in technology yield 1 - 2% increase in production/member

#### **U.S. O&G Production per**

## AAPG + SEG Member in U.S. Petroleum Industry



Assumes improvements in technology yield 1 - 2% increase in production/member

## Worldwide Petroleum Geoscientist Demand Based on AAPG + SEG Membership Only



AAPG or SEG, gap is 4 times larger than shown

## U.S. Petroleum Geoscientist Demand Based on AAPG + SEG Membership Only



If 2/3 of U.S. geoscientists in petroleum industry are members of AAPG or SEG, gap is 50% larger than shown

## Will the Gap Be Filled?

U.S. Geoscience Graduates Compared to Geoscientists Needed in U.S. Petroleum Industry

Geoscientist Gap/Year		Graduates Entering Petroleum Industry		
1%	2%	BS + MS + PhD	MS + PhD	
		@7.6% (AGI)	@14.4% (AGI)	@ 23.8% (K&C)
420	210	300	180	300

- Assumes all graduates work on U.S. production, i.e., none work on non-U.S.
- "Gap 1%" assumes technology improvement of 1% per year
- Gap numbers assume AAPG + SEG members are 2/3 of petroleum geoscientists in U.S.
- Assume 2000 level of 4000 U.S. geoscience degrees of which 1250 are MS & PhD. Percentage entering petroleum industry are for 1999
- K&C percentage includes Canada and did not use same categories as AGI study Sources: NSF, AGI (2000), Katz & Claudy (2000)

- Median age of AAPG and SEG members is in the 46-50 group. As the older half reaches retirement, the need for replacements will increase.
- World oil and gas production will equal or exceed today's level for the next 40 - 60 years. Thousands of geoscientists will be needed to discover and recover these reserves.
- U.S. oil and gas production will decline slowly for the next 20 - 40 years and will require a continuing U.S. geoscience work force larger than that remaining after the coming retirements.
- Even with geoscience technology continuing to improve at the rate of the last ten years, 200 400 new geoscientists per year will be required for the U.S. petroleum industry.

- Additional new geoscientists will be required in the U.S. working on non-U.S. areas and in other countries working for American companies
- Although the number of petroleum geoscientists worldwide is unknown, a conservative estimate is that 2000 - 3500 new geoscientists per year will be required in the petroleum industry (including the U.S.)
- The requirement for petroleum geoscientists will last at least as long as a career.



## Estimates of 21st Century World Energy Supplies



# Estimates of 21st Century United States Energy Supplies



## Assumptions

## Many assumptions are necessary, among which are:

- Retirement at age 65
- Technology improvement at same rate as last ten years
- Production forecast
- In U.S., two-thirds of petroleum geoscientists are AAPG or SEG members