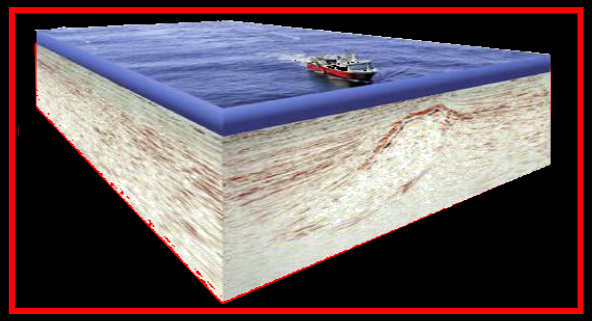
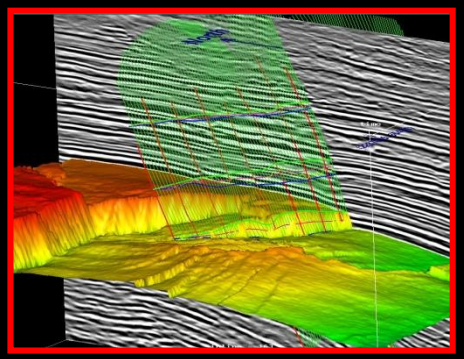
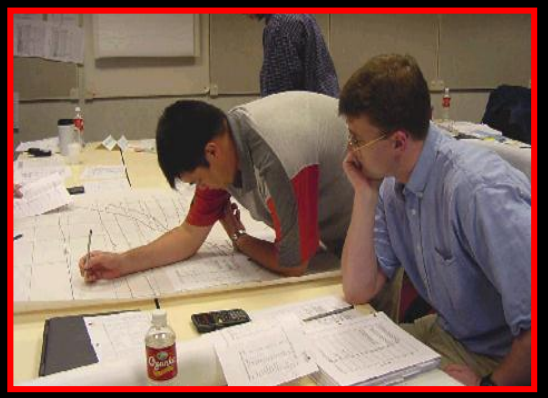
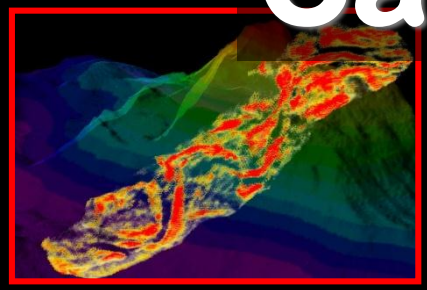
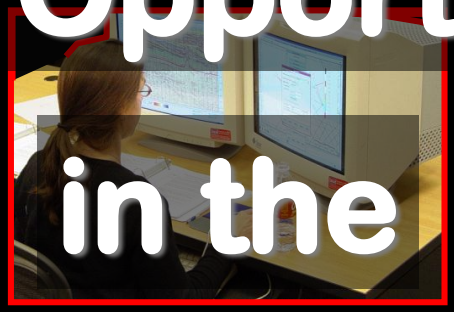


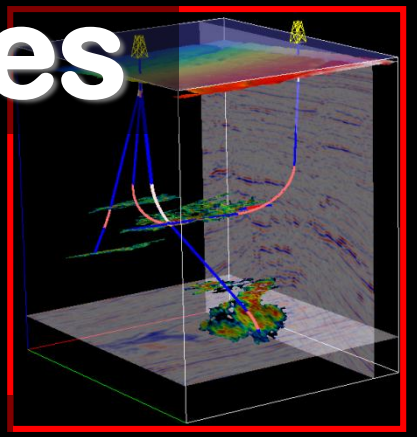


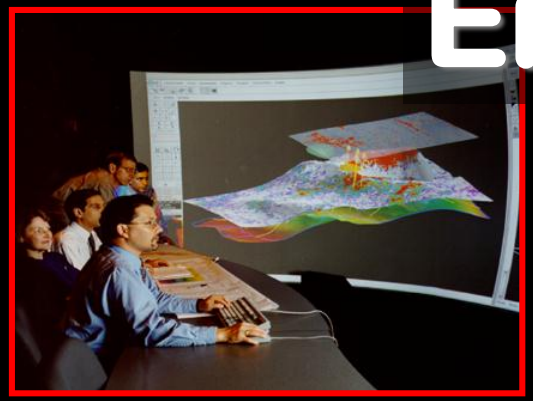


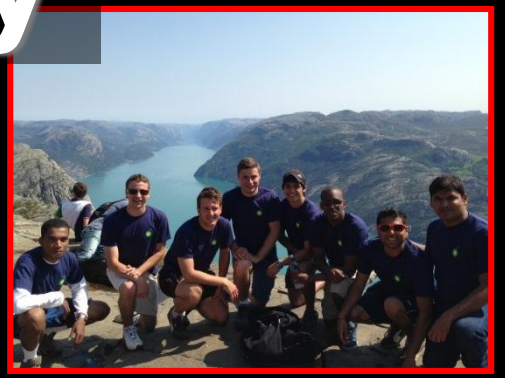
Career Opportunities in the Energy Industry





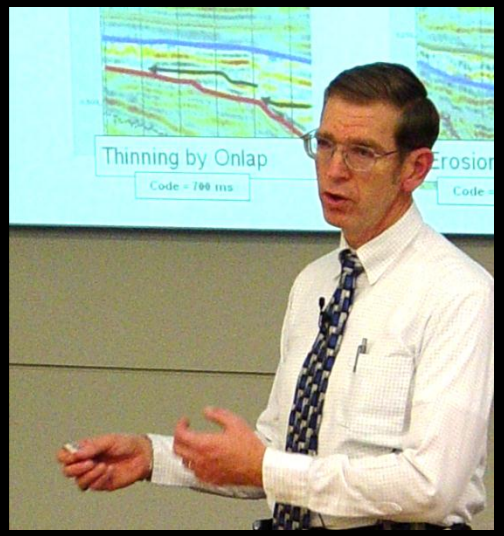






Outline

- A Bit about Me
- What We Do in the Energy Industry – G&G
- My Outlook for Energy Industry Careers
  - Three Big Positive Factors
  - Two Major Concerns
- How Can You Prepare
- Q&A



My Training & Career Path

4 years,
B.S. in Engineering Physics

5 years, M. Phil. and
PhD in Marine Geology

32 years, EPR-URC
Seismic R&D, Training

6 months as a
Visiting Lecturer

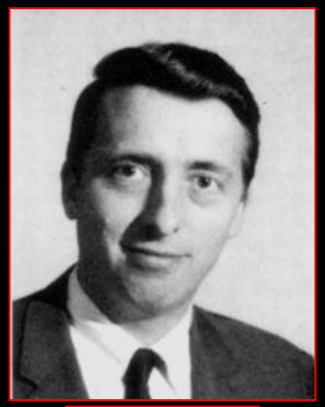
3 years as a
Tutor

3 years as a
Geological Advisor

Coming Out of Grad School

I Was Triple Blessed:

1. Industry just started a hiring boom
2. I received an offer from Exxon Research
3. I was assigned to the Seismic Stratigraphy section and was mentored by:



PETE VAIL

BOB MITCHUM

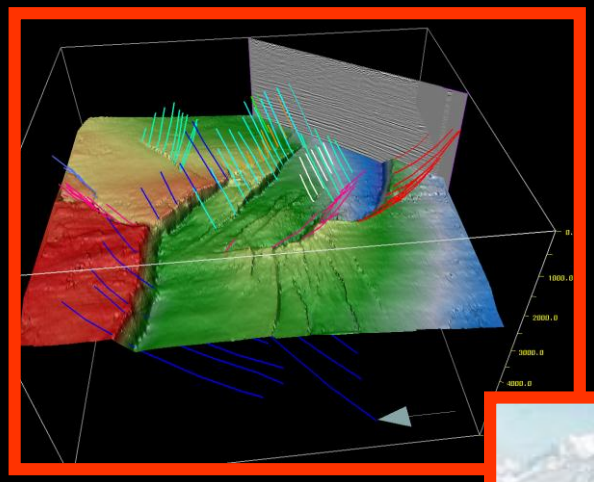
The Fathers of Seismic Startigraphy

My Areas of Study

1. R&D New Methods
2. Apply New Methods
3. Training/Mentoring

- Seismic Interpretation (2D & 3D)
- Seismic Stratigraphy
- Basin Modeling
- Seismic Attribute Analysis
- Volume Interp & Visualization

What We Do in the Energy Industry



Exploration

Upstream

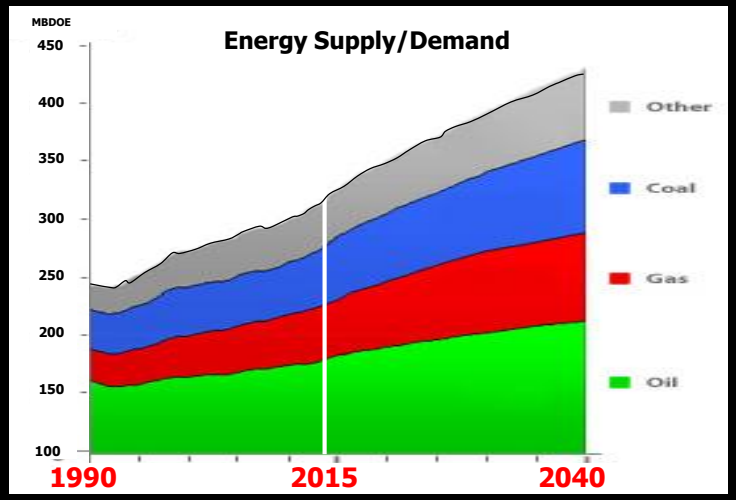
Production

Refining

Downstream

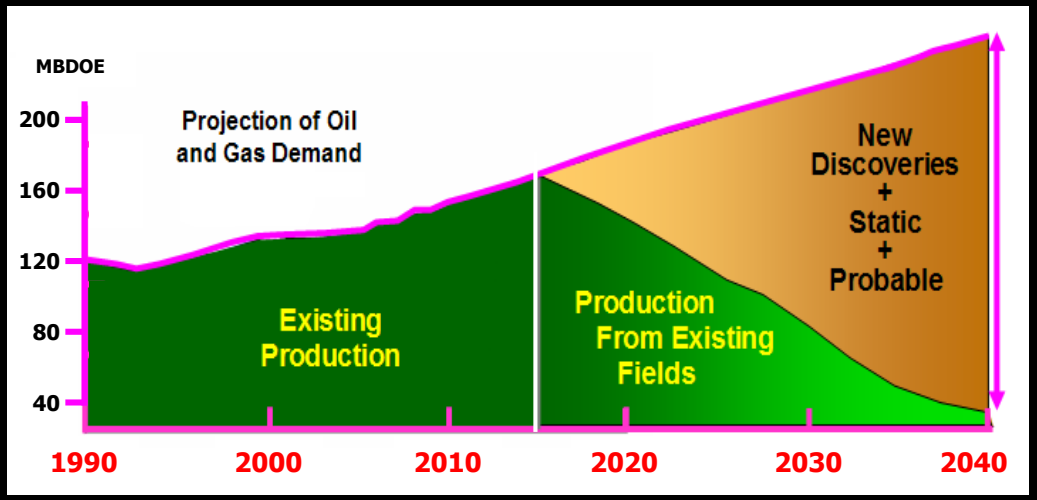
Marketing

Challenge for the Upstream



Worldwide demand for energy will increase steadily out to 2040 and beyond

Projected demand for oil and gas in 2040 is 45% more than it is in 2015



There is a huge GAP between projected production from existing fields and what needs to produced through 2040 to meet the demand

What We Need

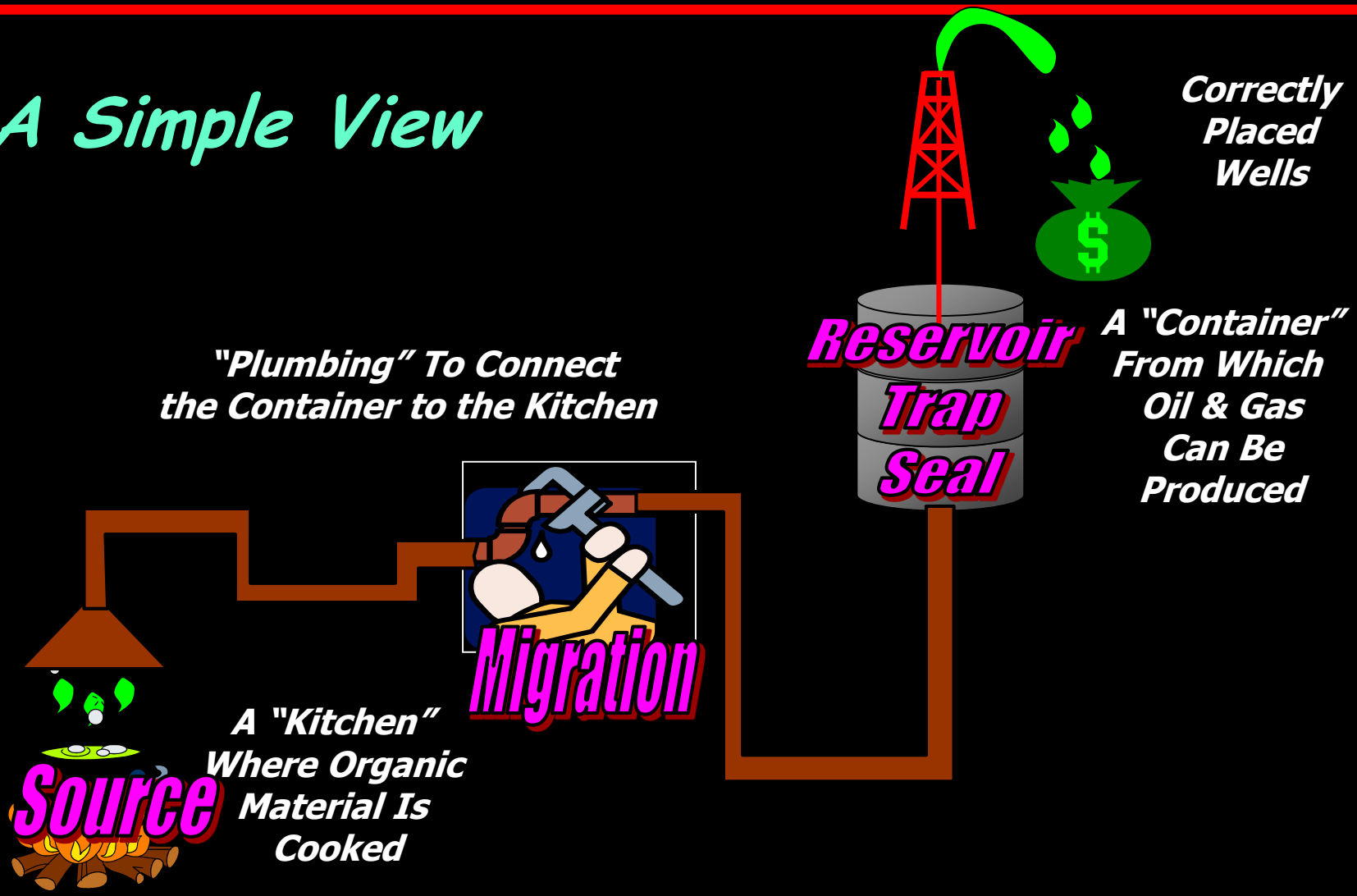
- We need to drill 'good' wells, ones that have low risk and maximize the return on our investments
- Since wells can be very expensive, some more than $200 million, we must position each well with care

- We need as accurate an understanding of the subsurface as possible so we can:
  - Maximize oil & gas recovery from known fields
  - Move probable & static assets to proven reserves
  - Discover new reserves beneath & adjacent to known fields
  - Find and produce oil & gas in new areas

Conclusion: The energy industry needs new geoscientists with the talent and drive to find, develop and produce the energy that people will need.

What We Need for Success

A Simple View

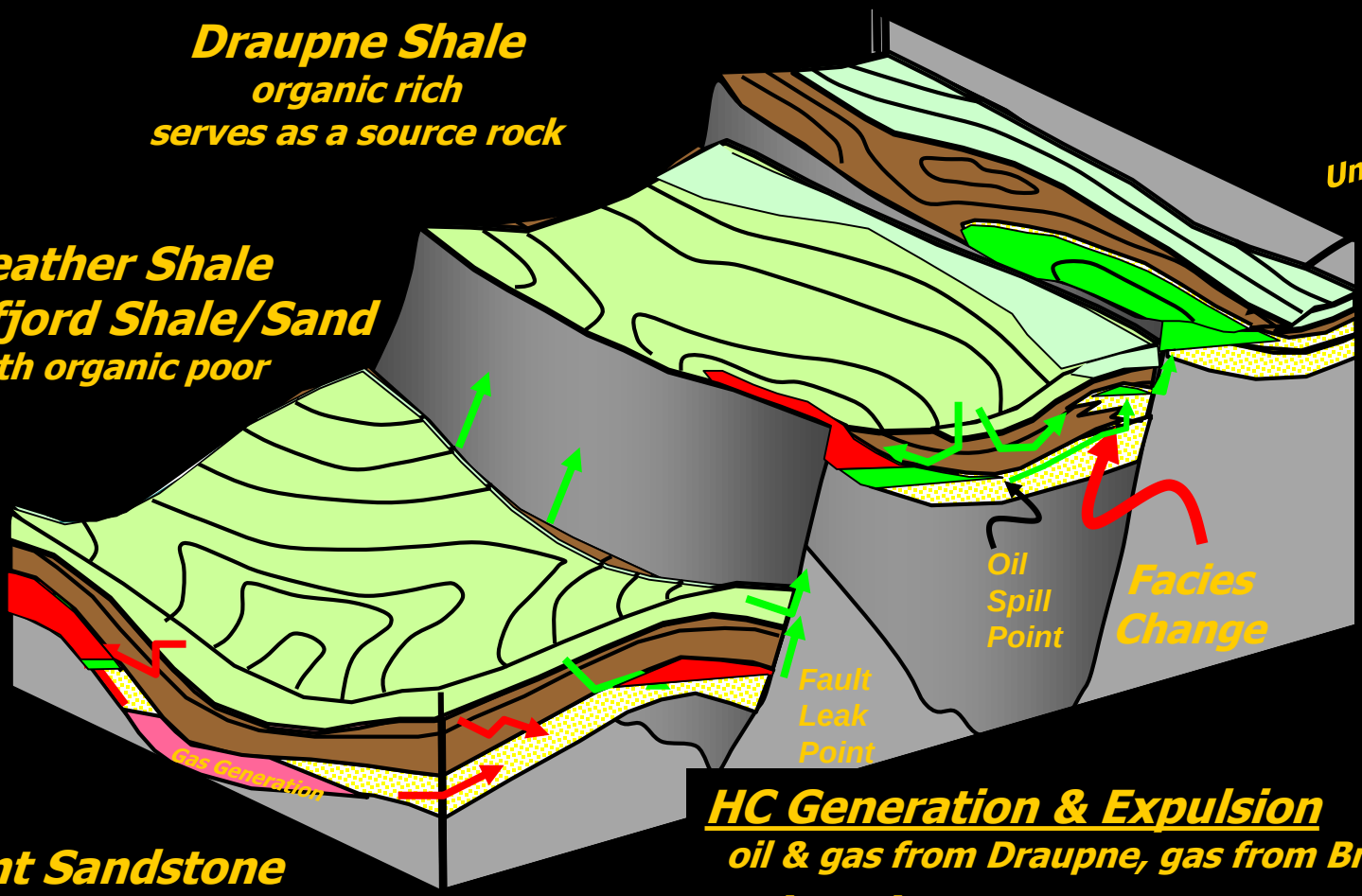


Summary of the North Sea HC System

Schroeder & Sylta, 1993

Draupne Shale
organic rich
serves as a source rock

Heather Shale
Sognefjord Shale/Sand
both organic poor



Brent Sandstone
acts as a reservoir
and carrier beds

Brent Coals
acts as gas source

HC Generation & Expulsion
oil & gas from Draupne, gas from Brent coals

HC Migration
into Brent carrier beds and up faults

HC Fill & Spill
late gas displaces early oil in the
deeper traps; oil into shallow traps

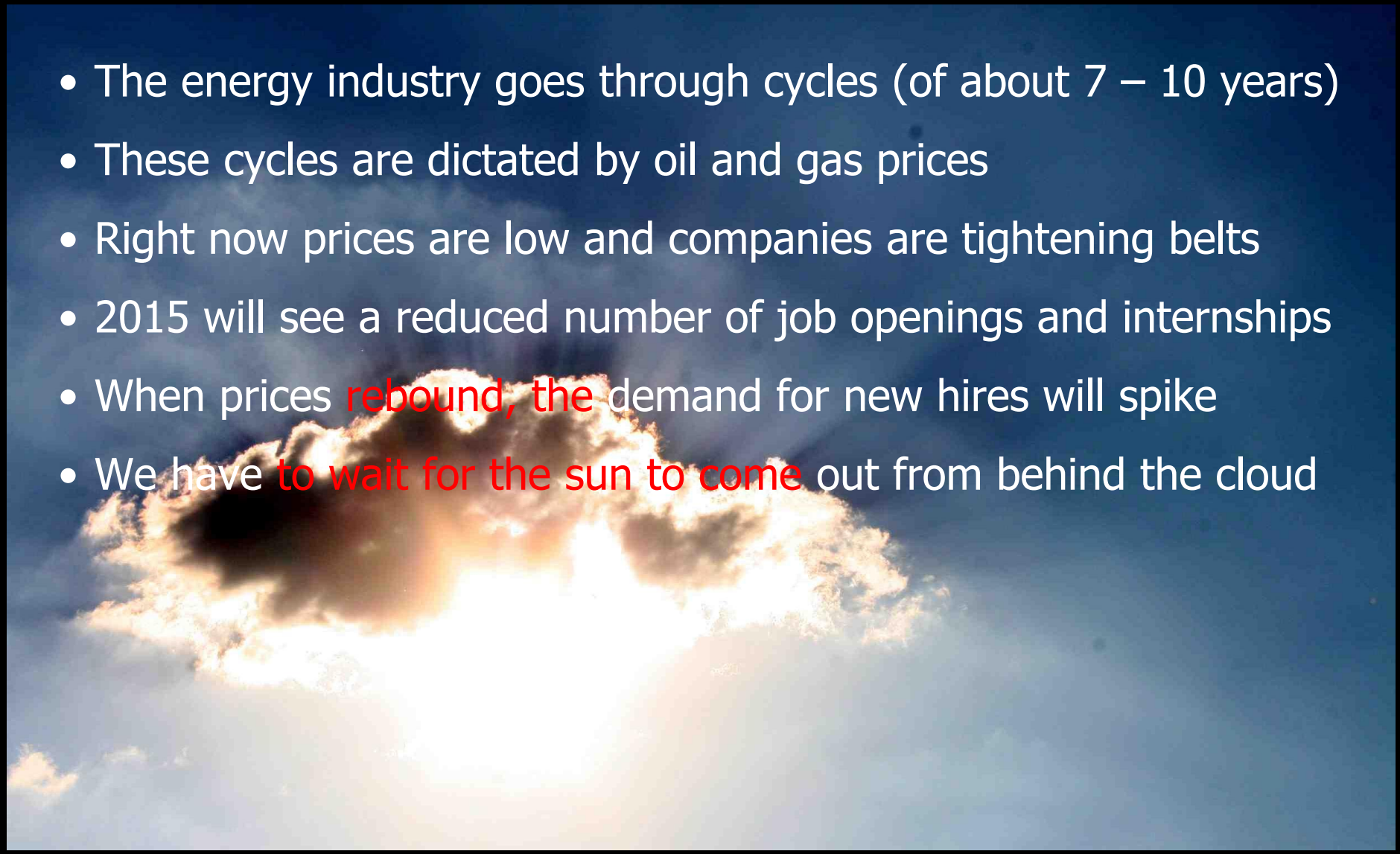
My Outlook for Careers in Industry

Is this a good time to start a career in the energy industry - one that will last 30+ years?

Long-term - the timing is Good!

But short-term it may be Poor

Oil & Gas Prices



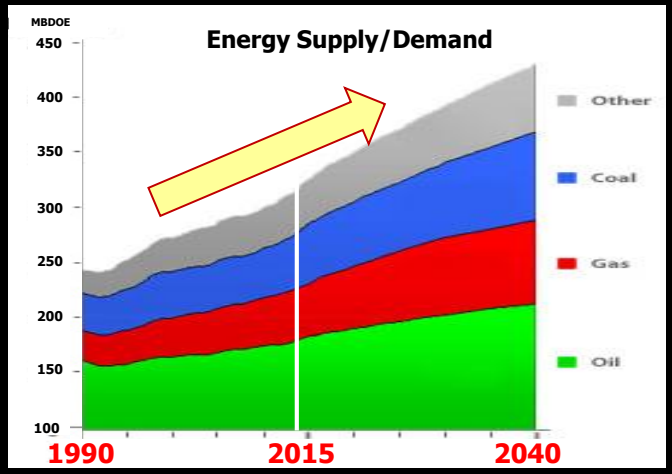
- The energy industry goes through cycles (of about 7 – 10 years)
- These cycles are dictated by oil and gas prices
- Right now prices are low and companies are tightening belts
- 2015 will see a reduced number of job openings and internships
- When prices rebound, the demand for new hires will spike
- We have to wait for the sun to come out from behind the cloud

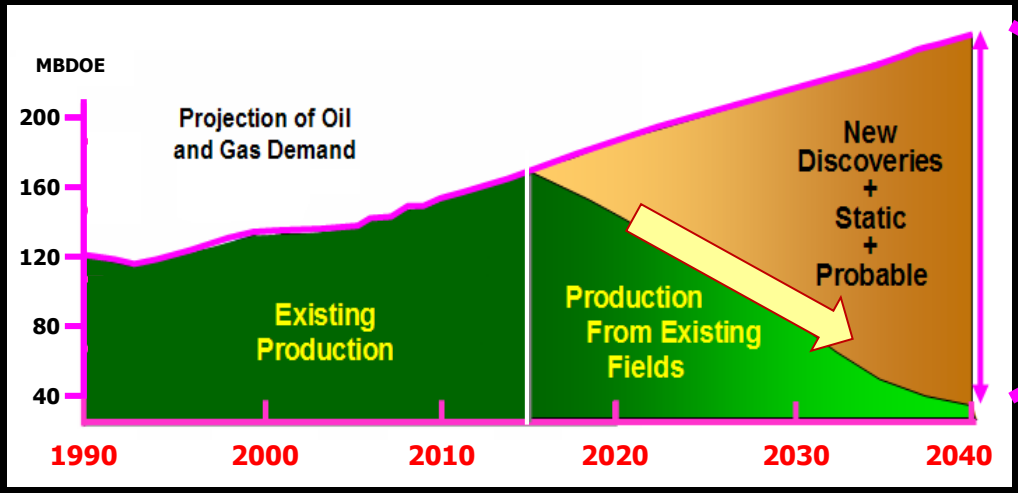
Three BIG Positive Factors

1. Energy Demands
2. Technology Needs
3. Industry Demographics

Energy Demands UP, Existing Production DOWN

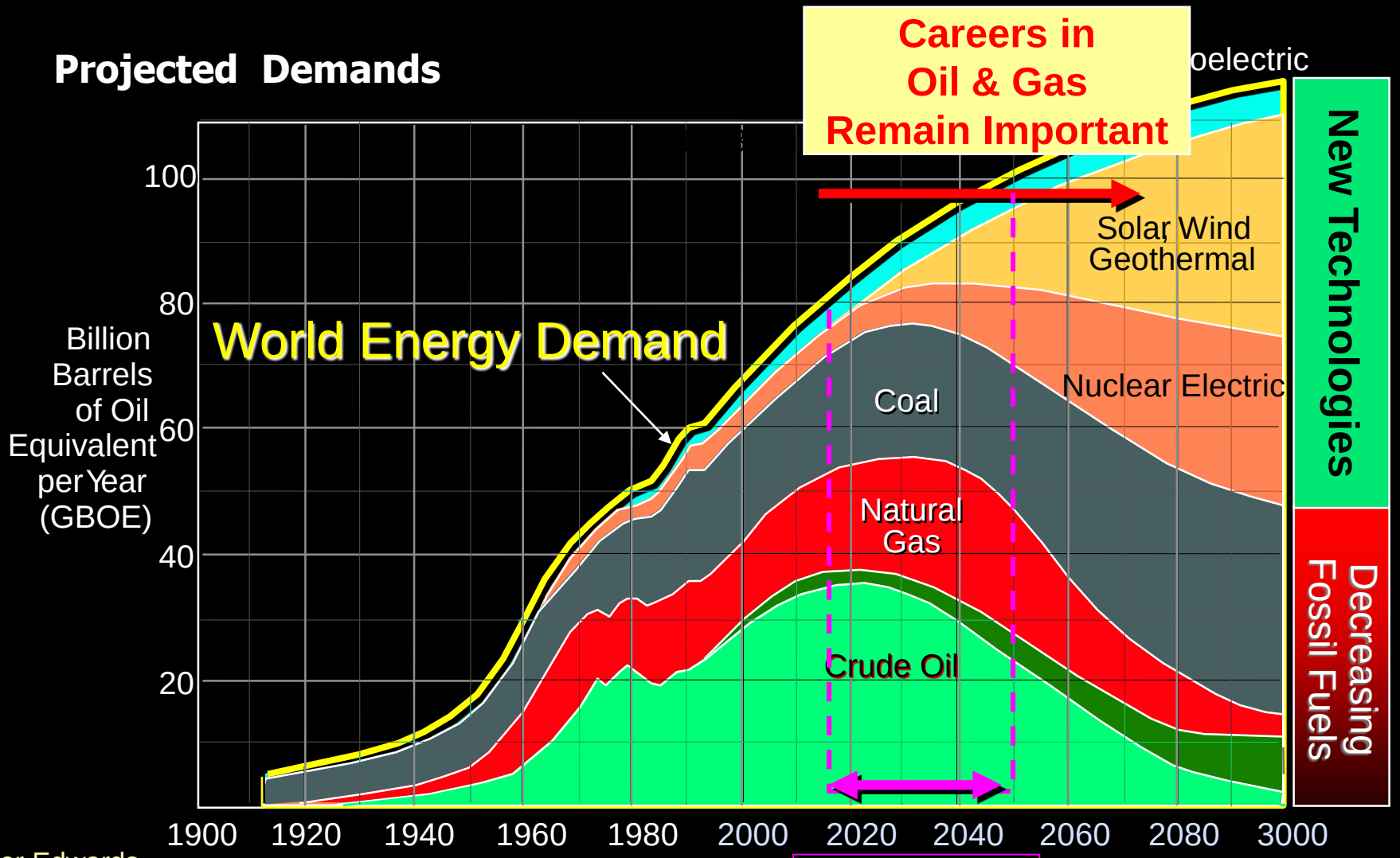
As You Have Seen…





Geoscientists are Needed to Fill this GAP?

Sources of Energy Forecast



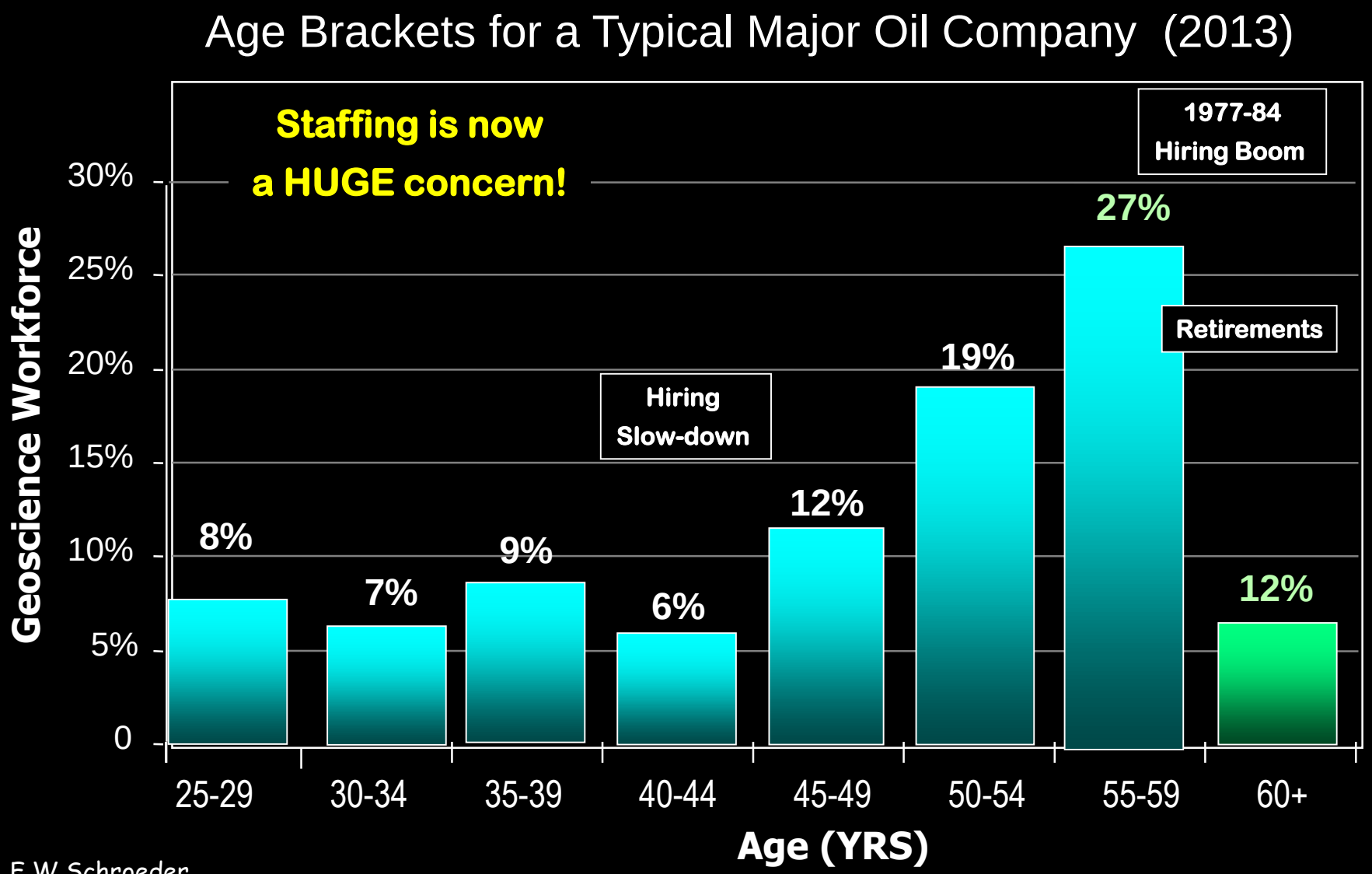
after Edwards, *AAPG 8/97*

F W Schroeder

Technology Needs

- To meet energy demands, we can't count on simply making 'giant new discoveries'
- In addition to making new discoveries, we need to get more out of what we already have found:
  - New life in old fields
  - Make 'uneconomic' reserves economic
- Technology, and the people to develop and apply it, will be the key

Industry Demographics



Career Forecasts – by 2021

From: Eric M. Riggs and

262,627 geoscience jobs today

~130,000 geoscientists expected to retire by 2021

72,000 geoscience job growth by 2021 (BLS)

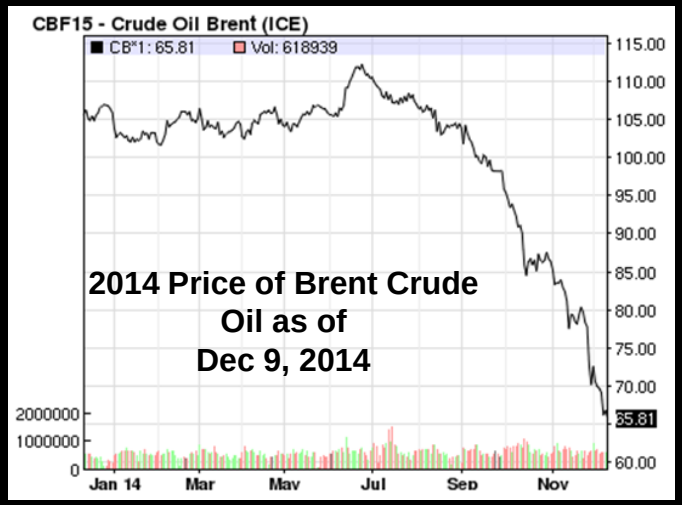
15,000 total new graduates (MS or PhD)

OR

45,000 total new graduates if hiring BS/BA

Net deficit of over 150,000 geoscientists by 2021

Two Major Concerns



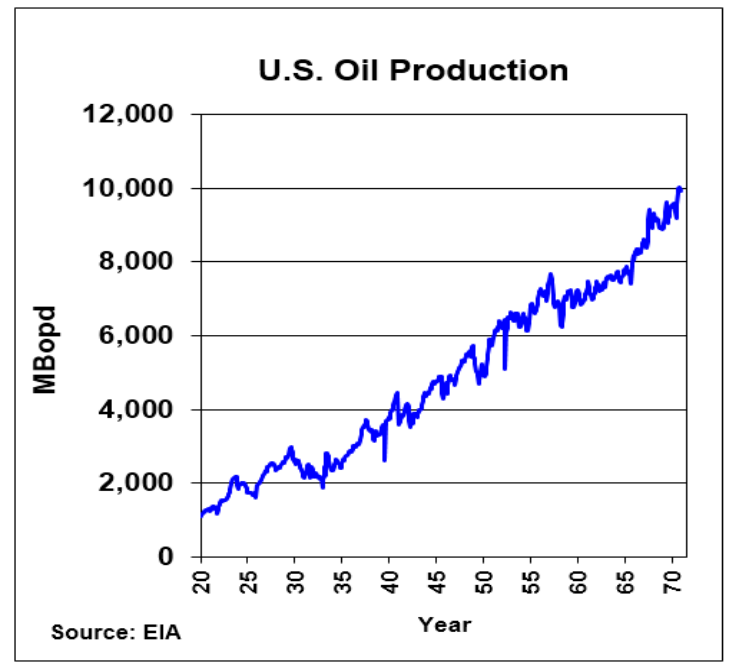
2014 Price of Brent Crude Oil as of Dec 9, 2014

- **Recent drop in the price of oil (down almost 40%)**

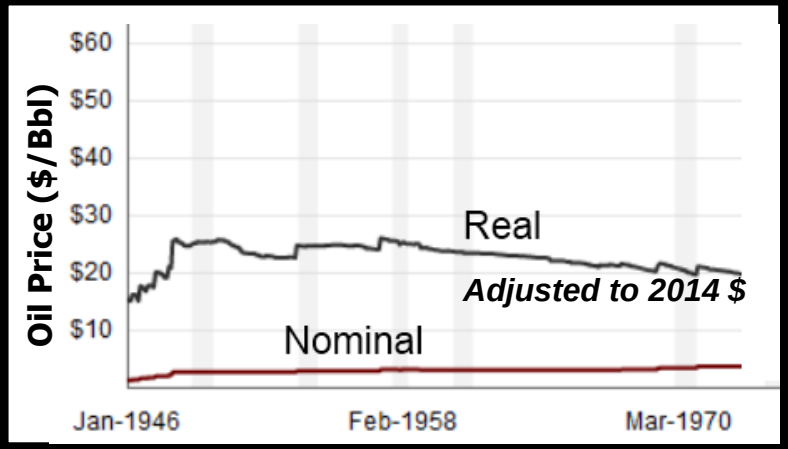
- **Number of Geoscience Majors is high**

  a recent AAPG/SEG Student Expo

Some History: 1946 to 1970



- US demand was less than our production capacity – the spigots were not open 100%
- We did not require imported oil to meet our needs
- Oil prices were quite stable



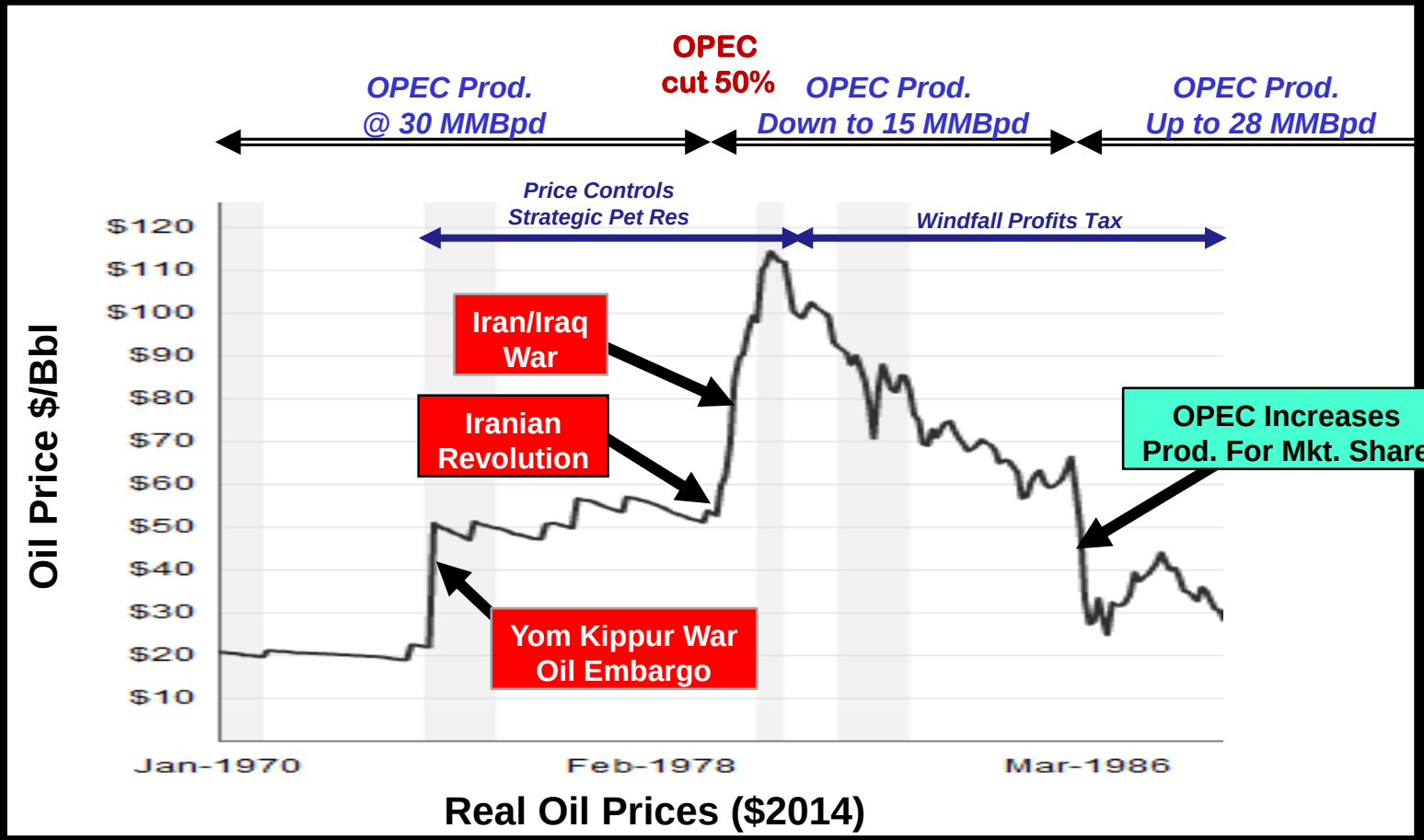
More Recent History: 1970 - 2014

- US demand exceed US production capacity – the spigots were opened 100%
- Henceforth we required imported oil to meet our energy needs
- World economic and political events drive price extremes
  1. Concerns over supply disruptions
  2. Production quotes of suppliers
  3. World financial instabilities
  4. Production from Unconventionals

Oil Embargo led to long gas lines

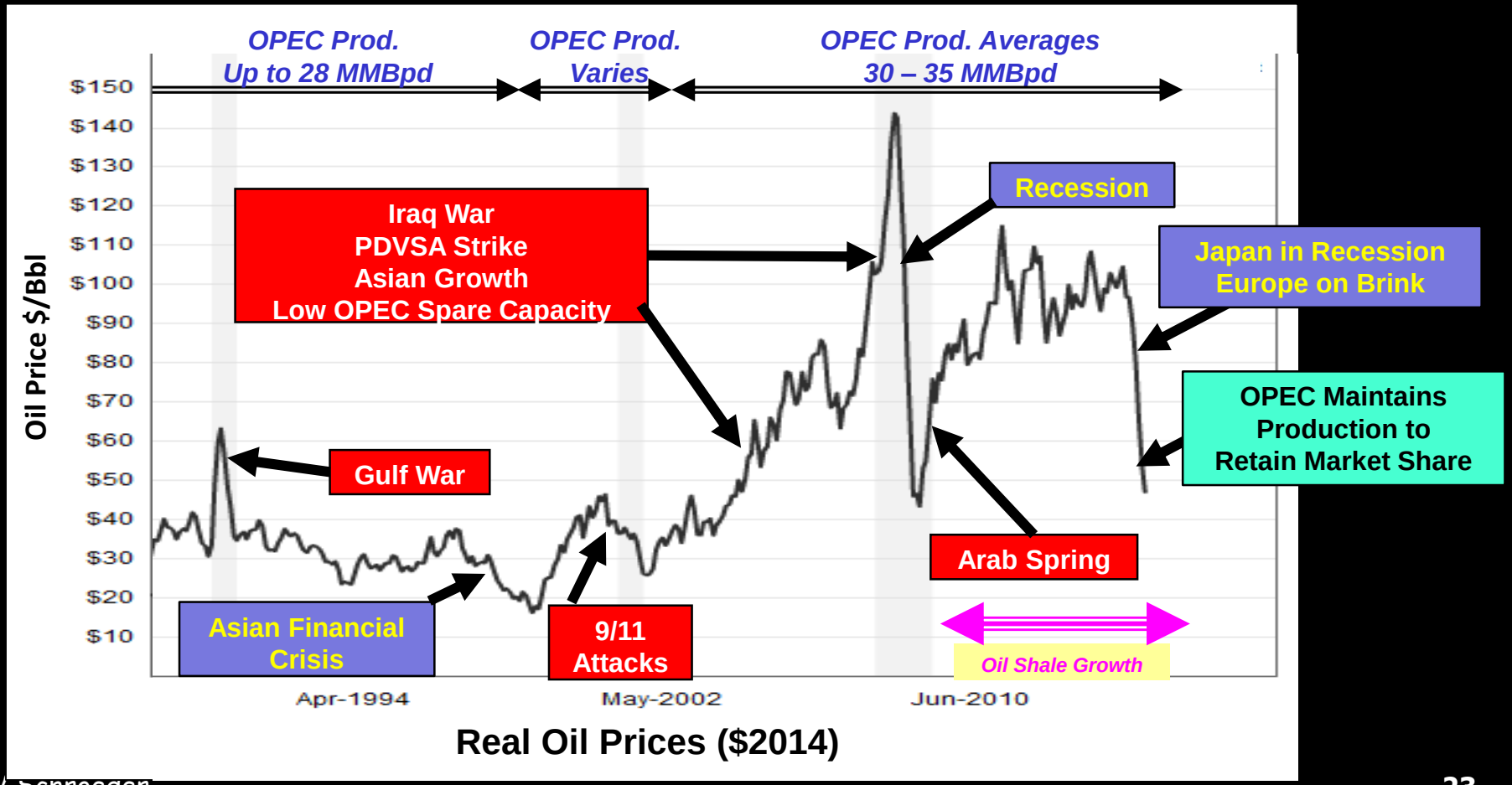
Oil Prices: 1970 - 1988

1. Concerns over supply disruptions
2. Production quotes of suppliers



Oil Prices: 1988 - 2014

1. Concerns over supply disruptions
2. Production quotes of suppliers
3. World financial instabilities
4. Production - Unconventionals



Current Price Collapse

- **Significant production from unconventionals has added to our supply**
- **OPEC has not reduced production (as they traditionally would have)**
- **We have a slight over-supply (more produced in a day than consumed)**
- **This has caused oil prices to drop ~50%**
- **Wells, especially in unconventional fields, are being shut in, which will lower daily production**
- **With time, we'll balance supply with demand and prices will stabilize at $_?_ /barrel**

G&G Students

- Long term – we will need a lot of geoscience professionals to replace those retiring and to accommodate the predicted job growth
- Short term – Many are graduating at a time when companies are cutting expenses
- Starting a career during the next 12 (?) months will be challenging
  - ❑ Companies will be very selective
  - ❑ Great qualifications and a lot of effort
- After oil prices rise and stabilize, hiring will spike to make up for the hiring slowdown

Therefore……

- Thinking long-term, this is an ideal time to be working towards a geoscience degree
- Recruiting activity should dip but then RISE
- When prices rebound, Demand >> Supply

For those with …

Analytical Thinking

Bright Ideas

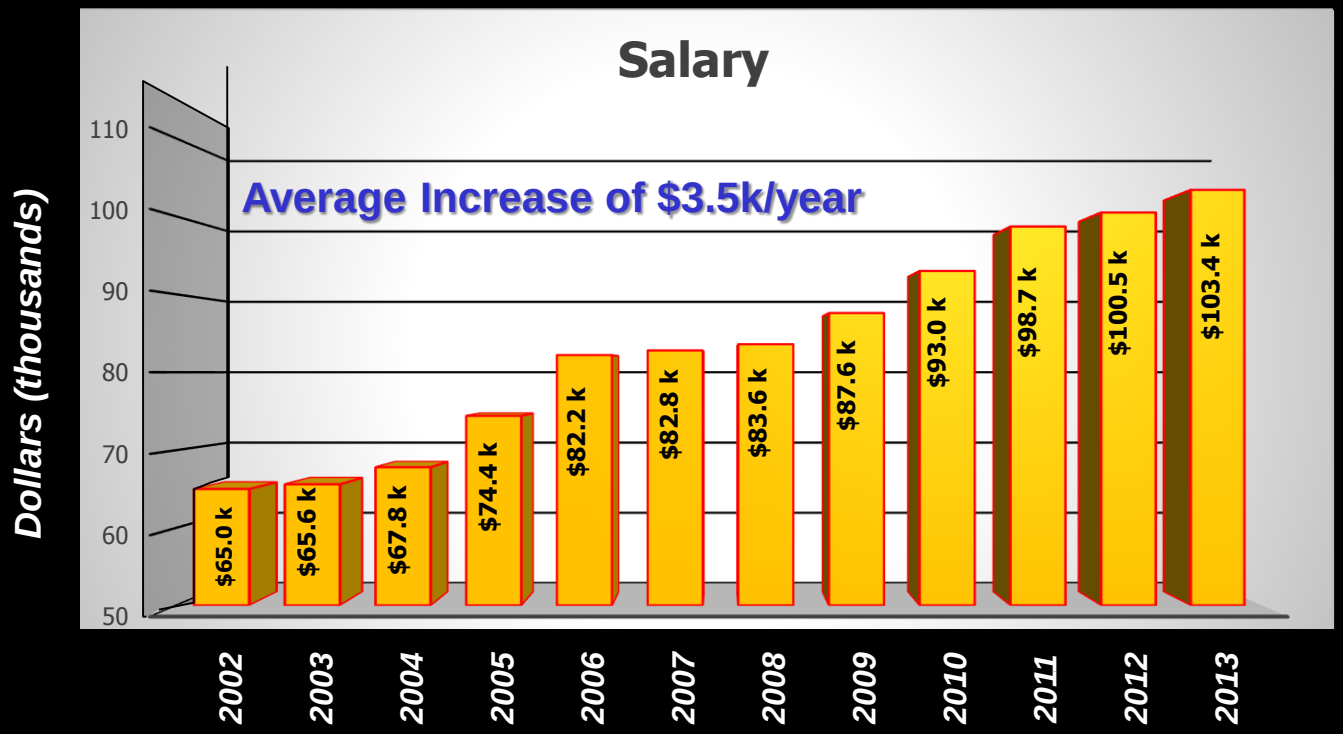
You will find …

Timing Will be ~~in~~ Great

Excellent Pay

Current Salaries: 0 – 2 Years Experience

Average Salaries



Salaries by Degree 0 – 2 Years

B.S.	M.S.	Ph.D.
$92,000	$103,800	$115,000

Source: AAPG Explorer

Which Degree Should I Get

- BS or BA
  - A geotech for a large company, not recruited
  - In the trenches for a small company
- Masters
  - Bulk of people in industry
  - Able to hold any position, may be hard to get into a research role initially
- PhD
  - Some companies may think you are over-qualified
  - Advisable if you want to do applied research for a mega-company
  - Advisable if you may want to become a Prof.
  - Small difference in starting salaries for 2+ more years

How Can I Prepare?

- Undergrad Level
  - Excel in all your courses – high GPA
  - Take fundamental, classic geoscience courses
  - Get exposure to all disciplines – attend seminars
  - Scan professional society journals – take note of who is working on topics that interest you
  - ASAP decide on a sub-discipline
  - Choose a "senior topic" that you have a lot of interest in, work it well, be creative and application-minded

How Can I Prepare?

- Grad Level
  - Choose a high-caliber university with a great geoscience department
  - Excel in all your courses – high GPA
  - Take courses that will give the depth & breadth
  - Look for way to demonstrate leadership potential
  - Get some good work experience – internship
  - Choose a research topic that we have passion for; better to have a superb thesis topic on something unrelated to industry than a mediocre thesis
  - Polish your resume/CV – sell yourself
  - Gain interviewing experience

Big vs. Small Companies

A BIG company

- Competition is great
- Work with great minds
- Pressure to perform
- Can specialize
- Able to shift a lot

- May rank below average
- No special treatment
- Mega-bureaucracy

A SMALL company

- Competition is still high
- Work more friendly
- A bit less pressure
- Jack of all trades
- Not much latitude

- May rank above average
- Individual rewards
- Less bureaucracy

What to Look For

- Salary, vacation, work hours
- Location
- People & facilities
- Training program
- Benefits, includes a pension?
- Job and work environment
- Stability – what happened in down cycles?
- Bureaucracy
- Initial assignment
- Opportunities to grow/move


Questions?