A Role for the Petroleum Industry in STEM Education

Science, Technology, Engineering, and Mathematics

David A Huete PE
Principal Development Planner, Shell International E&P Inc.
President, Core Element: The Greater New Orleans STEM Initiative

Tulane Engineering Forum
23 March 2012
Demand Outlook

• In 2012, there were 7.6MM STEM workers in the US (about 1 in 18 workers).¹

• STEM occupations are projected to grow by 17% from 2008 to 2018, compared to 9.8% for non-STEM occupations.¹ (Comparable actuals for 2000-2010 are 7.9 and 2.6)

• The number of workers in “computer, engineering, and science occupations” in the Oil & Gas Extraction industry is expected to rise over 20% from 2010 to 2020.²

Sources:
Competition for STEM Workers

Primarily
• Aerospace/Defense
• Healthcare/Pharmaceutical
• Engineering/Construction
• Computer/IT
• Telecommunications

But also
• Entertainment/Gaming
• Finance/Insurance
• Agriculture/Food Processing
• Small Business

Source:
1 Science, technology, engineering, and mathematics occupations: a visual essay, by Cover, Jones, and Watson, Monthly Labor Review, May 2011

A Role for the Petroleum Industry in STEM Education Tulane Engineering Forum March 2012
Supply Challenges

About 2/3rds of LA public school students achieve "basic" proficiency in math (per LEAP and iLEAP scores).¹

Nationally, students interested in STEM careers are concerned that:
• Cost & time to get a STEM degree is too high.
• Their grades in math/science are not good enough.
• STEM degrees involve too much work!²

The “Great Crew Change” is here. At the median O&G company, 43% of its workforce is 50 or older.

Sources:
¹ Louisiana Department of Education (doe.louisiana.gov)
² ASQ survey conducted on-line in December 2011 by Harris Interactive (www.asq.org).
The Problem

Not enough people coming out the end of the funnel.

- **Blockers**
  - Demographic Bias
  - Social Bias
  - Alternative Careers

- **Key Filters**
  - APTITUDE
  - FAMILY SUPPORT
  - EDUCATIONAL OPPORTUNITY
  - ECONOMIC RESOURCES
  - SKILL LEVEL

- **Reinforcers**
  - Good Careers
  - Good Pay
  - Economic Opportunity

---

A Role for the Petroleum Industry in STEM Education

Tulane Engineering Forum March 2012
THE SOLUTION
"Let’s work the problem, people!"

<table>
<thead>
<tr>
<th>Engage, Advocate, Support</th>
<th>PIPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generate interest and provide recognition</td>
<td>BLaST/FIRST Lego League/FIRST Robotics New Orleans Science and Engineering Fair</td>
</tr>
<tr>
<td>Improve the curricula</td>
<td>Project Lead The Way</td>
</tr>
<tr>
<td>Improve the pedagogy STEM education = enhanced skills in critical thinking, problem solving, communication</td>
<td></td>
</tr>
</tbody>
</table>

1 Quote from flight director Gene Kranz in the film Apollo 13 (1995)
Shell’s Workforce Development Initiative
Building the Talent Pipeline

“To increase the awareness among educators, parents, and students the importance of math and science, and the connection to vast energy career opportunities, specifically the technical disciplines.”

www.shell.com/us/energizeyourfuture

A Role for the Petroleum Industry in STEM Education
Tulane Engineering Forum March 2012
• PIPE was formed in 2006.
• A collaboration of local oilfield societies and organizations.
• Serves as a liaison between the education community and the oil industry.
• Objective is to aid education while informing the public about the industry and the job opportunities it offers.

PIPE has made a difference!

http://api-delta.org/pipe.asp
Core Element: The Greater New Orleans STEM Initiative strives to educate and prepare K-12 students in the Greater NO area in STEM subjects through teacher professional development, inquiry-based science and math curricula and materials, and scholarly enrichment activities.

Promoting quality teaching in Science, Technology, Engineering, and Mathematics.
• A non-profit corporation that provides its services without charge to public schools.
• Summer institutes for teacher training, including instruction in the use of science kits for hands-on learning.
• In-classroom mentoring by master teachers.
• Out-of-classroom enrichment activities.
• Active in Orleans, Jefferson, St Bernard, Plaquemines, St Tammany Parishes.
Core Element Impact:
• Steady growth.
• Increasing footprint.
• Cumulative impact.

Threats:
• Limited funding.
• School district support.
• Need for volunteers.

<table>
<thead>
<tr>
<th>Year</th>
<th>Teachers</th>
<th>Elementary</th>
<th>Middle</th>
<th>High</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>84</td>
<td>750</td>
<td>2100</td>
<td>6400</td>
<td>9250</td>
</tr>
<tr>
<td>2010</td>
<td>63</td>
<td>675</td>
<td>1950</td>
<td>4140</td>
<td>6765</td>
</tr>
<tr>
<td>2009</td>
<td>68</td>
<td>475</td>
<td>3000</td>
<td>5220</td>
<td>8695</td>
</tr>
<tr>
<td>2008</td>
<td>58</td>
<td>700</td>
<td>3900</td>
<td>720</td>
<td>5320</td>
</tr>
<tr>
<td>2007</td>
<td>49</td>
<td>300</td>
<td>2850</td>
<td>3240</td>
<td>6390</td>
</tr>
</tbody>
</table>

Program Totals: 322, 2900, 13800, 19720, 36420

* Based on normal average teacher to pupil ratios.
IN CONCLUSION

• STEM education ⇒ enhanced skills in critical thinking, problem solving, communication.

• The petroleum industry is facing a severe shortage of potential workers with adequate skills.

• There are initiatives in place that are successfully addressing the challenges to STEM education.

• Benefits of support accrue to all industries and the community.
Thank You!