Critical Workforce Needs in Energy

Michael R. Muller
Professor and Director
Rutgers University
Who is this guy?

Michael R. Muller
Professor & Director

- At Rutgers since 1979
- Ran IAC from 86-92
- IAC Field Manager since then
- Director, Center of Advanced Energy Systems
  At Rutgers since 2002
- Current passions:
  - Steam engines
  - Operation of cooling towers
  - NOx in biofuels
The Workforce “Perfect Storm” – PSEG CEO

- Workforce issues impact competitiveness
- Competitiveness impacts national security
Workforce Solutions Depend on the Tasks!
The Federal Government is Already Making a Difference

- **Great Example:** The DOE Industrial Assessment Centers
  - A University-Based Technical Assistance Program

- **IACs are located at accredited engineering schools throughout the USA**
  - Major function is to perform industrial assessments at nearby manufacturing centers.
  - Assessments are performed by teams made up of faculty and students
  - Normally consists of a one day site visit at an industrial plant
What is an Industrial Assessment?

• A brief, but thorough evaluation of a manufacturing plant by an external team of technical experts
• An “energy audit” grown up
• Must be integrated to include waste and productivity (dangerous, otherwise)
The IAC Industrial Assessment (cont.)

• Results in a formal report being sent to the client firm
  – Each report has several recommendations which provide:
    • Sufficient engineering design to explain the recommendation
    • Anticipated savings
    • Implementation costs
    • Simple payback

• Students fully involved
  – Pre-Assessment prep
  – Onsite data and measurement
  – Post-assessment analysis
  – Report writing
  – Presentation of results
The IAC DATABASE

- Publicly Available
- Contains:
  - Facility data
  - Recommendation data
  - Implementation data
- Searchable by
  - Size (in energy usage, employees, etc…)
  - Industry Type (NAICS or SIC)
  - Location
  - Recommendation Type
- Updated in Real-Time as the assessments are completed
IAC – *Industrial Assessment Centers*

- Created in 1974
- 26 IAC located at 34 Universities across the Country
- 13,900+ Assessments Conducted
- 103,700+ Recommendations
- Total Implemented Savings: $4.5 Billion
- Median Implementation Rate: 50.0% of Recommendations
- Median % Energy Savings vs Total Energy Costs for the Last 5 Years: 11.6%
- Field Managers:
Who wins? Everyone!

Federal Government

Universities

Students

Faculty

Manufacturers

Who wins? Everyone!
Does the IAC help with workforce issues?

2,500 alumni since 1977 with 56% now working in energy related positions!
Adding Faces to the Data

• Centers have dozens of alumnae – great success stories are everywhere
  – Any center director could do this presentation!
• For today, I am just looking at Rutgers
  – Taking six examples from our distinguished alumnae board
<table>
<thead>
<tr>
<th>Name:</th>
<th>Sunil Shah</th>
<th>Name:</th>
<th>David Abbe</th>
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<tbody>
<tr>
<td>Status:</td>
<td>1988 Graduate</td>
<td>Status:</td>
<td>1991 Graduate</td>
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<tr>
<td>Employer:</td>
<td>BGI, Inc. (Now ConEd Solutions)</td>
<td>Employer:</td>
<td>GlaxoSmithKline</td>
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<tr>
<td>Assignment:</td>
<td>Vice President of Operations</td>
<td>Assignment:</td>
<td>Manager, Engineering &amp; Capital Projects</td>
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<tr>
<td>Name</td>
<td>Brindesh Dhruva</td>
<td>Name</td>
<td>Tim Barnish</td>
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<tr>
<td>Status</td>
<td>1993 M.Sc. Graduate</td>
<td>Status</td>
<td>1994 Graduate</td>
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<td>Employer</td>
<td>Schlumberger</td>
<td>Employer</td>
<td>Johnson Controls Inc.</td>
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<tr>
<td>Assignment</td>
<td>Carbon Sequestration</td>
<td>Assignment</td>
<td>LEED Performance Assurance</td>
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<td></td>
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<td></td>
<td>Specialist</td>
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<tr>
<td>Name: Kyri Papadaratsakis</td>
<td>Name: Dan Furman</td>
<td></td>
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<tr>
<td>--------------------------</td>
<td>------------------</td>
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<tr>
<td>Status: 2002 Graduate</td>
<td>Status: 2004 Graduate</td>
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<tr>
<td>Employer: Schering Plough</td>
<td>Employer: Foster Wheeler</td>
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<tr>
<td>Assignment: Energy Assessments and QA</td>
<td>Assignment: Energy Efficient Boiler Design</td>
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How is the Program Doing???

- Budget cuts are impacting the program dramatically

<table>
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<tr>
<th>Year</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
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<tr>
<td>EERE Funding</td>
<td>$1,043.791 M</td>
<td>$1,180.295 M</td>
<td>$1,279.153 M</td>
<td>$1,202.326 M</td>
<td>$1,220.262 M</td>
<td>$1,234.313 M</td>
<td>$1,162.747 M</td>
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<td>ITP Funding</td>
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<td>$148.6 M</td>
<td>$100.9 M</td>
<td>$96.8 M</td>
<td>$93.1 M</td>
<td>$73.0 M</td>
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<td>IAC Funding</td>
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<td>$8.300 M</td>
<td>$5.774 M</td>
<td>$6.694 M</td>
<td>$6.694 M</td>
<td>$7.150 M</td>
<td>$6.500 M</td>
<td>$4.035 M</td>
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- Per center impact includes:
  - Reduction in the number of centers (30 → 26)
  - Reduction in funding by 50% (~$200k per yr → ~$100k per yr)
  - Fewer Assessments (30 per yr → 12 per yr)
  - Fewer Students (number has dropped 50%)
IAC Student Level – the bad news!

Total Student Participants by FY
(as of June 2008)

IAC Budget, $
Bottom Line

• Workforce issues in energy are big and getting bigger
• The DOE’s Industrial Assessment Centers are an important federal effort
  – Provides a steady stream of top young engineers into energy efficiency careers
  – Helps small and medium sized manufacturers save energy and cope with the enormous recent increases in costs
  – Carefully utilizes Federal $$ - the centers make their nickels scream!
  – Develops energy efficiency expertise in faculty at our top engineering schools
• But, funding decreases are reducing the impact of the IAC’s in a time of skyrocketing energy prices