

Engineers for a Sustainable World



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Regina Clewlow, BS '01 ME '02
Exec Director, Engineers for a Sustainable World



Global Outlook

- 6 billion people in the world
 - 1.2 billion survive on less than \$1 a day
 - 1 billion do not have clean water
 - 65% of total energy consumed by the richest 10% of the world's people
- Millennium Development Goals
 - Time-bound, measurable goals
 - Combat poverty, hunger, disease, environmental degradation
 - Create global partnerships





Why Should Engineers Be Involved?

- Many global challenges are engineering-related
 - Access to water, sanitation, and energy
 - Food storage
 - Digital divide
- Create a positive image of engineering
 - Improve recruitment
 - Increase diversity
- Address need for globally aware engineers
 - Global integration of industry
 - Science and engineering are intrinsically global



ESW Mission and History

To engage engineers as catalysts for reducing poverty, and to promote environmental, social, and economic sustainability worldwide.

2001:

- Originally founded as Engineers Without Frontiers at Cornell University. Cornell student group and national headquarters developed concurrently.

2002:

- Several chapters developed at other institutions; total membership: 400.
- First overseas volunteers worked in Costa Rica and India.





ESW History (cont)

2003:

- New int'l service course piloted at Cornell University.
- Student members present on 50 campuses; total membership: 900.
- Cornell University hosts first national conference; 150 members and 30 universities participate.
- Volunteers work on int'l development projects in Washington DC, Bosnia, India, and South Africa.

2004:

- New courses and seminars develop on chapter campuses.
- Student members present on 60 campuses; total membership: 1000.



Programs and Approach

- Project partnerships
 - Partner with organizations on the ground
 - Design through implementation coordinated with partner
 - Two-way exchange
- Outreach and education
 - Local action with global implications
 - Transforming formal education
 - Dissemination of best practices



Project Partnerships

Chapter-based project partnerships

■ Characteristics

- Team of 4-7 students, a project supervisor (faculty or professional), and a partner liaison
- Project integrated into curriculum
- Addresses engineering-related problem

■ Cornell University example

- Earthquake risk education in Turkey



Project Partnerships

SEED Program/ Internship Program

■ Characteristics

- 3, 6, or 9-month technical work placements offered with partner development organizations
- Technical areas: information technology, renewable energies, transportation, water, manufacturing, etc.
- Volunteer logistics and training coordinated by ESW

■ Cornell University example

Volunteer: Shawhin Roudbari, graduate student in CEE

Partner: International Water Mgmt Institute, S. Africa

Project: Managed design, testing, and construction of rainwater storage tanks in 8 villages (15 tanks total)





Outreach and Education

University Chapters

■ Community outreach examples

- Drive to Not Drive
- Landmine Awareness
- Earth Day

■ Impact on engineering education

- New courses developed at Cornell University and University of Michigan.
- Project integrated into existing courses at Penn State University (2) and Stanford.
- Seminars developed at MIT, Iowa State University, and others.



University Chapters

Chapters

- California Institute of Technology
- Columbia University
- Cornell University
- Iowa State University
- Johns Hopkins University
- Massachusetts Institute of Technology
- Morgan State University
- Northwestern University
- Ohio State University
- Penn State University
- Purdue University
- Stanford University
- University of Alaska
- University of California, Berkeley
- University of Michigan
- University of Nebraska, Lincoln
- University of New Hampshire
- University of Texas, Austin

Select Campuses with Members

- Brandeis University
- Bucknell University
- Kean University
- Lafayette University
- North Carolina State University
- Saint Louis University
- Smith College
- State University of New York, Buffalo
- Syracuse University
- University of California, San Diego
- University of California, Davis
- University of California, Riverside
- University of Illinois, Urbana-Champaign
- University of Iowa
- University of Missouri, Rolla
- University of the Virgin Islands
- Villanova University
- Virginia Tech



Member Diversity

- 84% students, 16% professionals
- Students
 - Female: 41%
 - Underrepresented minority: 17%
 - Non-traditional (minority or female): 49%
- Professional
 - Female: 31%
 - Underrepresented minority: 8%
 - Non-traditional (minority or female): 38%



New Initiatives

- National conference, Sept 30-Oct 2, 2004
 - Focused on engineering and *enterprise* for sustainable development
- New project partnerships
 - Renewable energy/ business development in Abia, Nigeria. Partners: Base of the Pyramid, Johnson School, and Abia State University.
 - Composting education campaign in Tuzla, Bosnia-Herzegovina. Partners: Friends of Bosnia and local environmental NGO.
 - ICT education in China. Partner: PlaNet Finance.
- Development of regional centers of excellence
 - Regional (global) and service areas of expertise
 - Integrated with board development
 - Pilot professional chapters