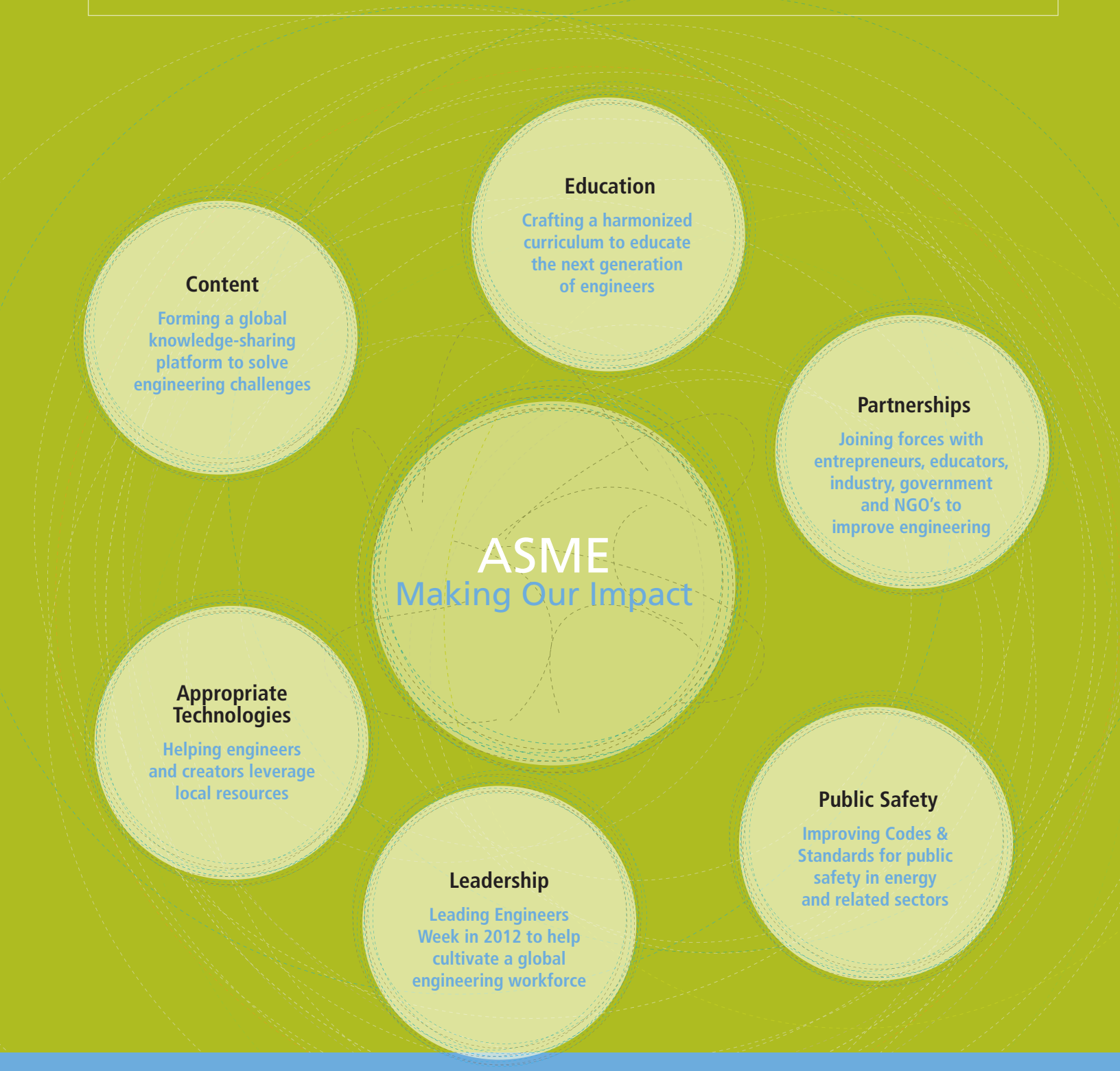
ASME
SETTING THE STANDARD

ASME 2012 GLOBAL IMPACT REPORT

Advancing the quality of life throughout the world

Serving Global Communities
Advancing and Applying Engineering Knowledge
Improving Quality of Life



ASME Global Impact 2012

Thomas G. Loughlin

Welcome to ASME's inaugural Global Impact Report. This is the first of what we hope will be many annual updates that explain how ASME is improving lives around the world. In the pages ahead, we want to share our perspective on the many ASME projects, collaborations and achievements that are making an impact.

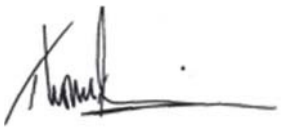
ASME was founded on a commitment to public safety. Over the years ASME volunteers have helped create new sources of safe energy, leverage appropriate technologies to improve housing and sanitation, and foster engineering innovations. ASME serves global communities. The goal of this report is to provide a snapshot of our work, and to present indicators for measuring our global impact.

"Impact" means enabling individuals to make a difference in their communities. When engineers help improve health and quality of life, they help change entire societies.

None of our work would be possible without the thousands of thoughtful, energetic and engaged engineers who make up our global membership. But we also know that impact requires partnership and collaboration. As we celebrate our achievements, we recognize the individuals and organizations that contribute to our work.

One of this report's purposes is to present a baseline to gauge our global impact. These benchmarks will serve us in the years ahead as we chart our progress. We look forward to your feedback, so please share your thoughts with us. Impact is a two-way conversation, and we want to hear your voice.

Sincerely,



Thomas G. Loughlin
Executive Director, ASME

ASME is engaging with stakeholders to promote global development

Vision 2030: Preparing Tomorrow's Engineers

Engineering education and workforce development will undergo significant change in the coming years.

To meet these challenges, ASME formed the Vision 2030 task force to help refine the skills that engineering students will need to be successful in the practice of engineering.

With support from Vision 2030, ASME is forging links around the globe to champion the goal of preparing students for the business side of engineering. Additionally, Vision 2030 seeks to stem the historical "brain drain" of trained engineers from economically disadvantaged regions.

"Engineering students need to learn the basic skills for starting a business," says ASME veteran Dr. Robert O. Warrington, the task force chair. "By better preparing students to be entrepreneurs in their own countries, we can help stimulate job growth in regions all over the world."

Vision 2030's goals include:

- Promoting hands-on project work and industry exposure for students and faculty.
- Emphasizing professional and leadership skills training.
- Attracting greater numbers of faculty members from industry.
- Integrating non-traditional disciplines into engineering curricula.

ASME has coordinated workshops at conferences that bring academics and business people together to share best practices, and to develop engineering curricula throughout the world. Last year, ASME was organizing partner in several regional leadership conferences in Asia and Latin America.

The annual ASME International Mechanical Engineering Education Leadership Summit

Working to Harmonize Engineering Curricula

Science and engineering education are foundations for improving health, promoting gender equality, eradicating hunger and poverty, and stimulating economic development. These important goals can be met when well-prepared engineers collaborate to solve problems. We have been leveraging existing ties and encouraging new links and coordinated curriculum standards between colleges of engineering in the Americas and in the Asia-Pacific region.

ASME is striving to align global accreditation and curriculum standards for engineering

ASME Asia-Pacific Mechanical Engineering Education Conference (Taipei, Taiwan)

ASME is leading efforts to strengthen educational ties. Through partnerships with the Chinese Mechanical Engineering Society, Pan American Federation of Engineering Societies (UPADI) and Engineering for the Americas (EFTA), ASME is helping align engineering curricula and promote an accreditation system among engineering departments in the Americas and Asia-Pacific region. By nurturing engineering education and training, ASME supports job growth in places where engineering needs are great but the workforce is undeveloped.

ASME is taking action to align engineering programs by:

- Providing guidance on forming practice-relevant mechanical and multi-disciplinary engineering curricula.
- Bringing together key stakeholders to share best practices.
- Establishing standards and practices committees within stakeholder organizations.
- Encouraging and nurturing the growth of local engineering expertise.

Creating New Engineering Curricula for the Americas

ASME member Arvind Raman, Associate Professor of Mechanical Engineering at Purdue University, is helping to develop a new curriculum to enhance undergraduate engineering education in the Americas. The goals are to enhance learning via cloud computing, foster engineering collaboration, and promote cross-cultural exchange. As Latin America faces a shortage of engineering talent, the curriculum also supports the training of greater numbers of engineers.

Dr. Raman's home institution and the government of Colombia recently established the Colombia-Purdue Institute for Advanced Scientific Research to help develop the new curriculum. Efforts are currently underway at several Colombian universities, including the Universidad del Norte in Barranquilla. The new model is aimed specifically at undergraduate engineering in the foundational courses.

ASME is encouraging efforts like the Colombia-Purdue partnership by promoting engineering exchange and collaboration at educational conferences throughout the Americas. "Historically, there has not been enough North-South engineering integration within the Americas region, and the field is ripe for new initiatives," Dr. Raman says. "This is a critical focus area where ASME is taking a leadership role."

Purdue University president France A. Córdova talks to students at the Universidad EAFIT in Medellín, Colombia. Purdue University recently donated a supercomputer to EAFIT as part of a strengthening alliance between the two universities.

Cultivating the Next Generation of Engineers

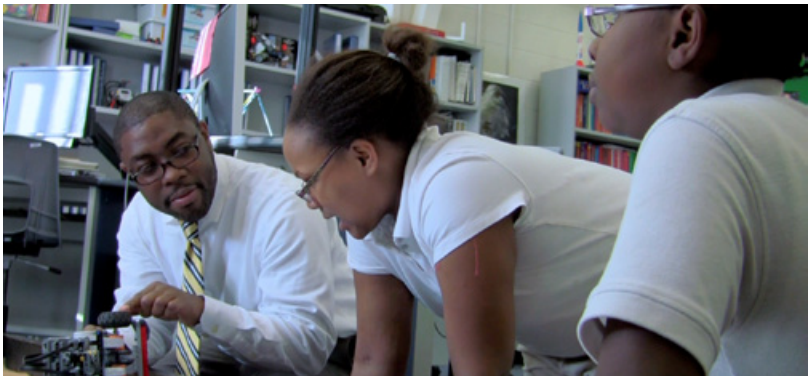
As one of the partner organizations behind Engineers Week, ASME has been a leading voice in developing new science teaching standards for the next generation of pre-college students.

As part of this commitment, ASME launched an important new award in 2012 to recognize outstanding teaching.

The *DiscoverE Educator Recognition Award* honors educators specializing in STEM (science, technology, engineering and math) for their achievements in helping students discover engineering. Engineers and engineering students participate in the nomination process.

ASME recognized winners of the inaugural awards in February at a ceremony in Washington, D.C., in conjunction with Engineers Week. Each winner, as well as their student or engineer nominators, received a trip to Washington to attend the ceremony. Winners received a $2,000 cash prize from ASME, and a $1,000 prize and gift pack of classroom supplies from 3M.

2012 DiscoverE Educator Award Winners



Javaris Powell, Friendship Public Charter School, Washington, D.C.

Javaris has taught middle school engineering for 11 years and actively participates in several engineering-related programs. Because most of his students only consider careers in sports or entertainment, he has worked hard to challenge his students to consider a new dream: engineering.

Shella Rivano Condino, Presidio High School, Presidio, TX

Shella has taught high school physics for 18 years and believes she has a calling to reach out and connect with her students. She sponsors the Presidio Rocketry and Robotics Club and coaches and mentors students in STEM-related competitions. Teaching students in a rural, poor area of Texas, Shella demonstrates to her students that there is no limit to what they can accomplish.

Derek Sale, Raul Robeson Malcolm X Academy, Detroit, MI

Derek has been a middle school science and social studies teacher for 14 years, empowering his students using engineering lessons and exposure to engineering careers. About 85% of his students live at or below the poverty level, and Derek strives to make engineering a viable option for his students as a means of breaking the cycle of poverty.

Helping new science teaching standards meet next-generation engineering education needs

Maker Faire – Creating Localized DIY Communities

Enabling DIY (do it yourself) design–an important approach in engineering for global impact. Involving a whole community of local creators builds capacity for problem-solving, and every community has much to offer.

This idea lies at the heart of Maker Faire, a celebration of local innovations created with limited resources. Maker Faire events began in the San Francisco Bay Area. Enterprising organizations and social entrepreneurs then decided to launch the concept in Africa. The first Maker Faire Africa took place in Ghana, and ASME was one of the first sponsors.

Subsequent Maker Faire Africa events took place in Nairobi and, most recently, in Cairo. Conceived as hyper local events, Maker Faire Africa motivates citizen designers and bridges the gap between formally trained engineers and DIY amateurs. Each event is different, reflecting local cultures. Everyone is equal at Maker Faire—the act of simply making something qualifies a participant as a stakeholder.

Maker Faire Africa photos provided by disterics at Flickr

Maker Faire Africa: Shining a spotlight on a continent's creativity

"If you look at how societies solve problems, you realize that the tools are usually generated from within. We want to hold up a mirror to African society to discover these resources communities may be overlooking."

~ Emeka Okafor, Co-Founder, Maker Faire Africa

ASME's Fellows Program Extends its Reach

In 1973, ASME became the first engineering society to establish a fellowship program with the federal government.

For more than 35 years, the ASME Federal Fellows program has enabled ASME members to provide technical advice and assistance to policy makers in Washington. Fellows play a critical role in promoting sound public policy. Few elected officials have technical or scientific backgrounds, and ASME Fellows provide non-partisan, unbiased technical expertise.

Starting in 2012, the ASME Fellows program adopted a new global focus, a Federal Government Fellowship opportunity with the United States Agency for International Development (USAID), the principal U.S. agency providing assistance to countries recovering from disaster, trying to escape poverty, and undertaking democratic reforms.

The role of the new Fellow is to provide scientific, technical, and intellectual leadership, and analytical support, to help advance USAID's efforts in rain-fed agriculture and off-grid, renewable energy for agriculture. He or she will serve as a liaison with partners and will help USAID enhance its network of development solution providers. In addition, the Fellow will serve as an engineering adviser to the Director of the Office of Science & Technology.

Signing in Rio: (from left to right) UNESCO Director General Irina Bokova, Gretchen Kalonji, Assistant Director-General for Natural Sciences, and Victoria Rockwell, ASME President (2011-2012).

ASME Enters into a Partnership with UNESCO for a sustainable future

At the Rio+20 conference in June 2012, ASME signed a Memorandum of Understanding with UNESCO regarding education for a sustainable future. The new ASME-UNESCO partnership seeks to develop projects to improve engineering education standards, including best practices in engineering education, curriculum design, and teacher training.

In addition, UNESCO and ASME will seek to increase public awareness about the importance of engineering and expanding the influence of engineers in research and policy development. The collaboration also aims to make engineering workforces more effective by creating new opportunities in multi-disciplinary areas. All partnership activities will build on existing programs in both organizations, with a particular focus on resources in Africa and gender equality in engineering.

USAID FROM THE AMERICAN PEOPLE

UNESCO
United Nations Educational, Scientific and Cultural Organization

Creating Technical Engineering Solutions to Solve Critical Global Needs

ASME's IShow Combines Engineering Excellence with Entrepreneurial Leadership

The ASME IShow inspires engineering students to create technical solutions to engineering challenges. And to do so with a sustainable business model.

Held in conjunction with ASME's annual conference, the IShow provides a platform for top collegiate engineering teams around the world to pitch their inventions to a judging panel of industry experts and innovators. Teams compete for prizes of $20,000 in seed money to further develop their innovation.

These enterprising change agents are developing important innovations to improve medical care and infrastructure, and to meet sustainable energy needs. They are also improving quality of life for people around the world.

Winners of the 2012 IShow were announced in June

ISHOW
INNOVATION
SHOWCASE

ASME's IShow inspires engineering students to become entrepreneurial change agents with new inventions

Designing for mobility - when pavement is rare

Amos Winter, founder and director of MIT's Mobility Lab, designed the Leveraged Freedom Chair. This is a wheelchair capable of navigating difficult terrain often encountered in developing countries.

The Leveraged Freedom Chair combines elements of a traditional wheelchair, a tricycle, and an elliptical machine. It has one small front wheel and two oversized rear wheels. Users propel forward by tilting levers forward and back, and they can increase leverage or decrease speed depending on how high they grasp the levers.

Designed to be manufactured and maintained in developing countries, the compact chairs can handle rough roads and do not require complicated parts. For people with disabilities in developing countries, the ground-breaking chair promises to make a huge impact.

"To see my efforts as an engineer change a person's life is very moving."
~ Amos Winter

Once a project, now a reality: Amos Winter (pictured) won first prize at the 2010 ASME IShow for the chair he invented. [Photo: Amos Winter]

Wheelchair users in Kenya testing the Leveraged Freedom Chair [Photo: Amos Winter]

Creating a Knowledge Hub for Engineering Solutions

Engineering for Change Takes Off

One of ASME's most important goals is to create collaborative platforms for engineers to solve problems. With this in mind, ASME helped launch *Engineering for Change* (E4C), a platform that unites a global community of engineers to collaborate and share knowledge.

Contribute – Learn – Collaborate

Visitors to E4C (www.engineeringforchange.org) can submit questions to a bulletin board, participate in public workspaces and take advantage of a solutions library. By providing access to innovative thinking, engineers and community advocates alike can find solutions to common development challenges.

E4C focuses on water, energy, health, structures, agriculture, sanitation, and information systems. Humanitarian organizations and thousands of engineers volunteer their knowledge and skills to support developmental projects, and E4C is a transparent forum for these partnerships.

Some projects on E4C's community platform include:

- Internet cellphone networks that provide low-cost service in rural areas.
- A diesel engine powered by vegetable oil that mills grain and generates electricity in Uganda.
- Low-cost medical instruments made from plastic pipe, cardboard and velcro.
- Solar-powered refrigerators for camels to carry chilled vaccines to remote areas.
- A salad-spinner-based centrifuge used for anemia testing in rural medical clinics.
- Using microbes in dirt to generate electricity for light bulbs and cell phones.

Leveraging the talents and passions of a truly diverse, multi-disciplinary group of individuals

Emphasizing solutions over technology

"We have created an infrastructure that lets engineers and humanitarian organizations operate in full transparency. We are removing communication barriers so that people know who is doing what, what resources are available, and what approaches have succeeded or failed."

~ Noha El-Ghobashy
President, E4C
Director of Technical Programming, ASME

A Dynamic forum for engagement and problem-solving

E4C brings together engineers, social scientists, NGOs, community advocates and local governments. The goal: to collaborate, share knowledge, and bring positive change to communities all over the world.

Evolving and Adapting to Meet New Engineering Challenges

A New ASME Committee Puts Solutions in Focus

One of ASME's goals is to bring diverse talents together to solve great challenges, such as improving access to clean water and sanitation, developing sustainable housing, and building infrastructures for safe and reliable electricity. These are the missions of ASME's Engineering for Global Development (EGD) committee.

The EGD committee pools the knowledge of academics, NGOs, and social entrepreneurs. To benefit from multiple perspectives, the committee engages ASME members, volunteers, and other engineers to develop solutions for problems facing underserved communities.

The EGD committee is formed around four grounding principles:

- **Knowledge - Developing content that increases engineering rigor and facilitates industry interest.**
- **Public Policy - Recognizing and advocating for the role of engineering in social innovation.**
- **Social Innovation and Technology Transfer - Creating funding mechanisms and brokering relationships between various stakeholders in the development and transfer of social innovations.**
- **Education - Developing global educational programs focused on technology research, development and transfer.**

Boosting Gas Turbine Efficiency and Reducing Emissions

ASME's International Gas Turbine Institute (IGTI) has been dedicated to improving the technology and efficiency of the gas turbine since it started out in 1944 as ASME's oil and gas power division. The Atlanta-based institute was formally established in 1986 with a mission to support international exchange and development for improving the design, operation and environmental impact of gas turbines, turbo machinery and related equipment.

Each year since 1956 the IGTI has hosted Turbo Expo, a gathering of academics, professionals and students to share ideas and collaborate on new developments in turbine technology. Last June the IGTI held its largest Expo to date in Copenhagen, Denmark. In keeping with local interests, a track on wind turbines was added to the Expo's traditional program.

IGTI continues to expand its focus on new technical areas. In 2010 and 2011 the institute created new technical committees on wind and steam energy as part of a plan to concentrate on energy production and storage. "Our continuing goal is to make turbine technology more efficient and effective, which ultimately contributes to reducing emissions and improving the environmental impact of gas turbines," says Charity Golden, IGTI's Operations Director.

IGTI is also looking to broaden its global reach with plans to expand its presence in Asia and other global markets.

Creating Independent Energy Sources

Making Solar Cookstoves a Reality in Rural India

One of the great engineering challenges facing the world is the creation of new, safe and sustainable energy sources. Just as the E4C website was launching in late 2010, it took on an energy challenge that would soon prove the value of global engineering collaboration.

About 800 million people in India use some form of biomass for cooking. In rural villages, women spend hours each day gathering and hauling wood as fuel for traditional cookstoves. The indoor pollution caused by cookstoves has been likened to smoking two packs of cigarettes a day and is a major cause of premature death.

The NGO Climate Healers set out to introduce solar cookstoves in rural Rajasthan, India. The goal was to reduce CO_2 emissions and indoor smoke, and to free village women from the labors of gathering wood. But the cookstoves failed to catch on because they didn't work at night—traditionally when most cooking takes place.

Fires from indoor cooking cause pollution and are a major cause of premature death.

Climate Healers approached E4C to help find a better solution.

- E4C issued a challenge to engineers worldwide to develop new designs for a stored energy cookstove that would work at night.
- E4C leveraged crowdsourcing to help Climate Healers attract an international network of engaged engineers to its **Workspace Area**.
- E4C helped Climate Healers participate in the Shaastra Social Innovation Challenge at the Indian Institute of Technology Madras. Dozens of designs were submitted from university teams across India.
- E4C facilitated Climate Healers' partnership with the Global Alliance for Clean Cookstoves.
- E4C helped engage an important Indian NGO—the Self Employed Women's Association—to become stakeholders in the project's success.

SUSTAINABLE ENERGY FOR ALL

ASME Announces Support for UN's "Sustainable Energy for All" Initiative

Approximately 20% of the world's population, or 1.3 billion people, still lack access to electricity, and more than twice that many still lack safe and sustainable methods of heating and cooking.

ASME has joined a group of distinguished organizations in pledging its support for United Nations Secretary General Ban Ki-moon's vision and goal of achieving Sustainable Energy for All by 2030. ASME pledges to help meet the following goals:

- Ensure universal access to modern energy services.
- Double the global rate of improvement in energy efficiency.
- Double the share of renewable energy in the global energy mix.

Innovating a solar cookstove that works at night: University of Iowa students develop the **iHawk Cooker**

"E4C's greatest impact is allowing engineering students from all over the world to work on a single challenge independently. I'm convinced that crowdsourcing is the best way to solve difficult, knotty problems that have defied the lone inventors of the past."

~ Sailesh Krishna Rao, Ph.D.
Executive Director, Climate Healers, Inc.

Sailesh Krishna Rao (lower left) speaking with villagers in Hadagori (Dhenkanal district, Orissa, India) about their energy needs.

Cooking roti on a solar cookstove

Engineering Collaboration to Promote Global Development

January 2010: ASME entered into an enhanced partnership with Engineers Without Borders-USA (EWB-USA) to help develop engineering workforces and foster renewable energy initiatives in the developing world. ASME's collaboration with EWB-USA originally dates back to 2003.

March 2011: ASME co-sponsored a National Science Foundation workshop on materials and manufacturing for extreme affordability. The workshop's goals were to identify new opportunities for research and design in affordable solution development and manufacturing, and to examine deployment of recent advances in engineering, social science and design. Another goal was to identify fundamental research needs, design and development challenges, and knowledge gaps.

Forging a New Nuclear Safety Construct

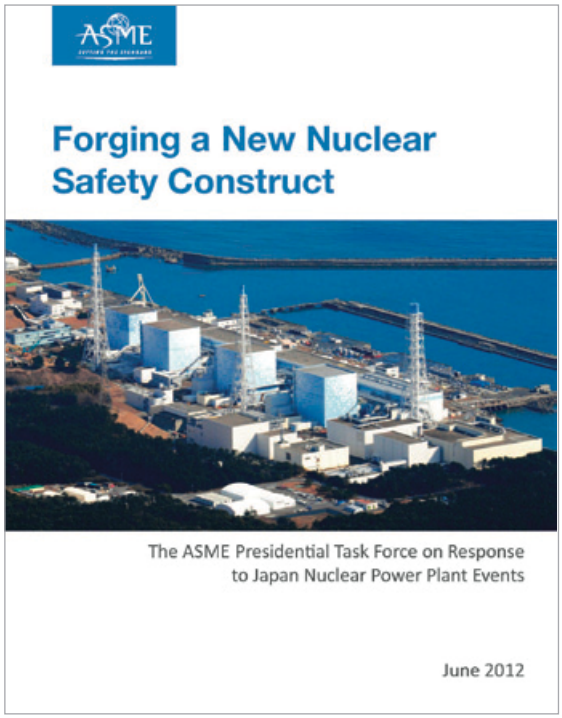
ASME Responds to the Fukushima Daiichi Crisis

On March 11, 2011, the world watched in horror as a devastating earthquake and tsunami ravaged Japan. The natural disaster triggered cascading failures at the Fukushima Daiichi nuclear power plant, cutting off power necessary for cooling the reactors. The loss of cooling resulted in significant core damage and the uncontrolled release of radioactivity.

More than 100,000 people were evacuated from their homes, and there was extensive land contamination in the surrounding area. The earthquake, tsunami and power plant accident created an environmental disaster with severe economic consequences.

As a leading engineering organization committed to the nuclear industry and to nuclear safety, ASME plays a major role in helping industry stakeholders as well as the general public learn from the Fukushima Daiichi events. We are seeking to identify areas of design improvement to ensure the continued safe use of nuclear power for generations to come.

In June 2011 ASME formed a Presidential Task Force in response to the Fukushima Daiichi events to help enhance nuclear power safety throughout the world. In addition to reviewing events that occurred in and around the Fukushima Daiichi plant, the task force is reviewing the lessons from over 50 years of power reactor operations around the world. Chaired by



Dr. Nils Diaz, former Chairman of the U.S. Nuclear Regulatory Commission (NRC), the task force is composed of nuclear industry leaders, regulators and technical experts who are best positioned to develop and recommend future initiatives by the global nuclear power industry.

In March 2012 the task force provided preliminary recommendations for a new nuclear safety construct to better serve society and to enhance nuclear power safety around the world. The recommendations were presented at the NRC's Regulatory Information Conference in Bethesda, MD. The task force continues, planning public workshops, government and congressional briefings, and summary white papers.

In addition to the Task Force, ASME's Board on Nuclear Codes and Standards formed a task group on nuclear design and responses to severe accidents. The group is charged with reviewing data from Fukushima Daiichi and proposing the development of new codes and standards. The group will communicate and coordinate initiatives with the NRC, the Nuclear Energy Institute, and other industry stakeholders.

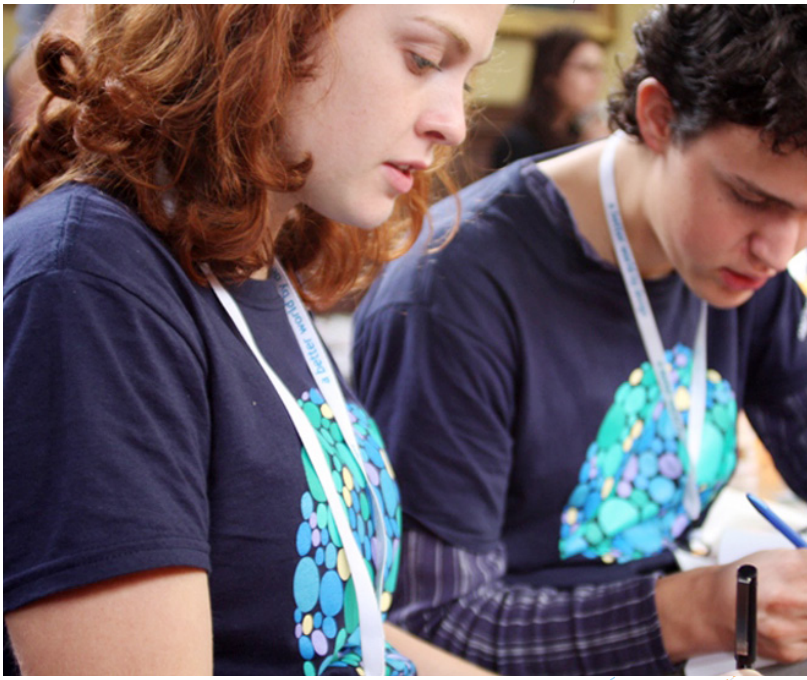
Presidential Task Force Goals

- Learn the lessons from the Fukushima Daiichi tragedy.
- Develop a new nuclear safety construct for power plants worldwide.
- Ensure nuclear power safety for the benefit of future generations.

Developing appropriate safety procedures and guidelines is critical for public acceptance of nuclear energy.

A History of Supporting Nuclear Safety

- By 1963, ASME developed code and conformity assessment programs for pressure vessels specifically designed for nuclear power plants.
- ASME's safety codes and standards for the nuclear industry include: rules for facility component construction; in-service inspection of plant components; operations and maintenance; Q&A and risk management; air and gas treatment; and cranes for nuclear facilities.
- More than **200 companies** in **20 countries** hold more than **500 ASME Section III** nuclear certificates, and the number is growing.



The challenges we face as a global organization are too big for any one organization to solve. To make a truly positive impact, collaboration and coordination are essential. ASME is indebted to our alliances and partnerships that help make the world a better place.

Thomas G. Loughlin, Executive Director, ASME

Please note: this list of organizations, while representative of our partnerships, is not comprehensive.

Measuring Our Global Impact

ASME has created a **Global Impact Index** based on the volume of web visits, membership totals, conference registrants, training course participants, committee volunteers, and certified manufacturers. Data is collected on a quarterly basis from each country and region worldwide, and it is measured as a percentage of growth over the same period in the previous fiscal year.

In FY 2012, ASME's Global Impact Index grew by **12.4%** outside North America. This compares with **4.5%** growth in North America.

Other key Global Impact metrics (as of June 2012):

ASME reached a milestone by providing professional courses to over **10,000** engineers. Of these engineers, **49%** were located outside the U.S.

From July 2011 to June 2012 there were more than **1,948,400** unique visitors to ASME's website. **45%** of visitors were from outside North America.

ASME crossed a new threshold in 2010 by certifying more manufacturers outside the U.S. than within. Last year ASME's Conformity Assessment certified **283** manufacturers.

Over **70%** of these (204) were based outside the U.S.

As of June 2012, **53%** of ASME Certified Manufacturers were located outside the U.S.

In Fiscal Year 2012, ASME membership outside the U.S. grew by **8.5%**.

As of June 2011 **17%** of ASME's members and **35%** of the organization's student members were from outside the U.S.

ASME membership outside the U.S. has grown by **20%** since 2008.

Since Engineering for Change (E4C) was launched in January 2011, membership has grown to more than **10,765** people.

As of June 2011 E4C members were collaborating on **277** workspace projects.

ASME welcomes engagement with new collaborators to promote global development

Advancing the quality of life throughout the world

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