

Contributions of the World Federation of Engineering Organizations (WFEO) to the Implementation of the 2030 Agenda

Introduction

The World Federation of Engineering Organizations (WFEO) is the lead organization for the engineering profession globally, representing more than 100 nations and more than 30 million engineers. The members of WFEO are the main national and regional professional engineering institutions of the world. WFEO is a member of the United Nations Scientific and Technological Community Major Group and has an official Associate status with UNESCO.¹

UNESCO, as the United Nations agency for education, science and culture, supports engineering through its Natural Science Division, and acknowledges engineering as a great means to achieve sustainable development, to progress capacity building education level and gender equality in developing countries, and safeguard world heritage.

WFEO is committed to playing a key role in leading and coordinating projects to achieve the SDGs through engineering. WFEO can bring together its members, educational institutions, government and industry to address the need for engineering capacity and the quality of engineers around the world and develop strategic frameworks and best practices for the implementation of engineering solutions for sustainable development.

The WFEO Committee on Technology (CommTech) published a CD which was included as an insert "Sustainable Engineering Practice: An Introduction" published by ASCE in 2004 (ASCE, 2004) that outlines engineering contributions to sustainable development up to 2002. The text on the CD is available online.² Background documents are available on the CD.

Some of the highlights from that report

Soon after the 1992 United Nations Conference on Environment and Development (known as the Rio Summit), a group of engineers made a systematic analysis of the conference's primary action document, Agenda 21.³ They found that of the 2500 issues in Agenda 21, 1700 seemed to have engineering or technical implications, and at least 241 appeared to have major engineering implications.

Eminent engineers, scientists and environmental non-governmental organizations met at

¹ WFEO <http://www.wfeo.org/about/>

² World Federation of Engineering Organizations' Committee on Technology, August 2002 Engineers and Sustainable Development <https://ceae.colorado.edu/~amadei/CVEN4700/PDF/WFEOdoc.pdf>

³ UN Agenda 21 <https://sustainabledevelopment.un.org/content/documents/Agenda21.pdf>

the United Nations headquarters in 1993 to review these high-priority needs and to discuss possible action programs.

In September 1991, the WFEO held a meeting of its General Assembly in Arusha, Tanzania. At this meeting WFEO adopted the Arusha Declaration on the future role of engineering, developed from a study of Our Common Future, (the report of the World Commission on Environment and Development) and other documents. This declaration provided helpful guidelines that could be used by engineers in their projects.

Following this meeting, WFEO's Environmental Committee began to review the results of preparatory meetings for the UNCED conference scheduled for Rio de Janeiro in 1992. In reviewing drafts of Agenda 21, it appeared to the WFEO members that the engineering contributions to both developmental and environmental projects were omitted and that these omissions weakened the report. Independently, FIDIC formed an Environmental Task Committee in 1988 to review environmental trends and to provide recommendations to FIDIC members. They also developed guidelines, policies and training programs. FIDIC members also became concerned by the lack of engineers in the planning of the Rio Summit.

Until 1991, WFEO and FIDIC worked independently in support of sustainable development. However, both organizations began to realize the need for joint efforts if the real contributions of engineers were to be recognized at the Rio Summit. This led to the decision to form a new organization that would be a partnership of WFEO, FIDIC and UATI. A representative group from these organizations met in New York in 1992 during the final meetings of the UN delegation to the Rio Summit. The engineers drafted a Vision Statement and the broad goals for a new World Engineering Partnership for Sustainable Development (WEPSD). The results of this engineering meeting were shared with the UN delegates at an open house at the United Engineering Center, located near the headquarters of the United Nations. Maurice Strong, Secretary General of the Rio Summit, assisted the engineers at this open house, where he told the UN delegates that "the concept of sustainable development would be impossible without the full input by engineers."

The WEPSD organization accomplished a great deal in its five years and successfully laid the groundwork for the many programs in support of sustainable development that are being pursued by WFEO, FIDIC and other international organizations through their members and committees. In addition to activities at the international level, engineering societies in many countries have also been extremely active in considering the implications of sustainable development in engineering practices.

Again from the report some of the actions taken between 1992 and 2002

- The World Engineering Partnership for Sustainable Development (WEPSD) was formed.
- Engineering contributed to the Earth Charter
- Engineers interacted with the United Nations Commission on Sustainable Development (UNCSD).
- WFEO and FIDIC collaborated in developing a report for the Rio + 5 conference, *The Engineer's Response to Sustainable Development* was published by WFEO in February 1997.
- *Since 1997, the major international engineering organizations have worked together on several projects and are making contributions to the World Summit on Sustainable Development (WSSD) held in South Africa in 2002. In addition, for the first time, engineers and scientists have agreed to be represented jointly at the WSSD. This includes the preparation of a joint paper entitled Role and Contributions of the Scientific and Technological Community to Sustainable Development.*
- *Members of WFEO and WEPSD were present at the 1992 Rio Summit, and WFEO officers were represented at the Rio + 5 conference.*

Much of the early work on sustainable development focused on ethics, policies, and guidelines. Again from the ComTech report some highlights:

- *The WFEO Arusha Declaration on Environment and Development*⁴
- *The WFEO Model Code of Ethics, adopted in September 2001.*⁵
- *FIDIC adopted a powerful set of environmental policies in 1990. These include guidelines on the obligations of the consulting engineer with respect to their projects and clients.*
- *The Melbourne Communique is a statement of operating principles adopted by 20 national organizations of Chemical Engineers (see e.g. Byrne and Fitzpatrick)*⁶
- *In 1992 the American Association of Engineering Societies adopted The Public Policy on Sustainable Development and Action Principles. AAES also developed six action principles to guide engineers in applying sustainable development.*
- *The Code of Ethics of the American Society of Civil Engineers was a pioneering effort that has far reaching implications; the code is enforceable in requiring consideration of sustainable development principles in civil engineering projects.*⁷
- *In June 2002 representatives of the National Academy of Engineering in the USA met with representatives of the major American engineering organizations to*

⁴ Arusha Declaration

<http://www.wfeo.org/arusha-declaration-wfeo-general-assembly-1991-statement-1992-united-nations-conference-environment-development-earth-summit-rio-de-janeiro/>

⁵ WFEO Code of Ethics <https://www.wfeo.org/code-of-ethics/>

⁶ Byrne, E.P., and Fitzpatrick, J.J 2009

https://cora.ucc.ie/bitstream/handle/10468/344/epb_chemicalav2009.pdf?sequence=4

⁷ ASCE Code of Ethics <http://www.asce.org/code-of-ethics/>

consider how to unify the American engineers in support of the goals of the 2002 World Summit on Sustainable Development in Johannesburg, South Africa and to work together after this conference. Further meetings are planned and recently the group adopted a powerful statement on engineers and sustainable development.

WFEO worked collaboratively with the United Nations Commission on Sustainable Development. From the ComTech report:

The United Nations Commission on Sustainable Development (UNCSD)⁸ was established in December 1992 to ensure effective follow-up to the United Nations Conference on Environment and Development held in Rio de Janeiro in 1992.

In June 1997, James Poirot, then President of WFEO's ComTech, participated in the Earth Summit + 5, Special Session of the UN General Assembly.⁹ Poirot's attendance at this conference led the UNCSD to involve the engineering community in its annual meetings. Since 1998, WFEO has organized and sponsored four panels of experts on important topics.

The WFEO 1997-1999 Biennial Report notes the "ICSU- International Council of Scientific Unions Bilateral agreement to collaborate in issues of sustainable development."¹⁰

From the WFEO 1999-2001 Biennial Report

The WFEO United Nations Committee (WURC) was established in 2011.¹¹ WFEO participated with ICSU and ISSC at Rio +20 as the Science and Technology Community major group.¹²

This brief review makes it clear that prior to 2015, WFEO had already made substantial contributions to sustainable development in the context of engineering practice and education.

2015-2017

Specific action plans are captured in the WFEO Engineering 2030 Plan with annual reporting on progress. The national and regional members of WFEO, that are leading professional engineering institutions, are developing country and region-specific responses.

As part of its discussion of the Post 2015 Goals prior to the approval of the SDGs in September

⁸ UN About the CSD <https://sustainabledevelopment.un.org/intergovernmental/csd>

⁹ United Nations Earth Summit +5 <https://undocs.org/en/A/S-19/29>

¹⁰ WFEO 1997-1999 Biennial Report

https://www.wfeo.org/wp-content/uploads/WFEO_Biennial_Reports/WFEO_Biennial_Report_1995-1997.pdf

¹¹ WFEO WURC <http://www.wfeo.org/unrelations/>

¹² WFEO Rio + 20 https://www.wfeo.org/wp-content/uploads/wurc/RIO20_SUMMIT_CONFERENCE.pdf

2015, WFEO mapped the proposed SDGs to the ongoing work of the WFEO Standing Technical Committees (STCs).¹³ Highlighted in the mapping are linkages to the U.S. National Academy of Engineering's *Engineering Grand Challenges*.¹⁴

The SDGs are prominently featured on the WFEO website with examples of contributions.¹⁵ Details are included in WFEO's 2015-2017 Biennial Report.

In his introduction to the 2015-2017 report, President Jorge Spitalnik reports that

Implementation of the WFEO Strategic Plan for developing, identifying and applying engineering and technology for sustainable development and poverty alleviation was pursued in the frame of UN organizations and agencies, such as HLPF, UNFCCC and UNESCO.

This included actions on education and training, capacity building, codes of practice, risk management, environmental protection, climate change mitigation and adaptation, sustainable energy and water supply, and codes for ethical professional practice.

WFEO President Elect (Now President) Marlene Kanga states in her remarks

Working with the United Nations, UNESCO and other international agencies will be a high priority to demonstrate the important role of engineering and technology in achieving the UN Sustainable Development Goals.

And

Our Standing Technical Committees are the engine room of the organization and are crucial to producing outcomes that support the UN Sustainable Development Goals.

From the 2015-2017 Biennial Report some current activities.

Committee on Disaster Risk Management (CDRM) - According to the chairman, the committee has promoted sustainable and adaptable development based on DRM through scientific and engineering approaches. The mission of the committee is to share those practices, lessons and methods with WFEO member countries, engineering societies and leading engineers over the world. The committee has been actively engaged in implementation of the Sendai Framework. The committee is focusing its efforts on the SDG 1 Poverty - target 1.5 and SDG 11 Cities - targets 11.5 and 11.8.

Committee on Information and Communications (CIC) - The committee has a broad range of

¹³ WFEO ENGINEERS FOR A SUSTAINABLE POST 2015
[www.wfeo.org/wp-content/uploads/wurc/WURC - WFEO ENGINEERS FOR A SUSTAINABLE POST -2015Version%201.6.pdf](http://www.wfeo.org/wp-content/uploads/wurc/WURC_-_WFEO_ENGINEERS_FOR_A_SUSTAINABLE_POST-2015Version%201.6.pdf)

¹⁴ NAE Grand Challenges for Engineering <http://www.engineeringchallenges.org/>

¹⁵ WFEO SDGs <https://www.wfeo.org/sdgs/#>

activities directed at ICT for implementation and achievement of the SDGs with a focus on Goals 2,3,6,7,9,11. Related to Goal 2 - hunger, a monograph on ICT in micro farming is in preparation. Related to Goal 7 energy, the committee is supporting innovative "canal top solar plants."

Committee on Energy (CE) - The Committee's focus is Goal 7 - Energy - specifically targets 7.1 and 7.2.

Committee on Education in Engineering (CEIE) - The WFEO Committee on Education in Engineering held a conference with the theme *Engineering Education for Sustainable Development* in 2015. The proceedings of the conference are published as volume 19 in the IDEAS series.¹⁶ The committee is focusing on Goal 4 Education and Goal 11 Cities.

Committee on Women in Engineering (WIE) - The committee's focus is Goals 5 Gender Equality and Goal 6 - Water and Sanitation. The committee has been actively participating in the Commission on the Status of Women (CSW) since 2016. The committee is working on getting more girls interested in S&T careers; one way is by finding ways to expose girls to actual career experiences.

More broadly the committee sees opportunities in six of the goals but is starting with Goal 6 - Water and Sanitation with a project with the UNESCO Nigeria office to accelerate access to safe excreta disposal, good hygiene practices and safe water supply in selected communities identified with the expected outcome of "... more Open Defecation Free communities with more and more people gaining access to safe means of excreta disposal and visible improvements in environmental health."

Committee on Engineering for Innovative Technologies (CEIT) - the chair of the committee states that

CEIT is dedicated to be a leading international comprehensive platform for engineering professionals from multi-stakeholders to: Identify the next innovative technologies for sustainable development, Share the innovative engineering experience in building a sustainable society, Enhance the national and international collaboration among multi-stakeholders to promote the innovative technology.

The committee is focusing on Goals 9 & 11 and has been using the Delphi technique to identify the most promising innovative technologies to support the SDGs 9 & 11.

Committee on Engineering Capacity Building (CECB) - Having innovative technologies is not sufficient; countries must have the engineering capacity to design, construct, operate and maintain the infrastructure necessary to deliver basic services needed to accomplish Goals, 6, 7,

¹⁶ WFEO IDEAS Education Journal

<http://www.wfeo-ceie.org/File/0f175ab7084c688c07e91510e71adfe9.pdf>

9, 11, and 12. The CECB has several ongoing projects in Africa

Committee on Engineering and the Environment (CEE) - The Committee developed the WFEO Model Code of Practice for Sustainable Development and published it in 2013.¹⁷ The Code of Practice is supplemented with a detailed interpretive guide. The committee is continuing to promote its adoption. The committee also developed a Model Code of Practice on the Principles of Climate Change Adaptation for Engineers that was accepted by WFEO in 2015.¹⁸ CEE has been promoting its principles in various climate venues including COP 21 in Paris in 2015. For Goal 12 - Responsible Production and Consumption, the CEE Task Group on Sustainable Mining continues to focus its efforts around outreach and capacity-building.

Committee on Young Engineers/Future Leaders (YE/FL) - Just as the UN recognizes the importance of involving young people in SDGs activities, the committee sees the SDGs as opportunities and the lever "... to unpack the huge potentials that lie latent in our hearts and minds. If our world is serious about realizing the sustainable development goals, the unexpressed ingenious minds of young engineers around the world presents a potent lever!" The committee is focusing on Goal 4 and 8.

WFEO UN Relations Committee (WURC) -

WURC was created in September 2011 with the mission of acting as the WFEO interface with different UN agencies as well as intergovernmental organizations requiring engineering content, systems, methodologies and analyses.

Next Steps

WFEO is celebrating its 50th anniversary during 2018. WFEO as a major science and technology organisation of the United Nations recognizes and accepts the important role it most play in supporting the achievement of the UN Sustainable Development Goals through engineering.

During 2018, WFEO is developing its plan to achieve the UN Sustainable Goals through the contributions of engineering. The plan will integrate the efforts of the Standing Technical Committees, national and international members and international partners. The first step in this planning progress was taken at a seminar at UNESCO on March 7, 2018.¹⁹ The plan is expected

¹⁷ WFEO Model Code of Practice for Sustainable Development and Environmental Stewardship https://www.wfeo.org/wp-content/uploads/code-of-practice/WFEOModelCodePractice_SusDevEnvStewardship_One_Page_Publication_Draft_en_oct_2013-3.pdf

¹⁸ WFEO Model Code of Practice on the Principles of Climate Change Adaptation for Engineers https://www.wfeo.org/wp-content/uploads/code-of-practice/WFEO_Model_Code_of_Practice_Principles_Climate_Change_Adaptation_Engineers.pdf

¹⁹ UNESCO Progressing the UN Sustainable Development Goals through Engineering <https://en.unesco.org/events/progressing-sustainable-development-goals-through-engineering?language=es>

to be implemented late in 2018 or early 2019.

Summary

The WFEO has been leading global engineering efforts on sustainable development since soon after the Brundtland Report was published. These efforts are continuing today with the WFEO support of the implementation of the UN SDGs.

Acknowledgment

Today's WFEO's contributions to sustainable development and the Sustainable Development Goals build on the important work of past WFEO leaders. Two of these leaders - David Thom and Don V. Roberts passed away in 2017 and 2016 respectively.

References

ASCE 2004 Sustainable Engineering Practice: An Introduction.

<https://www.asce.org/templates/publications-book-detail.aspx?id=8192> Accessed May 8, 2018