

The UN Post 2015 Sustainable Development Goals: Next Steps

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The United Nations (UN) Post 2015 Sustainable Development Goals became effective January 1, 2016.¹ The UN Division of Sustainable Development works with nine major groups to facilitate outreach, engagement and information sharing; engineering is part of the Science & Technology major group. One of the ways information is shared is through the Global Sustainable Development Reports (GSDR). For the reports, the UN Division for Sustainable Development crowdsources briefs from the global science and technology community on sustainable development issues that policy makers - the High Level Political Forum (HLPF) - should be aware of. The 2016 GSDR will focus on several areas of particular interest to the engineering profession including “The infrastructure – inequality – resilience nexus.” This paper reviews past contributions related to engineering education, and provides an update on the continuing process of developing and providing engineering input into the High Level Political Forum process.

1. Introduction

The United Nations (UN) Post 2015 Sustainable Development Goals became effective January 1, 2016. The engineering community contributes through the World Federation of Engineering (WFEO) to the implementation of the goals as one of the nine major groups identified in Agenda 21.² The Science and Technology group consists of WFEO, the International Social Science Council, and the International Council for Science.³ The UN Division of Sustainable Development works directly with the major groups to facilitate outreach, engagement and information sharing.

One of the ways information is shared is through the Global Sustainable Development Reports (GSDR).⁴ In preparing the reports, the UN Division for Sustainable Development crowdsources briefs from the global scientific community on sustainable development issues that policy makers - the High Level Political Forum (HLPF) - should be aware of. Briefs of high significance may be highlighted in the GSDR. Past GSDRs and briefs can be found on the UN Sustainable Development Knowledge Platform website.⁵

The 2016 report will focus on several areas of particular interest to the engineering profession including “The infrastructure – inequality – resilience nexus.”⁶ The purpose of this paper is to review past contributions related to engineering and education, and provide an update on the continuing process of developing and providing engineering input into the High Level Political Forum process.

2. The High Level Political Forum

The High Level Political Forum replaced the UN Commission on Sustainable Development in 2013; the HLPF is now the primary forum for discussion of sustainable development at the UN. The HLPF is an intergovernmental body; however, the UN General Assembly by resolution established a process where representatives of the Major Groups could interact with the HLPF.⁷ There are nine major groups and as mentioned earlier; Science and Technology is one of the major groups and the WFE0 represents engineering in this group. Essentially the only way that non governmental organizations and other stakeholders can participate in UN sustainable development activities is through a major group. The UN Division of Sustainable Development works directly with the Major Groups through its Stakeholders Engagement Program.⁸

Communications with the Major Groups is facilitated by Organizing Partners. Organizing Partners, are comprised of accredited organizations that are invited to be facilitators between the Major Group constituencies and the UN Division of Sustainable Development. Organizing Partners are tasked with coordinating inputs and communications with their constituencies. The WFE0 is one of the organizing partners for the Science and Technology Group.⁹

As mentioned earlier, the main way non-governmental entities can interact with the HLPF is through the major groups as provided in the General Assembly resolution. Major group representatives can attend meetings, have access to the Forum, can submit oral and written materials, and can make recommendations. Another way way that the major groups can contribute is by organizing side events and roundtables.

To coordinate the work of the Major Groups with the HLPF a HLPF Working Group (HLPF WG) has been organized.¹⁰ The HLPF WG is in the process of developing its terms of reference (TOR). The HLPF is mandated to review progress on meeting the SDGs. The HLPF will meet July 11-20, 2016 at UN Headquarters in NY and a central part of that meeting will be review of voluntary national reports on the SDGs.¹¹

Information on the countries volunteering to report at the HLPF can be found on the UN Sustainable Development Knowledge Platform.¹² Although the U.S. has not volunteered to report at the HLPF in 2016, information on U.S. sustainable development efforts can be found on the Knowledge Platform.¹³

Goal 4 is the education goal which is to

*Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.*¹⁴

Education is broadly recognized as important for achieving sustainable development; see e.g. “Sustainable Development Begins with Education.”¹⁵ Vladimirova and Le Blanc looked at how education is connected to and seen as an enabler for the SDGs in a broad sample of UN reports; they found some goals are addressed in depth but others are not addressed or not addressed in depth.¹⁶ As a generalization and simplification, education is not seen as an important enabler of

the engineering centric goals e.g. water and cities. For engineering and engineering education, Target 4b is the only place engineer or engineering is mentioned in the Goals report.

Table 1 UN SDG 4 and Targets

Goal 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	
Targets	Targets
<p>4.1 By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes</p> <p>4.2 By 2030, ensure that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education</p> <p>4.3 By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university</p> <p>4.4 By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship</p> <p>4.5 By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations</p> <p>4.6 By 2030, ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy</p>	<p>4.7 By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture’s contribution to sustainable development</p> <p>4.a Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all</p> <p>4.b By 2020, substantially expand globally the number of scholarships available to developing countries, in particular least developed countries, small island developing States and African countries, for enrolment in higher education, including vocational training and information and communications technology, technical, engineering and scientific programmes, in developed countries and other developing countries</p> <p>4.c By 2030, substantially increase the supply of qualified teachers, including through international cooperation for teacher training in developing countries, especially least developed countries and small island developing States</p>

3. Technology Facilitation Mechanism

A primary way the science and technology community can provide input into the UN SD process is through the Technology Facilitation Mechanism (TFM) established to support the SDGs. The TFM is led by a United Nations inter-agency task team on science, technology and innovation for the sustainable development goals (IATT). The IATT held its first meeting in October 2015.

One component of the TFM is an annual multi-stakeholder forum on science, technology and innovation (STI) for sustainable development and a second is an online platform for information on existing STI initiatives, mechanisms and programs.¹⁷ The IATT is mandated to work with 10 representatives of civil society, the private sector and the scientific community on both the forum

and the online platform.¹⁸ A 10- member group was appointed by the UN Secretary General on January 16, 2016. William Colglazier former Science Advisor to the U.S. Secretary of State is a member of the 10- member group.¹⁹ The first annual meeting of the TFM multi-stakeholder forum will be June 6-7, 2016 at UN Headquarters in New York.

4. Global Sustainable Development Reports

One of the ways that the TFM gathers information from the various S&T constituencies is through the annual Global Sustainable Development Reports(GSDR). Colglazier has described the GSDRs as the bridge for the science community to the HLPF.²⁰

GSDR 2016 will be the fourth report and the third where science briefs have been crowdsourced. The 2013 report was the first with the High Level Political Forum replacing the UN Sustainable Development Commission in 2012.²¹ Initially, the crowdsourced responses were simply what kind of World responders would like to see in 2050. Not much investment was required to respond. Engineering was not mentioned in 2013 and in 2014 only in the context of geoengineering.²²

The 2015 report used a more structured process for crowdsourcing and the top issue identified was energy. In the 2015 report it was noted that a more integrated approach to sustainable development is needed. The report stated that

Many sustainable development research questions also require integrating the humanities and the engineering sciences, with their very different methods and traditions.

The 2015 report also noted the need for transdisciplinarity which requires not only engagement of scientists and engineers but interdisciplinarity and outreach by scientists and engineers to non-science communities. The 2015 report also noted the need to address social responsibility and ethical aspects in looking for innovative technological solutions.

The 2016 report will maintain the science-policy interface and the SDGs as an integrated system as the main threads of the report. The UN Environmental Program (UNEP) recently teamed with the World Health Organization to look at how improving the environment would contribute to achieving Goal 7 the health goal.²³ This may be a good way to think about the goals. For education, how would achieving Goal 4 - the education goal - support achieving any other goal or the number one goal - to eliminate extreme poverty.

All of the briefs can be found on the UN Sustainable Development Knowledge Platform.²⁴ As mentioned above, the 2015 GSDR called for more engineering but engineering that is attuned to the social and economic aspects of sustainable development. This is the only place engineering is mentioned in the 2015 report. In one 2015 brief though, Mader and Rammel call for a transformation of higher education.²⁵ They note that infusion of sustainable development into higher education has been going on for more than 20 years with a long way still to go. It is about that long in engineering with the first attempt to add sustainability to the ABET engineering criteria in 1994. Mader and Rammel argue for infusion of sustainability at the institutional level

and based on their research conclude that this would need to be driven by a requirement for assessment. The same could be said in engineering education; if there is no requirement to assess sustainability knowledge then there is no assurance that this knowledge will be achieved.

The call for 2016 briefs closed on February 18, 2016. Although briefs are being accepted after that date, they may not receive full consideration in preparing the 2016 GSDR. Several briefs appear to deal with engineering and there is at least one on engineering education submitted by the author.²⁶

5. Engineering Input and Next Steps

There is a need for more input into the UN SDGs process by the engineering community. The WFEO developed a matrix showing the various ways that the WFEO Standing Technical Committees are already contributing to the 17 Goals.²⁷

What are the opportunities for engineering education? Goal 4 is the education goal and the targets call for more opportunities to study engineering especially for those from least developed countries. One of the Goal 4 targets calls for efforts to ensure that all learners gain an appropriate knowledge of sustainable development.²⁸ Note that the Goal itself calls for promotion of lifelong learning opportunities for all.

At the global level, engineering education has a relatively high and appropriate expectation for sustainability knowledge. The IEA Graduate Attributes and Competences that are the foundation for accreditation of engineering programs under the Washington Accord(WA) has strong statements on sustainability.

*WK7: Comprehension of the role of engineering in society and identified issues in engineering practice in the discipline: ethics and the professional responsibility of an engineer to public safety; the impacts of engineering activity: economic, social, cultural, environmental and sustainability.*²⁹

WA7: Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems in societal and environmental contexts. (WK7)

The way the attributes are implemented in criteria are variable with Engineers Canada being on the strong end and ABET on the weak end. In the U.S., strengthening the ABET general criteria to more fully achieve this IEA graduate expectations would be a good first contribution to Goal 4. There is the opportunity to do this with the possible revision of ABET Criterion three currently being discussed. As proposed, however, there would be no sustainability outcome and thus no need to assess.³⁰ Also, the lifelong learning outcome would be eliminated even though there is an IEA graduate attribute on lifelong learning,

Globally, one opportunity is to support and encourage the WFEO initiative to mentor candidates for IEA membership.³¹ Part of this mentoring could be to assist in developing criteria that

support the SDGs by appropriate inclusion of sustainability and sustainable development in engineering curricula.

Beyond criteria there is the need for more faculty development and sharing of teaching and learning resources. The technology to do both exists and the UN Technology Facilitation Mechanism could help facilitate and enable this.

6. Summary

Engineering education is well positioned to make a substantial contribution to achievement of the SDGs. The IEA Graduate Attributes and Competencies have strong statements of sustainability and fully implemented globally would go along way to assuring that engineering graduates have an appropriate knowledge of sustainable development.

References

- 1 Retrieved February 19, 2016 UN Sustainable Development Knowledge Platform <https://sustainabledevelopment.un.org/?menu=1300>
- 2 Retrieved January 30, 2016 UN Web site Major Groups <https://sustainabledevelopment.un.org/majorgroups>
- 3 Retrieved January 30, 2016 UN Web Site Science & Technology Community <https://sustainabledevelopment.un.org/majorgroups/scitechcommunity>
- 4 Retrieved January 30, 2016 UN Web site Global Sustainability Report <https://sustainabledevelopment.un.org/globalreport>
- 5 Retrieved January 30, 2016 UN Web Site Global Reports <https://sustainabledevelopment.un.org/globalreport>
- 6 Retrieved January 30, 2016 UN Web site Global Sustainable Development Report 2016 edition, <https://sustainabledevelopment.un.org/globalreport/2016>
- 7 Retrieved January 30, 2016 Resolution 67/290. Format and organizational aspects of the high-level political forum on sustainable development http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/67/290&Lang=E
- 8 Retrieved January 30, 2016 UN Sustainable Development Platform <https://sustainabledevelopment.un.org/majorgroups>
- 9 Retrieved January 30, 2016 UN Sustainable Development Platform <https://sustainabledevelopment.un.org/orgpartners.html>
- 10 Retrieved January 30, 2016 <https://sustainabledevelopment.un.org/content/documents/9105HLPFWGToROriginal.pdf>
- 11 Retrieved January 30, 2016 <https://sustainabledevelopment.un.org/?page=view&nr=1039&type=230&menu=2059>
- 12 Retrieved January 30, 2016 <https://sustainabledevelopment.un.org/hlpf>
- 13 Retrieved January 30, 2016 <https://sustainabledevelopment.un.org/memberstates/usa>
- 14 Retrieved February 19, 2016 UN Sustainable Development Knowledge Platform <https://sustainabledevelopment.un.org/?menu=1300>
- 15 Retrieved January 30, 2016 UNESCO Sustainable Development Begins with Education, http://www.unesco.org/new/en/media-services/single-view/news/unesco_sustainable_development_begins_with_education/back/9597/#.VscZ-Y-cF-U
- 16 Retrieved February 19, 2016 Vladimirova, K. and Le Blanc, D. (2015) DESA Working Paper No. 146 <https://sustainabledevelopment.un.org/content/documents/2111education%20and%20sdgs.pdf>
- 17 Retrieved February 19, 2016 UN Sustainable Development Knowledge Platform Technology Facilitation Mechanism <https://sustainabledevelopment.un.org/topics/technology/facilitationmechanism>

- 18 Retrieved February 19, 2016 TFM Task Team Sets TOR, Discusses Membership, Streams of Work
<http://sd.iisd.org/news/tfm-task-team-sets-tor-discusses-membership-streams-of-work/>
- 19 Retrieved February 19, 2016 UN Announces Composition, Terms of 10-member Group to support TFM
<http://sd.iisd.org/news/un-announces-composition-terms-of-10-member-group-to-support-tfm/>
- 20 Retrieved February 19, 2016 Colglazier, W. Sustainable development agenda: 2030
<http://science.sciencemag.org/content/349/6252/1048>
- 21 Retrieved February 19, 2016 High Level Political Forum 2013 <https://sustainabledevelopment.un.org/hlpf/2013>
- 22 Retrieved February 19, 2016 Global Sustainable Development Report 2014 Prototype edition
<https://sustainabledevelopment.un.org/globalsdreport/2014>
- 23 Retrieved February 19, 2016
<http://www.unep.org/civil-society/Portals/24105/documents/UNEA2/HEHP%20draft%20report%20CPR.pdf>
- 24 Retrieved February 19, 2016 Crowdsourced Briefs
<https://sustainabledevelopment.un.org/topics/science/crowdsourcedbriefs>
- 25 Retrieved February 19, 2016 Transforming Higher Education for Sustainable Development
https://sustainabledevelopment.un.org/content/documents/621564-Mader_Rammel_Transforming%20Higher%20Education%20for%20Sustainable%20Development.pdf Accessed February 3, 2016
- 26 Retrieved February 19, 2016 UN Sustainable Development Knowledge Platform, Crowdsourced Briefs,
<https://sustainabledevelopment.un.org/topics/science/crowdsourcedbriefs>
- 27 Retrieved February 19, 2016 WFEO Engineers for Sustainable Development Post 2015
<http://www.aees.org/sites/default/files/WFEOENGINEERSFORASUSTAINABLEPOST2015%20V1.6.pdf>
- 28 Retrieved February 19, 2016 UN Sustainable Development Knowledge Platform Sustainable Development Goal 4
<https://sustainabledevelopment.un.org/sdg4>
- 29 Retrieved February 19, 2016 EA Graduate Attributes and Professional Competencies Version 3 21 June 2013
<http://www.ieagreements.org/IEA-Grad-Attr-Prof-Competencies.pdf>
- 30 Retrieved February 19, 2016 ABET Proposed Revisions to EAC Criteria 3 & 5 Released for Public Comment
<http://www.abet.org/accreditation/accreditation-criteria/accreditation-alerts/>
- 31 Retrieved February 19, 2016 WFEO IEA Memorandum of Understanding
http://www.wfeo.org/wp-content/uploads/IEA_WFEO_MoU_2_4_14_signed.pdf