World Federation of Engineering Organizations
Fédération Mondiale des Organisations d'Ingénieurs

United Nations
Educational, Scientific and
Cultural Organization

WORLD ENGINEERING DAY

From WFEO's creation to World Engineering Day for Sustainable Development: Reflecting on UNESCO's and WFEO's Shared Accomplishments

Gong Ke

World Federation of Engineering Organizations (WFEO)

October 2022

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WORLD ENGINEERING DAY

1. The World Engineering Day (WED)
2. The Engineering Report (ERII)
3. The Graduate Attributes and Professional Competencies Framework of Engineering Education (GAPC)

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In 2015, at the 70th United Nations General Assembly unanimously adopted the **"Transforming our world: the 2030 Agenda for Sustainable Development"** with 17 Sustainable Development Goals. Engineering has a crucial role to play to achieve the SDGs.

"……we strive to achieve the 17 Sustainable Development Goals – the world's blueprint for building a future of peace and prosperity for all on a healthy planet. Every one of the Goals requires solutions rooted in science, technology and engineering."

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WFEO engages in extensive global project cooperation to contribute to sustainable development through engineering.

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2015

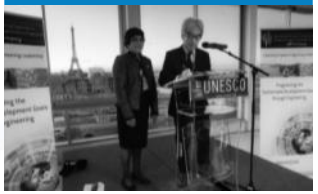
UN 2030 Agenda

Advancing the UN SDGs through engineering is one of the aims of WFEO.

Initiation of WED

As part of its 50th-anniversary celebrations, UNESCO and WFEO signed the Paris Declaration and initiated the proposal to establish a world engineering day.

2018



2019

Official Proposal

WFEO highlighted the important role of engineering in realising SDGs at the UNESCO's Information Meeting. The initiative of WED received support from around 80 peak international and national institutions of engineering.

Initiative Adopted

The 40th General Conference of UNESCO adopted the resolution to proclaim 4th March every year the World Engineering Day for Sustainable Development, proposed by more than 40 member states..

2019

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2020

March Forth to the Sustainable Future

Global Celebrations - WED2020 & WED2021

More than 400 WED celebrations have been held across the world, from over 80 countries covering all continents, different engineering institutions, businesses, UN bodies and social groups.

WED 2020 Global Celebrations

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WORLD ENGINEERING DAY

Global Celebration

Messages and Congratulatory Letters

"Best wishes for the success of the event."

Antonio Guterres
UN General Secretary

"Engineering has helped to shape the world for millennia and now more than ever, the world needs engineering."

Audrey Azoulay
Director-General of UNESCO

Under the High Patronage of
Mr Emmanuel MACRON
President of the French Republic

中国科学技术协会
China Association for Science and Technology

CAE

CAST – CAE – National Commission of China for UNESCO Declaration

WED Supporting Organizations

ORGANIZERS

WFEO / FMOI

DISCOVER
LET'S MAKE A DIFFERENCE

IESF
THE SOCIETY OF FRENCH ENGINEERS AND SCIENTISTS

ICEE

IFEES
International Federation of Engineering Education Societies

GEDC

FAEO

INWES

Federation of Engineering Institutions of Asia and the Pacific (FEIAP)

IChemE

IEEE
Advancing Technology for Humanity

marchmont communications

PATRON UNESCO

SPONSOR WGC

INDUSTRIAL PARTNERS

SAP AIRBUS Microsoft GREE

Some of the WED 2020 Activities

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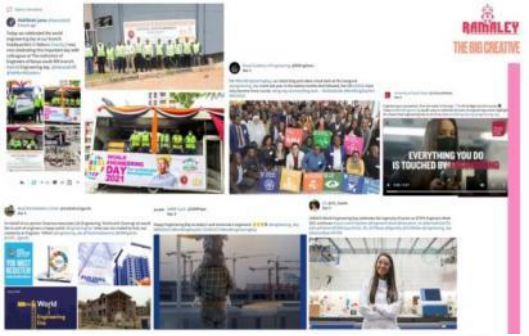
WED 2021 - “Engineering for a Healthy Planet”

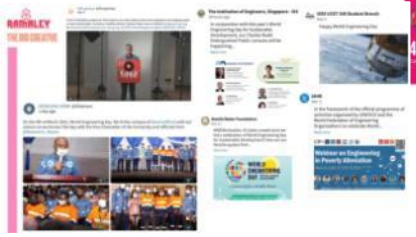
Officials from UNESCO, CAE, and an invited young student addressed the opening.

WU Qidi, Marlene Kanga, GONG Ke and José Vieira introduced the Engineering Report.

Around 2000 people around the world registered the event and the event is live-streamed on different platforms to the whole world in English, French and Chinese.

Round table discussion of Young Engineers around the globe





Some of the WED 2021 Activities

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WED 2022 - “Build Back Wiser: Engineering the Future”

Some of WED 2022 Activities

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WED 2022 Global Events - Webinars, Stream, Talks, Competitions

There were 135 registered events globally, and the celebration of the Day reached more than 56 million via social media channels. Two new international events were held – the 24 Hour-LIVE streaming of engineering from around the world and the global World Engineering Day Hackathon.

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WED 2022 Hackathon to Meet Three Challenges to achieve SDGS

Winning Team: WONDERPETS (from Philippines) 2nd Place: Mobile Rain Harvesting (from Canada) 3rd Place: HyaPak (from Kenya)

- more than 1000 pre-event registrations of which 465 students entered
- 92% engineering students
- 125 teams from 23 countries

CHALLENGE 1

Responsible and innovative use of materials and reduction of non-biodegradable waste

This is an engineering challenge that involves the responsible use of materials and innovations that will ensure that the materials can be recycled and reused. The challenge is to develop a product, solution that addresses the resource challenge, or a system to recover and reuse materials.

You might start by considering the questions, what waste streams you are familiar with or can see impacting in your local community, what scientific knowledge could tackle the problem, and how to meet the requirements of easy to use, economical affordable, safe and environmental friendly, etc.

Your solution should be consistent with the theme of World Engineering Day 2022 **Build Back Wiser-Engineering the Future.**

CHALLENGE 2

Biomimicry in Engineering Solutions. Learning from nature for Sustainable solutions that result in innovation, optimal resource use and healthy and improved living.

This is an engineering challenge that looks to nature for inspiration for solutions for sustainable engineering solutions.

The challenge is to develop a product or system that addresses sustainable use of materials, reduces energy and water consumption and is resilient to natural disasters. This project brief is to look to nature for inspiration and propose an engineering solution that will result in increased performance on sustainability and human-well-being indicators.

The challenge is not limited to buildings but to any other type of product or technology. Nature can be the source of many innovations and inspire engineers to develop products and ideas that are innovative and sustainable and reduce energy and resources use and are consistent with the theme of World Engineering Day 2022 to **Build Back Wiser – Engineering the Future.**

CHALLENGE 3

Water accessibility in a changing climate.
Climate-resilient water management systems to ensure safe and ongoing access for all.

This is an engineering challenge for the responsible use of water in our cities/towns and villages around the world. Solutions can be for clean water or for sanitation and other responsible uses of water, including solutions and systems for recycling.

The challenge is to develop a product or system that addresses sustainable use of water for clean, healthy and smart living and is consistent with the theme of World Engineering Day 2022 to **Build Back Wiser – Engineering the Future.**

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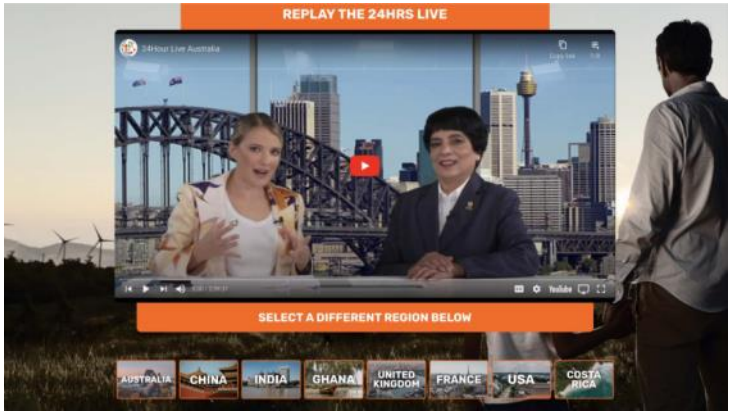
WED 2022 - 24Hrs Live



- 24 hours live in **8** zones including Australia / China / India / Africa / France / UK / USA / Costa Rica
- **31,538** views with **29.85%** from female
- **194** videos
- **12** sponsors and **21** partners

WORLD ENGINEERING DAY FOR SUSTAINABLE DEVELOPMENT

1.3 Million Video Views (1Mil 2021)
410,000 Link Clicks (123K 2021)
17 Million Impressions (5.7 Mil 2021)

WORLD ENGINEERING DAY 2022 FINAL REPORT

SOCIAL MEDIA ADS!

Ad Set	Results	Video plays	Link clicks	Reach	Impressions	Unique link clicks
New Post engagement Ad Set	496,204 Post Engagements	863,541	1,430	425,600	1,012,862	1,415
Global Engineers Dynamic Videos	247,997 Link clicks	319,996	247,997	1,205,227	2,217,429	193,280
Global Engineers	121,410 Link clicks	–	121,410	3,536,490	12,393,454	103,648
Post: "#WorldEngineeringDay is thr... Inspect Duplicate	13,344 Link clicks	95,602	13,344	186,877	233,550	10,904
Post: "#WorldEngineeringDay #Hack...	11,003 Link clicks	70,508	11,003	130,304	171,257	9,316
Engineering Students	7,142 Link clicks	–	7,142	203,549	729,622	6,016
Global Engineers Dynamic Videos - C...	6,929 Link clicks	17,818	6,929	71,312	78,414	6,460
Post: "WE'RE LOOKING FOR SPONSO...	425 Link clicks	–	425	37,287	43,221	403
Post: "#Worldengineeringday 24HRS ...	423	–	423	49,855	66,276	382
Results from 12 ad sets	–	**1,367,609**	**410,707**	**5,550,238**	**16,994,935**	**325,504**

THE BIG CREATIVE

RAMALEY

Holistic Potential Reach

THIS YEAR

56,100,000

2021

32,060,000

2020

17,000,000

Growing Number of Sponsors

3 years' platinum sponsor

2 years' platinum sponsor

2 years' gold sponsor

gold sponsor

gold sponsor

gold sponsor

gold sponsor

gold sponsor

gold sponsor

silver sponsor

silver sponsor

silver sponsor

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https://www.worldengineeringday.net

- **Increased public awareness of the significant role of engineering and engineers in realizing the UN Sustainable Development Goals;**
- **Rendered guidance in promoting sustainable development, especially, by UNESCO Engineering Report, which has been further propagated by WED celebrating activities;**
- **Created precious opportunities for the engineering community to mobilize engineers engaging themselves deeply in implementing SDGs and to attract the young taking engineering as a carrier;**
- **Enhanced the cooperation between the engineering community with the government, industry, and academia communities.**

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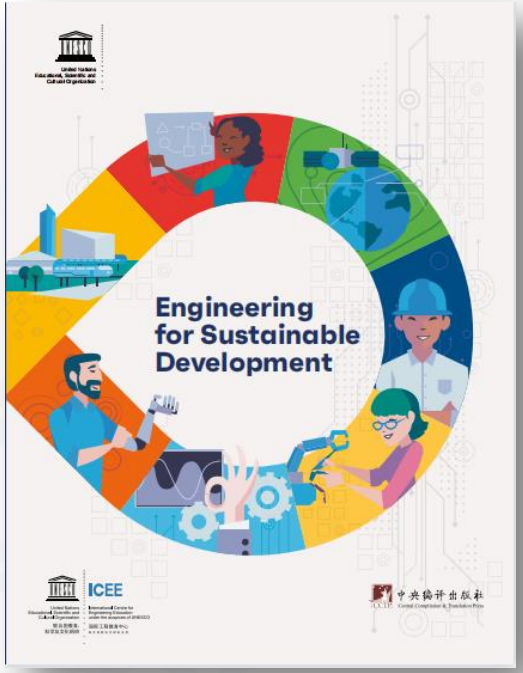


https://en.unesco.org/reports/engineering

Introduction

- **Five Highlights of the Report:**

➢ Leveraging the crucial role of engineering in delivering the SDGs

➢ Focusing on engineering innovations and Stressing transition of engineering itself

➢ Indicating capacity building is a continuous process and is key for achieving SDGs by engineering

➢ Recognising regional particularities while promoting interregional cooperation

It is hoped that the report will serve as a reference for governments, engineering organizations, academia and educational institutions, and industry to forge global partnerships and catalyse collaboration in engineering so as to deliver on the SDGs.

- **Leveraging the crucial role of engineering in delivering the SDGs**

Engineering has transformed food production through mechanized agriculture, fertilizers and pesticides, and they are working on green, low carbon and smart agriculture.

Engineers have developed energy generation and are now innovating low cost solutions from renewable sources

Engineers need to ensure that women benefit from new technologies and also participate in the technology revolution so no one is left behind.

Engineering drives economic growth, e.g. there is a positive relationship between economic growth and the number of engineers in a country.

Engineers are essential for sustainable water supply and sanitation systems for the world

- **Focusing on engineering innovations and Stressing transition of engineering itself**

Combating COVID-19 and Improving human health

More actions to adapt and mitigate climate emergency, promoting energy transformation

Building Smart Cities with Big Data and Artificial Intelligence

Transform Engineering profession for sustainable development

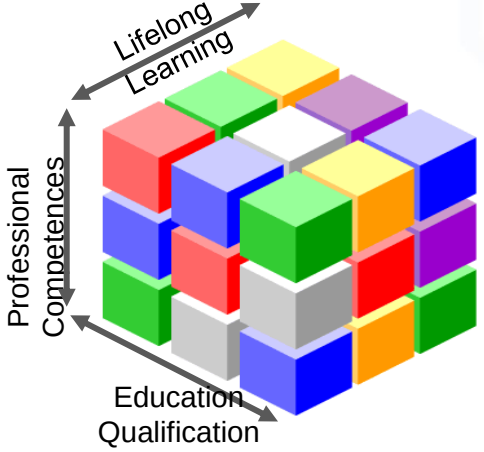
- **Indicating capacity building is a continuous process and is key for achieving SDGs by engineering**

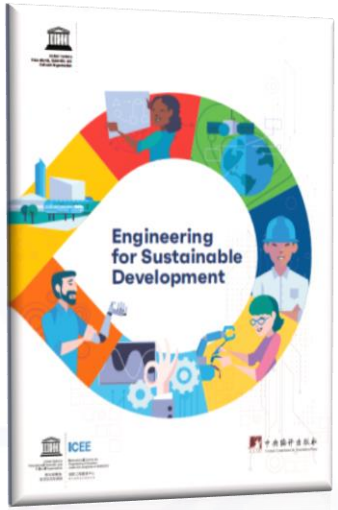
Engineering education and capacity-building: The key to enable engineering for the SDGs

Trends and Challenges for Engineering Education

- Globalisation of labour markets
- Mobility of students and workers
- Increased migration
- Automation
- Digitalization
- Polarisation of labour market
- Skills mismatch

New approach to learning, switching from a teacher-centric focus to one that is more student-centred and problem-based





Recommendations

Each chapter of the report concludes with a set of actionable recommendations that can be implemented by governments, educational institutions, engineering organizations, civil society or the private sector, with the up-to-date expertise of the engineering and scientific community. Some of the key recommendations are outlined below.

Understanding the role of engineering and engineers in achieving the SDGs

1. Government, engineering educators, industry and professional engineering institutions need to promote greater understanding of the crucial role played by engineers and engineering in creating a more sustainable world.

Equal opportunities and diversity

2. Governments and policy-makers should take urgent action to encourage more young people, especially girls, to consider engineering as a career in order to address the shortfall in the number of engineers, and to ensure the diversity of thought and inclusive participation necessary to achieving the SDGs.
3. The engineering sector as a whole should embrace the 'leave no one behind' ethos of the SDGs and ensure that technological solutions address current inequalities.

Water as a global and strategic sustainability issue

chemicals, biotechnology and information technology.

5. The social and environmental relevance of clean water and the holistic nature of the 2030 Agenda for Sustainable Development demand an integrated and systematic approach when dealing with the specificities of each of the 17 SDGs, all of which require intensive interdisciplinary analysis and multi-sectoral expertise for their implementation.
6. Engineered and nature-based infrastructure needs to be combined with water management approaches involving stakeholder engagement and bottom-up climate adaptation. Engineers need to be trained in recent advances in hydrology, intertwined with externalities such as technology and societal needs, in order to develop approaches for the implementation of SDGs and other water-related goals.

Climate change awareness and resilience

7. Countries can identify, understand and manage climate-change risks by prioritizing adaptation planning and actions, including implementing operational and maintenance procedures that extend the life of infrastructures that: i) are at critical risk of failure; ii) service a high level of demand; iii) are reaching the end of their life cycle; or iv) exceed the risk tolerance level and require significant investment to refurbish or replace.
8. Special attention should be given to developing vulnerable countries in building their capacities to deliver climate resilient infrastructures, by updating their national codes, standards and guidelines, and building capacity in their climate services, engineering and delivery capabilities. Public and private funding is needed for investment in engineering activities for disaster risk prevention and reduction, through structural and non-structural measures in order to foster resilience. Cooperation coupled with

sustainable and resilient energy systems. Policies and developments in this area must be based on rigorous facts and avoid preconceptions. To achieve these objectives, all energy options are open, depending on the national context. It is important to use simple and transparent economic criteria such as the cost per tonne of CO_2 avoided.

10. Suitable technologies to achieve sustainability in mining should be implemented and developed.

ata, AI and smart cities

i. Governments and data owners need to make data findable, accessible, interoperable and reusable in an ethical way. Rules and standards need to be developed based on global consensus to enable efficient data sharing and data exchange.

i. Security and privacy of data have increased in relevance and must be part of the design process at all stages of the big data paradigm. International and interdisciplinary cooperation should be in place between academic institutions, universities and industry, as well as civil society, to advance AI innovation and applications for the implementation of the SDGs. Governments and civil society should promote international dialogue to reach global consensus on AI governance, and to adopt global principles, guidelines and standards for the responsible conduct of AI.

i. Smart engineering technologies and applications change the nature and economics of infrastructure. With the new generation of transport and healthcare facilities, disaster resilient infrastructure and low-carbon sources of energy, smart cities could be vehicles of purpose-driven innovation and test-beds for new applications and solutions.

gineering education and capacity-building r the SDGs

i. Government, engineering educators, industry and professional engineering institutions need to collaborate to fund and support strategies, in order to increase the number of engineers, to introduce an internationally harmonized

education systems to train engineers with the right skills.

i. Improving and strengthening STEM education in school is the foundation of higher engineering education and lifelong learning. Furthermore, the topic of 'sustainability' needs to be included in the curriculum for all education establishments, from schools and universities to engineering departments and professional training bodies.

16. Governments should increase their focus on interdisciplinary curricula, sustainable development and professional competencies, combining them with funding models that support these needs. National accreditation criteria should be formulated and accompanied by incentives and rewards for institutions meeting these requirements.
17. Studies should focus on interdisciplinary and complex problem-solving using student-centred, problem-based approaches and online learning.
18. Engineering institutions, industries and academia should cooperate to develop and implement an engineering professional certification system for the promotion of continuing professional development and the recognition of engineering qualifications and professional competences worldwide.

Regional engineering cooperation

19. There is a need to strengthen all types of interregional, regional and sub-regional cooperation for engineering capacity-building in alignment with sustainable development, including an emphasis on the engineering dimension across all SDGs, as well as inclusive standards, the mobility of engineers and the articulation of the engineering-education nexus to address imbalances in engineering capacity and economic development in the various regions of the world.
20. Engineering is a highly diversified sector in both educational and professional settings. A common approach is therefore

Much more need to be done to implement the recommendations

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Thanks for your kind attention

WFEO is looking forward to working with all of you to take concrete actions in your country to leveraging engineering for sustainable development.