



Engineering a Sustainable World

The United Nations (UN) led a global effort to develop 17 ambitious sustainable development goals (SDGs) that tackle some of the greatest challenges facing people and the planet. These goals (see box) were adopted by a majority of countries around the world in 2015, including the U.S.

The UN is calling on governments, businesses, and civil society to work together to achieve the 17 SDGs by 2030. The engineering community has the opportunity and duty to take part in, and in some cases lead, SDG implementation. Engineers have the necessary skills to develop feasible technical solutions and inform evidence-based policies that best serve society within the constraints of local and global resources. We can have a big impact on goals related to universal access to water and energy, inclusive and resilient industry and infrastructure, and environmentally responsible operations (*i.e.*, Goals 6, 7, 9, 11, 12, 13).

However, we should not limit ourselves to only these goals. Interdisciplinary, international collaboration will play a critical role in translating goals into practical, functional, and actionable solutions. Engineers leading sustainable development efforts should seek input from other stakeholders, and we should be engaged in developing solutions in areas outside our purview. This approach will ensure that goals are met with holistic solutions that are compatible, serve and benefit the target populations, and can be implemented locally.

Goal 9 will require leadership from the engineering community. Engineering is at the core of the manufacturing industries that create the materials and products our society needs. If we help achieve sustainable and equitable industrialization, we can also help

ensure fair access to essential products, such as food and medicine, that help fight hunger (Goal 2) and ensure health and well-being (Goal 3).

Manufacturing is a major employer in both developed and developing regions. Jobs created as a result of equitable industrialization can help eradicate poverty (Goal 1) by providing decent work and boosting economic growth (Goal 8). Pulling people out of poverty will help increase social stability, and thus, create more peaceful societies (Goal 16).

In addition to creating jobs, the manufacturing industry can help reduce inequalities within and among developed and developing nations (Goals 5 and 10). Manufacturers can help achieve these goals by diversifying their businesses to include emerging markets and small and medium-sized enterprises (SMEs), as well as through fair employment practices and by holding the entire supply chain to high social standards.

Solutions for achieving Goal 9 must consider the constraints presented by other goals. Infrastructure and industry will need to be upgraded and retrofitted for efficient use of energy, water, and other resources, which will help guarantee access to these commodities for other users (Goals 6, 7, 12). Resilient infrastructure is key to developing inclusive, safe, resilient, and sustainable cities (Goal 11). Furthermore, upgrades and new developments will have to address environmental goals to protect marine and terrestrial resources and ecosystems (Goals 14 and 15) and combat the impacts of climate change (Goal 13).

Contributions to Goal 9 and its impacts go beyond industry. Academia contributes by innovating and developing new and improved technologies; defining metrics and standards for

benchmarking progress; educating students and professionals about the principles and practice of sustainable engineering and development; and fostering diversity, collaboration, and innovation (Goal 4).

The SDGs developed by the UN have received a lot of attention, but this is certainly not the first time these challenges were considered or attempts to address them were made. These goals are undeniably lofty, but achieving them is proportionately crucial. Strategic and diverse partnerships and collaborations, led by and involving engineers, will play an integral part in meeting the targets set forth by these goals to improve the planet and the lives of people.

CEP

The UN Sustainable Development Goals

1. End poverty
2. End hunger
3. Ensure good health and well-being
4. Ensure quality, inclusive education
5. Achieve gender equality
6. Ensure access to clean water and sanitation
7. Ensure access to affordable and clean energy
8. Promote decent work and economic growth
9. Build resilient infrastructure, promote sustainable industrialization, and foster innovation
10. Reduce inequalities
11. Make cities sustainable, safe, inclusive, and resilient
12. Ensure responsible consumption and production
13. Take action to combat climate change
14. Conserve life below water
15. Conserve life and resources on land
16. Promote just, peaceful, and inclusive societies
17. Partner to achieve sustainable development