

Climate Change and Standardization

By *Wathma Jayathilake*

Did you know that approximately 35 million adults in the United States don't think global warming is happening? (Marlon et al. 2022) Additionally, a 2020 study conducted by the United Nations showed that of the 1.2 million people surveyed, 36% didn't believe that climate change was an emergency requiring immediate action. (Carrington 2021) But the science cannot be ignored: glaciers are shrinking, the frequency of wildfires is increasing, the number of cold- and heat-related deaths is becoming more prevalent, and bodies of water are freezing later and later.

Proof of this exists in Ottawa, Ontario, home to the world's largest outdoor ice-skating rink, the Rideau Canal Skateway, which is 8 kilometers (5 miles) long and has a surface area equivalent to 90 Olympic ice hockey rinks. This canal has opened to the public every year since 1971, but due to an unusually mild winter in 2022, the city was not able to open the canal for the first time in more than 50 years. Climate change is happening, and we need to act.

CLIMATE CHANGE

Earth's climate has changed throughout history, mostly due to slight variations in the planet's orbit. However, the changes in climate that we are experiencing today are due to an abrupt increase in the Earth's temperature—a change caused not by varia-

tions in the Earth's orbit, but likely by human activity.

Modern human activities and industrial production have increased the release of non-naturally-occurring greenhouse gases, mostly from burning fossil fuels. Gases in our atmosphere such as water vapor, carbon dioxide (CO₂), nitrous oxides, methane, and chlorofluorocarbons allow sunlight to pass through but prevent some heat from escaping. As we release more greenhouse gases into the atmosphere, more heat gets trapped, strengthening the greenhouse effect and increasing the Earth's temperature.

We see the effects of climate change everywhere, including North America. In 2022, there were more than 500,000 emergency responses to fires for more than 800 structures across California, and wildfires were responsible for 9 fatalities and over 360,000 acres of land burned in the state. (CAL FIRE 2022) In that same year, there were more than 100 fatalities from floods in the United States and more than 100 fatalities from Hurricane Ian. (National Weather Service 2023; Bucci et al. 2023) According to the National Oceanic and Atmospheric Administration (NOAA), the total damage from Ian exceeded \$112 billion. (Bucci et al. 2023)

As the concentration of greenhouse gases (particularly CO₂) in our atmosphere continues to increase, we will also see an increase in global warming, ocean acidification,

rising emissions costs, and increased sea levels. Sea levels will continue to rise as glaciers melt, flooding coastal regions and displacing millions of people. If we don't do anything to address our warming planet, we will see a rise in sea levels of almost 1 meter (3.2 feet) by the end of the century. Cities such as Jakarta, Houston, Dhaka, Venice, Lagos, Bangkok, New Orleans, and Miami will be completely flooded by the end of the century. (Lakritz 2019)

According to data provided by the Intergovernmental Panel on Climate Change (IPCC) and the International Energy Agency (IEA), we are already seeing a rise in the Earth's surface temperature on every continent. It is estimated that we will experience a 2.1% increase in deaths from extreme heat by 2100 in North America alone, which equates to approximately 9.4 million people. (En-ROADS v23.2.1) Southeast Asia will experience an 8.9% increase in deaths from extreme heat by the end of this century, which equates to approximately 66 million people. (En-ROADS v23.2.1) We can expect air pollutants from energy to increase to almost 40 megatons by the end of the century. As the concentration of air pollutants in our atmosphere increases, we can expect an increased prevalence of adverse pregnancy outcomes, strokes, heart disease, lung cancer, and pneumonia. (IPCC 2023)

STANDARDS THAT ADDRESS CLIMATE CHANGE

Standards are playing a major role in helping us adapt to the changing climate. Standards developers have the opportunity to take climate action by prioritizing standards solutions that address sustainability for a variety of products and services. Standards offer practical and actionable measures that help us adapt to a variety of circumstances. They help us establish requirements that can be voluntarily implemented by the public or adopted through regulation.

At UL Standards & Engagement (ULSE), we develop standards that are climate-aware and supportive of sustainability practices for new and emerging technologies in a variety of industries. One example is UL 110, the Standard for Sustainability for Mobile Phones, which helps to reduce electronic waste (E-waste) from outdated cell phones through requirements that help to make it easier for devices to be disassembled and recycled. E-waste has become a growing problem over the past several decades because cell phones and other electronic devices contain toxic materials such as lead and lithium. These materials can cause serious harm to people and the environment if they are not disposed of properly. Through its requirements for the design, manufacture, use, and end-of-life management of mobile phones, UL 110 helps to reduce these unhealthy environmental and social impacts.

To help prevent usable electronic vehicle (EV) batteries from adding to the accumulation of E-waste, ULSE published ANSI/CAN/UL 1974, the Standard for Evaluation for Repurposing Batteries. This standard provides guidance on the sorting and grading of batteries that are intended for repurposing. Although used EV batteries may not be suitable for electric vehicle propulsion at 70-80% capacity, they can be repurposed in applications that do not require as much power, such as stationary energy storage systems.

To help improve overall confidence and trust in the sustainability claims of companies, ULSE published UL 3600, the Standard for Measuring and Reporting Circular Economy Aspects of Products, Sites and Organizations. As companies shift away from linear production models in favor of circular ones—prioritizing sustainability practices such as eliminating waste, reusing materials, and regenerating natural resources—this standard helps them communicate their sustainability efforts to consumers transparently by measuring sustainability at the site, product, and company level.

PARIS AGREEMENT

The Paris Agreement is a legally binding international treaty on climate change that was adopted by 196 parties at the 2015 United Nations Climate Change Conference. The purpose and goal of this agreement is to limit the global temperature increase to 1.5°C by 2100. In support of their international commitments to take climate action, the signatory countries communicated their nationally determined contributions (NDCs) to reduce greenhouse gas emissions and ultimately build resilience to adapt to the rising temperatures.

Countries like the United States and Canada have been working to reduce their footprint by implementing more sustainable and climate-conscious initiatives. The United States committed to reducing greenhouse gas emissions by 50–52% by 2030 (compared to 2005) by deploying zero-carbon solutions, creating jobs in low-carbon economies, and supporting the development of low-carbon technologies. Canada committed to reducing its contributions to greenhouse gas emissions by 30% by 2030 by pricing carbon pollution, phasing out coal-fired electricity, and investing in green infrastructure and clean technology.

CLIMATE-RESILIENT BUILDINGS AND CORE PUBLIC INFRASTRUCTURE INITIATIVE (CRBCPI)

The Climate-Resilient Buildings and Core Public Infrastructure initiative was a five-year partnership between the National Research Council of Canada (NRC) and Infrastructure Canada. Instituted in 2016, CRBCPI was intended to help ensure Canada's existing and new buildings and public infrastructure were more resilient to the effects of climate change and extreme weather events. Through this initiative, the NRC and Infrastructure Canada led the development of new and revised codes, standards, specifications, guidelines and decision support tools. This initiative was in direct support of the Pan-

Canadian Framework on Clean Growth and Climate Change, which was built to meet Canada's international commitments for climate action.

In support of this initiative, and by using data in a predictive way, UL Standards & Engagement published 23 National Standards of Canada (NSCs) to support standards users in understanding and applying requirements related to climate change adaptation. These product standards covered areas related to public infrastructure, including lime thermal insulation and fuel tanks. The updated requirements were designed to adapt to future impacts of climate change such as extreme heat, increased severe weather events, and rising sea levels.

THE UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS

In 2015, the United Nations and its member states adopted the 2030 Agenda for Sustainable Development, a comprehensive, far-reaching, and people-centered set of universal and transformative goals and targets intended to be achieved in three balanced and integrated dimensions: economic, social, and environmental. This agenda set a 15-year global framework centered on an ambitious set of 17 sustainable development goals (SDGs), with the vision of a secure world free of poverty and hunger, access to education and health, gender equality and women's empowerment, and reduced negative impacts on our environment.

At ULSE, we understand the importance of international collaboration and standardization. More importantly, we are acutely aware of the role we play in addressing our world's greatest challenges through the support of international commitments like the 2030 Agenda for Sustainable Development. In 2022, we prioritized support of the 2030 Agenda by aligning our standards catalog and standards development process with its 17 SDGs to help advance these critical goals. While the success of these goals will re-

quire dedicated collaboration from a multitude of industries, our standards can help improve and strengthen existing sustainability efforts and also support and encourage investing into new sustainability initiatives and technologies.

ULSE has published more than 1,700 standards and other documents, with 50 standards for sustainability. Although these standards were not developed with the SDGs in mind, the majority of them still directly or indirectly align with these goals.

To better understand the relationship between our standards portfolio and the SDGs, we conducted quantitative and qualitative analyses to identify the correlation between each of our standards and the SDGs. We discovered more than 950 individual cases in which a UL standard supports one or more SDGs. We also found at least one standard that supports each of the 17 SDGs. The SDGs with the most associations were the following:

SDG 11, Sustainable Cities and Communities;
SDG 7, Affordable and Clean Energy;
SDG 12, Responsible Consumption and Production;
SDG 9, Industry, Innovation and Infrastructure; and
SDG 13, Climate Action.

In addition to understanding how our standards portfolio supports and impacts the SDGs, this research will also help us identify new opportunities for standards development. We are committed to advancing the security, safety, and sustainability of our world by putting safety science into action. We will continue to research how our standards portfolio can support and advance the UN 2030 Agenda for Sustainable Development and its Sustainable Development Goals; more importantly, we will continue to communicate and be transparent with the public on our sustainability efforts.

We are also evaluating potential options for integrating the UN SDGs into our standards development process and establishing a new

precedent for discussing SDGs and their individual targets in our conversations. To learn more about our initiative to support the UN SDGs, visit ULSE.org to read “The UN Sustainable Development Goals and UL Standards & Engagement: A Report.”

CONCLUSION

Rising sea levels, changing landscapes, and natural disasters are only a few examples of the impacts of climate change. If we don't act, climate change has the potential to cause irreversible harm to our environment and our health. We need to adapt to our changing climate, and standardization is an important tool that can help implement mitigation tactics to reduce the risk of climate change. Standardization at the local and international levels can help ensure trust and integrity in greenhouse gas mitigation efforts and new and emerging technologies that are sustainable and climate conscious. As standards developers, it is crucial that we take accountability and initiative to address the impacts of climate change through our work.

Standards developers can leverage international frameworks to help guide and support the implementation of impactful climate solutions for slowing global temperature rises and reducing greenhouse gas emissions. We can also use international standards development efforts to help guide and shape our own national climate change-related standards initiatives, leading to consistency across regions and eliminating obstacles to trade. Standards developers can also invest in research and innovation for new technologies to reduce greenhouse gas emissions, increase efficiencies, and reduce waste, while continuing to support our needs and standards of living. Lastly, we can explore how our existing portfolios of standards impact climate change and we can re-evaluate their requirements to consider the associated environmental and health risks. If you would like to take part in these initiatives, please visit ULSE.org/get-

involved to learn how you can get involved in our standards development process.

REFERENCES

- Bucci, L., L. Alaka, A. Hagen, S. Delgado, and J. Beven. 2023. *Hurricane Ian (AL092022)*. *National Hurricane Center Tropical Cyclone Report*. Washington, D.C.: U.S. Department of Commerce, National Oceanic and Atmospheric Administration.
- CAL FIRE. 2022. *2022 Incident Archive*. Sacramento, Calif.: State of California.
- Carrington, D. 2021. "UN global climate poll: 'The people's voice is clear – they want action.'" *The Guardian*, 27 January.
- En-ROADS Climate Solutions Simulator (v23.2.1). Additional Deaths from Extreme Heat. Climate Interactive.
- Intergovernmental Panel on Climate Change. 2023. Synthesis Report of the IPCC Sixth Assessment Report (AR6). United Nations Framework Convention on Climate Change.
- Lakritz, T. 2019. These 11 sinking cities could disappear by 2100. *Geneva: World Economic Forum*.
- Marlon, J., L. Neyens, M. Jefferson, P. Howe, M. Mildenerger, and A. Leiserowitz. 2022. *Yale Climate Opinion Maps 2021*. New Haven, Conn.: Yale Program on Climate Change Communications.
- National Weather Service. 2023. NWS Preliminary US Flood Fatality Statistics. La Crosse, Wisc.: *Weather Forecast Office*.



Wathma Jayathilake is a standards scientist at UL Standards & Engagement, where she is responsible for driving human health and safety considerations in standards. She works to identify hazards and risk factors in the areas of human and environmental health and climate change to strengthen the technical rigor of ULSE standards. In 2023, Jayathilake presented on climate change and standardization at the SES Annual Conference.