SUSTAINABLE DEVELOPMENT

Link between United Nations Sustainable Development Goals and *CSA N286 Management System Requirements for Nuclear Facilities*

Enabling Sustainable Development through Standards





United Nations Sustainable Development Goals Addressed:

SDG 7 – Affordable and Clean Energy
SDG 8 – Decent Work and Economic Growth
SDG 9 – Industry, Innovation and Infrastructure, and
SDG 12 – Responsible Consumption and Production

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About CSA Group

CSA Group is a global organization dedicated to safety, social good and sustainability. We are a leader in North American Standards and in Testing, Inspection and Certification around the world. Our mandate is to hold the future to a higher standard. The mission of CSA Group's not-for-profit Standards organization is to enhance the lives of Canadians through the advancement of standards in the public and private sectors. We are a leader in standards research, development, education, and advocacy. The technical and management standards developed with our more than 11,000 members improve safety, health, the environment, and economic efficiency in Canada and beyond.



Prepared for CSA Group by Delphi

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Summary

The Sustainable Development Goals (SDGs) are a set of aspirational targets that aim to define global sustainable development priorities and mobilize efforts to address them in a comprehensive and integrated manner. Adopted by all United Nations (UN) member states in 2015, the 17 goals call for worldwide action among governments, businesses and civil society on issues including poverty, gender equality, water pollution and clean energy. The Canadian Standards Association, operating as CSA Group, a North American leader in standards development, has conducted research to demonstrate how standards can help organizations achieve their SDG-related objectives.

This case study examines how the CSA N286-12 (R2022) *Management System Requirements for Nuclear Facilities* ("CSA N286") can contribute to the achievement of the SDGs. Interviews with users of the standard and technical experts revealed that implementation of the standard could result in progress toward several SDGs (Goals 7, 8, 9, and 12). As the management standard is non-prescriptive in nature, many of the links to the SDGs were contingent on implementation and were therefore more indirect or enabling in nature.



1 Introduction

CSA Group identified an opportunity to raise awareness about the SDGs among standards users and explore how standards might help organizations achieve their SDG-related objectives. As part of this initiative, CSA Group conducted a mapping exercise in which CSA N286-12 (R2022) *Management system requirements for nuclear facilities* and other standards were mapped to the 17 SDGs and links were identified. This case study is written based on information gathered from publicly available sources (e.g., CSA Group and the United Nation's SDG websites), and on interviews with users and other experts of the standard. The goal of the interviews was to better understand how the standard is implemented in practice, providing for a better assessment of its contributions to the SDGs.

This case study explores how CSA N286 contributes to the achievement of the SDGs. The standard provides a consolidated framework for an integrated management system that includes health, safety, economics, environment, and quality requirements that previously resided in separate standards. It is a consensus standard that provides overall direction for developing and implementing sound management practices and controls for nuclear facilities in Canada. This standard applies to the top management with overall accountability for the nuclear facility and outlines a set of consistent management processes that should be in place. While safety is the primary objective of the standard, it is designed to help meet other business objectives as well.

Nuclear facilities licensed by the Canadian Nuclear Safety Commission are required to implement and maintain a management system as a license condition, the requirements for which are contained in CSA N286, *Management System Requirements for Nuclear Facilities.* As stated in CSA N286, a nuclear facility is defined as a business that includes uranium mining, uranium milling, uranium processing, fuel manufacturing, power production using a reactor, research using a reactor, particle acceleration, isotope processing, radioactive waste management, or radioactive waste facilities. The standard lists generic requirements that apply to all nuclear facilities, as well as specific requirements for uranium mines, uranium mills, uranium processing and fuel manufacturing facilities, high-energy reactor facilities, and research and isotope processing facilities.

Research conducted for this case study indicates a potential for the use of this standard to contribute to a range of SDGs. It supported a connection to SDG 9 (identified by CSA Group's mapping exercise), and uncovered additional connections to goals 7, 8, and 12. The extent of the contribution was frequently dependent on how individual organizations operationalize the requirements of the standard.

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SDG 7 – Ensure access to affordable, reliable, sustainable and modern energy for all.



SDG 8 – Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.



SDG 9 – Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.



SDG 12 – Ensure sustainable consumption and production patterns.

2 Results and Impact

2.1 Industry Use and Perception of Standards

Interviewees for this case study included sustainability leads and operations experts from nuclear facilities in Canada, as well as experts from the technical committee responsible for the development and maintenance of the standard. The standard was viewed by interviewees as a useful tool, providing the backbone of an integrated management system that drives expectations and behaviors for business activities (nuclear and non-nuclear activities). Interviewees consistently highlighted that while the standard provides a list of processes that need to be in place, it does not provide information on how the processes are designed. It allows flexibility for the organizations' business management team to determine *how* they will meet the objectives and requirements that are applicable to them, enabling them to design their processes in a manner consistent with their business objectives, requirements, complexities, and risk profile. Other CSA Group nuclear standards provide technical requirements and guidance that support the management system.

While the interviewees had not previously discussed links between CSA N286 and the SDGs, all were able to make connections and offer insights. All interviewees had a general understanding of the importance of sustainability initiatives and had varying levels of knowledge and experience with the SDGs. All organizations represented by interviewees had taken some action on Environmental, Social, and Governance (ESG) issues, but were at different stages in their sustainability journey.



2.2 Links to UN SDGs

The links to individual SDGs are outlined below. Some links were direct, while others were more indirect or enabling.

UN SDG 7 Energy: Ensure access to affordable, reliable, sustainable and modern energy for all

Target 7.1 *By 2030, ensure universal access to affordable, reliable and modern energy services.*

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While all interviewees perceived a strong link between their work and advancing clean energy, the direct link to CSA N286 was not as clear. However, it is reasonable to assume that a user of the standard related to nuclear energy generation could claim that they were contributing to this goal. The UN has proposed that progress towards this target be measured based on the proportion of the population with primary reliance on clean fuels and technology. There was a consensus among interviewees that nuclear is a non-carbon-emitting energy source. Many other organizations point to nuclear as a carbon-free electricity source that has avoided approximately 55 Gt of CO_2 emissions over the past 50 years[i]. Others have explicitly made the connection with SDG 7, and the potential for nuclear energy to contribute to this goal[ii]. Many believe that nuclear has a big role to play in the energy transition, for example by providing an emissions-free, reliable source of energy to support electrification[iii].

Target 7.a *By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology*

Interviewees emphasized the strong culture of collaboration that exists in the nuclear industry and can contribute to international cooperation on research and technology. This is addressed in CSA N286 including in requirements for continual improvement (Clause 4.13), sharing of experience (Clause 4.1.2), and use of experience (Clause 4.12). As evidence of the culture of collaboration, one interviewee spoke about a time when they observed potential flaws in a product. They reached out to peers for insights, who quickly shared relevant information that contributed to mitigating potential risks.

UN SDG 8: Decent work and economic growth: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

Target 8.8 *Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment.*



CSA N286 states that "Safety is the paramount consideration, guiding decisions and actions". Safety is defined in the standard as "A business objective directed at preserving and protecting workers, the public, the environment, and assets against harm resulting from known conditions, natural occurrences, malicious acts, accidents, and risks at a nuclear facility that causes radiological and non-radiological effect."

The interviews conducted highlighted the inclusive nature of this definition, pointing out that often when people think of safety, they think only of occupational safety. The definition of safety in CSA N286 is intended to protect not only workers, but the public and the environment. By using the definition of safety in CSA N286, the top management adopts that definition as well, meaning (according to one interviewee) that the C-suite is accountable for keeping people safe under that definition. This includes ensuring a safe and secure work environment for all. All interviewees emphasized the strong safety culture in the nuclear industry, supported by requirements in the standard including Clause 4.2 (safety culture), that would contribute to this target.

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UN SDG 9: Industry Innovation and Infrastructure: Build resilient infrastructure, promote inclusive and sustainable industrialization and fosterinnovation

> **Target: 9.5** *Enhancing scientific research, upgrade technological capabilities of industrial sectors in all countries, in particular developing countries, including by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending.*

Interviewees noted the potential indirect connections to SDG 9. For example, several interviewees highlighted their research and development activities on small modular nuclear reactors and next-generation nuclear facilities, and the contribution this research would make to resilient infrastructure. It was noted that the implementation of the management system led to increased research and development efforts, including attracting and retaining competent and qualified science and technology staff. The principles of continual improvement (Clause 4.13), use of experience (Clause 4.12), and sharing of experience (Clause 4.1.2) support this connection as well, as organizations are encouraged to analyze trends of causes and problems and seek opportunities to improve processes.

The supply chain and procurement management policies (e.g., Clause 5.4) laid out in CSA N286 also have the potential to upgrade innovation and technical capabilities in developing countries. One interviewee shared an example of procuring a part that required specialized production capabilities. Their team collaborated closely with a production facility in another country, in an attempt to help the organization enhance its management system and quality program to meet the necessary production and delivery requirements. This collaboration not only ensured the successful delivery of the part but also contributed to upgrading the technical capabilities of the facility.

UN SDG 12: Responsible consumption and production: Ensure sustainable consumption and production patterns

> **Target 12.4** *By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.*

There is a clear link with Target 12.4, reflected in the definition of safety outlined above and its inclusion of environmental preservation and protection. This would include the prevention of the release of wastes (including nuclear waste and others) into the environment at all stages of operation. In addition, the standard and Clause 9 specifically are applicable to the lifecycle of radioactive waste management facilities. Interestingly, this target is the only one that comes up in a search for "nuclear" in the Global Reporting Index SDG Compass[iv] tool, an online tool for businesses to link the SDGs to existing business activities. As an integrated management system standard, CSA N286-12 applies to environmental management. The standard also requires that design inputs be established, which includes environment considerations, interested and affected parties impact considerations, and decommissioning requirements (e.g., Clause 5.3.2), which could contribute to the sound management of wastes throughout the lifecycle.

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Target 12.6 *Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle*

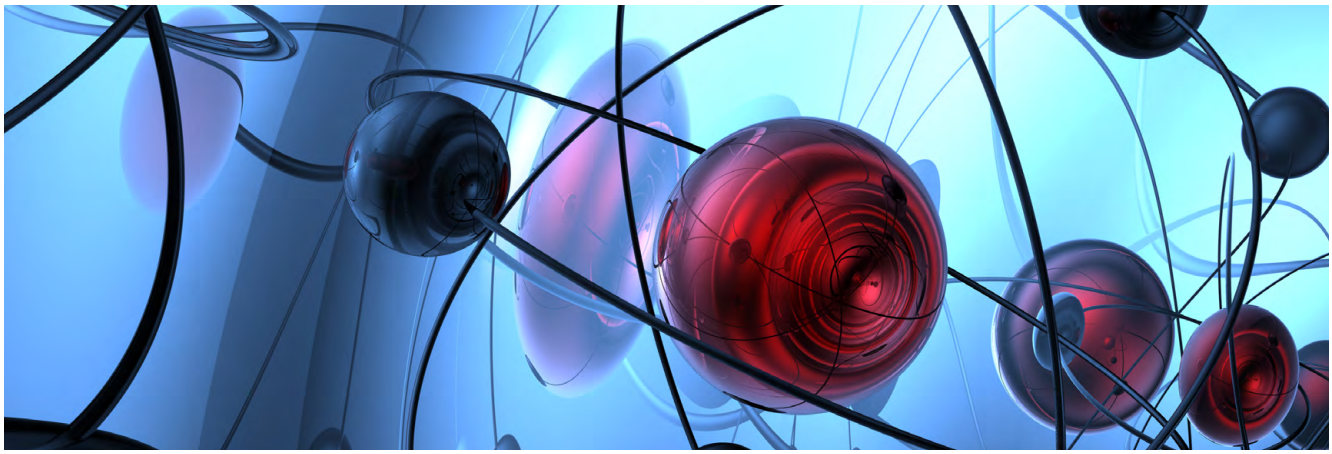
CSA Group identified Target 12.6 as a potential link in its SDG mapping exercise. The principles of continual improvement (Clause 4.13), sharing of experience (Clause 4.1.2) and the use of experience (Clause 4.12) could contribute to this goal when the shared/used experience and continual improvement is in the area of sustainability. The standard also covers integrated management systems, which include environmental management. Interviewees saw a potential connection, reflecting on their own adoption of sustainability practices, but the link to CSA N286 was perceived to be relatively indirect compared to other targets.

3 Discussion

There is strong potential to make connections between the use of CSA N286 and advancing the SDGs. Some connections to the SDGs are direct, where the adoption and implementation of the standard clearly align with specific SDG targets. Other connections are more indirect or enabling, supporting broader sustainability outcomes through improved processes and systems As the examples below illustrate, implementation of the standard can be customized to a great degree. CSA N286 is not prescriptive, which allows flexibility in the practices employed by the business for compliance with the applicable requirements. Examples of topics in the standard that may result in contributions to the SDGs are:

Example	Description
Business planning	Clause 4.3 on business planning requires that objectives, plans, measures and targets are established. Clause 4.5.1 specifies that the resources necessary to carry out the business plan shall be determined and provided. One interviewee described how this process informs their business planning and puts parameters around it, including KPIs connected to sustainability-related factors and the investment needed to achieve the desired outcomes. Depending on the priorities set by top management, this could be a cue to allocate more resources to initiatives that would have an impact on the factors that are adjacent or additional to the requirements under CSA N286– such as SDGs. One interviewee discussed an example in which, as a result of a high-level strategic initiative, a new goal related to environmental impact was added to the design change process. The screening form, which posed generic questions, was expanded to include more detailed questions on environmental impact. This change encouraged the consideration of alternative technology designs that would minimize the environmental impact during the design change process.
Awareness of changes in the business environment	The Standard states that companies must monitor changes in their business environment (Clause 4.13). One interviewee stated that having that requirement prompted their organization to pay attention to any changes in other standards and good practices internationally. The SDGs, including associated national targets, new regulations, or technological development, could represent changes in the business environment and lead to more direct SDG connections within the management system.
Engagement with interested and affected parties	There is a requirement in the Standard for changes to be reviewed by relevant interested and affected parties (Clause 4.10), and to consider impacts on these parties during process design (e.g. Clause 5.3.2). Interested and affected parties (term "stakeholders" used in the Standard) are referenced in the Standard as "those who have an interest in the performance of the business and can influence objectives". One interviewee reflected that the interested and affected parties that were typically involved included mainly nuclear power plant personnel who were consulted to get their input on how a change would affect their day-to-day operations. The same interviewee suggested that the group of "relevant" interested and affected parties has likely expanded to include other groups, such as Indigenous communities. Engagement with different interested and affected parties could enable a contribution to progress on other SDGs, for example, gender equality (SDG5), or good health and well-being (SDG3).

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Other standards: While users supported connections between the use of CSA N286 and many different SDGs, they also highlighted that the nuclear industry is very heavily regulated. As such, many of the activities related to SDGs are influenced more directly by other CSA Group standards or government regulations. The interviewees agreed that CSA N286 offers a solid framework, but significant contributions to the SDGs are more likely to come from other standards that are used in conjunction with CSA N286.

In addition to topics highlighted in this paper, users of the standard could indicate connections to the SDGs that result from the implementation of nuclear technology more generally, as the standard indirectly supports the use of this technology. By underscoring the principle that safety is paramount (Clause 4.1.2), the holistic definition of safety (Clause 2), and safety culture requirements (Clause 4.2), the standard upholds the priorities of preservation and protection of safety for workers, the public, the environment, and assets, which align with various SDGs (e.g., SDGs 8, 9, 11, 14, 15). In addition to the benefits mentioned above around carbon-free energy, nuclear technology can be used to create radioisotopes such as cobalt-60 that are used in food sterilization (SDG 2 Zero Hunger). Nuclear technology is used in many medical applications, including radiotherapy which helps treat and cure cancer (SDG 3 Good Health and Wellbeing). Nuclear technologies have been linked to the SDG goals in some way[v], and organizations should consider which contributions apply to their particular context. Users of the standard are encouraged to contemplate the impact of their activities in supporting the SDGs, regardless of whether they directly relate to the use of CSA N286.

4 Conclusions and Next Steps

When asked how CSA N286 could be modified to help users draw connections, some felt strongly that the SDGs (or sustainability in general) should be addressed more explicitly in the standard, without being prescriptive in how the standard could be implemented. For example, instead of "the organization shall be carbon-free by 2040", the standard could include requirements related to setting targets or including ESG factors in decision inputs. Interviewees also recognized the need for the standard to remain flexible enough so that it can be applied in different organizational contexts and remain relevant as technologies and business drivers change. In the context of ESG, there was an observation that the standard strongly addresses "G" (governance) aspects, "E" (environment) aspects to a lesser extent, but that the "S" (social) aspects were not clearly addressed. A final suggestion was to bring in some of the language (using similar terms or wording) from the SDGs to relevant sections of the standards to help strengthen the connections.

In conclusion, this study determined that the use of CSA N286 has the potential to contribute to several SDGs. The research conducted for this case study uncovered additional links to the SDGs beyond the links that were identified in CSA Group's initial mapping exercise. Overall, users were supportive of the idea of making better connections to the SDGs within CSA N286 and its management systems requirements.

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Endnotes

i International Energy Agency. Nuclear

ii International Atomic Energy Agency, n.d., Sustainable Development Goal 7: Affordable and clean energy

iii International Energy Agency, 2019. Nuclear Power in a Clean Energy System

iv SDG Compass, n.d. Inventory of Business Indicators

v World Nuclear Association, 2023. Nuclear's contribution to achieving the UN SDGs

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