2020 Voluntary University Review of the Sustainable Development Goals
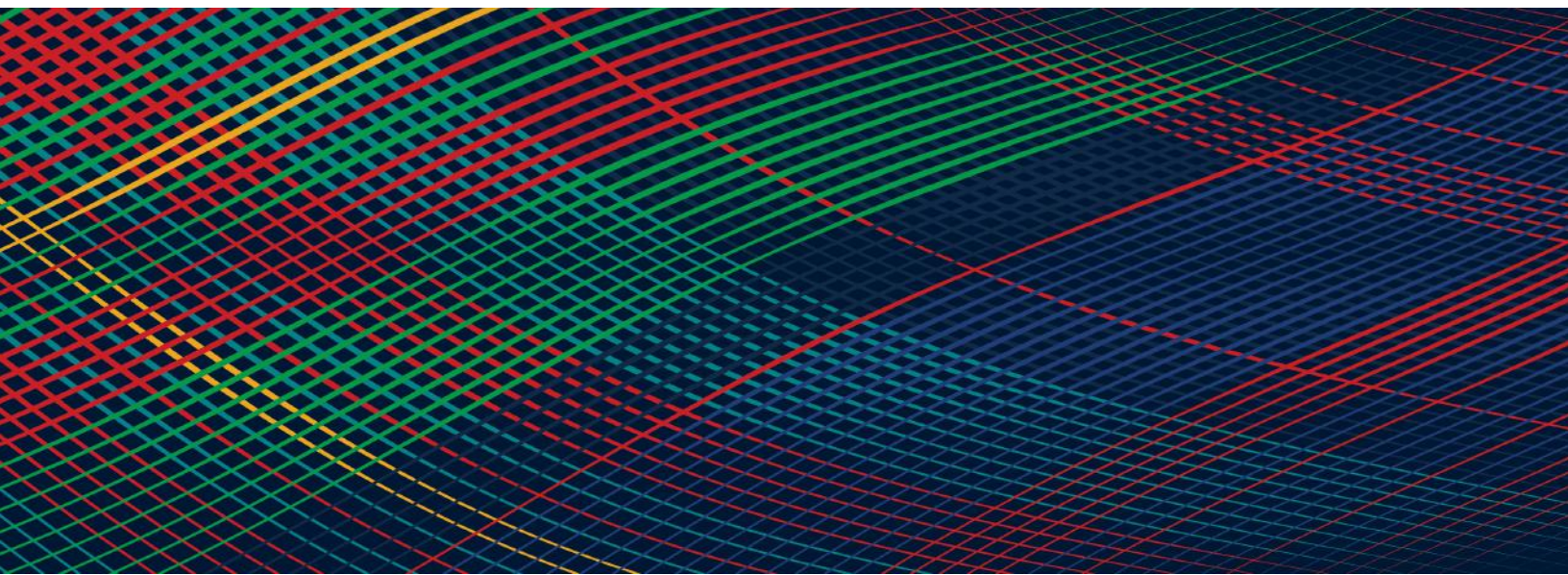
Carnegie Mellon University
Sustainability Initiative

Table of Contents

Table of Contents

1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE AND JUSTICE
17 PARTNERSHIPS FOR THE GOALS

#GlobalGoalsCMU

Opening Statement

Dear Colleagues and Community Members:

When Carnegie Mellon University (CMU) established the Sustainability Initiative in September 2019, we did so with the explicit recognition that at its core, sustainability, even when focused on our environment, is about equity and inclusion.

CMU has long supported sustainability activities through education, research, and practice at our campuses across the globe. The Sustainable Development Goals, also known as the Global Goals, came together following input from millions of people around the world, and were adopted by the international community at the United Nations in 2015. The Global Goals provide a universal framework to discuss and take action on issues of shared concern.

While countries and cities around the world are using the Global Goals to identify challenges they face and engage in action to make our world more just and equitable, CMU's Voluntary University Review (VUR), the first in the world, sends a strong signal that universities are also a critical partner in achieving these 17 ambitious goals by 2030.

Our intention is for CMU's VUR to be a framework for us to track what we are doing across the 17 Global Goals and where we might find opportunities to do more. We also hope that by issuing this VUR, we will spark action at other institutions of higher education to do the same. We recognize that this first VUR is a starting point, a stepping stone, to an iterative learning process. With our initial VUR now complete, we welcome and look forward to continued and enhanced engagement on the Global Goals from the CMU community and community partners, as well as from the higher education community at large.

A unique contribution of universities is that we are educating many young people, the next generation, who will carry forward this objective to create a more equitable and sustainable planet by 2030. Embracing the Global Goals now in our missions of education, research, and service/practice will help ensure that the next generation is prepared to address the world's greatest challenges.

I want to thank the hundreds of students, faculty, and staff who engaged in this VUR process, and in particular, the Sustainability Initiative Steering Committee and Advisory Council for their leadership.

Our commitment to the Global Goals and VUR process will leverage our education, research, and practices to help shape a more sustainable and equitable future for all.

James H. Garrett
Provost, Carnegie Mellon University

Executive Summary

With the Sustainability Initiative launched in September 2019, Carnegie Mellon University (CMU) has committed to enhancing CMU's goals for education, research, and practice within the framework of the Sustainable Development Goals (SDGs). The Sustainability Initiative is building on more than two decades of CMU's engaged effort in support of the broader definition of sustainability afforded by the SDGs. To contribute to the advancement of the SDGs at CMU, Provost James H. Garrett Jr. established a Sustainability Initiative Steering Committee, an Advisory Council, and made six public commitments, including conducting a Voluntary University Review (VUR) with the results to be published in September 2020.

As a university, we have a particular commitment to educate the next generation, to create knowledge, and to lead by example. Undertaking these efforts using the framework of the SDGs will help advance collective action on this ambitious agenda. We are pleased to do this through our association with a number of university networks on sustainable development. Undertaking a VUR is yet another indication of our commitment. While adapted for the university setting, this VUR is in line with how countries and cities and regions are communicating about their SDG work — through annual voluntary reviews.

Following the initial planning for the VUR in Fall 2019 in collaboration with the Advisory Council, in January 2020, the CMU Sustainability Initiative hired an executive fellow and launched a range of activities to engage the CMU community in discussions about the SDGs. Communications efforts included a podcast and several articles in the CMU community publication, *The Piper*, and dissemination of information about SDG-related activities occurring on campus. The Sustainability Initiative also established a web page and sustainability@cmu.edu, an email address for all sustainability-related questions and suggestions.

II. Executive Summary

In February 2020, Provost Garrett distributed a Knowledge, Attitude, and Practice survey to take stock of the CMU community's understanding of and interest in the SDGs. Also, an interactive SDG exhibit was launched in the Cohon University Center. Additional activities included conducting a 17 Rooms exercise, following on the flagship effort by The Brookings Institution and The Rockefeller Foundation, to help gather information on the SDGs at CMU.

The VUR was conducted during summer 2020 by a team that included the Steering Committee, the executive fellow, a project administrator, a research associate, a sustainability intern, and seven students enrolled in a 2020 summer project course. The Advisory Council provided additional input, and members of the CMU community were consulted throughout the process.

The V in the VUR is critical to understand; this effort is completely voluntary, and the team is grateful to those community members who shared information. To clarify what is being reviewed in the VUR, CMU is not measuring CMU activities as United Nations Member States do yearly through the Voluntary National Reviews; those metrics — targets and indicators — were developed for implementation at the national government level (and in some cases adapted for the local government level). However, the team did refer to the SDG targets to develop thematic issues for each SDG, which helped refine the analysis. While conducting the VUR, the team recognized that there is no systematic or comprehensive process in place (yet) to collect information on CMU's education, research, and practice as it relates to the SDGs. Rather, the team developed a process to track current activities based on consultations, an analysis of courses and research publications, and a review of CMU information submitted to the Association for Advancement of Sustainability in Higher Education (AASHE) and other reports, all done with a spirit of creativity and a large dose of humility. The global pandemic further underscored the importance of remaining flexible throughout the VUR process.

Through desk research and engagement with CMU students, faculty, and staff, the team reviewed education, research, and practice activities to develop a snapshot of current and recent SDG-related activities. To analyze CMU's curricular offerings, the team reviewed 2,938 courses offered in spring 2020 as a one-semester sample. The research activity evaluation was based on 995 CMU publications in archival literature from 2018 to 2020 identified as sustainability-related with the aid of a bibliographic tool. The practice category includes activities undertaken by the university or by individuals at the university that are not directly related to coursework or research, which the team identified through existing reports, support centers, and policies. Additionally, the team analyzed articles published by the CMU communications group and student organizations and mapped these to particular SDGs. Each of the activities/items identified in the education, research, and practice areas was mapped to a single SDG deemed to be of primary relevance.

To complement information collected through the desk research, the team also engaged directly with CMU students, faculty, and staff. In addition to supporting desk research and analysis for the VUR, the seven summer project course students conducted outreach to student organizations to investigate how their activities related to the SDGs.

Figure II-1: Summary of Recent SDG-Related Education, Research, and Practice Activities at CMU from Analysis of Coursework, Research Publications, and Practices

With this initial VUR, the team did not attempt and does not claim to have developed a comprehensive compilation of SDG-related education, research, and practice activities at CMU. This initial compilation will be supplemented by additional information provided by CMU community members over the coming academic year. That said, even with caveats and the acknowledged limitations of the initial inventory effort, the compiled data and information provide useful and informative insights into SDG activity at CMU. It also highlights areas where there are opportunities to do much more. Substantive contributions and progress will require serious interest and proactive initiatives at all levels of the university. This analysis provides a foundation for planning and implementing actions across the CMU community.

Key Findings

Through the initial analysis of education, research, and practice related to the SDGs, the team identified CMU activities that addressed each of the 17 goals. There was a greater level of activity in certain SDGs, as revealed in the analyses of research, education, and practice. Nevertheless, the diversity of sustainability-related activities identified at CMU is not a result that was obvious when beginning the VUR.

Additionally, the team identified linkages among people and activities at CMU not previously recognized. Groups working on specific SDGs at CMU did not know about each other's work. For example, faculty members at the Heinz College of Information and Public Policy using the SDGs had not previously connected with one another; researchers from different disciplines shared a common focus on a problem but with different ways of addressing the issues.

While the SDG awareness levels were low at the start of the VUR process, engagement increased following the Knowledge, Attitude, Practice survey, the SDG exhibit in the Cohon University Center, and the 17 Rooms exercise. However, it is clear that there is still much room for expanded awareness in the CMU

community about the wide range of issues addressed by the SDGs. Additionally, engagement with CMU campuses around the world was limited and needs to be expanded. Just from the initial VUR engagement efforts conducted over several months, it is clear that with continued SDG awareness elevation and engagement, CMU has an opportunity to strengthen linkages among those working on issues within and beyond environmental sustainability to include goals related to creating a more peaceful, just, and inclusive community.

Education

The SDGs mapped to the largest number of courses were SDG 4 (Quality Education), SDG 9 (Industry, Innovation, and Infrastructure), and SDG 11 (Sustainable Cities and Communities). The majority of SDG 4 (Quality Education) courses were related to increasing the number of youth and adults with relevant skills for employment and entrepreneurship. The SDG 9 (Industry, Innovation, and Infrastructure) courses were primarily engineering courses, computer science courses, and biomedical and data science courses. For SDG 11 (Sustainable Cities and Communities), many arts courses were included due to the target related to protecting cultural and natural heritage. Courses also addressed work directly on sustainable cities, which is a feature at CMU. The smallest number of courses addressed SDG 1 (No Poverty), SDG 2 (Zero Hunger), and SDG 6 (Clean Water and Sanitation).

Research

Using the beta version of the "Dimensions" tool, a software product involving an artificial intelligence algorithm that performs automated SDG tagging of research articles, the team found that the SDGs mapped to the largest number of CMU research publications since 2018 were SDG 3 (Good Health and Well-being), SDG 7 (Affordable and Clean Energy), and SDG 13 (Climate Action). The fewest publications were tagged with SDG 1 (No Poverty), SDG 6 (Clean Water and Sanitation), and SDG 17 (Partnerships for the Goals). Based on information collected in the 17 Rooms exercise, the team identified additional research publications that were not tagged to any goal by Dimensions despite being directly relevant to those topics. While the Dimensions tool has limitations, it did enable a somewhat comprehensive investigation of recent CMU research published in academic journals.

Practice

In regards to practice activities, the SDGs with the largest number of activities were SDG 4 (Quality Education), SDG 8 (Decent Work and Economic Growth), and SDG 16 (Peace, Justice, and Strong Institutions), while limited numbers of activities were identified for SDG 1 (No Poverty), SDG 6 (Clean Water and Sanitation), and SDG 17 (Partnerships for the Goals). Many of the activities are cross-cutting and address a range of SDGs, but this initial analysis focused on assigning one SDG to each activity. Further research and mapping would likely uncover practice activities that contribute to multiple goals.

Across all three of the mission categories, activities related to SDG 4 (Quality Education) and SDG 8 (Decent Work and Economic Growth) were most numerous, perhaps unsurprising for an educational institution that employs many people. Activities related to SDG 11 (Sustainable Cities and Communities) also were identified abundantly across the three mission categories, reflecting CMU's urban presence and long-standing urban focus in education, research, and practice, as well as the many arts initiatives, as the protection of the world's cultural heritage is also addressed in SDG 11.

Next Steps

Over the coming academic year, the CMU Sustainability Initiative team intends to deepen its analysis of SDG implementation by investigating and engaging more sources of information for education, research, and practice activities and incorporating feedback mechanisms to validate findings.

The team will also seek opportunities to strengthen coordination and engagement within the CMU community, within the locations where CMU operates, and with other entities committed to achieving the SDGs. The team will organize another iteration of the 17 Rooms exercise (potentially in person), and will conduct a follow-up Knowledge, Attitude, and Practice survey to determine if the CMU community's engagement with the SDGs has increased since the VUR process began in early 2020. The results from these activities will inform future engagement efforts. The team will also strengthen engagement with student organizations and expand consultations to include CMU alumni.

The VUR is intended to provide a foundation for individuals, academic units, administrative units, operational units, and institutes to plan education, research, and/or practice activities that can enhance CMU's contributions to the SDGs. The team will work with interested university units at all CMU campuses and with the university leadership to help identify opportunities based on the results of the VUR and its continuing refinement.

This VUR is part of an ongoing process for CMU to assess and strengthen its education, research, and practice activities using the framework of the SDGs. A significant, ongoing effort is required to ensure that systems are put in place to collect and analyze information rather than relying on individuals coming forward with information. By doing so, CMU can use the SDGs as a common framework to discuss shared challenges and solutions both internally and with other institutions committed to the SDGs.

Are you working on an activity at CMU that contributes to the Global Goals? If so, we want to hear from you. Please convey the details or request a meeting to discuss your activity by sending an email to sustainability@cmu.edu.

The SDGs in Context: From Global to Local

The Sustainable Development Goals, also known as the SDGs or the Global Goals, were adopted by all countries during the United Nations (UN) General Assembly in September 2015 and run through December 2030. The agenda emerged following a three-year process. It included recommendations from millions of people — with young people being the most engaged — from around the world as well as lengthy negotiations in capitals and at the UN. Indeed, the full history of how these goals came together has yet to be written, but when it is, it will be full of heroes who stood firm on what needed to be included, whether they were scientists, community organizers, CEOs, environmental activists, athletes, ambassadors, or artists. In other words, rather than think of them as the UN SDGs, the SDGs ought to be thought of as the Global Goals or Our Goals.

These 17 Goals represent a paradigm shift in how we think about and work on sustainability — namely the agenda includes issues related to the environment and climate but goes far beyond to include conceptions of equality and governance. The SDGs encompass the "triple bottom line" of environment, economics, and equity in a comprehensive manner. The SDGs also represent a paradigm shift in how we think about development — it happens everywhere and not just in the Global South. These Global Goals provide a framework for more just, equitable, and livable communities, regions, and nations. They focus on wide-ranging issues, including reducing violence, ending extreme poverty, promoting equitable education, increasing gender empowerment, fighting inequality and injustice, advancing economic growth and decent work, and preventing the harmful effects of climate change, all by 2030.

Any individual or organization that is committed to a more sustainable, peaceful, just, and inclusive world should take notice of and do what they can to advance the SDGs. As a university, we have a particular commitment to educate the next generation and to generate knowledge. Doing both with the SDGs as

guide posts will help advance collective action on these Global Goals. We are pleased to do this through our association with a number of university networks on sustainable development such as the University Global Coalition (UGC), the Sustainable Development Solutions Network (SDSN), and the AASHE. Undertaking a VUR is yet another expression of our commitment. While adapted for the university setting, it is in line with how countries and cities and regions are communicating about their SDG work — through annual voluntary reviews.

This ambitious agenda is time sensitive and urgent; the global pandemic has exposed the inequities that characterize so many communities and elevated the importance of engaging the development of communities everywhere — from Pittsburgh to Kigali to Doha — so that no one is left behind. The value proposition of the SDGs, like their predecessor, the Millennium Development Goals that ran from 2000 to 2015, is that when communities come together through collective action to achieve a particular goal, such as reducing maternal mortality, significant progress can be made. Imagine what that would be like in terms of reducing systemic racism, health inequities, or economic disparities.

The way that the international community communicates about the SDGs is in part through a process and a product called a Voluntary National Review (VNR). All countries are invited to present their VNR in New York City at the UN to document progress toward achieving the Global Goals. Member states gather each year in July at the UN High Level Political Forum on Sustainable Development and in September at the General Assembly to review progress. It is worth noting that to date more than 150 countries have reported out their progress, some multiple times. The United States is the only country in the Organization for Economic Co-operation and Development (OECD) and only G20 country that has not yet submitted a VNR.

Since the SDGs were adopted, many people around the world have come to recognize that localities below the level of the national or federal government play a critical role in advancing the SDGs. Moreover, the specific role of the UN is rather limited; more of a convener than an implementer in making progress on the SDGs. Real action on the SDGs needs to happen at the local level. To that end, in 2018, New York City became the first city in the world to voluntarily report on its progress on the SDGs, highlighting the critical role that sub-national entities play in achieving the agenda. Alexandra Hiniker, now executive fellow with the Carnegie Mellon Sustainability Initiative, conceived of and designed what she termed a Voluntary Local Review (VLR) for New York City, and oversaw the VLR process for the city. Today, cities and localities as diverse as Hawaii and Helsinki, Buenos Aires and Pittsburgh, Accra and Los Angeles have committed to doing their own VLRs.

At the same time, it has been increasingly recognized that universities have a critical role to play in advancing the SDGs in terms of teaching the many aspects of sustainable development, conducting research on what works or does not work, as well as tracking how we engage sustainable development in our own personal and professional lives through practice. Sustainable development at its core is a way of looking at and living in the world that adds complexity but also nuance and texture: it is about understanding the impact on communities of all public and private sector decisions, e.g., how the placement of a factory can drive health outcomes, or a transport system can double down on racial inequities.

In 2019, Provost Garrett committed CMU to undertake a VUR. There is no blueprint to follow. Countries and cities offer something of a model but universities are engaged in an entirely different and more focused enterprise. This first VUR is an unprecedented opportunity to map what is already going on at CMU to the SDGs through our education, research, and practice. This first effort — conducted during a global pandemic, a historic economic crisis, and a growing international movement for racial justice — makes us realize how urgent the Global Goals are in this decade of action and how relevant it is for the recovery process of what the UN first called "building back better," or perhaps more aptly, building forward differently. Moreover, just as a VNR is not a report of or for a president and a VLR is not a report of or for a mayor, the VUR is not a product of or for the provost. It is for each individual, for units within the university, and for the entire university community.

The VUR is an internally produced, community effort, with input from students, staff, and faculty. The VUR can help surface previously hidden, common interests and can contribute to shared interdisciplinary contributions. If you have been heavily engaged with the SDGs, we thank you for your effort to date. If you have not yet become familiar with the framework, you are invited to learn more. No matter your passion, interests, or goals, you are likely to find alignment with at least some of the SDGs. Going forward, as the team continues to build the next VUR and develop individual and collective actions based on the information in it, we hope you will help us make progress! To share your ideas or request a meeting to learn more, send an email to sustainability@cmu.edu.

Sustainability at CMU: Steps Leading to the VUR

CMU is a private, internationally ranked research university with programs in areas ranging from science, technology, and business, to public policy, the humanities and the arts. More than 14,000 students in the university's seven schools and colleges benefit from a small student-to-faculty ratio and an education characterized by its focus on creating and implementing solutions for real problems, interdisciplinary collaboration, and innovation. CMU's mission is to create a transformative educational experience for students focused on deep disciplinary knowledge; problem-solving; leadership, communication, and interpersonal skills; and personal health and well-being.

In addition to the Pittsburgh campus, CMU offers degree programs in various locations around the world. The university has a branch campus in the Middle East, CMU in Qatar, which offers several undergraduate programs, and graduate-level campuses for engineering programs in Silicon Valley and Rwanda. The Tepper School of Business and Heinz College of Information and Public Policy maintain satellite centers in downtown Manhattan and Adelaide, Australia. Heinz College, the Institute for Politics and Strategy, and the Department of Engineering and Public Policy host centers in Washington, D.C., as part of degree programs, research, and government affairs initiatives.

With the Sustainability Initiative launched by Provost Garrett in 2019, CMU is building on more than two decades of an engaged effort in support of the broader definition of sustainability afforded by the Sustainable Development Goals (SDGs). As a university, we have a particular commitment to educate the next generation, to create knowledge, and to lead by example. Undertaking these efforts using the framework of the SDGs will help advance collective action on this ambitious agenda.

As the concepts of sustainability and sustainable development emerged in the 1990s, especially after the publication of the 1987 report of the World Commission on Environment and Development titled "Our Common Future," various education, research, and practice initiatives were developed at Carnegie Mellon. A prominent example was the establishment of the Green Design Initiative, a research collaboration of CMU's College of Engineering and the Graduate School of Industrial Administration, now known as the Tepper School of Business. In addition, the Environmental Institute was established, and in 2004 it became the Steinbrenner Institute for Environmental Education and Research. Courses related to sustainability were developed in all CMU colleges and schools.

In 1999, former CMU President Jared Cohon charged the Environmental Practices Committee with developing a plan for an expanded environmental practices program on campus to increase environmental awareness on campus and as a means of informal environmental education. The Environmental Practices Committee identified areas of opportunity through study of the current state of environmental practices on campus, initiatives at other college campuses, and discussions with various CMU constituents.

Now called the Green Practices Committee, this group of faculty, staff, students, and administrators aims to develop university practices that improve environmental quality, decrease waste, and conserve natural resources and energy. Through these efforts the university can serve as a study site, a test bed, and a model for progressive and responsible practices. The Green Practices Committee works in coordination with the Staff Council Sustainability Committee, the student club Sustainable Earth, the Faculty Senate, and other campus organizations to involve staff, students, and faculty in supporting the university's green initiatives. Additionally, the Green Practices Committee runs Scotty Goes Green, a voluntary, self-guided initiative that promotes a high standard for environmental practices at CMU.

CMU also participates in higher education networks focused on sustainability. Through the Green Practices Committee, CMU has been very engaged with the Association for the AASHE since its founding in 2006. CMU joined the AASHE Sustainability Tracking, Assessment and Rating System (AASHE STARS) effort when it was established in 2009 and committed to the International Sustainability Campus Network (ISCN) framework in 2010. Since 2011, CMU has submitted reports with data on various sustainability performance metrics to AASHE STARS and currently holds a Gold rating.

Over the past decade, there has been growing interest from students, faculty, and staff at CMU in expanding sustainability activities in education research, and practice. Members of the 2018-2019 Faculty Senate Ad Hoc Committee on Sustainability, CMU's Green Practices Committee, and a number of student organizations and classes have provided ideas and recommendations for the future of sustainability activities at CMU.

In December 2017, students in a project course by the departments of Engineering and Public Policy (EPP) and Social and Decision Sciences (SDS) published the report of their work on "Pittsburgh to Paris: Reducing the Carbon Footprint of Carnegie Mellon University." The report focused primarily on the greenhouse gas (GHG) emissions generated by CMU's Pittsburgh campus. Through exploring the four topics of heating, electricity use, transportation, and non-energy systems, the report assessed the current CMU GHG emissions profile and made recommendations for how the university can meet different emission

targets. The highest-level recommendations were to change university-wide practices and to adapt to a more sustainable framework as an institution and line up with SDG 6 (Clean Water and Sanitation), SDG 12 (Responsible Consumption and Production), and SDG 13 (Climate Action). Students involved with the study brought their findings and recommendations to student government units, the Green Practices Committee, and the Faculty Senate.

In fall 2018, students in another EPP-SDS project course published "Sustainability at CMU: A Path Forward," which identified actions and activities at CMU on a range of sustainability topics and compared them to those of peer institutions to develop recommendations for CMU. The study analyzed CMU's actions related to campus buildings, water and waste management, transportation, education and research, social and behavioral dimensions, economic and financial aspects, and organizational structures. The overall recommendation from the study was to create a sustainability office to organize and oversee university sustainability efforts, with a focus on SDG 7 (Affordable and Clean Energy), SDG 11 (Sustainable Cities and Communities), and SDG 12 (Responsible Consumption and Production). The report also touched on SDG 4 (Quality Education) and SDG 9 (Sustainable Infrastructure) through recommendations to increase education and research initiatives on these topics.

Motivated by the call-to-action from the students who led the EPP-SDS project courses, a Faculty Senate Ad Hoc Committee on Sustainability was formed in 2018 to review the history of sustainability education, research, and practice at CMU and to develop recommendations for the next level of sustainability activities at CMU. The Ad Hoc Committee published "The Future of Sustainability, Education, Research, and Practice at CMU" in February 2019. The purpose of the report was to summarize current work and propose recommendations for leadership to advance sustainability efforts at CMU. The report described how many sustainability-related activities exist at CMU but in a decentralized manner, consistent with the university culture at Carnegie Mellon. The Ad Hoc Committee report presented and discussed various options for coordinating and leveraging these activities for a more unified representation and impact of CMU's sustainability activities. The topics addressed in the report primarily relate to SDG 4 (Quality Education), SDG 6 (Clean Water and Sanitation), SDG 7 (Affordable and Clean Energy), SDG 12 (Responsible Consumption and Production), and SDG 17 (Partnerships for the Goals).

In the 2018-2019 period when the EPP-SDS students were engaging students and faculty across the university with their project course findings, and the Ad Hoc Faculty Senate Committee was doing its work, other units at CMU were discussing sustainability challenges and solutions using the framework of the SDGs. In October 2018, at a Global Symposium in honor of CMU President Farnam Jahanian's investiture, Ambassador Sarah Mendelson, Head of Heinz College in Washington, D.C., and Distinguished Service Professor of Public Policy, discussed the importance of the SDGs for the university community and the role that universities have to play educating the next generation of sustainable development experts. In November 2018, along with the Brookings Institution, Ambassador Mendelson organized a public event in Washington, D.C., with city officials from Los Angeles, New York, and Pittsburgh to explore how the SDGs can help solve economic, political, and environmental challenges to their cities and for their residents.

On April 25, 2019, Heinz College and Brookings again convened on the SDGs, this time along with the city of Pittsburgh. The public panel was moderated by Ambassador Mendelson, and included Mayor Bill Peduto, the city of Pittsburgh; Jerry MacCleary, then-chairman and CEO of Covestro LLC; and CMU Heinz

College alumna Leah Lizarondo, co-founder and CEO of 412 Food Rescue. Anthony Pipa of the Brookings Institution also shared reflections on SDG implementation beyond Pittsburgh. In brief, the panelists noted the value proposition of the SDGs for city officials around the world, the private sector, and the NGO community, providing a common frame to tackle deep societal issues. Following the public panel, there was a closed roundtable with representatives from New York City, the city of Orlando, and the city of Pittsburgh about their respective efforts to implement the SDGs at the city level.

Leadership Decisions and Processes to Advance the Sustainable Development Goals

In response to the recommendations from the EPP-SDS students, the Faculty Senate Ad Hoc Committee and the programs at CMU discussing the SDGs, in June 2019, Provost Garrett established a steering committee to explore options to elevate CMU's sustainability efforts in education, research, and practice. The Sustainability Steering Committee co-chairs are David Dzombak, Hamerschlag University Professor and head of the Department of Civil and Environmental Engineering; Steve Guenther, University Engineer and assistant vice president of Facilities Management and Campus Services; and Sarah Mendelson, Distinguished Service Professor of Public Policy and head of Heinz College in Washington, D.C. They have met weekly since June 2019.

In summer 2019, Provost Garrett also created the Sustainability Advisory Council, a group of CMU faculty members, administrators, staff, and students, to provide advice to the Sustainability Steering Committee and the provost on opportunities regarding CMU's goals for education, research, and practice within the framework of the SDGs. The Sustainability Advisory Council meets monthly.

During the 74th United Nations General Assembly in September 2019, at a meeting co-sponsored by the UN Foundation and Brookings, Provost Garrett joined Pittsburgh Mayor William Peduto and leaders from Chatham University, the University of Pittsburgh, and The Pittsburgh Foundation to highlight regional accomplishments to advance the SDGs. The convening was part of a larger conversation about U.S. leadership on the SDGs. At this event, Provost Garrett announced that CMU was committed to educating, empowering, and aligning our community around the world to help address the SDGs, and to developing a VUR of how CMU education, research, and practice align with the SDGs. He shared the following six commitments:

- We commit to educate CMU students around the world about the SDGs, recognizing that this framework applies to all of us and represents a special opportunity to create a more peaceful, prosperous planet with just and inclusive societies.

- We commit to help solve pressing problems brought to light by the SDG framework, by acting boldly, taking risks, and applying creativity.

- We commit to do this work collaboratively, an approach deeply embedded in our university culture.

- We commit that through education, research, partnerships and operational activities, we will demonstrate advancement of the SDGs at CMU.

- We commit to create a Voluntary University Review of work being done at CMU and will report these findings in New York City as the UN General Assembly meets next year.

- We therefore commit to do more to align our work with the SDGs and build on the good work already done by CMU faculty, students, staff, and alumni — whether focused on mitigating climate change, eliminating food waste, reducing violence, or ending human trafficking.

Following this announcement, the Sustainability Steering Committee and Advisory Council began work to plan the VUR. In fall 2019, Provost Garrett also launched the search for an Executive Fellow to help support the Sustainability Initiative and development of the VUR. Alexandra Hiniker, who created the concept of the Voluntary Local Review for cities to report on their SDG progress and oversaw the process for New York City in 2018 and 2019, joined CMU in January 2020.

Starting in 2020, the CMU Sustainability Initiative launched a range of activities to engage the CMU community in discussions about implementation of the SDGs. This included a podcast in January 2020 as well as several articles in *The Piper*, the weekly publication that informs the CMU community about campus news and activities. When the Sustainability Initiative was launched, the sustainability@cmu.edu email account was created for the CMU community to share sustainability suggestions and concerns. The Sustainability Initiative also established a web page to serve as a central resource for information.

In February 2020, Provost Garrett distributed a Knowledge, Attitude, and Practice survey to take stock of the CMU community's understanding of and interest in the SDGs, with a response rate of 8 percent. Of the 1,647 respondents, the highest interest was in SDG 3 (Good Health and Well-being), SDG 4 (Quality Education), SDG 5 (Gender Equality), SDG 10 (Reduced Inequalities), SDG 11 (Sustainable Cities and Communities), SDG 12 (Responsible Consumption and Production), and SDG 13 (Climate Action). Of the students in Pittsburgh who responded, 56 percent were not aware of the SDGs. More than half of all respondents requested follow-up communication. This response indicated that there was interest from certain members of the community, but overall awareness about the SDGs at CMU campuses around the world was quite low.

Additionally, in February 2020, an SDG exhibit was launched in the Cohon University Center, the 24/7 hub for the campus community. The rotating exhibit included information about all 17 SDGs, and CMU community members were encouraged to engage by writing their thoughts and reflections on the posters. In addition to the posters, a performance by the all-women euphonium quartet "poWer" demonstrated that the SDGs extend beyond the environment to include issues such as women's empowerment and access to culture. (Unfortunately, additional exhibits planned for other buildings on campus had to be canceled due to COVID-19.)

Methodology: How We Conducted the VUR

The creation of the VUR was a team effort that included the Sustainability Initiative's Steering Committee, the executive fellow, a project administrator, a research associate, a sustainability intern, and seven students enrolled in a 2020 summer project course. The Advisory Council provided additional input, and members of the CMU community were consulted throughout the process. Names of individuals in the positions and groups who contributed are provided in the Appendix.

The VUR process consisted of investigating and making an inventory of current and recent (over the last two years) education, research, and practice activities at CMU related to the SDGs, and then mapping the various activities to the SDGs in consultation with the CMU community. The goal was to obtain a snapshot in time of already ongoing SDG activities at CMU, and to provide insight into SDG areas with lots of activity and those with much less activity at CMU. *The team did not attempt and does not claim to have achieved a comprehensive inventory of all current and recent SDG-related activities at CMU.* Using a snapshot analogy, the intent was to obtain some initial perspectives on SDG activities at CMU from a limited number of photographs taken from different angles over a short period of time. This first compilation of activities will be refined over the next academic year as the VUR team learns more from continued community engagement.

The investigation was done through a combination of desk research and outreach to and engagement with current students, faculty, and staff. This work involved a number of different kinds of research and engagement tasks, as described below.

Mapping each activity to an SDG involves some level of subjectivity. We developed general criteria for making judgments but recognize that additional criteria will need to be developed in order to refine

the process. Additionally, it is important to note that many activities relate to more than one SDG. For this initial assessment, we assigned a single goal to each activity in order not to skew the analysis by assigning some activities more than one SDG. To help with the accuracy of the mapping exercise, the team went beyond the 17 SDGs to look at the associated targets listed with the SDGs. As the SDG targets were originally developed and expected to be delivered at the country/national level, the team extracted thematic issues for the university context to conduct the mapping exercise. *This initial VUR should be understood as a work in progress*.

Desk Research

The team reviewed published information about CMU education, research, and practice activities, including web sites for departments, programs, institutes, and individuals; reports; policies; commitments; partnerships; and strategic plans. External reporting submissions for the Association for Advancement of Sustainability in Higher Education (AASHE) and for the *Times Higher Education* (THE) survey were also reviewed.

Since 2011, CMU has been compiling and submitting data and information to the AASHE Sustainability Tracking and Rating System (STARS), a transparent self-reporting framework for colleges and universities to measure their sustainability performance. STARS invites institutions to submit data and information in five categories: Academics; Engagement; Operations; Planning and Administration; and Innovation and Leadership. In 2019, CMU received Gold status. The next AASHE evaluation is slated for 2022.

The CMU 2019 AASHE STARS report, prepared by the CMU Green Practices Committee, catalogued education, research, and practice activities primarily related to environmental sustainability topics. The report does touch upon the SDGs and includes references to diversity, equity, and inclusion initiatives. The two CMU representatives who led the 2019 AASHE STARS reporting also serve on the Sustainability Initiative's Advisory Council and provided advice and support based on their experience. While the AASHE STARS report served as a helpful foundation for the VUR process, it does not comprehensively look at all education, research, and practices across the university, nor does it directly map these activities to the 17 SDGs.

To deepen the analysis of activities related to the socioeconomic aspects of the SDGs, the team reviewed the internal 2019 interim report published by the Task Force on Campus Climate. That Task Force was charged with developing specific recommendations to help make the climate at CMU more diverse, inclusive, fair, and respectful, and to sustain a community that exemplifies CMU's core values. While the interim report is an internal document, it does include a summary of CMU activities related to these topics, and therefore served as a useful resource for capturing relevant initiatives. In July 2020, CMU President Farnam Jahanian announced a slate of new initiatives to confront racism that were also mapped to the SDGs as CMU practices.

"Impact Rankings 2020" is an external reporting mechanism published by *Times Higher Education* (THE) that focuses specifically on higher education institutions worldwide and the SDGs. THE has developed a set of indicators relevant to certain SDGs and requested that universities supply data. Based on data provided by the universities, THE ranked their performance on the prioritized SDGs. CMU has not

participated in the rankings and was not included in their report, but it was informative to see other ways that higher education institutions engage with the SDGs. As there are no agreed-upon indicators for the integration of the SDGs at universities, the team came to the opinion that a review focused only on data does not present a complete picture of SDG implementation at CMU. Community engagement, such as the 17 Rooms exercise, are needed complements.

Education

To analyze CMU's curricular offerings related to the SDGs, the team reviewed courses offered in spring 2020 as a one-semester sample. In this initial iteration of the VUR, the team decided to focus on courses offered only in spring 2020 to keep the education analysis manageable, with the aim to include additional semesters and years in future analyses. Each semester, CMU offers approximately 6,000 course sections, seminars, and other learning opportunities, including experiential courses or capstone projects. First, the team removed any duplicate courses or courses that did not include a description with key words that are relevant to a specific SDG, narrowing the list to 2,938 courses. The team then mapped each course to a single goal and target within the SDG framework. There were limitations in conducting the mapping because certain courses did not include descriptions that could be definitively mapped to an SDG. The team also conducted spot checks by comparing the analysis to information gathered in the May 2020 17 Rooms exercise (described below). In some cases, the course descriptions reflected a different SDG than the one that the professor teaching the course may have chosen to emphasize that semester. This analysis represents a starting point, and the information collection process will continue to be refined moving forward.

Research

In this initial VUR, research activity was evaluated solely based on CMU publications in archival literature from 2018 to 2020. The team employed "Dimensions," a beta-version software product involving an artificial intelligence algorithm that performs automated SDG tagging of research articles. The criteria in the algorithm are not publicly available, and the product is still in development. While the team found that the Dimensions tool had limitations in SDG-assignment accuracy, it did represent a systematic attempt to do SDG tagging of large numbers of articles. The team examined and grouped all CMU publications that were identified and tagged with an SDG for the 2018-2020 timeframe, and then compared the results to information collected through the 17 Rooms exercise to supplement their analysis.

Practice

The practice category at CMU includes activities undertaken by the university and individuals that are not directly related to coursework or research. The university's operations, such as facilities management, housing, and transportation services, are part of practice and were examined. Human resources; student engagement; education and learning methods support; community outreach and engagement; and diversity, equity, and inclusion initiatives were also addressed in the practice analysis. This effort included review of numerous university support centers for students, faculty, and staff as well as research institutes affiliated with the university. The main sources utilized for comprehensive information about practices at CMU were the 2019 AASHE STARS report and the 2019 Campus Climate Interim Report.

Information from these sources was supplemented by practices identified in the 17 Rooms exercise and through outreach and engagement with relevant offices, programs, and individuals.

Engagement with CMU Students, Faculty, and Staff

To complement information collected through the desk research, the team also engaged directly with CMU students, faculty, and staff through various outreach efforts.

The executive fellow held one-on-one meetings with Sustainability Initiative Advisory Council members in February 2020 to hear their thoughts about sustainability activities at CMU and priorities for the VUR. The next phase of consultation was going to be a series of small roundtables with different members of the CMU community, but in-person meetings became impossible in mid-March due to COVID-19.

The Steering Committee shifted to an online consultation process based on the 17 Rooms initiative launched by The Brookings Institution and The Rockefeller Foundation in September 2018. During the first two weeks of May 2020, one-hour Zoom meetings were organized for each of the 17 SDGs. Each room was led by CMU community members who were experts on some of the topics relevant to the SDG being discussed in their particular room. Current students, faculty, and staff from all CMU campuses around the world were invited to participate, and the focus was explicitly on collecting information about current education, research, and practice.

Although the 17 Rooms exercise occurred during an especially challenging time of year for many people (e.g., the last two weeks of the school year) and the CMU community had transitioned to an online environment because of the global pandemic, 157 unique participants joined one or more of the 17 one-hour Zoom meetings on each of the 17 SDGs. Counting people who joined several rooms, there were 327 total participants. As seen in Figure V-1, the highest participation rate was from staff, followed by faculty. Fewer students participated, likely because final exams were taking place at the same time.
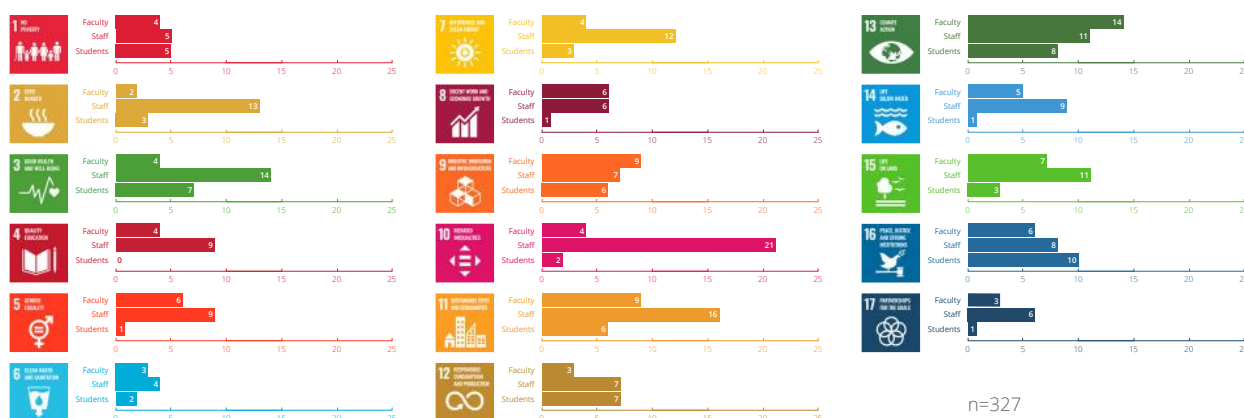
Figure V-1: 17 Rooms Faculty, Staff and Student Participation

Once the 17 Rooms exercise was completed, the team looked at participation to understand the sources of the information offered in the 17 Rooms. The team then reviewed recordings of each of the 17 Rooms meetings and extracted specific, current activities that participants identified, and sorted these activities into education, research, and practice. Next, the team tagged each activity with the most relevant SDG. Not all activities identified in a Room directly contributed to that Room's SDG. For example, there was a detailed discussion about composting in Room 2 (Zero Hunger), but this activity is addressed more directly in SDG 12 (Responsible Consumption and Production).

The draft findings were shared with all participants to confirm that their contributions were correctly captured. Participants were also encouraged to share supplemental information.

The Steering Committee and executive fellow also joined additional CMU meetings to share information about the Sustainability Initiative and encourage engagement. These meetings included the Green Practices Committee and the Provost Office staff team, among others.

During summer 2020, six undergraduate students and one graduate student (listed in the Appendix) participated in a VUR summer project course to help review, synthesize, interpret, and follow up with additional research on information collected by the Sustainability Initiative over the previous six months. This analysis included a review of the 17 Rooms content as well as CMU research publications, spring 2020 courses, and communications materials, which was then reviewed by the rest of the VUR team. The students also mapped hundreds of student organizations and conducted outreach to confirm their analyses. The summer project course helped increase student engagement with the VUR process as well as the SDGs more broadly.

The team also analyzed 32 emails that CMU students, faculty, and staff sent to the sustainability@cmu.edu account from September 2019 to July 2020 to understand what issues the CMU community felt the Sustainability Initiative should address.

Additionally, the team looked at the 212 articles written and published by the CMU Marketing and Communications group from January 1 to July 15, 2020, to determine which SDGs were being communicated to external and internal audiences.

External Engagement

Throughout the VUR process, members of the team engaged with representatives of the city of Pittsburgh, civil society groups, and numerous other universities. Organizations engaged include: Sustainable Pittsburgh, Global Switchboard, the Pittsburgh Foundation, the Forbes Funds, the Greater Pittsburgh Nonprofit Summit, 412 Food Rescue, World Affairs Council Pittsburgh, Bread for the World Institute, the International Youth Foundation, the Society for International Development, the UN Foundation, The Rockefeller Foundation, the Council on Foreign Relations, the United States Institute of Peace, and the Brookings Institution. Universities engaged in one-on-one consultations include the University of Pittsburgh, Chatham University, University of California-Davis, the University of Pretoria, the University of Waterloo, Concordia University (Montreal), the Georgia Institute of Technology, George Mason University, the College of William & Mary, the University of Vermont, the University of Bristol, and the University of Toronto. CMU also engages with the broader community of SDG practices through numerous existing networks and relationships, including the SDSN, AASHE, and the Network of Schools of Public Policy, Affairs, and Administration (NASPAA). CMU has signed on to the University Global Coalition, dedicated to advancing sustainable development among higher education institutions. CMU representatives have also presented our VUR plans to universities across Canada through the SDSN Canada annual summit (held remotely in May 2020) and at a gathering of more than 100 university presidents and provosts world-wide organized by SDSN USA, which was held on the margins of the annual UN High Level Political Forum (also held remotely in July 2020).

Steering Committee co-chair Sarah Mendelson is co-leading Room 16 (Peace, Justice, and Strong Institutions) for the 17 Rooms annual exercise led by The Brookings Institution and The Rockefeller Foundation, while Provost Garrett is a participant in Room 17 (Partnerships for the Goals), which this year is focusing specifically on higher education engagement with the SDGs.

The Initial VUR Results: CMU and the SDGs in 2020

From the investigation of SDG-related activities at CMU conducted since January 2020, involving desk research and engagement with many CMU community members, the VUR team has developed a snapshot of current and recent activities. Findings are presented in this section. *The team did not attempt and does not claim to have developed a comprehensive compilation of SDG-related education, research, and practice activities at CMU.* This initial compilation will be supplemented by additional information provided by CMU community members over the coming academic year. Even with the acknowledged limitations and caveats of the initial inventory effort, the compiled data and information provides useful and informative insights into SDGs where there is a lot of activity at CMU and areas where there are opportunities to do much more.

Here the team presents the results of data gathering efforts and analyses, including mapping the SDGs to activities identified. Following the presentation and discussion of the specific analyses, the data obtained were aggregated to provide a preliminary overall view of SDG-related activities at CMU. In addition, the information collected has been used to provide an analysis of activity at CMU for each SDG, one by one, while recognizing the interdependent nature of the SDG framework. For the sake of presentation, the team analyzed each SDG separately but acknowledge and embrace the fact that the 2030 Agenda can only succeed as a holistic one. Ending poverty (SDG 1) relates to quality education (SDG 4), gender empowerment (SDG 5), and decent work (SDG 8), among many other SDGs. Building peaceful, just, and inclusive communities is not just about SDG 10 (Reduced Inequalities) or SDG 16 (Peace, Justice, and Strong Institutions). Likewise, tackling the climate crisis is not about just one SDG either.

The analyses and summarized information presented here are intended to serve as a starting point for individuals, departments, and other academic, research and administrative units, including the university

administration, to consider personal, unit, or institutional actions that can be taken to enhance the overall contributions of the CMU community to advancing the SDGs. *Substantive contributions and progress will require serious interest and proactive initiatives at all levels of the university.* The information that follows provides a foundation for planning and implementing actions across the CMU community.

17 Rooms Results

The 17 Rooms exercise, a deep dive discussion of education, research, and practice aligned with each SDG, conducted via Zoom in the first half of May 2020, engaged more than 150 staff, students, and faculty from across the global CMU community. Counting people who joined several rooms, there were 327 participation units. Activities brought forward by leaders and participants in each of the 17 Rooms were captured by reviewing the recordings of the events, and subsequently were grouped and mapped to the SDGs. Figure VI-1 represents how many activities were mapped to each of the SDGs, rather than the Room in which the activities were discussed.

n=304

Figure VI-1: 17 Rooms Activities

As evident from the sizes of the squares in the infographic, the SDGs that encompassed the largest number of activities (e.g., education/classes, research, or practice) mentioned in the 17 Rooms exercise were SDG 4 (Quality Education), SDG 9 (Industry, Innovation, and Infrastructure), and SDG 7 (Affordable and Clean Energy). The SDG to which the fewest activities were assigned was SDG 5 (Gender Equality).

The 17 Rooms exercise was helpful in both raising awareness about the SDGs and uncovering hidden connections at CMU. The breadth of the information gathered also helps in some ways to supplement how CMU defines itself. For example, CMU has well-known strengths in technology, but through the 17 Rooms exercise, the team witnessed passion around public policy issues for which technological solutions are peripheral and political, social, or economic solutions are central. The 17 Rooms exercise also revealed

connections of people and activities not previously recognized by the participants. For example, experts on specific SDGs from different parts of the community had not known about one another but connected through the 17 Rooms events. While this initial effort focused on current activities undertaken by CMU students, faculty, and staff, many participants identified additional opportunities for action that could be addressed in future iterations of the 17 Rooms exercise.

Analysis of Student Organizations

As is the case with many universities, CMU has a large number of student organizations spanning a wide range of missions and activities. The team analyzed 470 student organizations and mapped their missions and activities. Student organizations were identified using The Bridge site, which lists student organizations registered at CMU, and this review was supplemented by searches for organizations associated with specific colleges. Results are summarized in Figure V-2.

As seen in Figure VI-2, many organizations address SDG 11 (Sustainable Cities and Communities) as this includes cultural preservation, and a large number of organizations focus on celebrating particular cultures or religions. Many student organizations focus on enhancing education so SDG 4 (Quality Education) also garnered a large number of student organizations in the mapping. There are also many groups focused on addressing issues of inequality, which includes SDG 5 (Gender Equality) and SDG 10 (Reduced Inequalities). As there are numerous sports teams and groups focused on recreational activities, SDG 3 (Good Health and Well-being) also has many associated organizations. Professional development organizations were mapped to SDG 8 (Decent Work and Economic Growth) and student government associations were mapped to SDG 16 (Peace, Justice, and Strong Institutions). Organizations conducting community outreach were mapped to SDG 17 (Partnerships for the Goals). The SDGs with 10 or fewer organizations include SDG 1 (No Poverty), SDG 2 (Zero Hunger), SDG 6 (Clean Water and Sanitation), SDG 7 (Affordable and Clean Energy), SDG 12 (Responsible Consumption and Production), SDG 13 (Climate Action), SDG 14 (Life Below Water), and SDG 15 (Life on Land).
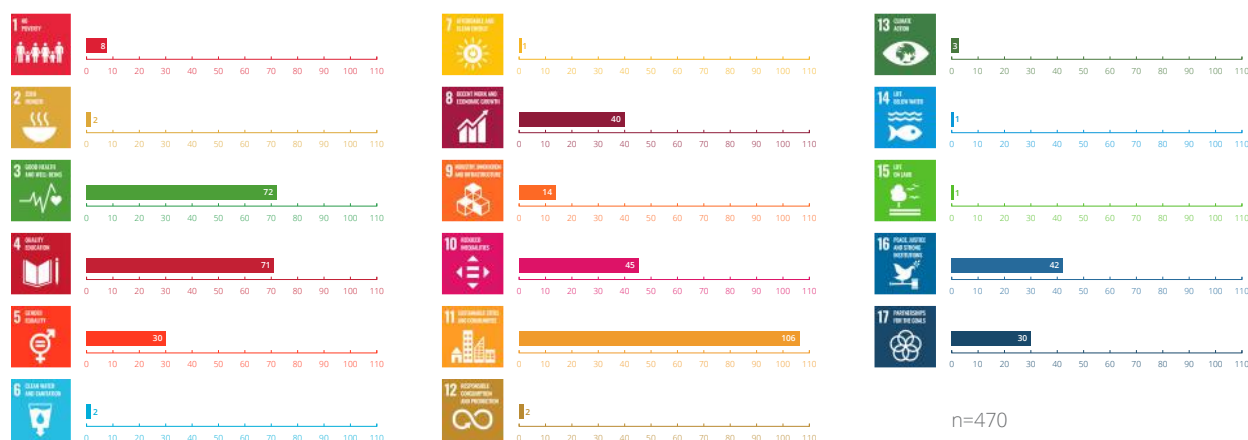

n=470

Figure VI-2: CMU Student Organizations Mapped to the SDGs

Analysis of News Articles Published by CMU

Of the 212 articles written and published by the CMU Marketing and Communications group from January 1 to July 15, 2020, the largest number of articles focused on SDG 4 (Quality Education) and SDG 9 (Industry, Innovation, and Infrastructure). The number of articles addressing SDG 3 (Good Health and Well-being) increased following the COVID-19 outbreak. Because arts and culture are addressed by SDG 11 (Sustainable Cities and Communities), there were also many articles that were mapped to that goal. Staff changes and obituaries were mapped to SDG 8 (Decent Work and Economic Growth), so there were quite a few articles for this goal as well. The breakdown is listed in Figure VI-3.
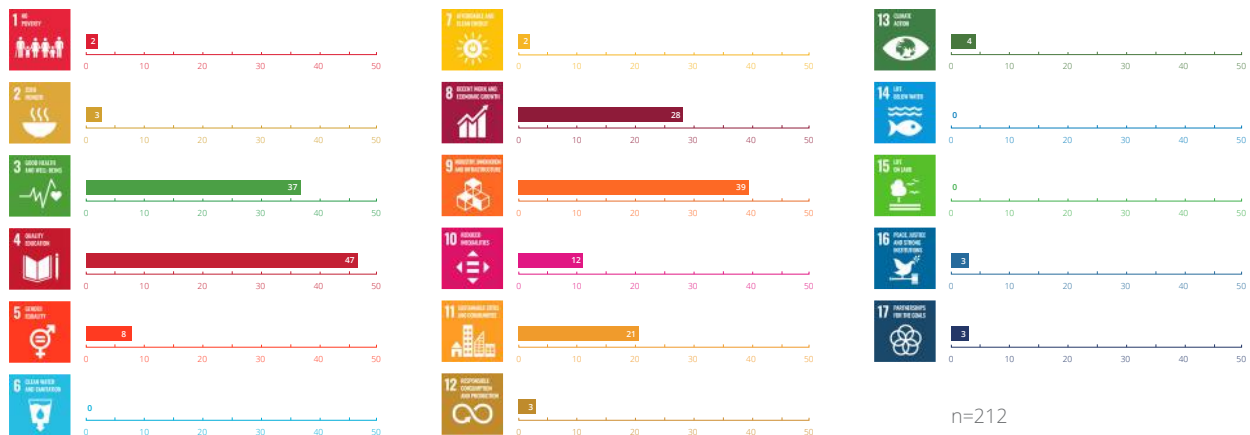

n=212

Figure VI-3: CMU News Articles January-July 2020 Mapped to the SDGs

Analysis of Spring 2020 Courses

To obtain insight into the extent to which course offerings at CMU align with the various SDGs, the team conducted an analysis of all courses offered by CMU in the spring 2020 semester. Titles and descriptions for courses offered by each unit and at all CMU campuses were examined, and individual courses were mapped to an SDG. As indicated in Figure VI-4, the SDGs mapped to the largest number of courses were SDG 4 (Quality Education), SDG 8 (Decent Work and Economic Growth), SDG 9 (Industry, Innovation, and Infrastructure), and SDG 11 (Sustainable Cities and Communities). SDGs aligned with a relatively moderate number of courses were SDG 3 (Good Health and Well-being), SDG 7 (Affordable and Clean Energy), SDG 10 (Reduced Inequalities), SDG 16 (Peace, Justice, and Strong Institutions), and SDG 17 (Partnerships for the Goals). Small numbers were mapped to SDG 1 (No Poverty), SDG 2 (Zero Hunger), SDG 5 (Gender Equality), SDG 6 (Clean Water and Sanitation), SDG 12 (Responsible Consumption and Production), SDG 13 limate Action), SDG 14 (Life Below Water), and SDG 15 (Life on Land).

n=2,938

Figure VI-4: Spring 2020 Courses Mapped to the SDGs

Analysis of CMU Research Publications 2018-2020

As one measure of how research at CMU aligns with the various SDGs, the team employed, with the assistance of CMU Libraries, a new tool called Dimensions that uses artificial intelligence to tag published research articles in peer review journals with the SDGs. Research articles published by CMU-affiliated authors since 2018 were identified and tagged with an SDG using the tool. The Dimensions tool has limitations, as discussed previously, but did enable a comprehensive investigation of recent CMU research published in academic journals. As indicated in Figure V-5, the SDGs mapped to the largest number of CMU research publications since 2018 were SDG 7 (Affordable and Clean Energy), SDG 3 (Good Health and Well-being), and SDG 13 (Climate Action). SDGs mapped to a smaller number of CMU research publications included SDG 4 (Quality Education), SDG 11 (Sustainable Cities and Communities), and SDG 16 (Peace, Justice, and Strong Institutions). Only a few publications were tagged with the other SDGs, and not a single one was tagged with SDG 17 (Partnerships for the Goals).

n=995

Figure VI-5: CMU Research Publications 2018-2020 Mapped to the SDGs in Dimensions

Analysis of CMU Practices

For the practice mission area, activities across university academic, administrative, research, and service units were identified through various mechanisms including the 17 Rooms exercise, engagement with individuals and units, and other means as discussed in Section V. A summary of activities identified and how they mapped to the SDGs is provided in Figure VI-6. As indicated there, the SDGs with the largest number of activities are SDG 4 (Quality Education), SDG 8 (Decent Work and Economic Growth), SDG 10 (Reduced Inequalities), and SDG 16 (Peace, Justice, and Strong Institutions). There was also noteworthy activity in the practice area related to SDG 2 (Zero Hunger), SDG 5 (Gender Equality), SDG 9 (Industry, Innovation, and Infrastructure), SDG 11 (Sustainable Cities and Communities), and SDG 12 (Responsible Consumption and Production). There was limited activity regarding SDG 3 (Good Health and Well-being), SDG 6 (Clean Water and Sanitation), SDG 7 (Affordable and Clean Energy, SDG 13 (Climate Action), SDG 15 (Life on Land), and SDG 17 (Partnerships for the Goals), and no practice activities were mapped primarily to SDG 1 (No Poverty) and SDG 14 (Life Below Water).

n=221

Figure VI-6: CMU Practices Mapped to the SDGs

Overview of SDG-Related Activities at CMU by Education, Research, and Practice Activities

From a total count of activities at CMU related to particular SDGs grouped by education, research, and practice, a preliminary view of areas of greater and lesser amounts of activities can be obtained. The VUR team aggregated the number of activities extracted from the analyses of coursework during the spring 2020 semester, research publications from 2018-2020, and current and recent CMU practices. Note that each activity only had one SDG assigned, so there was no counting of activities in multiple SDGs, even though many activities are relevant to multiple SDGs. Figure VI-7 shows the aggregated activity counts in each of the categories of education, research, and practice. The differences in the areas are explained in more detail in the individual SDG analysis section below.

Importantly, the VUR information gathering revealed CMU has activities ongoing in all 17 SDG topical areas. There are differences in the amount of education, research, and practice activities in each of the 17 SDG areas, of course, but nevertheless, the diversity of sustainability-related activities identified at CMU was not a predictable result.

Across all three of the mission categories, activities related to SDG 4 (Quality Education) and SDG 8 (Decent Work and Economic Growth) were most numerous, which is unsurprising for an educational institution that employs many people. Activities related to SDG 11 (Sustainable Cities and Communities) also were identified abundantly across the three mission categories, reflecting CMU's urban presence and long-standing urban focus in education, research, and practice. Efforts to protect and safeguard the world's cultural and natural heritage are also addressed by SDG 11 (Sustainable Cities and Communities), so CMU's College of Fine Arts bolsters the number of activities under this goal.
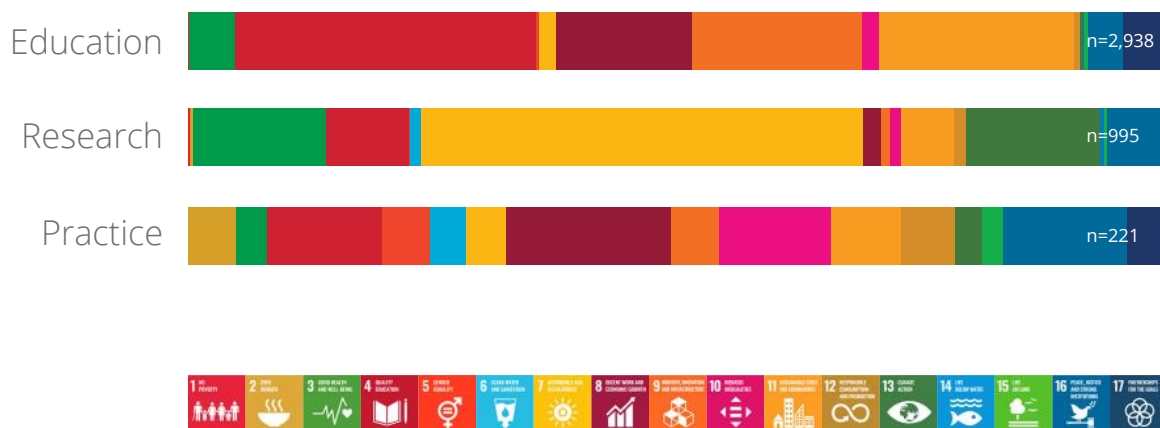
Figure VI-7: Summary of Recent SDG-Related Education, Research, and Practice Activities at CMU from Analysis of Coursework, Research Publications, and Practices

Overview of SDG-Related Activities at CMU by SDG

Another way to examine the compiled information about SDG-related activities at CMU is by each SDG, rather than by the education, research, and practice mission area categories. Here, the team describes education, research, and practice activities at CMU that the team mapped to each particular SDG.

GOAL 1

No Poverty

Figure VII-SDG1-1: Percentage of SDG 1 activity in education, research, and practice

Education .06% n=2,938

Research .2% n=995

Practice 0% n=221

Many of the targets under SDG 1 (No Poverty) are addressed by numerous other SDGs. While the top-line analysis indicates that there is limited activity related to this goal at CMU, it is clear when reviewing other related goals, in particular SDG 4 (Quality Education), SDG 8 (Decent Work and Economic Growth), and SDG 17 (Partnerships for the Goals), that CMU is quite active in areas that contribute to poverty reduction. Additionally, further analysis and feedback from the 17 Rooms exercise may uncover additional activities that contribute to SDG 1. There are a few student organizations that primarily focus on SDG 1 and two articles were published by CMU on this topic.

Education

According to the analysis of courses available during the spring 2020 semester, few courses primarily addressed SDG 1. However, it is important to note that this analysis draws from course descriptions that may not directly reflect how courses address SDG 1. In conversations during the 17 Rooms exercise, several students and faculty members highlighted how their courses addressed SDG 1.

Research

In the Dimensions analysis, two CMU publications were tagged with SDG 1. However, upon further analysis using keywords and researchers mentioned during the 17 Rooms exercise, the team identified numerous articles that could potentially be related to SDG 1. Furthermore, since poverty reduction is a cross-cutting issue related to many other goals, and each publication is only tagged with one goal, it is likely that many publications that contribute to SDG 1 were tagged with another goal instead.

Practice

There were no practice activities identified in the analyses conducted that primarily address the themes outlined under SDG 1, though practice activities mapped to other goals may contribute to the overarching objectives of SDG 1. Practices addressing issues related to students are addressed in SDG 4 (Quality Education), those related to supporting staff are included in SDG 8 (Decent Work and Economic Growth), and community engagement initiatives are reflected in Goal 17 (Partnerships for the Goals).

2
Communication Articles
n=212

8
Student Organizations
n=470

7
17 Room Activities
n=304

Figure VII-SDG1-2: Number of CMU communications articles, student organizations, and 17 Rooms activities addressing SDG 1

Are you working on an activity at CMU that contributes to SDG 1? If so, we want to hear from you. Please convey the details or request a meeting to discuss your activity by sending an email to sustainability@cmu.edu.

GOAL 2

Zero Hunger

Education   .1%   n=2,938

Research   .3%   n=995

Practice   5%   n=221

Figure VII-SDG2-1: Percentage of SDG 2 activity in education, research, and practice

Although there are aspects of CMU education, research, and practice that contribute to SDG 2 (Zero Hunger), there were few specific activities identified for which this goal is the primary objective. Very few student organizations focus primarily on SDG 2, while CMU published three articles on the topic.

Education

There were few courses in spring 2020 that primarily addressed SDG 2. This does not necessarily mean that there are not more courses at CMU that address achieving zero hunger. Rather, it may indicate that course descriptions did not clearly include a mention of the targets under SDG 2. Through conversations during the 17 Rooms exercise, several professors and students highlighted how their activities helped contribute to SDG 2, although this was not the explicit objective of the courses they mentioned.

Research

Three CMU publications since 2018 were tagged by Dimensions with SDG 2. Upon further research, the team identified numerous additional CMU articles that could be tagged with SDG 2 using a wider array of keywords taken from the targets for SDG 2.

Practice

Like education and research, a small number of CMU practice activities were mapped primarily to SDG 2. The practice activities are related to ensuring everyone has access to food, supporting local food producers, ensuring sustainable food production, and investing in rural infrastructure through the campus dining services. For example, the university partners with 412 Food Rescue, an organization founded by a Heinz College alumna that transfers surplus food to nonprofits serving those who are food insecure. Other major activities include the CMU Food Pantry for students and a robust annual CMU Community Food Drive with many facets that is organized by Staff Council.

2 ZERO HUNGER	3 Communication Articles n=212	2 Student Organizations n=470	12 17 Room Activities n=304

Figure VII-SDG2-2: Number of CMU communications articles, student organizations, and 17 Rooms activities addressing SDG 2

Are you working on an activity at CMU that contributes to SDG 2? If so, we want to hear from you. Please convey the details or request a meeting to discuss your activity by sending an email to sustainability@cmu.edu.
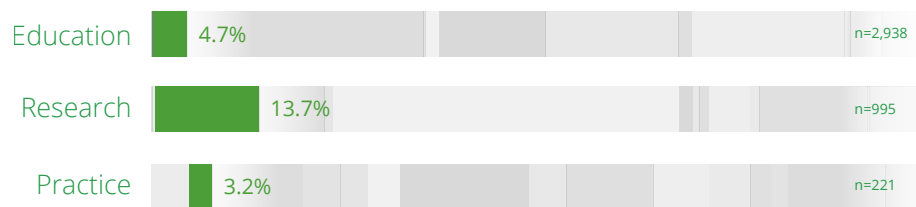
GOAL 3

Good Health and Well-being

Figure VII-SDG3-1: Percentage of SDG 3 activity in education, research, and practice

A small but significant portion of education, research, and practice activities at CMU were identified as related to SDG 3 (Good Health and Well-being). However, student organizations are quite active on SDG 3, particularly because there are many sports and recreation organizations. The large number of articles CMU published on SDG 3 from January 1 to July 15, 2020, can be attributed to the COVID-19 outbreak.

Education

Nearly 5 percent of the spring 2020 courses were related to SDG 3. The vast majority of these courses address reducing mortality for non-communicable diseases and promoting mental health. This includes biology courses, psychology courses, and exercise courses. Additionally, numerous courses that support healthcare management were mapped to SDG 3.

Research

There were 136 CMU publications since 2018 tagged with SDG 3 in Dimensions. However, the team found that there were numerous additional publications about healthy living and wellness that could have been tagged with SDG 3, but were not included in the Dimensions mapping. The team noted that there is a vast range of topics that are relevant to SDG 3, which makes it a challenge to tag individual topics as primarily related to SDG 3. Of the articles tagged, many focused on research related to information technology.

Practice

All of the CMU practices identified as related to SDG 3 are associated with providing support for students, faculty, and staff. This includes the mental and physical health services made available to the CMU community as well as the various insurance plans for students, faculty, and staff. CMU has incorporated wellness into its strategic planning and established a program for Student Affairs Wellness Initiatives. The Employee Assistance Program is a voluntary program that provides confidential counseling for employees and their families. CMU is one of the first universities to offer all faculty, staff, and students access to the Headspace meditation program, and invested in a Mindfulness Room that is open to all members of the CMU community. Additionally, CMU offers Group X-ercise classes at no cost to the faculty, staff, and students.

3 GOOD HEALTH AND WELL-BEING	37 Communication Articles n=212	72 Student Organizations n=470	23 17 Room Activities n=304

Figure VII-SDG3-2: Number of CMU communications articles, student organizations, and 17 Rooms activities addressing SDG 3

Are you working on an activity at CMU that contributes to SDG 3? If so, we want to hear from you. Please convey the details or request a meeting to discuss your activity by sending an email to sustainability@cmu.edu.

GOAL 4

Quality Education

Education 30.6% n=2,938
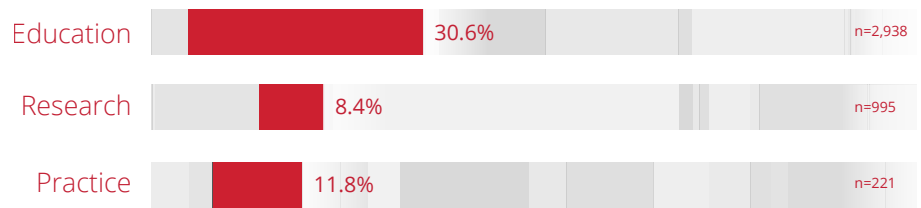
Research 8.4% n=995

Practice 11.8% n=221

Figure VII-SDG4-1: Percentage of SDG 4 activity in education, research, and practice

As a research and higher education institution, it is no surprise that CMU has a large number of research, education, and practice activities mapped to SDG 4 (Quality Education). Student organizations also are most active on SDG 4, and CMU published a large number of articles on this topic.

Education

Nearly one-third of the spring 2020 courses were mapped to SDG 4. The vast majority of courses were related to increasing the number of youth and adults with relevant skills for employment and entrepreneurship due to the classification of courses labeled independent study, capstone, thesis, or seminar. However, some courses with these labels were not mapped to SDG 4 (Quality Education) because they included specific details that indicated how they contributed to another goal. Through the 17 Rooms exercise, the team also discovered that professors ranging from engineering to human rights to information systems were already using the SDGs as a framework in their courses. Although this was not captured in the spring 2020 course analysis, it is worth noting and warrants further investigation.

Research

There were 84 CMU research publications since 2018 tagged with SDG 4 by Dimensions. The team noted that several articles tagged with SDG 4 were directly relevant to women in education and could have been tagged with SDG 5 (Gender Equality) instead. Furthermore, education technology articles were tagged with SDG 4, although they may have been more relevant to goals in support of technological development.

Practice

As CMU is an educational institution, many of the practice activities identified focus on providing quality education and developing skills for students. However, a significant amount of activity under SDG 4 that extends beyond CMU students was identified. Additionally, there are several centers that focus on various aspects of SDG 4, including the Gelfand Center for Service Learning, the Eberly Center for Teaching Excellence and Education Innovation, and the Osher Lifelong Learning Institute. The Student Academic Success Center offers students a wide variety of opportunities to deepen their understanding of who they are as learner, communicator, and ultimately scholar. Facilities Management Services also operates a state certified Apprentice Program for skilled trades in Electrical, HVAC and Plumbing.

47
Communication Articles
n=212

71
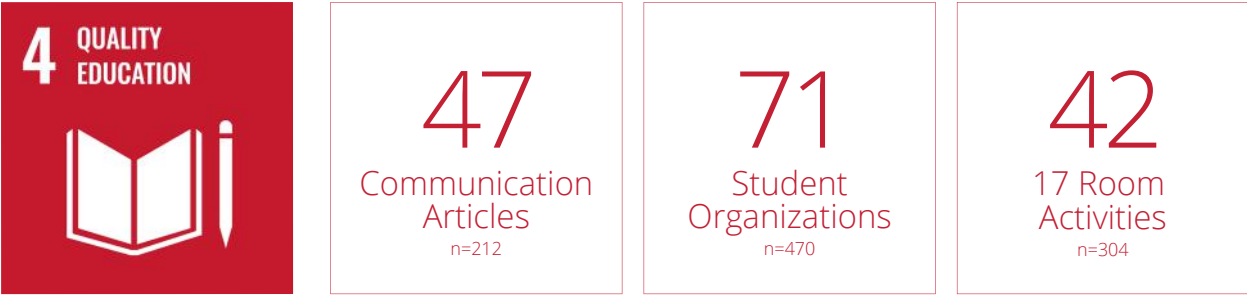Student Organizations
n=470

42
17 Room Activities
n=304

Figure VII-SDG4-2: Number of CMU communications articles, student organizations, and 17 Rooms activities addressing SDG 4

Are you working on an activity at CMU that contributes to SDG 4? If so, we want to hear from you. Please convey the details or request a meeting to discuss your activity by sending an email to sustainability@cmu.edu.
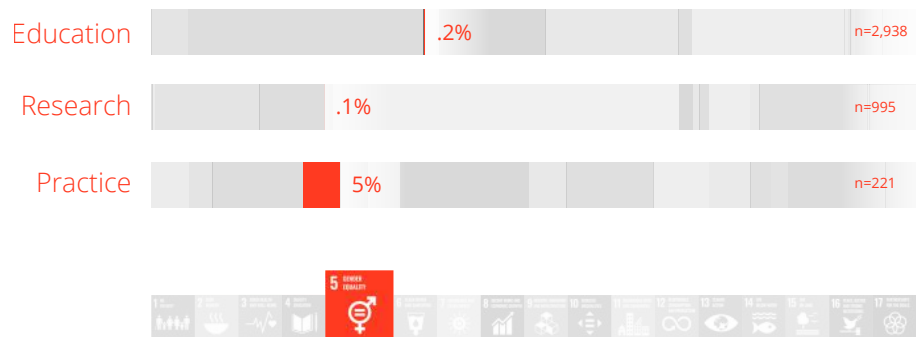
GOAL 5

Gender Equality

Figure VII-SDG5-1: Percentage of SDG 5 activity in education, research, and practice

While SDG 5 (Gender Equality) is addressed in various ways through CMU's research, education, and practice activities, a number of the activities were not mapped primarily to this goal. Many activities related to SDG 5 were tagged preferentially to SDG 4 (Quality Education), SDG 8 (Decent Work and Economic Growth), SDG 10 (Reduced Inequalities), and SDG 16 (Peace, Justice, and Strong Institutions). SDG 5 is a popular topic for student organizations, and CMU published several articles on this topic.

Education

In the analysis of spring 2020 courses, there were seven courses that mapped primarily to SDG 5. Similar to SDG 1 (No Poverty) and SDG 2 (Zero Hunger), there were other courses that may have addressed topics that relate to SDG 5, but this was not indicated in the course descriptions. Of the courses mapped to SDG 5, the main topics they addressed included ending discrimination against women and girls and ending violence against women and girls.

Research

There was one CMU research publication since 2018 tagged with SDG 5 by Dimensions. Based on information gathered through the 17 Rooms exercise, the team searched for CMU researchers and topics addressed under SDG 5 and noted that there were many untagged CMU articles that address gender equality.

Practice

The CMU practice activities related to SDG 5 primarily contribute to two targets: ending violence against and exploitation of women and girls (including human trafficking) and ensuring full participation of women and girls in leadership and decision-making. The Program of Research and Outreach on Gender Equity in Society (PROGRESS) focuses on improving society by empowering girls and women through the art of negotiation. Additional practice activities identified with a connection to gender equality are related to education and employment at CMU, so they mapped primarily to SDG 4 (Quality Education) and SDG 8 (Decent Work and Economic Growth).

| 5 GENDER EQUALITY | 8 Communication Articles n=212 | 30 Student Organizations n=470 | 3 17 Room Activities n=304 |

Figure VII-SDG5-2: Number of CMU communications articles, student organizations, and 17 Rooms activities addressing SDG 5

Are you working on an activity at CMU that contributes to SDG 5? If so, we want to hear from you. Please convey the details or request a meeting to discuss your activity by sending an email to sustainability@cmu.edu.
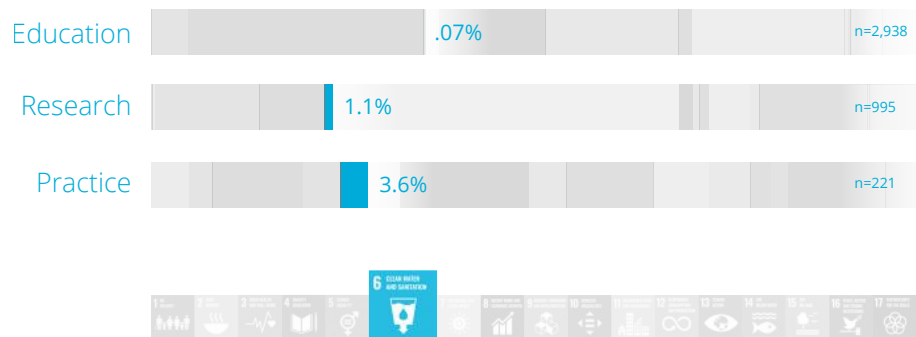
GOAL 6

Clean Water and Sanitation

Figure VII-SDG6-1: Percentage of SDG 6 activity in education, research, and practice

With a CMU department directly related to SDG 6 (Clean Water and Sanitation) and innovative campus facilities related to clean water and sanitation, CMU's activities in this area are noteworthy. However, due to the nature of this initial exercise that focused on specific time periods, the scope of activities was not fully reflected in the analysis of SDG 6. A small number of student organizations address SDG 6, but CMU did not publish any articles primarily addressing SDG 6.

Education

In spring 2020, there were two courses that mapped to SDG 6. Both of the courses focused on improving water quality by reducing pollution. Through the 17 Rooms exercise, the team identified courses that were taught during other semesters, so an analysis of additional semesters would identify more courses related to this goal.

Research

There were 11 CMU research publications since 2018 tagged with SDG 6 by Dimensions. Most of the publications related to practical research on water sustainability in cities around the world, and they primarily focused on engineering. Based on additional searches of relevant professors and topics, the team determined that many publications tagged with SDG 13 (Climate Action) were more relevant to SDG 6 (Clean Water and Sanitation).

Practice

Identified CMU practice activities related to SDG 6 primarily addressed water reuse, recycling, and sanitation, including green roofs, engineered terrains, dry wells, pervious pavement, retention ponds, and bio-swales to manage stormwater. Rainwater is used for irrigation, flushing bathroom toilets, and cooling water supply at CMU.

6 CLEAN WATER AND SANITATION

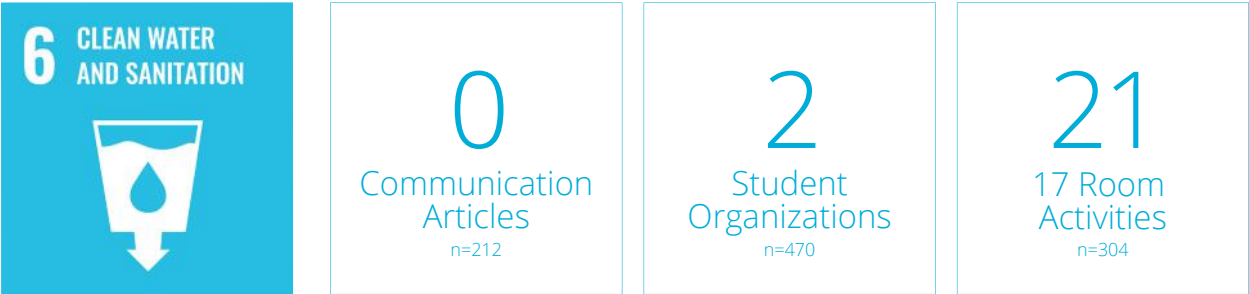| 0	2	21
Communication Articles	Student Organizations	17 Room Activities
n=212	n=470	n=304

Figure VII-SDG6-2: Number of CMU communications articles, student organizations, and 17 Rooms activities addressing SDG 6

Are you working on an activity at CMU that contributes to SDG 6? If so, we want to hear from you. Please convey the details or request a meeting to discuss your activity by sending an email to sustainability@cmu.edu.

GOAL 7

Affordable and Clean Energy

Figure VII-SDG7-1: Percentage of SDG 7 activity in education, research, and practice

With a research institute and several research centers dedicated to energy issues and significant resources devoted to management of energy consumption in campus facilities, there is a considerable amount of activity related to SDG 7 (Affordable and Clean Energy) at CMU. Only a few student organizations address SDG 7, and a small number of articles were published by CMU on this topic.

Education

There were 51 courses in spring 2020 that mapped to SDG 7. The majority of courses focused on energy systems and were relevant to energy policy and enhancing international cooperation to facilitate access to clean energy research, and technology. Several additional courses addressed ensuring universal access to affordable, reliable, and modern energy services. The courses that mapped to SDG 7 were primarily engineering and physics courses.

Research

In Dimensions, there were 448 CMU research publications since 2018 tagged with SDG 7. The team also noted that there were additional publications tagged with "earth sciences" or "engineering" that could have been tagged with SDG 7. Relative to other SDGs tagged in Dimensions, the team found that SDG 7 was more accurately assigned to research publications.

Practice

CMU practice activities related to this goal primarily related to energy management and renewable energy on the Pittsburgh campus. The Wilton E. Scott Institute for Energy Innovation addresses the world's most important energy-related challenges by enabling collaborative research, strategic partnerships, policy outreach, entrepreneurship, and education. The Scott Institute annually organizes Energy Week, the largest event on campus hosted by an institute on a particular topic of focus. Additionally, CMU operates a district energy plant with other large institutions in Pittsburgh in recognition of the value that district-scale energy systems can bring. CMU has won multiple awards for its energy policies, which source 105 percent of the university's electricity needs from renewable sources. CMU is ranked by the Environmental Protection Agency as one of the top 10 green power users in American higher education.

	2 Communication Articles n=212	**1** Student Organizations n=470	**29** 17 Room Activities n=304

7 AFFORDABLE AND CLEAN ENERGY

Figure VII-SDG7-2: Number of CMU communications articles, student organizations, and 17 Rooms activities addressing SDG 7

Are you working on an activity at CMU that contributes to SDG 7? If so, we want to hear from you. Please convey the details or request a meeting to discuss your activity by sending an email to sustainability@cmu.edu.

Decent Work and Economic Growth
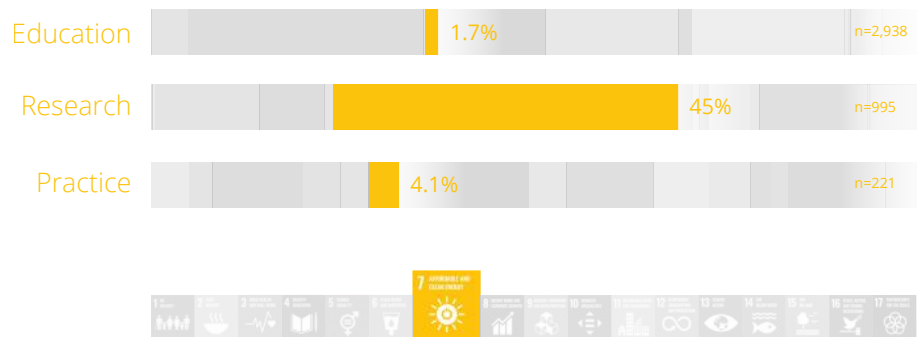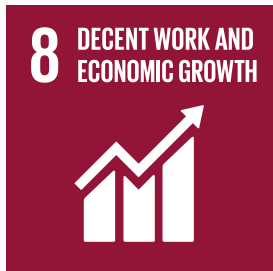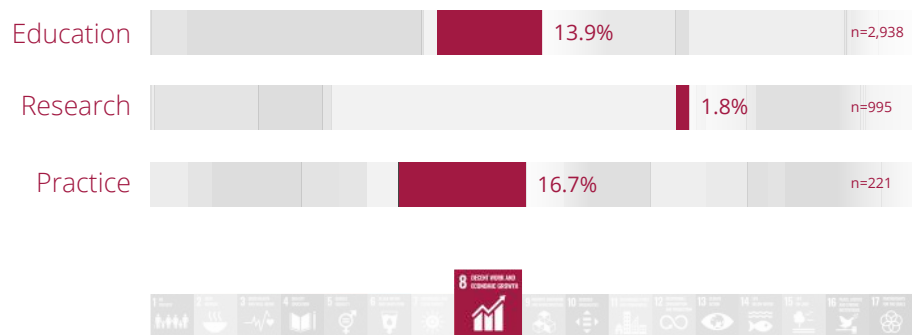

Figure VII-SDG8-1: Percentage of SDG 8 activity in education, research, and practice

With the Tepper School of Business, the Block Center for Technology and Society that addresses topics related to the future of work and employment, and the fact that CMU employs a large number of faculty and staff, numerous education, research, and practice activities related to SDG 8 (Decent Work and Economic Growth) were identified for CMU. A handful of faculty were also engaged in various ways in activities (education or research) that relate to the SDG 8 target on combating human trafficking. There are quite a few student organizations that address SDG 8, including many that focus on professional development. CMU published a large number of articles related to SDG 8, including many that focused on career achievements, rewards, and recognition.

Education

The analysis of spring 2020 courses resulted in 408 courses mapped to SDG 8, or about 14 percent of all the courses mapped. Most of the courses mapped to this goal contribute to diversifying, innovating, and upgrading sectors for economic productivity or promoting youth employment, education, and training. Many of the courses identified train students in labor-specific work such as business, finance, and computer science. Additionally, any courses labeled "internship" or "professional development" were mapped to SDG 8.

Research

There were 18 CMU research publications since 2018 tagged with SDG 8 by Dimensions. The team noted that none of the publications were from faculty members who participated in the 17 Rooms exercise on SDG 8, and research and programs mentioned in this exercise did not seem to be included in Dimensions. Additionally, because this goal had a wide range of targets, more detailed searches with a wider set of keywords would be necessary in order to capture all of the relevant publications.

Practice

There was a high level of CMU practice activity mapped to SDG 8 because CMU employs a large number of people, and many employment practices concerning staff and faculty are relevant to this goal. The Career and Professional Development Center supports career development for students. Additionally, CMU invests in local businesses and start-ups through seminars, workshops, and networking events, and this is reflected in the practice section. The Block Center also contributes to the practice activities for SDG 8.

8 DECENT WORK AND ECONOMIC GROWTH

28 Communication Articles n=212

40 Student Organizations n=470

23 17 Room Activities n=304

Figure VII-SDG8-2: Number of CMU communications articles, student organizations, and 17 Rooms activities addressing SDG 8

Are you working on an activity at CMU that contributes to SDG 8? If so, we want to hear from you. Please convey the details or request a meeting to discuss your activity by sending an email to sustainability@cmu.edu.

GOAL 9

Industry, Innovation and Infrastructure
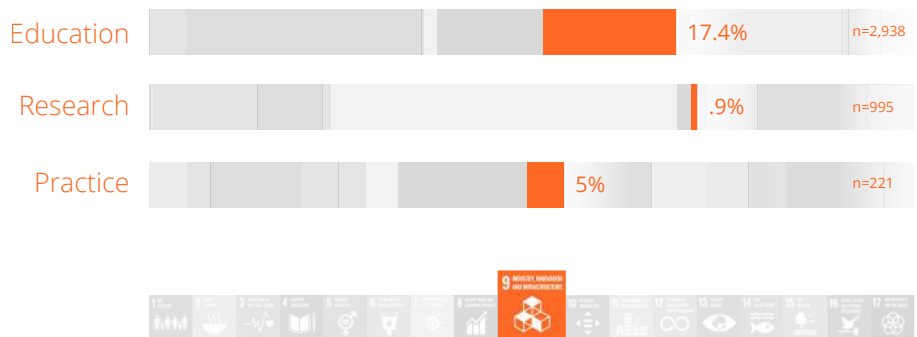
Figure VII-SDG9-1: Percentage of SDG 9 activity in education, research, and practice

With several colleges that address topics related to SDG 9 (Industry, Innovation, and Infrastructure), CMU has a large number of activities that map to this goal and its targets. This included providing skills to the students to excel in industry-related fields, supporting various enterprises, and helping to create technologies that aid both industry and infrastructure. There are a small number of student organizations that primarily address this SDG. CMU published the second-highest number of articles on SDG 9.

Education

Of the spring 2020 courses analyzed, 17 percent were mapped to SDG 9. The majority of these courses were related to enhancing research and upgrading industrial technologies. These courses were primarily engineering courses, computer science courses, and biomedical and data science courses.

Research

Although there was a lot of research at CMU related to SDG 9 as conveyed in the 17 Rooms exercise, this was not reflected in the research tagged through Dimensions. Nine articles were with tagged with SDG 9. During the 17 Rooms exercise, participants presented a large body of research related to SDG 9, but because the work described related to many of the other goals, the scope of research activity was not evident in the Dimensions analysis results for this goal.

Practice

The CMU practice activities identified under SDG 9 through the investigations conducted are primarily related to facilities management. The Carnegie Bosch Institute contributes to SDG 9 by aligning with CMU's top research competencies in areas of ever-growing importance for global industry. Practice activities also includes several significant activities that CMU has ongoing in relation to regional and national industrial development, including the Mill 19 project in Hazelwood and the Manufacturing Futures Initiative.

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	**39** Communication Articles n=212	**14** Student Organizations n=470	**28** 17 Room Activities n=304

Figure VII-SDG9-2: Number of CMU communications articles, student organizations, and 17 Rooms activities addressing SDG 9

Are you working on an activity at CMU that contributes to SDG 9? If so, we want to hear from you. Please convey the details or request a meeting to discuss your activity by sending an email to sustainability@cmu.edu.

GOAL 10

Reduced Inequalities

Figure VII-SDG10-1: Percentage of SDG 10 activity in education, research, and practice

For SDG 10 (Reduced Inequalities), CMU has the most activity under practice. Because reducing inequalities represents the foundation for many other of the SDGs, various education and research activities that may have been related to this goal were mapped to other goals in the analyses conducted. SDG 10 was the third most popular goal for student organizations, following SDG 4 (Quality Education) and SDG 11 (Sustainable Cities and Communities). CMU personnel published a modest amount of articles related to this goal.

Education

There were 51 courses mapped to SDG 10 in spring 2020, or nearly 2 percent of all courses. The courses were primarily related to policy, psychology, and ethics.

Research

For 2018-2020, Dimensions tagged 12 CMU research publications with SDG 10, primarily under economics. Based on keyword searches and research topics discussed in the 17 Rooms exercise, the team determined that many CMU publications related to SDG 10 were not tagged in Dimensions.

Practice

CMU's practice activities related to SDG 10 were mainly related to initiatives regarding the promotion of social, economic, and political inclusion; advancing diversity at CMU and higher education; ensuring equal opportunities; and ending discrimination. The Center for Student Diversity and Inclusion plays a key role regarding SDG 10 activities for the university by actively cultivating a strong, diverse, and inclusive community capable of living out these values and advancing research, creativity, learning, and development that changes the world. Many practice activities were related to CMU's hiring and employment practices, and they were identified, created, or strengthened following recommendations from the Campus Climate Report published by the President's Task Force, and President Jahanian's Confronting Racism memo.

| REDUCED INEQUALITIES | 12 Communication Articles n=212 | 45 Student Organizations n=470 | 6 17 Room Activities n=304 |

Figure VII-SDG10-2: Number of CMU communications articles, student organizations, and 17 Rooms activities addressing SDG 10

Are you working on an activity at CMU that contributes to SDG 10? If so, we want to hear from you. Please convey the details or request a meeting to discuss your activity by sending an email to sustainability@cmu.edu.
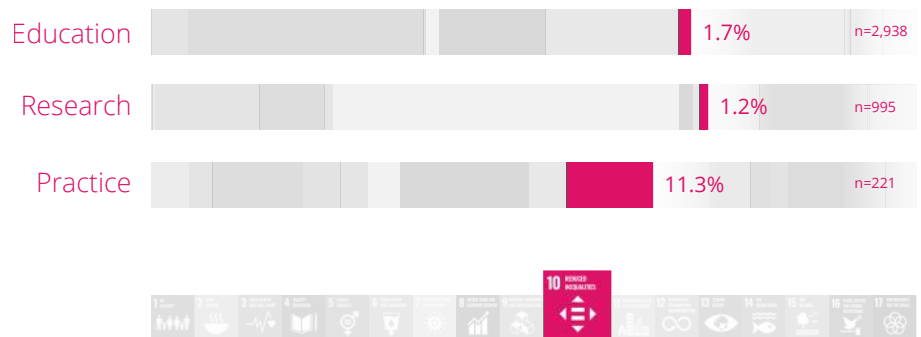
GOAL 11

Sustainable Cities and Communities
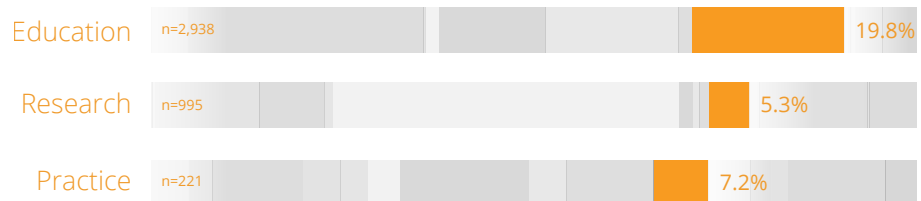
Figure VII-SDG11-1: Percentage of SDG 11 activity in education, research, and practice

Activities mapped to SDG 11 (Sustainable Cities and Communities) addressed a wide range of topics because the goal encompasses many targets that also were included under other goals, but with an urban lens. Additionally, CMU hosts Metro 21, a large center specifically focusing on smart cities; however, much of this activity was not captured in the analyses of education and research. The second-largest number of student organizations addresses SDG 11, mainly because this included cultural groups, of which there are many at CMU, and CMU published a moderate number of articles related to this goal.

Education

Of the spring 2020 courses, nearly 20 percent mapped to SDG 11. This was largely due to the inclusion of the target related to protecting cultural and natural heritage. Many of the courses from the College of Fine Arts were mapped to this goal, as well as any study-abroad courses. Courses in the Heinz College of Information and Public Policy and the College of Engineering were also connected to SDG 11, including a capstone that was devoted to better use of SDG data to help mayors' offices in their Voluntary Local Reviews.

Research

Dimensions tagged 53 CMU research publications since 2018 with SDG 11. Most of the research tagged was related to engineering, information and computer science, artificial intelligence, and image processing. The tagging algorithm did not capture numerous publications that would be considered relevant to SDG 11.

Practice

The CMU practice activities identified under SDG 11 were linked primarily to two areas: sustainable transportation options and air quality. Furthermore, Metro 21 brings people, technology, and policy together to significantly improve the quality of life in metropolitan areas by employing research, development, and deployment tactics with key partners to create and implement smart city solutions around the world.

11 SUSTAINABLE CITIES AND COMMUNITIES

21 Communication Articles n=212

106 Student Organizations n=470

17 17 Room Activities n=304

Figure VII-SDG11-2: Number of CMU communications articles, student organizations, and 17 Rooms activities addressing SDG 11

Are you working on an activity at CMU that contributes to SDG 11? If so, we want to hear from you. Please convey the details or request a meeting to discuss your activity by sending an email to sustainability@cmu.edu.

GOAL 12

Responsible Consumption and Production

Figure VII-SDG12-1: Percentage of SDG 12 activity in education, research, and practice

Participants in the 17 Rooms event for SDG 12 (Responsible Consumption and Production) brought forth many examples of practice activities in the CMU community related to SDG 12, and this also was reflected in additional analyses of CMU practices. While there were also education and research activities at CMU that map to SDG 12, they were not as large of a percentage of total activities as the practice area. There were not many student organizations that focus primarily on this topic, and CMU published a small number of articles related to SDG 12.

Education

In spring 2020, there were 30 courses mapped to SDG 12. These courses were primarily related to optimization, sustainable management, and development and manufacturing.

Research

Dimensions tagged 13 CMU research publications since 2018 with SDG 12. The team noted that many results contained the phrase "sustainable production" but by broadening search criteria to include keywords such as "life-cycle" and "recycling," additional publications would have been identified. Searching for "biomaterials" also could have yielded additional publications.

Practice

There were numerous practice activities at CMU that contribute to SDG 12. These generally were in one of three areas: reducing food waste; responsibly managing chemicals; or reducing waste generation. The Department of Student Affairs supports zero waste events and food composting, and most dining locations at CMU were intentionally trayless to help reduce food waste. Food composting was established in campus kitchens in 2008 and expanded to the academic departments in January 2013. Activities extended beyond food waste to other aspects of SDG 12. CMU also promotes environmental practices through the Scotty Goes Green program, a voluntary, self-guided initiative using a series of checklists and tools that guide applicants through three levels of certification.

| | 3 Communication Articles n=212 | 2 Student Organizations n=470 | 22 17 Room Activities n=304 |

Figure VII-SDG12-2: Number of CMU communications articles, student organizations, and 17 Rooms activities addressing SDG 12

Are you working on an activity at CMU that contributes to SDG 12? If so, we want to hear from you. Please convey the details or request a meeting to discuss your activity by sending an email to sustainability@cmu.edu.

GOAL 13

Climate Action
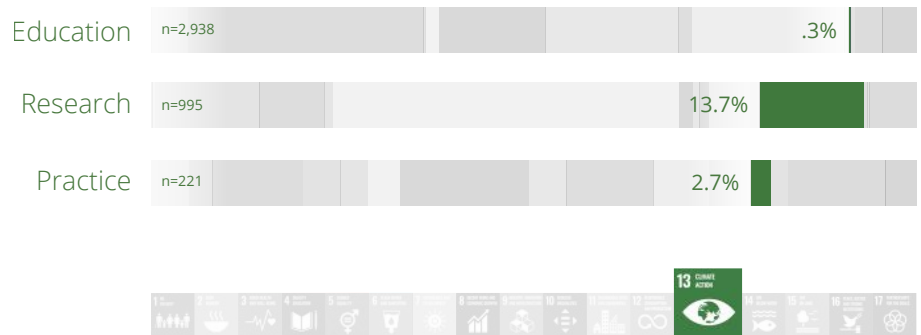
Figure VII-SDG13-1: Percentage of SDG 13 activity in education, research, and practice

Climate action is a popular topic at CMU, as demonstrated by the large number of participants in the 17 Rooms discussion for SDG 13 (Climate Action). However, because of the way that the SDGs are structured, this goal focuses mainly on policy and outreach efforts, which means that many of the activities that one might expect to be classified under this goal are actually mapped to other environment-related goals. CMU published a small number of articles on this goal and there are a few organizations that primarily address it.

Education

There were nine CMU courses for spring 2020 mapped to SDG 13. The courses addressed all of the targets under this goal, with those related to education, awareness-raising, and human and institutional capacity on climate action being the most common. The courses primarily addressed engineering and science-based topics. However, there were some specific courses directly related to a focus on climate change awareness and mitigation.

Research

Dimensions tagged 136 CMU research publications since 2018 with SDG 13. Many results contained the terms "climate" and "carbon dioxide" and came from engineering experts. The team found that many of the publications tagged with SDG 13 were potentially more relevant to other goals but a more sophisticated analysis of search terms would have been required to determine their classification.

Practice

The CMU practice activities that mapped to SDG 13 were primarily related to policy engagement with local and regional governments. The numerous activities of the Steinbrenner Institute for Environmental Education and Research contributed to SDG 13 as well as several other environmental SDGs in terms of practice as well as education and research. To date, CMU has reduced its carbon footprint by 70 percent in comparison to the 2005 base year without adjusting for campus growth. Additionally, CMU signed a Climate Pledge focused on the university's practices to address climate change. CMU is a founding member of the Pittsburgh 2030 District, which is a strategic initiative of the Green Building Alliance (GBA) that supports building owners and managers in Pittsburgh who focus on building policies to mitigate climate change.

4	3	8
Communication Articles	Student Organizations	17 Room Activities
n=212	n=470	n=304

Figure VII-SDG13-2: Number of CMU communications articles, student organizations, and 17 Rooms activities addressing SDG 13

Are you working on an activity at CMU that contributes to SDG 13? If so, we want to hear from you. Please convey the details or request a meeting to discuss your activity by sending an email to sustainability@cmu.edu.

GOAL 14

Life Below Water

Education n=2,938   .2%

Research n=995   .4%

Practice n=221   0%
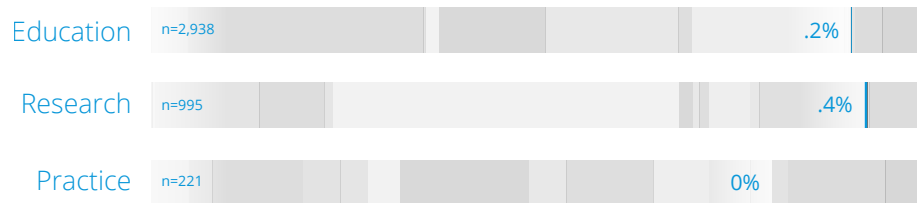
Figure VII-SDG14-1: Percentage of SDG 14 activity in education, research, and practice

SDG 14 (Life Below Water) primarily addresses issues related to the coastal environment, so there were not many practice activities under this goal at CMU considering the inland location of the university. However, there were a few activities in terms of education and research that were relevant to this goal. Less than five student organizations focus on this goal, and there were no articles published by CMU that focus on SDG 14.

Education

There were five spring 2020 courses mapped to SDG 14 (Life Below Water). These courses were related to a range of targets, but had some specific aquatic component indicated in the description.

Research

Dimensions tagged four CMU research publications since 2018 with SDG 14, although additional searches with keywords such as "fishing" and "oceans" brought up CMU publications that were not tagged with any SDG. Further research into environmental engineering and science and biological sciences could possibly bring up additional research related to this goal.

Practice

As this goal relates to oceans and seas and CMU's main campus is not on a coast, no practices were identified that directly contribute to SDG 14. However, the team noted that CMU's efforts to reduce plastic bottle use, which is reflected in SDG 12 (Responsible Consumption and Production), is also important to the targets laid out in SDG 14.

| | 0 Communication Articles n=212 | 1 Student Organizations n=470 | 9 17 Room Activities n=304 |

Figure VII-SDG14-2: Number of CMU communications articles, student organizations, and 17 Rooms activities addressing SDG 14

Are you working on an activity at CMU that contributes to SDG 14? If so, we want to hear from you. Please convey the details or request a meeting to discuss your activity by sending an email to sustainability@cmu.edu.

GOAL 15

Life on Land
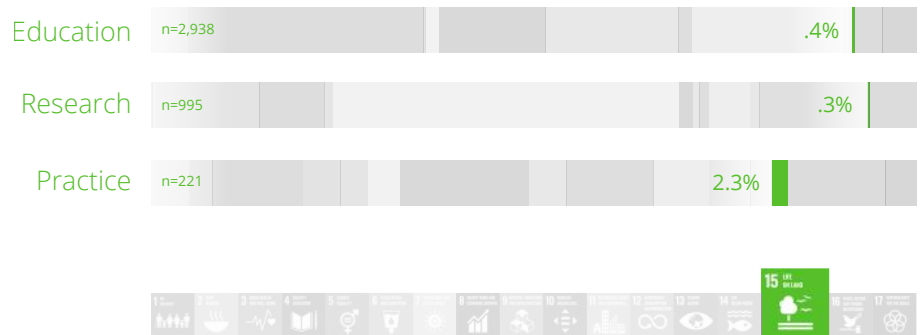
Figure VII-SDG15-1: Percentage of SDG 15 activity in education, research, and practice

There was limited activity at CMU related directly to SDG 15 (Life on Land), as indicated by relatively few courses and research publications related to this topic. This is related to CMU's urban location(s) and lack of agricultural academic programs. Fewer than five student organizations focus primarily on this goal and CMU did not publish any articles related to it.

Education

There were 11 spring 2020 courses mapped to SDG 15. The majority of courses addressed topics related to conserving and restoring terrestrial and inland freshwater ecosystems.

Research

Dimensions tagged three CMU research publications since 2018 with SDG 15. These were mainly related to conservation. However, it should be noted that not all CMU publications related to conservation were tagged with SDG 15. SDG 15-related CMU research publications that were not tagged were categorized under earth science, environmental science, agriculture and veterinary science, and environmental biotechnology. Publications on soil and water remediation also were not tagged.

Practice

CMU undertakes several practice activities that directly address SDG 15. For example, Facilities Management Services (FMS) Grounds employs integrated pest management in its sustainable approach to controlling insects, weeds, plant pathogens, and other pests, while landscape plans emphasize native plants and pollinators. Goats from Allegheny Goatscape visit campus every fall to clear a steep, overgrown hillside that has been invaded by Kudzu vines, which are strangling the native plants and trees. The Pittsburgh campus achieved Arboretum Accreditation based on demonstration of shared purpose to plant and conserve trees, while the university's green roof program increases vegetation and wildlife habitat on urban sites that typically have neither.

| **15** LIFE ON LAND | **0** Communication Articles n=212 | **1** Student Organizations n=470 | **9** 17 Room Activities n=304 |

Figure VII-SDG15-2: Number of CMU communications articles, student organizations, and 17 Rooms activities addressing SDG 15

Are you working on an activity at CMU that contributes to SDG 15? If so, we want to hear from you. Please convey the details or request a meeting to discuss your activity by sending an email to sustainability@cmu.edu.

Peace, Justice and Strong Institutions

Figure VII-SDG16-1: Percentage of SDG 16 activity in education, research, and practice

SDG 16 (Peace, Justice, and Strong Institutions) includes a large number of topics that are not easily classified as many of them deal with broad policy issues such as reducing violence or tackling corruption. SDG 16 posed a challenge to map specific education, research, and practice activities with primacy when conducting analyses. Activities related to SDG 16 were identified during the 17 Rooms exercise and further research into this topic would likely reveal additional relevant activities. A moderate number of student organizations address SDG 16, including student government organizations. There were three articles published by CMU that primarily address SDG 16.

Education

There were 108 spring 2020 courses mapped to SDG 16, or nearly 4 percent of all courses. The issues addressed included foreign and domestic public policy courses, legislative decision-making, peaceful and nonviolent institutional changes, human rights, security, and risk management. Additional courses were identified during the 17 Rooms exercise, but they were not all taught during the spring 2020 semester so were not included in this initial analysis.

Research

Dimensions tagged 62 CMU research publications since 2018 with SDG 16. While many articles were tagged with this SDG, the team did not believe that they were all relevant to the goal. At the same time, many articles that might have been relevant to this goal were not tagged. Furthermore, some publications by researchers identified in the 17 Rooms exercises were not included in the Dimensions extract at all. For example, articles published by journals such as the *Journal of Global Security Studies* or the *Stanford Social Innovation Review* also might have been relevant to this goal, but they were not tagged with SDG 16.

Practice

For SDG 16, five areas of activity at CMU had the largest number of activities. These included reducing violence, ensuring equal access to justice, reducing corruption, developing accountable institutions, combating human trafficking, and ensuring access to information. Policies related to the governance of the university were also included here. Many activities in President Jahanian's Confronting Racism memo contribute to this goal, as do the numerous programs and initiatives related to ethics and conflicts of interest.

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

3 Communication Articles n=212

42 Student Organizations n=470

18 17 Room Activities n=304

Figure VII-SDG16-2: Number of CMU communications articles, student organizations, and 17 Rooms activities addressing SDG 16

Are you working on an activity at CMU that contributes to SDG 16? If so, we want to hear from you. Please convey the details or request a meeting to discuss your activity by sending an email to sustainability@cmu.edu.
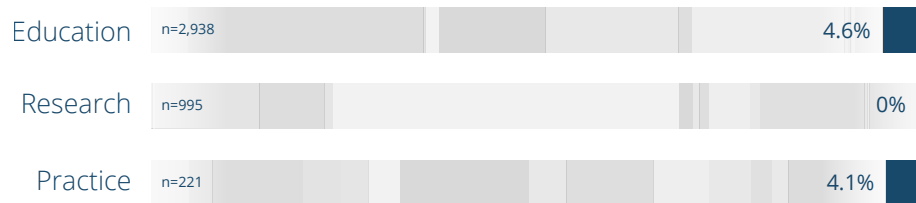
GOAL 17

Partnerships for the Goals

Figure VII-SDG17-1: Percentage of SDG 17 activity in education, research, and practice

Many CMU activities that involve partnerships focus on a specific technical area and were therefore mapped under that goal rather than under SDG 17 (Partnerships for the Goals). However, some education, research, and practice activities were identified that relate directly to this goal. In terms of student organizations, a moderate number were mapped to this goal, including many community outreach organizations. CMU published three articles related to SDG 17.

Education

As an institution that offers experiential learning and works in partnership with the Pittsburgh community, there are numerous education activities related to SDG 17, some of which are directly related to the SDGs including work done by Heinz College students with Brookings and with the UN. During the 17 Rooms exercise, several professors in different disciplines shared that they were using the SDGs as an organizing framework. Nearly 5 percent of spring 2020 courses were mapped to SDG 17, including courses that encourage and promote effective public, public-private, and civil society partnerships There are multiple courses that offer forms of experiential learning and/or bring in guest lecturers from various partner organizations.

Research

Dimensions tagged zero CMU research publications with SDG 17 since 2018. However, the team determined that there were numerous research publications that may have been related to this goal if the research criteria were refined. For example, there is no research category on Dimensions related to international relations or global issues, although these activities could have been considered directly relevant to SDG 17. By narrowing the search criteria to "international" or "global" in the title or abstract, the team found many CMU articles related to partnership.

Practice

Many CMU practice activities involve community engagement in a specific technical area and were therefore mapped as a practice under other goals rather than under SDG 17. However, there are some specific activities that clearly relate and contribute to this goal. In the July 2020 memo from President Jahanian on Confronting Racism, for example, he announced new initiatives to strengthen engagement with communities of color in Pittsburgh. CMU is also a member of several networks dedicated to various aspects of sustainability, including some that specifically address the SDGs. In fact, the commitment to the SDGs and the publication of this VUR are two prominent examples of how CMU is actively contributing to SDG 17.

17 PARTNERSHIPS FOR THE GOALS

3
Communication Articles
n=212

30
Student Organizations
n=470

27
17 Room Activities
n=304

Figure VII-SDG17-2: Number of CMU communications articles, student organizations, and 17 Rooms activities addressing SDG 17

Are you working on an activity at CMU that contributes to SDG 17? If so, we want to hear from you. Please convey the details or request a meeting to discuss your activity by sending an email to sustainability@cmu.edu.

Next Steps

The team conducted the VUR using available tools and information, recognizing that this is the beginning of an ongoing process that requires continuous refinement and further engagement with the global CMU community.

Through this VUR, the team identified more people from different parts of the university engaging on a wider range of SDG-related issues than had been previously known. Furthermore, all 17 SDGs were addressed by CMU's education, research, or practice activities. The team also found that there was interest in the SDGs across many units at CMU, and an impressive number of staff engaged.

Overall awareness of how the SDGs can be employed as a framework for action, however, is still low and needs to be raised; it is hard to get robust engagement and high levels of demand if people do not know about the SDGs. And even if they know about the goals, they do not always realize how interconnected the SDGs are and that they address topics such as racial inequality, gender empowerment, safe migration, police violence, and many other pressing societal issues. As with the general public, many at CMU still mainly associate sustainability with the environment and climate change. These are certainly important components of the SDGs, but the SDGs are also about a lot more.

The Sustainability Initiative is intended to improve coordination of and stimulate new approaches to education, research, and practice by students, faculty, and staff so that the CMU community can contribute to achieving the SDGs by 2030. Each member of the CMU community can contribute, and in many cases already is contributing, to advance the SDGs, whether through education, research, or practice. The VUR provides information about current SDG-related activities that can serve as the basis for individual; academic, administrative, and operational units; and institutional action to build on these activities.

Over the coming academic year, the CMU Sustainability Initiative team intends to deepen its analysis of SDG implementation by expanding the sources of information for education, research, and practice activities and incorporating feedback mechanisms to validate findings. Plans for Sustainability Initiative follow-up in each of the three mission areas of the university are as follows.

Education

The process to analyze and map courses will be refined, and the team will explore additional mechanisms to map a larger number of courses to multiple SDGs. Additionally, the team will incorporate feedback from professors and the broader CMU community across the globe to bolster the analysis. These activities will complement broader CMU efforts to identify and communicate thematic issues addressed in CMU courses.

Research

The team will build on the results from the Dimensions research analysis by exploring additional tools, and then triangulate this information with CMU's in-house database, Elements, to improve accuracy of the analysis. This process will also allow for pulling information from additional sources, such as public policy papers and publications aimed at a general audience, all of which provide a richer picture of the totality of CMU research and writing.

Practice

The team will expand efforts to identify and map university practices to the SDGs. During the course of this review, a range of new initiatives were announced to respond to COVID-19 and confront racism. Many of these practices are cross-cutting and address a range of SDGs, and as they are rolled out, CMU will incorporate them into the SDG analysis. Additionally, the practices analyzed in this review primarily focused on activities taking place in Pittsburgh; this analysis will be expanded to more comprehensively capture activities on all CMU campuses across the globe.

Engagement

The team will seek opportunities to strengthen coordination and engagement within the CMU community, within the localities where CMU operates, and with other entities committed to achieving the SDGs. This review was based on consultations with current students, faculty, and staff in the midst of a global pandemic. The team will deepen engagement by organizing another iteration of the 17 Rooms exercise, and also by identifying additional opportunities over the course of the year. The team will also conduct a follow-up Knowledge, Attitude, and Practice survey to determine if the CMU community's engagement with the SDGs has increased since the VUR process began in early 2020, and then use these results to inform future engagement efforts.

In terms of student organizations, the team will build on the efforts of the 2020 summer project course students to map these organizations to the SDGs. Based on this analysis, the team will identify opportunities for the organizations to cooperate both within CMU and externally to enhance implementation of the SDGs.

Furthermore, consultations for this review involved current students, faculty, and staff. We recognize that CMU alumni are also making critical contributions to the SDGs. The team intends to educate alumni about the university's SDG work and incorporate their activities into the overarching analysis of SDG implementation going forward.

Unit and Institutional Action Planning

The VUR is intended to provide a foundation for individual, academic, administrative, operational units, and institutions to plan education, research, and/or practice that can enhance CMU's contributions to progress aligned with the SDGs, or the Global Goals. The team will work with interested university units and with the university leadership to help identify opportunities based on the results of the VUR and its continuing refinement.

VUR Process Improvement and Collaborations

There has been a lot of interest from colleagues around the world (including from Australia, New Zealand, South Africa, Spain, and Canada) and around the United States in the process and results of this initial CMU VUR. This presents an important opportunity for CMU to engage this interest and to learn from colleagues and institutions around the world. There is no blueprint for a VUR. The team developed and implemented a set of investigative and information gathering activities, but there is much more that could be done to produce a VUR. The team looks forward to evaluating which activities present the best opportunities for being made more routine and systematic.

In closing, this VUR needs to be viewed as an ongoing process. In an institution as large and dynamic as a university, the team recognizes the continuously changing group of people and evolving set of interests and activities within the university community. The process of creating a VUR itself supports reflection and intentionality in regard to the SDGs as an organizing and inspirational framework. Of course, at the heart of the SDGs is the concept that not a single one of the goals can be achieved without the others. The next phase of analysis will also be to identify opportunities to use the SDGs as a framework to make links internally at CMU as well as with other institutions in order to help achieve all 17 SDGs, moving through the decade of action to 2030.

Acknowledgements

The Sustainability Initiative has been made possible by the enthusiastic interest of many students, staff, and faculty members and will continue because of the passionate interest of the Carnegie Mellon community. The seed efforts by the students of the fall 2017 and fall 2018 project courses sponsored jointly by the Departments of Engineering and Public Policy and Social and Decision Sciences, and their faculty advisors Professors Edward Rubin and John Miller, were critical to the development of the Sustainability Initiative. A group of devoted faculty members who agreed to serve on a Faculty Senate Ad Hoc Committee, chaired by Professor Vivian Loftness, gave their time for many meetings over more than a year to develop a comprehensive review and set of recommendations for taking sustainability education and research to the next level at CMU. Similarly, a group of more than 25 students, staff, and faculty members have given generously of their time in monthly meetings of the Sustainability Initiative Advisory Council since August 2019.

The VUR was conducted with the engagement, input, and work of hundreds of students, staff, and faculty members at Carnegie Mellon. The VUR team thanks all who participated in the Knowledge, Attitude, and Practice survey; in the interactive Sustainable Development Goal displays in the Cohon University Center; and in the 17 Rooms events. The team also thanks the many individuals who provided detailed information in interviews and other follow-up to the activities noted. The seven students who participated in the summer 2020 project course 99-520H helped the VUR effort significantly with evaluating data and information collected in the cited activities, and with conducting various data collection activities of their own.

Thanks also to Kaysie Brown and Krista Rasmussen of the United Nations Foundation and John MacArthur and Tony Pipa from the Brookings Institution for their continued partnership throughout the implementation of the Sustainability Initiative.

Acronyms

AASHE   Association for the Advancement of Sustainability in Higher Education
CMU   Carnegie Mellon University
EPP   Engineering and Public Policy
FMS   Facilities Management Services
GBA   Green Building Alliance
GHG   Greenhouse Gas
ISCN   International Sustainability Campus Network
OECD   Organization for Economic Cooperation and Development
NASPAA   Network of Schools of Public Policy, Affairs, and Administration
SDS   Social and Decision Sciences
SDGs   Sustainable Development Goals
SDSN   Sustainable Development Solutions Network
STARS   Sustainability Tracking, Assessment & Rating System
THE   Times Higher Education
UGC   University Global Coalition
UN   United Nations
UNF   United Nations Foundation
VLR   Voluntary Local Review
VNR   Voluntary National Review
VUR   Voluntary University Review

Appendix

Official Charge issued by Provost James Garrett Jr. on September 23, 2019

The Sustainability Initiative's Steering Committee and Advisory Council will lead the following charges:

- **Grow awareness** of the Sustainable Development Goals (SDGs) across the university;
- **Elevate** the university's engagement with the SDGs;
- **Oversee** a process of community engagement known as a "Voluntary University Review";
- **Develop processes** to identify and present high-priority opportunities for the university to consider;
- **Advise** on the strengths, weaknesses, opportunities, and challenges regarding CMU's engagement with the SDGs; and
- **Communicate** to the university and the world about our SDG progress and commitments.

Sustainability Initiative Leadership and Contributors, Academic Year 2019-20

a. **Sustainability Steering Committee Co-Chairs and Voluntary University Review Leadership**

- **David Dzombak**, Hamerschlag University Professor and Department Head, Civil and Environmental Engineering, College of Engineering
- **Steven Guenther**, University Engineer and Assistant Vice President of Facilities Management and Campus Services
- **Alexandra Hiniker**, Executive Fellow for Sustainability Initiatives, Office of the Provost
- **Sarah Mendelson**, Distinguished Service Professor of Public Policy and Head of Heinz College in Washington D.C.

b. **Sustainability Steering Committee Support**

- **Quinten Brown**, Executive Administrator to the Provost, Office of the Provost
- **Rebecca Culyba**, Associate Provost, Office of the Provost
- **Kathy Kendra**, Creative Director, **and the Central Design Team**, Marketing and Communications
- **Matt Nagel**, Associate Vice President, **and the Central Communications Team**, Marketing and Communications
- **Alexandra Spetz**, Project Administrator, Office of the Provost
- **Sakena Washington**, Director of Communications, Office of the Provost

c. **Sustainability Initiative Advisory Council, Academic Year 2019-2020**

- **Nina Baird**, School of Architecture, College of Fine Arts
- **Sven Burke**, Graduate Student Assembly
- **Don Coffelt**, Facilities Management and Campus Services
- **Neil Donahue**, Steinbrenner Institute, Mellon College of Science, College of Engineering
- **Matthew Fochs**, Graduate Student Assembly
- **Rayid Ghani**, Machine Learning Department, School of Computer Science and Heinz College of Information Systems and Public Policy
- **Georgia Giatras**, Office of the Provost
- **Kristin Hughes**, School of Design, College of Fine Arts
- **Barbara Kviz**, Staff Council
- **Vivian Loftness**, School of Architecture, College of Fine Arts
- **Brian Lee**, Sustainable Earth Student Group
- **Julia Lui**, President's Cabinet, Student Government
- **Nick Muller**, Tepper School of Business, College of Engineering
- **Dan Nagin**, Heinz College of Information Systems and Public Policy
- **Liam O'Connell**, Undergraduate Student Senate
- **Corina Paraschiv**, Heinz College of Information Systems and Public Policy, Class of 2020
- **Lib Rosemeyer**, Office of Title IX Initiatives
- **Peter Scupelli**, School of Design, College of Fine Arts
- **Anna Siefken**, Wilton E. Scott Institute for Energy Innovation
- **Rick Siger**, Office of the President
- **M. Shernell Smith**, Center for Student Diversity and Inclusion
- **Sakena Washington**, Office of the Provost
- **Keith Webster**, University Libraries

d. **May 2020 17 Rooms Leads**

- **Scott Andes**, Heinz College of Information Systems and Public Policy
- **Linda Babcock**, Dietrich College of Humanities and Social Sciences, and Heinz College of Information Systems and Public Policy
- **Nina Baird**, School of Architecture, College of Engineering
- **Silvia Borzutzky**, Heinz College of Information Systems and Public Policy
- **Neil Donahue**, Steinbrenner Institute, Mellon College of Science, and College of Engineering
- **David Dzombak**, Civil and Environmental Engineering, College of Engineering
- **Jen Gilbride-Brown**, Office of the Vice Provost for Education
- **Steve Guenther**, Facilities Management and Campus Services
- **Kim Hyatt**, Heinz College of Information Systems and Public Policy
- **Barb Kviz**, Facilities Management and Campus Services
- **Karen Lightman**, Metro 21 Institute
- **Leah Lizarondo**, Alumni, 412 Food Rescue
- **Sarah Mendelson**, Heinz College of Information Systems and Public Policy, Washington, D.C.
- **Dan Nagin**, Heinz College of Information Systems and Public Policy
- **Corina Paraschiv**, Heinz College of Information Systems and Public Policy, Class of 2020
- **Lib Rosemeyer**, Office of Title IX Initiatives
- **Rick Siger**, Office of the President
- **Anna Siefken**, Wilton E. Scott Institute for Energy Innovation
- **M. Shernell Smith**, Center for Student Diversity and Inclusion

Students | Summer 2020

a. **Summer Project Course**

- **Fiona Carcani**, Student, Chemical Engineering, College of Engineering
- **Alyssa Deng**, Student, Dietrich College of Humanities and Social Sciences
- **Molly Fitzgerald**, Student, Civil and Environmental Engineering, College of Engineering
- **Weidong Hu**, Student, Civil and Environmental Engineering, College of Engineering
- **Adithi Jayasimha**, Student, Civil and Environmental Engineering, College of Engineering
- **Julie Olsen**, Student, Civil and Environmental Engineering, College of Engineering
- **William Qiu**, Student, Civil and Environmental Engineering, College of Engineering

b. **Research Assistants**

- **Kathryn Posko**, Student, Heinz College of Information Systems and Public Policy
- **Usha Silwal**, Student, Civil and Environmental Engineering, College of Engineering