



# Can We Measure Universities' Impact on Climate Change?

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In order to assess their impact on the climate, organizations are now gauging their greenhouse gas emissions in three ways: scope 1—directly from their own activities; scope 2—through their energy supply; and scope 3—through upstream activities (goods and services used, transportation, investments, etc.) While this is a useful frame for organizations of all types, it falls far short of encompassing the range of impacts that a university might have. Universities do have their own emissions, but they also shape minds, advance science, and form professionals, all of which have impacts on the progress of climate change—sometimes profound ones. How can these impacts be gauged? Would it in fact ever be possible to find out what the full impact of a university is on climate change?

These questions are not merely of interest to theorists and researchers of higher education. The UN-endorsed Agenda 2030 and Sustainable Development Goals see universities as playing a pivotal role in ensuring global sustainability. University leaders are anxious to monitor and reduce their carbon footprint, whether through their own commitment to the environmental cause, or swayed by the consumer pressures of an environmentally committed student body. Governments concerned with moving toward net zero will certainly be keeping one eye on their higher education systems, particularly when public funding is involved.

## Measuring Greenhouse Gas Emissions

Some of this evidence is starting to be gathered. A [2019 study](#) by Robin Shields estimated that the global emissions associated with international student mobility amount to between 14.01 megatons of CO<sub>2</sub> equivalent per year (approximately the level of the national

### Abstract

Universities have a growing interest in understanding the impact that they have on climate change, whether positive or negative. Yet beyond the direct emissions from their campuses, is it possible to measure their multiple influences through education, knowledge production, and public engagement? This article argues that while it is important to monitor carefully those activities that can be measured, universities should not dismiss those activities that cannot.

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emissions of Latvia) and 38.54 megatons (similar to Tunisia), and are increasing year on year. Eckard Helmers and colleagues have created a [composite index](#) (across scope 1, 2, and 3 emissions) to assess the carbon footprint of 20 universities, of which energy consumption is on average the greatest component, followed by mobility (commuting and business travel). A [study](#) by Eugene Cordero and colleagues is particularly innovative in attempting to quantify the impact of an undergraduate module in terms of greenhouse gas emissions, estimating that five years after the course, it had led to a reduction per student of 2.86 tons of CO<sub>2</sub> per year, comparing favorably with other initiatives such as building insulation and electric vehicles. Yet there is still a dearth of evidence that universities can draw on in understanding their contributions and in comparing between the different areas of their work.

### Pathways of Influence on Climate Change

In order to understand the impact of universities on climate change, we can start with the range of activities carried out. The Transforming Universities for a Changing Climate (Climate-U) project has conceptualized the university as working in [five modalities](#): education (courses provided to undergraduates and graduate students, as well as other teaching and learning processes); knowledge production (basic research, innovation and application of knowledge, and academic publishing); service delivery (community projects, consultancy, and secondments); public debate (science communication, political mobilization, and fostering public discussion); and campus operations (universities' physical space and community).

It is possible to understand the impact of these five modalities on the climate through three stages. First are the communities who come into direct contact with the university—most importantly the students, who then go out into society as graduates, but also, on occasions, local communities, government, businesses, and civil society organizations. These are termed “bridging actors,” as they translate the influence of the university to the broader society (the second stage). Universities influence society in general through their shaping of work practices, production of new technologies, and circulation of ideas, all of which have a knock-on impact on the ecosphere (the third and final stage). These influences can, of course, be negative as well as positive, and universities have historically been implicated in much of the destruction of the natural environment, through the worldview that they have promoted and the technologies that they have developed.

Naturally, this is not a linear process through which universities change society without in turn being changed. There are various feedback loops through which the ecosphere and society influence universities and the higher education system. With the passing of the decades this century, universities around the world will be increasingly at the sharp end of climate impacts, including flooding, wildfires, water shortages, and extreme weather, not to mention changing economic and political currents.

### Challenges of Measurement

Yet while this framework can help us understand the flows of influence, it does not resolve all our problems of measurement. First, there is the age-old attribution problem. From being an issue known only in select circles in the 1980s, we have now moved to a situation in which 64 percent of the world's population recognize that we are living in a climate emergency, according to a [UNDP/University of Oxford survey](#)—in spite of the concerted attempts of the fossil fuel lobby to obstruct and distract. Yet what portion of that monumental change can we attribute to the work of universities and their researchers? Pennsylvania State University climate researcher Michael E. Mann has campaigned on this issue through his lifetime and developed the hockey stick graph that helped place anthropogenic global warming in the popular imagination. Yet could we ever track exactly the extent to which his ideas have shaped societal perceptions?

Even if we can chart the various flows of influence and solve the attribution problem, we are still faced with challenges of breadth, intensity, and timescale. Some of the impacts of the university are deep, but focused on a few people: For example, for a first-generation student, the experience of studying in the university may be life changing and lead to major shifts in career, lifestyle, and political commitments. Other impacts may be very diffuse. The secondment of a university professor to support UNESCO's climate

change education policy may have a global influence, but thinly spread. Furthermore, timescale can vary dramatically. Some impacts may be immediate, but others may mature over years or decades. History is full of examples of scientific discoveries that only came to have a practical influence on people's lives long after the event.

It is tempting to conclude from the above that the impacts of universities on climate change are simply too complex to gauge, and that it is a lost cause. It is true that we may never be able to identify, document, and compare all of the influences. Yet there is still a vital place for monitoring and research, if approached with the following three principles. The first is to carefully measure those things that are amenable to measurement—direct emissions, travel of students and staff, and so forth. Second is to diversify the ways in which we document impact, using qualitative as well as quantitative research, so as to capture those aspects of the work of universities that cannot be numerically measured. Finally, for those things that cannot be adequately captured through any form of research, to refrain from dismissing them on those grounds. To invoke a well-known saying, “not everything that counts can be counted,” and in universities—as in all spheres of our lives—we have at times to act on the basis of our experience and reasoned inferences, even in the absence of systematic research evidence. ▲

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