

## Universities as drivers of Sustainability - A strategic perspective

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### **Abstract.**

Schools of Architecture at European and US Universities, see themselves as drivers for a sustainable transformation of society towards a zero-emission society. In USA the Sustainability Tracking, Assessment & Rating System (STARS) was initiated by the Association for the Advancement of Sustainability in Higher Education (AASHE) and has compelled American universities to work in a systematic process with sustainability. Danish Universities see themselves as innovative fora for sustainability, however, they do not work with a common system, but each university work with its own process of sustainability strategy implementation and documentation. In this paper, a mapping of strategies, implementation processes and documentation at two Danish universities are compared to how two American universities in the STARS work with and document sustainability. The study presents the strategic framework of each universities' work with sustainability and how they implement and document the results. The two Danish universities focus their organization on a broad view of sustainability and a self-developed framework of metrics rooted in United Nations Sustainable Development Goals, the Time Higher Education Ranking System and the Ui green metrics administered by the university management. The American Universities focus on different sustainability topics within the STARS program. However, they give the authority to separate sustainability organizations within the university structure. This paper explores the pros and cons of having a common systematic approach within which universities can unfold their sustainability strategies.

### **1. Introduction**

Universities are key players in making the Green transition happen. Contrary to other parts of society, universities can influence a wide array of fields. Campus services are no longer maintenance offices and caretakers; in the yearly strategies, campus development is seen as a 'living lab' for research in a sustainable built environment. University Campi also works as demonstrators to the surrounding society, showcasing 'how it can be done' in practice – solar power or communal bike sharing. Schools of Architecture at universities are active players in these strategies.

The Green transition to a sustainable society demands research and innovation. This is the raison d'être for universities and there should be less need for changes in this regard. Funding Calls reflect this

urgency. However, the tradition of freedom in creating research topics and research projects is a dilemma.

Finally, the formation of future generations through curriculum development is also placed in the hands of universities. The question discussed at universities now is to which degree curriculum should be changed to provide the knowledge and skills needed in the near future.

The strategies published by universities yearly or biannually demonstrate the recognition of the obligations and questions described and show different strategic approaches. University strategy-reports are interesting to study because they work as test-beds for future policies in the broader society. In this paper the strategies of four universities concerning how they plan to meet the sustainability demands is inquired.

## **2. Method**

Through desktop studies, a mapping of the sustainability strategies, the implementation process and the documentation of the universities is performed. This is supplemented with semi-structured interviews with high-level decision makers involved in planning the sustainability strategies of the universities. Two Danish universities are compared to two American universities recognized through the Sustainability Tracking, Assessment & Rating System (STARS) developed by the Association for the Advancement of Sustainability in Higher Education (AASHE).

The STARS is a transparent, self-reporting framework for measuring sustainability performance for colleges and universities. It began in 2006 and is continuously further developed. The STARS provides a framework to work on sustainability in higher education by collecting information on sustainability efforts, documenting it in the online reporting tool, and submitting a report for public recognition. One thousand one hundred eight institutions have registered to use the STARS Reporting Tool, of which 577 have earned a STARS rating. The rating includes bronze, silver, gold and platinum according to the score, and the STARS score is based on the percentage of points earned for credits in the four main categories of Academics (AC), Engagement (EN), Operations (OP), and Planning & Administration (PA). Additionally, bonus points can be earned for Innovation & Leadership (IN). The common set of measurements allows meaningful comparisons within the institution over time and across other institutions. It also serves as a tool to engage faculty, staff, and students to understand sustainability, develop initiatives, and measure and report on its contributions towards United Nations Sustainable Development Goals (UNSDGs).

### *2.1 The Case Study of Universities*

The case study of Universities was conducted with the hypothesis that the STARS as a common framework has advanced American universities on a strategic level. The STARS came in 2006 before the launch of the UNSDGs.

Denmark is often depicted as a role-model country concerning the Green transition. However, Danish universities have not had a common strategic framework like STARS at hand. The universities are thus – for different reasons - chosen from a ‘best practice’ perspective allowing a comparison of the strategy developments in the context where the financial and political circumstances are equally beneficial.

### *2.2 Semi-structured Interviews*

The semi-structured interviews were conducted virtually and recorded. Prior to the interview, an interview guide was provided to interviews. Literature produced by the universities on their strategies was reviewed and planning documents of the Universities to develop the interview guide. Interviewees were asked questions relating to general ideas on sustainability and asked to describe who was involved in the strategy development and how. Then they were asked to describe how the implementation of the strategy was planned and how it took place. Lastly, they were requested to describe how a ‘normal’ faculty or technical administrative personnel would encounter evidence of the strategy in their work life

on campus. The interview recording was transcribed, and the content was analyzed to identify patterns of responses.

### 3. Results

The results of the desktop studies and semi-structured interviews were grouped according to the emerging themes: organization behind the sustainability strategies and their implementation, metrics curriculum integration, involvement of staff, faculty and students, and campus development and operation.

#### 3.1. *Organization behind the sustainability strategies and their implementation*

The two American universities have very different organizational structures behind the work with sustainability strategies, although both universities utilize the STARS. It could both indicate that the STARS does not relate to an organizational structure and that the choice of metrics does not per se lead to a specific organization behind the strategy work.

What the two American Universities have in common is that the reporting of metrics and the organization behind the strategy work concerning sustainability is placed as a separate unit though communicating directly with the University management. In the two Danish universities, strategic offices or institutes of sustainability have not been given separate authority and are instead integrated with specific staff as part of the provost's general office.

At one American university, the sustainability strategy, the implementation strategy and the metrics are all handled by a small separate office led by a sustainability officer:

*I am the only full-time employee in the Office of Sustainability. I have a part time graduate assistant that works 20 hours a week and then three undergraduate working 10 hours a week. So there's some additional staff capacity in my office, but I'm the only full time Professional. I report to the Vice President. She reported to an executive vice president and he's responsible for finance and administration. And then he reported to the president. And the President reports to a board. So those are the layers of administration that are above me.*

The office is also in charge of implementation and pursuing of metrics from different parts of university, to deliver to the STARS to perform the ranking.

*My office is in charge of implementation. And even though my office is embedded in facilities management my position has been described and is treated as an enterprise-wide asset... I worked outside of the facilities management umbrella with healthcare, with athletics, with research, with students, so the sustainability, even though it's embedded in facilities, is much broader and it truly is an enterprise-wide initiative... And to help Implement enterprise wide there is an advisory committee that's appointed by the president that includes leaders and representatives from those major areas of the campus... And so that committee, along with my office is responsible for implementation.*

## American University 1

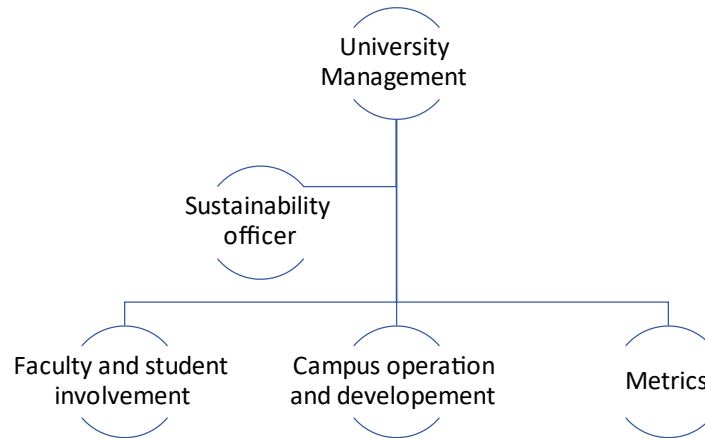


Figure 1. Sustainability Strategy Organizational Diagram: American University 1

The other American University was involved in the STARS and had an elaborate organization behind the sustainability strategy and implementation that had grown over decades. It was a management decision a decade ago to establish a Sustainability Institute working across the university with racial equity, curriculum integration, carbon offsetting, stakeholder engagement, and community partnerships. There is 14 full time staff at the Sustainability Institute.

Staff explains the role of the director of the Sustainability Institute:

*She can make decisions about what we do in the Institute. But she can't tell another department what to do, but she can accomplish things through influence.*

Concerning the organization and the responsibility behind the implementation of the sustainability strategy, the reference is to the university management, not the Institute, although Sustainability Institute is also in charge of metrics and pushing curriculum development.

*... the top management I guess and they gave the responsibility to the sustainability Institute to do influence. We're basically a think tank.*

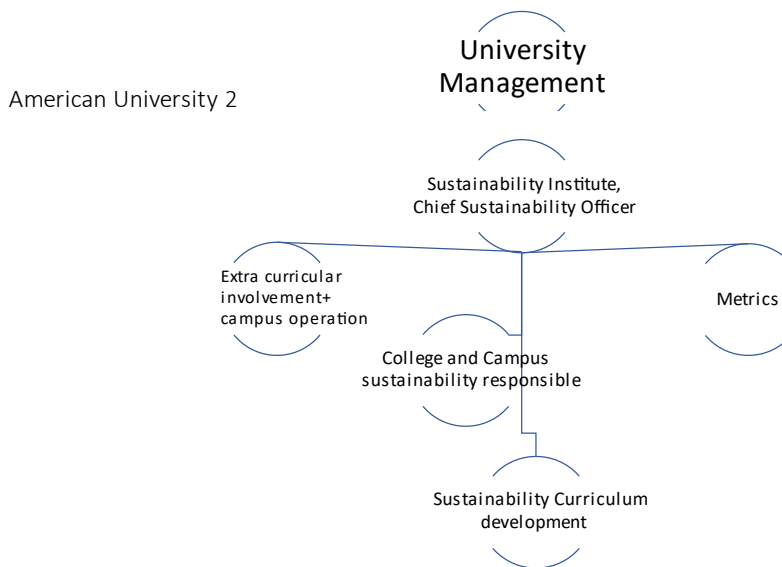


Figure 2. Sustainability Strategy Organizational Diagram: American University 2

The two Danish Universities are formally organized in the same way, concerning how the sustainability strategy is framed. They thus share one organizational diagram. However, when looked at more closely there are differences.

At one Danish University, the board announced in 2020 that the university should be a ‘sustainability university’, and that curricula should be developed to address UNSDGs explicitly, in the shape of a one year master for each of the 17 UNSDGs. The interviewee was involved in the latest sustainability strategy report, and explained the focus was adjusted:

*I think the criticism would be that it would result in something too silo oriented. But I think the intention was to send out the message of; we need to take this seriously.*

The boards and university management (the provosts office) work with the sustainability strategy received criticism from several faculty members:

*from our section we had criticized the report for being too polished and too much cherry picking.*

The board and university management decided to include the critical faculty in the next round of strategy development:

*our first step was to say, we can work on the report, but Are you ready to act on the advice you get? Otherwise, we don't want engage with it.' ...' we emphasized a focus on the operational level on the strategic but executing level where we said we advise you to pick some metrics that can be followed for a longer time and also pick some where we are not 'in green' ...where we do not deliver, and then continue to report on them in the next sustainability reports going forward several years. So in that sense suddenly (the strategy) became a driver of a strategy development process ...this came out of key discussions between myself, the professor from my section, and the head of the Provosts secretariat and one student assistant. So, the four of us ended up having very strategic suggestions about what metrics to follow up on. That ended up becoming those in the report.*

At the other Danish University the strategists and sustainability reporting members work at the provosts office. The main focus is on campus operations with elaborate carbon footprint reporting, addressing both scopes 1, 2, and 3 of the University's emissions.

*The main focus is campus operations, so it's not not research and it's not education.*

The strategist at the Provost's office explains the organization:

*it is the university director who owns the initiative. You have the Provost referring to him is the director, he's in charge of the campus operation, not research. It's not research but the operations. And I think it's very important to have a top management perspective when it comes to this because well, first of all, he can decide a lot on his own, but it's also when we have topics, that we need the university management to discuss, it's kind of easy for him to take it into that meeting.*

Concerning research and education in relation to sustainability, the University has a different strategy, which is more 'bottom up' as will be explained below.

Danish University 1 and 2

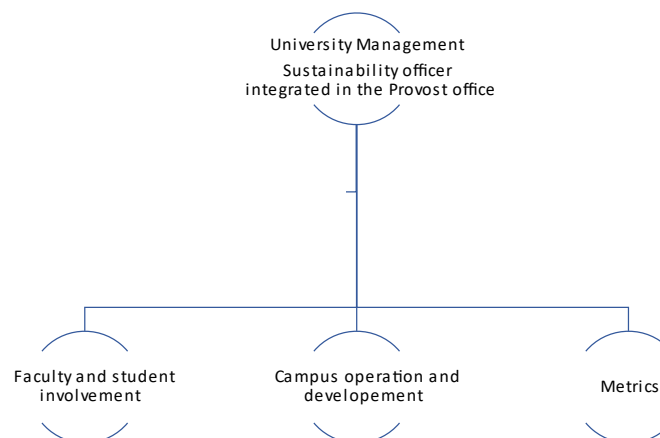


Figure 3. Sustainability Strategy Organizational Diagram: Danish University 1 and 2

### 3.2. Metrics

Metrics is the set or framework of performance measures that the schools of architecture and universities have chosen. Metrics important to keep the universities on track in implementing their strategies. Table 1 provides an overview of the ones chosen at the four case universities. All four universities adhere to at least one metric system developed to document sustainability at universities. But despite this, all four universities also have their own selection of internal metrics that are valuable to them. Although some of the indicators of these metrics might actually derive from one of the larger systems such as Times Higher Education (THE). THE Impact Rankings it is a global assessment, with 1,115 universities from 85 nations participating. The assessment is structured around the 17 UNSDGs and uses indicators to provide comparisons across three broad areas: Research, Outreach, and Stewardship. The latter plays a central part in that THE Impact Rankings maps how many universities courses that address UNSDGs directly, and also offer online courses on this subject. The three

universities that are part of the THE Impact Rankings thus ‘automatically’ have metrics related to UNSDGs.

	STARS	Ui Green Metric	Times Higher Education	Metrics of SDGs	Own Metrics
American University 1	O			O	O
American University 2	O		O	O	O
Danish University 1		O	O	O	O
Danish University 2			O		O

Table 1. Metrics

	Sustainability Institute	Sustainability Officer with Own Office	Unit-level Sustainability Responsible	Extra-Curricular Fora	Sustainability Officer Integrated in Provost Office
American University 1		O		O	
American University 2	O		O	O	
Danish University 1				O	O
Danish University 2				O	O

Table 2. Overview of Strategy Developers

Additionally, universities address the SDG’s further in a more elaborate manner. American University 1 has implemented the UNSDGs as a framework to prioritize strategies, which is then incorporated into its Sustainability Strategic Plan. Furthermore, the SDGs are implemented on many unit-level strategic plan objectives.

As previously mentioned, the university management of Danish University 1 announced that it would become a UNSDG university. And even though the American University 2 is not part of THE Impact Ranking System, the University is integrating UNSDGs in the metrics for its upcoming Sustainability Strategic Plan.

Both of American Universities work with the STARS metrics developed by AASHE. Though quite a number of work hours are placed in identifying data to inform the STARS metrics, both universities attempt to see it more as a driver and motivation than a competition.

Although universities utilize different metrics, similar aspects might be addressed. For example, the STARS includes metrics on Campus carbon footprint, from operation to transportation as mentioned above. Although Danish University 2 are not adapted the STARS the university’s own metrics address campus operation and transportation similarity. As the only one of the case universities works Ui Green metrics, that address many of the same aspects as STARS but have a deeper integration of UNSDGs.

### 3.3. Curriculum integration

The metrics facilitate incorporating sustainability into the courses and curriculum as THE Impact Ranking, STARS and Ui Green Metrics address the extent of sustainability being integrated in curriculum. For example, American University 1 tracks and reports progress toward the goals in this report on an annual basis:

*The key ones that I look at in the STARS program are the number of courses that are identified as either sustainability-focused or sustainability-related. And the number of students who graduate from a program where sustainability is an explicit learning outcome...I would like to see implemented when you submit your syllabus that there was a kind of default a required checkbox that says you know this course is sustainability focused. And here's how the university defines those things.*

Beyond the metrics, university initiated diverse approaches for curriculum integration. For example, American University 2 has created initiatives such as Climate Crossover for educators in addition to STARS and THE Impact Ranking,:

*to infuse sustainability principles into their classes holistically...six thousand students have benefitted from these efforts to draw connections between their courses and climate issues.*

However, one of the major fields of work for the university is to inspire and initiate sustainability learning objectives in all parts of the university's curriculum:

*The Sustainability Institute is to move ideas and be a catalyst and conveners. That would then be adopted by the university management, which has control of Curriculum. There is a Learning Outcome Committee at the university that focus on this and in every college there is a responsible for the collaboration with the and that's kind of think that the peak efforts from the Sustainability Institute.*

Danish University 1 announced on the board level three years ago that the university should be an SDG University. Based on these initiatives, a budget for a mandatory undergraduate course for all students focusing on UNSDGs was established. A large emphasis has been placed here and it is seen as an essential part of the University's contribution to a Green transition:

*... the scope 2 and 1 is our foot print, but actually Scope 3. ... the biggest impact we do is through our research and through the education of the students who graduates. That is the real scope 3.*

The mandatory bachelor course is 10ects which is 15 hours a week for a semester. It has an indirect influence on the rest of the universities curricula:

*so I can share ...colleague suddenly getting students in ...all the students ask: So what SDGs are we working with in this project? It is creating a pull from the rest of the faculty ..So it trickles down from that initial bachelor course.*

Utilizing a matrix influence curriculum integration, but it ultimately comes to the faculty decision. At most universities the dean for education is in charge of integrating sustainability learning objectives in the curriculum. However, the amount of free choice allocated to faculty varies. At Danish university 2, the emphasis is to allocate a lot of curriculum choice to individual faculty:

*So, on one hand, of course, she focuses on it. But on the other hand, like the way we build our university is really on a bottom-up approach. So, it's kind of ...each education decides. How they will teach...Sustainability is the hot topics when it comes to research - Climate will be part of the curriculum, but there needs to be some research before it can be become part of the curriculum.*

### *3.4. Involvement of Staff, faculty and students*

An important part of strategy development and implementation are to involve stakeholders. The creativity in this regard is large and points to a variety of options. A general trait is that at the two Danish Universities, the involvement has a less formalized character than at the two American universities. The involvement in the strategy development at Danish University 2 was in the form of meetings:



*And there was kind of some big meetings where the student and employees could deliver their messages. And what they thought would be important to focus on. The university management then had a say and could confirm it. And then in the end the board.*

Danish University 1 performed the first rounds of sustainability strategy development on the board and management level. This then achieved criticism, as already mentioned, and tricked a broader involvement of faculty and students.

*In network meetings at the University for faculty members across departments and across faculties and a lot of intention of allowing people to collaborate, make workshops of what could be new research areas or synergies between the education (programs) and so on. So, a lot of effort and quite a lot of hours invested in...you could say creating seeds for bottom-up innovation on what to do about sustainability. both in terms of research and in terms of teaching. So, I would say quite an interesting strategy and as a user from the university it is something that I have engaged in and seen a lot of other people engaged in and met colleagues that I could share and develop ideas with. I don't think I have specific research proposals coming out of those network meetings, but definitely new network and people I've talked to since. So, everybody can join the effort if they want, as there are calls for public and semi - public internal meetings and so on.*

At American University 1, the Campus operation and development involvement was established in what was named 'tactic teams:

*Each tactic team was chaired by a member of the Sustainability Strategic Plan Steering Committee.*

*Each team was charged with developing a list of potential tactics for their respective areas. The teams selected the final tactics for this plan after considering the feedback received from the campus community. For each tactic, the teams also developed action items, target dates, performance measures/metrics and responsible parties. The six tactic teams were: Energy Team, Buildings and Grounds Team, Materials Management Team, Transportation Team, Greenhouse Gas Emissions, Reduction Team.*

Concerning student and faculty involvement American University 1 also established a more formal and continuous institution:

*We created a Sustainability Council in 2017 with representatives from Every...Almost every college, I think 16 of our 17 colleges were represented. And that group identified what they thought to be the barrier to implementing. transdisciplinary sustainability focused programs within the curriculum and research. And then they came up with a set of recommendations on how to address those barriers. How to get beyond those barriers and they created a report Out of that.*

American University 2 has a firmly established structure for the involvement of stakeholders in that the Sustainability Institutes primary task is to influence and involve across campus. A larger number of appointed sustainability responsible for each campus part and the college also work as anchor persons for the involvement. This university also has a formalized involvement of stakeholders concerning campus operation with training and training certificates on how to operate campus more sustainably (*Green Paws Program*).

### 3.5. Campus development and operation

The STARS program was pioneering in the integrative approach of viewing curriculum development and Campus development as a whole. In the stars program, scores are given for the level of sustainability in energy production, motivating universities to engage in establishing solar energy fields as is the case for both American universities.

*you know we have a Goal of becoming a zero-waste campus. Another component of it is that we want to decarbonize our operations. That means on campus renewable energy installation. That would be very visible. If (faculty) weren't specifically looking at it from the standpoint of their syllabus and their research program, they would encounter it in the campus.*

The interdisciplinary approach is honored in scores concerning innovation. An example is the development of special plantings of grass for solar energy fields that enhance biodiversity at the American University 2. Viewing campus as a 'living lab' is especially appealing for faculty and students of schools of architecture, because they are dedicated to the built environment. Refurbishing to achieve a better energy balance and indoor climate is a central part of the STARS program and at the American University 1 the transformation of a derelict industrial building purchased by the university has been the subject for several years of architectural studio work. At this university, the sustainability officer is rooted in facilities management while also being an architect. This has provided an interface for collaboration with the school of architecture at the American University 1.

*We've been able to engage historic preservation classes and architectural studio classes in the demolition and renovation that is happening, so they're documenting what we are doing. With engineering students, we are doing a study on the embodied carbon of the building and how that impact the overall emissions of running the campus. So, we're integrating that transformation project pretty deeply in academic pursuits with students, which is add to both the complexity and to the value of that project.*

The direct engagement between research, education and campus facilities management in charge of maintaining and developing buildings is not as apparent at the Danish Universities, where it was not mentioned by the interviewees. However, the intention of viewing campus as a 'living lab' is mentioned in both strategy reports.

At Danish Universities the focus is more on the general outreach to society outside campus, and the collaboration with nearby municipalities and companies than integrating campus facilities management and teaching closely. Instead, the carbon foot print of operation and scope 3 is seen more as an administrative regulation than as part of educational processes:

*We have electric cars and so on, but that's kind of not where it gets tough, right, so I think where (sustainability on campus) is manifest is that we have closed the labs in the weekend. So now you have to book it because there's a huge energy waste in the laboratories. And just yesterday, we released our new travel policy reducing flights etc. and that will be a big change.*

## 4. Conclusion and discussion

The STARS program is unique in having exposed and pushed for this opportunity for a longer period of time and the effect is apparent. The STARS program with its integrative approach to both campus buildings and curriculum development has catalyzed a push for the two case

American universities to actually involve the architecture and engineering faculty in campus development. The reports and strategies demonstrate a thorough and continuous effort to work with campus as a living lab. In the two Danish Universities there are intentions of doing this but the emphasis is more on outreach to society such as municipalities and companies and do actual projects with them. There is both in the two American Universities but especially in the two Danish Universities a potential for more interaction between schools of architecture and campus when the campus is seen as a 'living lab' for the green transition.

The less formalized stakeholder involvement in the two Danish Universities might be dynamic and also time-consuming. The explicit 'bottom-up' approach of the Danish Universities places a large responsibility concerning sustainability curriculum development on individual faculty. The interchange between a university management decision to make Danish University 1 a UNSDG university per se and the following development from faculty initiatives seems to have pushed the development strongly. The resulting mandatory SDGs course of 15 hours per week for all first semester students (Freshmen) demonstrates a potential for effecting the curriculum development by making students 'SDGs agents'. The students will have a sustainability perspective on all their following courses, which will have an effect through feedback to faculty.

The Two American universities more formalized involvement of stakeholders encompasses both campus operation and curriculum development. An initiative like the Green Paws Program will have an effect through the continuity it gives for involvement. The Danish University 2 focus on changing the behavior of employees and students, however, it is more 'mechanical' in proposing the closure of labs on weekends and restricting flights for faculty. An interesting question that has come forth during this inquiry is whether educational institutions Scope 3 GHG impact is the 'use phase' understood as employees and students transport and consumer behavior on and off campus or it can be understood in a wider perspective. Scope 1 is the footprint of the university; Scope 2 is the carbon footprint of EG. The electricity plant that supplies the university and scope 3 is a wider effect of the 'products' of the university. A university produces students with the knowledge needed to make the green transition happen based on research produced by the university. Is the real scope 3 of a university the degree to which it is supplying students with the knowledge and research needed to address climate change?

The knowledge and skills needed to address climate change, provided by universities for future generations is essential and should be operational. The metrics university chooses to operate with will have an effect as is demonstrated with the STARS program. A question could be if metrics that count number of courses with SDGs perspective will reduce the development to formalities and ranking numbers, or if it will create a general awareness that will be a basis for the operational, specific knowledge and skills needed to make the Green transition happen? In the case of Danish University 1 the mandatory general SDGs course demonstrates a potential for pushing specific skills forward.

The universities have developed their own set of metrics suited for their specific context as well as using the metrics of larger systems. The larger systems have the ability to visualize to a larger public the state of the development. This is important for stakeholder involvement. However, it is also important that the metrics mean something to students and employees and are not a separate documentation-engine run by the university management. The 'local'

chosen metrics could propose a new opportunity for stakeholder involvement needed for the implementation of the strategies.

The general picture from this study is of an uneven field where each university is struggling to find a framework allowing them to live up to the demand of being drivers for sustainability. Some are established and have found a format, like American University 2, while Danish University 2 in the general current strategy report has noted sustainability under 'future initiatives'. The movement back and forth between stakeholder involvement, innovation and metric systems such as THE, STARS and UiGreen Metrics will be essential for society's ability to address the sustainability challenge.

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