YRKESHÖGSKOLAN
NOVIA

Sustainability, Responsible and Carbon-neutral University of Applied Science

A study of Novia's Technology Department

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Master's degree Thesis

Thesis for a master's degree in engineering (UAS)

Master of Engineering, Industrial Engineering and Management

Nokia 2024

MASTER'S THESIS

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Degree Programme and place of study: Industrial Management and Engineering, Vaasa

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Title: Sustainability, Responsible and Carbon- neutral University of Applied Science

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Date: 18.5.2024 Number of pages: 66 Appendices: 1

Abstract

Today the world is suffering from environmental issues and every country and institution need to work together towards a more sustainable future. In response to these rising issues, Finnish universities of applied sciences are also working together on sustainability and carbon neutrality. The rector's council Arene is taking responsibility and coordinating among the institution. This thesis explores and covered the Novia tech policies and its execution towards carbon neutral, and maturity level of sustainability.

The thesis began with collection of the resources from Arene, Novia and literature. According to the analysis requirement thesis has two parts: a survey and literature or fact analysis. The survey was carried out among the teaching and non-teaching staff of Novia tech, respondents answer 16 different questions related to sustainability.

This thesis work concludes with perceived maturity level of the sustainability into four different sector education, RDI, management and carbon footprint in support of the Arene matrix. Additionally, the thesis also presented the action implemented within Novia to achieve the goal of carbon neutrality like electric car, saving water, less travel etc.

The thesis highlights the importance of sustainability course, sustainability-focused curricula, and active engagement of students, faculty, and staff in sustainability initiatives. The research concludes with some suggestions for achieving the carbon neutrality like policies, guidelines, training, pamphlet etc. Apart from this this, the Thesis also suggested a dedicated group for measuring, monitoring and handling the carbon footprint.

These finding would be definitely supportive for Novia to become a carbon neutral by their targeted time and can also play a pivotal role in addressing climate change, sustainable practices, and educating and sharing knowledge about sustainability to the society.

Language: English

Key Words: Sustainability, Carbon neutral, footprint, handprint, maturity level

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List of Abbreviations

Arene	The Rectors' Conference of Finnish Universities of Applied Sciences
CFCs	chlorofluorocarbons
CFP	Carbon footprint
CO_2	Carbon dioxide
ESD	Education for sustainable development
ESG	Environment, social and governance
EUR	European currency
GHG	Greenhouse gases
ISO	International organization for standardization
LCA	Life cycle Assessment
RDI	Research development and innovation
SD	Sustainability Development
SDG	Sustainability development goals
UAS	University of applied science
UN	United Nations
UNESCO	United Nations educational, scientific and cultural organization

1 Introduction

Nowadays, Sustainability is one of the most common topics that are discussed in all areas like industries, business, education and many more. The rapid increase in the world population and to fulfil the necessity of the rapid consumption of the natural resources, industrialization and urbanization put the future generation at risk of scarcity of resources. The past 20 years have seen a substantial accumulation of evidence that, overall, current human behaviours are undermining the capacity of humans to survive long into the future. Evidence of the degradation of natural capital is particularly strong, and includes rapid climate change, ozone depletion, acidification, toxic pollution and the depletion of non-renewable resources. The precise impacts of these phenomena are difficult to predict, but most scientists now agree that they will generally be harmful to us. Rapid climate change, for example, is expected to cause significant extinction of species, loss of agricultural production, scarcity of fresh water and more frequent extreme weather events. (HEFCE,2015) To overcome the different current issues and secure the needs of future generation sustainability and sustainability development are most discussed, research and implemented all around the globe. The long-term prevention of the energy and resources rather than consuming all for current needs is simply named as sustainability and the action and plan that are developed or implement by considering sustainability can be named as sustainability development. (HEFCE,2015)

United Nations Brundtland Commission defined one of the most general definitions of sustainability in year 1987. According to that definition sustainability is “meeting the needs of the present without compromising the ability of future generations to meet their own needs. (WCED, 1987)” After the initiation of UN, most of the countries figure out solutions or plan in their development strategies in a such a way that they meet their development goals by ensuring that it doesn’t affect the future generation needs.

In more briefly, the University of Columbia sustainability committee defined sustainability in their charter as: “the integration of environmental health, social equity, and economic vitality to create thriving, healthy, diverse, and resilient communities for this generation and generations to come. The practice of sustainability recognizes how these issues are interconnected and requires a systems approach and an acknowledgement of complexity.” (UCLA, 2023) Sustainable practices support ecological, human, and economic health and

vitality. Sustainability presumes that resources are limited and should be used wisely. In common words, sustainability is about our children and our grandchildren, and the world we will leave them. (UCLA, 2023)

The term sustainability and sustainable development is defined as identical and different according to the writer's perception in published literature review. In general sustainability has an economic orientation, while sustainable development incorporates also a social and environmental direction (Nikolaou, Jones& Stefanakis, 2021). "The sustainability development consists of the three dimensions like economic development, environmental protection, and social equity" according to the UN Rio Summit for "Environment and Development" in 1992. In simple it is object that stands on three legs where one leg shorter or longer that object that will not be stable on its position same as these three pillars of sustainability have to be balanced, so our world can be stable and prosperous. The main objective of sustainable development is to make sure everyone has fair access to natural resources and make sure that there's enough left for future generations as well.

The United Nations summit which was held in New York in year 2015, set the 17 Sustainable Development Goals (SDGs) with 169 associated targets which covers the different areas like poverty, health, education, sanitation, climate change, and sustainable production and consumption. Several research articles study how these SDGs have been adopted by various organizations from different sectors (Ghosh & Rajan,2019). To align their strategies with SDGs, many organizations have adopted certain strategies to attain the goals of sustainable development and change their reporting behaviour by disclosing relative information to meet the needs of stakeholders (Tsalis, Malamateniou, Koulouriotis, Nikolaou,2020). Similarly, several countries, cities, and regions have aligned their policies with SDGs to create safely, and environmentally friendly and justice conditions for their citizens.

Sustainability development has become crucial today for several reasons. The Agri-environmental specialist Daniel Hernández Torres who works in Global nature foundation points out these are the most relevant reasons for need of sustainability development:

- To advance the SDGs created by united nation.
- To align with business strategies that seek greater efficiency and stronger social and environmental responsibility.

- Helps the companies to strengthen their commitment to social and environmental responsibility and can benefit from them.
- Helps in reducing operating cost of companies through energy efficiency and responsible use of resources.

Sustainable development helps to integrate governments, businesses, non-governmental organizations, and civil society to work together to address challenges and find sustainable solutions. This cross-sectorial cooperation can generate a more significant impact by combining the resources, knowledge, and expertise of various stakeholders. Sustainability has been applied to many fields, including engineering, manufacturing, and design. The sustainable development is not a simple process it will be more challenging and complex process due to involvement of the different parties and factors such as technology and engineering, economics, health of people, social desires, and government strategies, procedures, and policies and many more. Sustainable development requires balancing and integrating economic and environmental societal objectives, supportive policies, and practices. (Marc, Hosssam,2012)

The most important part to find the solution of these all the issues and meet the goal of SDGs is producing expertise and conveying the knowledge of sustainability among all the sectors. As a one of the sign members of UN SDGs goal, Finland has recognized its responsibility how to work and move forward to achieve sustainability development goal. To support this Finnish Ministry of Education and Culture, take their own responsibilities and set a target how the country will meet the UN SDGs target by year 2030. Finland government, education institution and other stake holders clearly understand that they are most responsible for sustainable future and education sector is one from where you can transfer the knowledge of sustainability quickly and broadly in all sectors.

The rectors' Conference of Finish Universities of Applied Sciences (UAS) started the program for sustainability development named as "Sustainable, Responsible and carbon-neutral university of applied Science" in year 2020. This program is mostly guide by the UN SDGs and Finnish Ministry of Education and Culture sustainable development guidelines. This program's main target is making the university itself sustainable and carbon-neural and produce expertise and experts in the field of sustainability development. According to Statistics, the number of students attending University of Applied science in year 2022 was

164,000 among them 51,000 were new students. The number of graduates was 29,000 which was same as last year (Statistic Finland,2023). In addition, around EUR 220 million budget to research development and Innovation and 9,500 personnel working in different roles to build the feature of society. Due to this broad area of education and large number of students, universities of applied science have an enormous role to achieve the SDGs and take an initiative for sustainable future in Finland as well support other countries with their innovation. The responsibility of the University of Applied Science is to consider all the direct and indirect impacts on the surrounding society in all our activities. (Arene, 2020)

The main target of this program is to produce expertise in the field of sustainability and support and challenge industry and business, higher education institution, municipalities, personnel, and students to build a more sustainable future. The core goal of universities of applied sciences is to reduce the carbon footprint and to increase “handprint”, in the development of society. The term handprint refers to the impact of education as well as the research, development and innovation activities carried out inside the university and their potential to change society, business, and industry. This will increase the expert personnel in education as well as in research, development, and innovation (RDI). Contributing society and country with development work, monitoring, and sharing best practices on sustainability work and make all the UAS carbon neutral by 2030. (Arene, 2020)

This thesis work is not the direct part of this UAS sustainability program, but it took the main objective of the program as a core part of own work. Novia is one of the most leading UAS in Finland with more than 4000 students in different fields. The thesis work researches, analyses, and provides suggestions if necessary, regarding the Novia progress in the field sustainability and meet the target of the carbon neutral. Thesis mainly focuses on the Novia technical department to do their research and find concreate result.

2 Literature Review

2.1 Sustainability Development (SD) and its evolution

Different paper and literature reviews considered sustainability and sustainability development in the same or different way. In general, these two terms conclude with the same goal "fulfil the needs of present generations without compromising the future generation's needs". In short, sustainability is the thought of goals and SD in the process or pathways to achieve those goals. The most common definition of sustainability was defined by the Brundtland Report in 1987:

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987: p.43)

The term sustainability development was used for the first time by Barbara ward, founder of the institute for Environment and Development in 1970s (Ward, Dubos,1972). So, we can assume that the concept and work on sustainability begin at staring of 1970s or late 1960. In the early 1970s the well-known report of the Club of Rome, a group of eminent economists and scientists, was published under the title "*The limits to growth"*. They warned that the earth had a limited supply of physical resources and that exceeding the limits of exploitation could end in catastrophe (Pisani,2006).

The United Nations conference on the Human Environment, held in Stockholm in 1972 as the first in a series of international conferences on the threatening ecological crisis. It stated that *"A point has been reached in history when we must shape our actions throughout the world with more prudent care for their environmental consequences. Through ignorance or indifference, we can do massive and irreversible harm to the earthly environment on which our life and well-being depend. Conversely, through fuller knowledge and wiser action, we can achieve for ourselves and our posterity a better life in an environment more in keeping with human needs and hopes . . . To defend and improve the human environment for present and future generations has become an imperative goal for mankind'* (United Nations, 1972).

So, the United Nations started work on safe able future from this conference and later introduce by term sustainability development in 1987 from Brundtland Commission. It is

all our responsibility to use all that as natural resources wisely otherwise it can be runout. Nowadays many countries and people are developing and using sustainable products and technologies in the leadership or guidance of United Nation. The main goal of sustainable development is to use resources in a way that doesn't destroy the balance of nature. Here are some common definitions of sustainable development:

*According to **former secretary General of United Nation Organizations Ban Ki Moon** sustainable development is the pathway to the future we want for all. It offers a framework to generate economic growth, achieve social justice, exercise environmental stewardship, and strengthen governance.*

***The former prime minister of Norway Gro Harlem Brundtland** who chair the Brundtland Commission, defined sustainable development as a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations. (WCED,1987)*

***Herman Daly, an ecological economist,** describes sustainable development as a development without growth in the scale of the economy, development with more equity and less poverty, development without environmental degradation, and development that is efficient in resource use. (Daly, 1990)*

All the definition and action towards the sustainable future follows these three legs of the sustainability which must always be balance or considered equally named as pillars of sustainability.

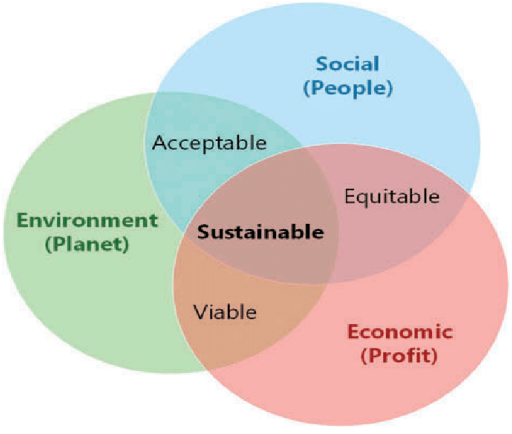


Figure 1 Three Pillar of the sustainability

(Tedeschi, Muir, Riley, Fox,2015)

Economic Sustainability: It ensures the economic growth and development with finding the right ways without harming the natural resources or not affecting the economy in long term. Some common practices for economic sustainability are resource management, fair trade, investment in renewable energy, and fostering innovation and entrepreneurship. (Thakkar& Gogia, 2022)

Social Sustainability: Social sustainability focuses on promoting the human resources and utilize to build the social communities where everyone can thrive and fulfil own potential. Social justice, human rights, access to education and healthcare, gender equality, cultural preservation are some of the aspects of these sustainability. (Thakkar& Gogia, 2022)

Environmental Sustainability: Environmental sustainability focuses on protecting and preserving natural resources and reduce the human's impact in ecosystems. It pursues the care and responsible use of natural resources, reducing carbon footprint, conserving biodiversity, managing waste and pollution. Its emphasis on adopting renewable energy, promoting sustainable land use, and implementing measures to mitigate climate change and environmental degradation. (Thakkar& Gogia, 2022)

2.1.1 Importance of the sustainability Development

The reason behind the sustainability is the number of populations increase in the world and the industrialization and competitive development without considering its impact on the future. A United Nations clearly state in their most of the report and program regarding sustainability that how the population and other factors have affected sustainable development. So, how we leave the world to the future generation depend upon what measure and procedure that we implement now for sustainability development. Here are some reasons that why we have an importance of the sustainability (Fey,2022) (Rehal,2023):

- To ensure that all the natural resources used wisely and left for future generation as well.
- To reduce the air, water pollution and ensure that earth is safe habitats for all living things. (healthy nature)
- Make the easy and comfortable life for people by saving their money through less and efficient energy, recycle products and minimum waste.

- Promotes the fairness by ensuring that everyone has equal access to all the resources and opportunities.
- To flight and implement the current action all around the world toward the climate change.
- To prepare for the different expected and unexpected challenges like natural disasters, financial troubles, or health crises.
- To unite all the countries to flight and solve all the natural and human causes challenges towards the nature.
- To lead the economic growth and job creation though the innovation and development of the efficient technology.
- Create a good and sustainable future for coming generation and gets better green life for us as well.

2.2 Sustainable Development Goals (SDGs)

The United Nations general summit 2015 which was held on its Headquarters New York in year 2015 where more than 150 Heads of State and Government and High Representatives are agreed and decided 15 years sustainable goals. They have announced 17 sustainable development Goals and 169 targets that demonstrate the scale and ambition of this new universal Agenda. The main aim of the SDGs is to prevent the human rights, gender quality, prevents the natural resources and environments. These goals interested and balanced the three pillars of the sustainable development: social, economic, and environmental. In current scenario 191 United Nation members state had agreed on these Goals and following to achieve the goals by year 2030. The former UN Secretary-General Ban Ki Moon stated “It is a roadmap to ending global poverty, building a life of dignity for all and leaving no one behind. It is also a clarion call to work in partnership and intensify efforts to share prosperity, empower people’s livelihoods, ensure peace, and heal our planet for the benefit of this and future generations” after the summit. (United Nations, 2015)

Here are the 17’s Sustainable goals sets by UN from its summit: (UN, 2023) (UNDP, 2023) (UN, 2015) (Rehal, 2023)

1. **Eliminating Poverty:** The aim of this goal is to reduce the extreme poverty across the world by at least half the proportion of men, woman and children of all ages in all its dimensions according to national definitions.
2. **Zero hunger:** The SDGs aim to end all forms of hunger and malnutrition across the world. It also aims to sure all people especially children have sufficient and nutritious food all year.
3. **Good health and well-being:** The objectives of this goal is efficient healthcare, healthy life and promote well-being for all at all age group.
4. **Quality education:** This goal ensures that student has free primary and secondary school. It also aims to provide equal access to affordable vocational training, and universal access to a quality higher education.
5. **Gender Equality:** The aim is to empowering women and girls by end all discrimination and give equal political, economic, and social equality.
6. **Clean water and sanitization:** The objective of this goal is providing safe and affordable drinking water to all population across the global so that they have better sanitary condition.
7. **Affordable and clean energy:** The target of this goal is to increase the renewable energy and give access to clean and affordable energy for all.
8. **Decent Work and Economic Growth:** This SDGs promoting inclusive and sustainable economic growth, employment and decent work for all. Decent work means productive work, fair salary, work and social security and better prospects for personal development and social integration.
9. **Industry, innovation, and infrastructure:** The target of this goal is to build resilient infrastructure, promote sustainable industrialization and foster innovation.
10. **Reduce inequality:** The aim is to reduce inequalities so that everyone gets an equal chance and collectively achieves sustainable development goals.
11. **Sustainable Cities and Communities:** The aim of this goal making mega-cities and human settlements inclusive, safe, resilient, and sustainable. It aims to ensure that everyone gets good social environment and opportunities in their own cities, and they don’t have to migrate.
12. **Sustainable consumption and production:** It involve decoupling economic growth from environmental degradation. It prompts the sustainable lifestyles and using the resource efficiency.

13. **Climate change:** The aim is to strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries. The aim is to reduce global greenhouse gas emissions by 45% by 2030 and net zero by 2050.
14. **Life Below Water:** This SDGs aim to sustainably manage and protect marine and coastal ecosystems from pollution. It also addresses the impacts of ocean acidification and sustainably using the oceans, seas and marine resources.
15. **Life on land:** This goal is about conserving life on land. It aims to protect and restore terrestrial ecosystems, sustainably manage forests, combat desertification, reverse land degradation and stop biodiversity loss.
16. **Peace, justice, and strong institutions:** Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels. The conflict and weak institutions threat to sustainable development (UNDP, 2024).
17. **Partnerships for the goals:** The goals aim to enhance North-South and South-South cooperation by supporting national plans to achieve all the targets. Promoting international trade and helping developing countries increase their exports is all part of achieving a universal rules-based and equitable trading system that is fair and open and benefits all. (UNDP,2023)

As all SDGs are set considering all the three aspects of sustainability. Now try to put these 17 SDGs in three aspects:

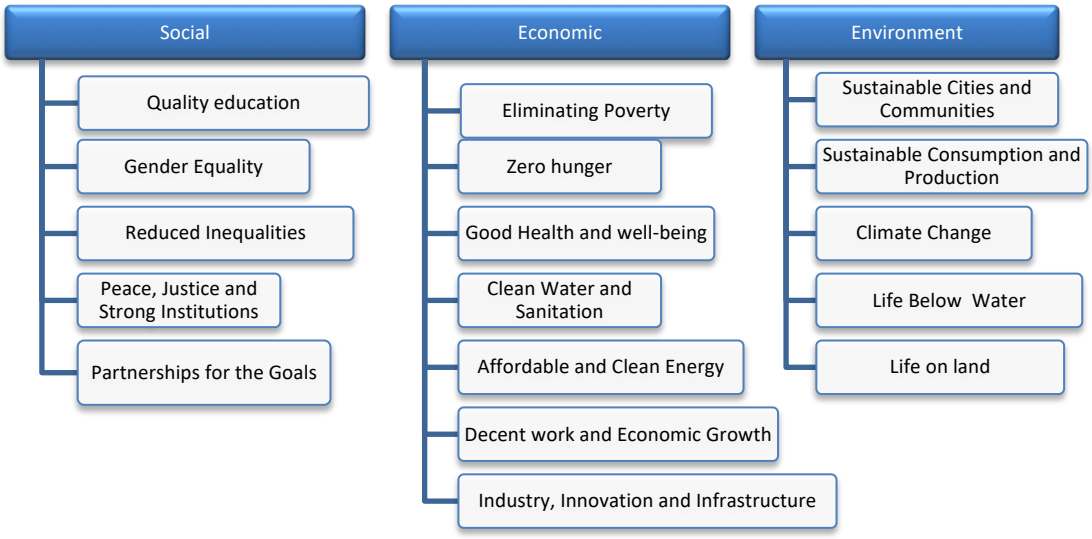


Figure 2 Categories of SDGs according to three Sustainable aspects

(Barbier & Burgess, 2017)

2.3 Sustainability in different areas

2.3.1 Sustainability in Business

The term sustainability in business means looking and develop the product and services without harming the environment, society or community. Every business must ensure that their business more sustainable is about looking at what you do, what you buy, and how you dispose the things. An organization analysed their sustainability practice by using the environment, social and governance (ESG) metrics. The practice of sustainable business increases the number of customers, reduce the operation cost, supports in marketing and avoiding the risk of business failure.

2.3.2 Sustainability in Manufacturing

The process or creation of products through economical processes and minimize negative impacts on environment while using natural resource named as sustainable manufacturing. The manufacturing is one of the fields where every country must be focused and considered the issues and develop the solution to reach the sustainability development goals. The relationship between manufacturing operations and the natural environment has a crucial role in decision making among industrial societies. The main benefits of manufacturing sustainability include operational efficiency, attract the new customer, build the trust on customer, and build the long-term business viability.

2.3.3 Sustainability in Education

Education for sustainable development (ESD) has a crucial role in helping the society to learn and develop their capacity to live more sustainably. It is a process in which everyone involvement is necessary. The involvement of higher education in sustainability has great impact on building sustainable society important because graduates will work on managerial and leadership positions all around the globe. If you educated and make aware graduates about their role on sustainability, then it will be very effective and cover the high sectors and their decision somehow reflect the sustainable nature or future.

The higher education institute has a role to play in helping society to find the efficient solution to the challenges presented by the SD. As an example, to overcome the challenges regarding energy crises all the institutions put their effort to find and deliver the alternative

sustainable source of energy and renewable energy. In addition, the higher education sector has connection and interconnectivity with different organization, where they exchange knowledge of interest, ideas, and joint effort to develop the sustainable solution which will be beneficial for local people, businesses, government bodies and all around the world. (HEFCE,2015)

2.4 Carbon Footprint

Carbon footprint can be defined as the total amount of the greenhouse gases generated by our actions including carbon dioxide (CO_2) and methane. The most and direct form of CO_2 emissions is the combustion of fossil fuel in manufacturing, heating, and transportation. Apart from this other different kind of human activities like using good and services, waste management, eating habit is the secondary source. In most of the past literature mention that carbon footprint equivalent to CO_2 (Weidman & minx, 2008) but nowadays the definition goes more open and carbon footprint concept include the emission of the other greenhouses gases like methane, nitrous oxide, or chlorofluorocarbons (CFCs). The emission of greenhouse gas (GHG) caused directly and indirectly by an individual, organization, event, or product. For example, the carbon footprint of a bottle of water includes the CO_2 or CO_2 equivalent emitted during the manufacture of the bottle itself plus the amount emitted during the transportation of the bottle to the consumer.

Here is some most common definition of carbon footprint:

According to Carbon Trust (2007), *"Carbon Footprint is defined as a measurement of the total GHG emissions caused directly and indirectly by an individual, an organization, event or product and is expressed as a carbon dioxide equivalent (CO_2)."*

The carbon footprint was calculated by measuring the CO_2 equivalent emission from the premises, company-owned vehicles, business travel and waste to landfill. (Patel, 2006)

A carbon footprint is a measure of the amount of carbon dioxide emitted through the combustion of fossil fuels. In the case of a business organization, it is the amount of CO_2 emitted either directly or indirectly in their everyday operations. It also might reflect the fossil energy represented in a product or commodity reaching market. (Grub & Ellis, 2007)

The parliamentary office of Science and Technology (POST,2006) defined Carbon Footprint as "*the total amount of CO_2 and other greenhouse gases, emitted over the full life cycle of a process or product. It is expressed as grams of CO_2 equivalent per kilowatt-hour of generation (gCO_2eq/kWh), which accounts for the different global warming effects of other greenhouse gases".*

"*The carbon footprint is a measure of the exclusive total amount of carbon dioxide emissions that is directly and indirectly caused by an activity or is accumulated over the life stages of a product*." (Weidman & minx, 2008)

There are variety of different tools exist for calculating the carbon footprints for individuals, businesses, and other organizations. The most popular and trusted methodologies for calculating carbon footprint are Greenhouse Gas Protocol, from the World Resources Institute and the World Business Council for Sustainable Development, and ISO 14064, a standard developed by the International Organization for Standardization dealing specifically with greenhouse gas emissions (Selin,2024).

There are different ways though which Carbon Footprints can be reduced such as following energy efficiency guidelines, sustainable lifestyle and procurement. As examples use public transport like bus, train for long journey, walk or use bicycle in short distance instead of own car. In addition, installing energy-efficient lighting, adding insulation in buildings, or using renewable energy sources to generate the electricity every individual and organization can reduce or control their individual weightage of Carbon Footprint. As an example, electricity generation from wind power produces no direct carbon emissions. The sustainable lifestyle and procurement associates with less used of the meat products and use or buy product which have less carbon emission from production to transport. (Selin,2024)

The carbon footprint of any organization can be calculated by calculating the emission of GHG, measuring all activities within the organization- such as energy used across buildings, various fugitive emissions, industrial activities and automobiles in a company. According to 2022 report China has a first position on emitting CO_2 gases but while calculating CO_2 per capita it has almost half of the United States with (8.85 metrics tons), but it is increasing every year whereas United States has gradually decreased their CO_2 Emission per capita and in year 2022 they have 14.44 metric tons. While talking about Finland, the Carbon

footprint per capital was increased in year between (1990-2005) with value more than 10 metric tons whereas now Finland improving their index of carbon footprint and remains 6.64 metrics tons per capita in year 2022 (Wikipedia, 2024). Globally, the average carbon footprint is 4.65 metric tons. United Nations targets to become a carbon neutral (zero carbon) by year 2050 whereas Finland set its target to be a carbon neutral by year 2035.

Every person and organization can calculate their carbon footprint using the different measuring calculator. The major contributors to carbon footprints are food, manufacturing, transportation, and household energy. The electricity and heat production are the one of the biggest emission factors for carbon footprint globally. On other hand, if we considered individual transportation and food lead the position of emission of greenhouse gases. The total value of carbon footprint is calculating by multiplying individual data from different contributor and multiplying it with emission coefficient and finally sum all the values together (GHG emissions =data x emissions factor). The emission factor is different for the different source of the contributor and it's also varying according to the country standard.

Here are few examples of carbon footprint contributor and its emission factors for Finland:

CFP Contributor	Carbon Emission Values	Original Sources
Flat house	8.0 kg/year/m^2	Saari, 2001
Row or separate house	6.9 kg/year/m^2	Saari, 2001
Electricity	281 g/kWh	Finnish Environment Institute 2017
Wooden pallets	0.516 kg/Kg	Carbon footprint, UK
Petrol	88.6 g/kWh	WTW, 2014
Diesel	87.1 g/kWh	WTW, 2014
Raw Beef	15 Kg/Kg	
Raw boiler	5 Kg/Kg	
Vegetable	0.2 Kg/Kg	
Electronic Devices	0.89 Kg/EUR	The ENVIMAT model, economic data from 2013
Mixed Waste	0.506 Kg/Kg	Salmenperä, 2018
Travel by plane	0.15-0.25 Kg/Km (Shorter travel distance has higher value than longer)	

Table 1 Few Examples of the CFP contributor with emission value

(Source: https://ilmastodieetti.ymparisto.fi/ilmastodieetti/#/)

2.5 Carbon Handprint

Carbon handprint is developing methodology that focus on the positive climate impact of a product, service, or company throughout its life cycle. In general, the handprint is associated with the notion" to do good things". The handprint was introduced as a new concept for the first time in 2007 during an UNESCO conference. (Grönman et al., 2019)

The Carbon Handprint guidelines published by VTT research centre, Finland stated that, "A handprint refers to the beneficial environmental impacts that organizations can achieve

and communicate by offering products and services that reduce the footprints of others." (Pajula et al,2021)

As a common word carbon handprint consider as the opposite of the carbon footprint. Carbon handprint always recognizes the action you take to reduce you own carbon footprint and make positive impact on environment rather than negative by emitting different greenhouse gases. Carbon handprints are typically created by more efficient material and energy use, reducing waste, or contributing to carbon sinks. In carbon footprint that goal is almost set carbon neutral or zero carbon but there is not any limited goal or boundary for the handprint. The carbon handprint is built on the principle that reducing one's own footprint is not a handprint. Instead, a handprint is considered as the overall achievement by reducing the carbon footprint by improving the performance of others. The handprint of a product or service is calculated or achieved by comparing the footprint of the baseline with footprint after the implementation of the offered solution. So, a rule of defining the baseline through which the positive impact is calculated is another fundamental theory of the carbon handprint. (Pursula,2022)

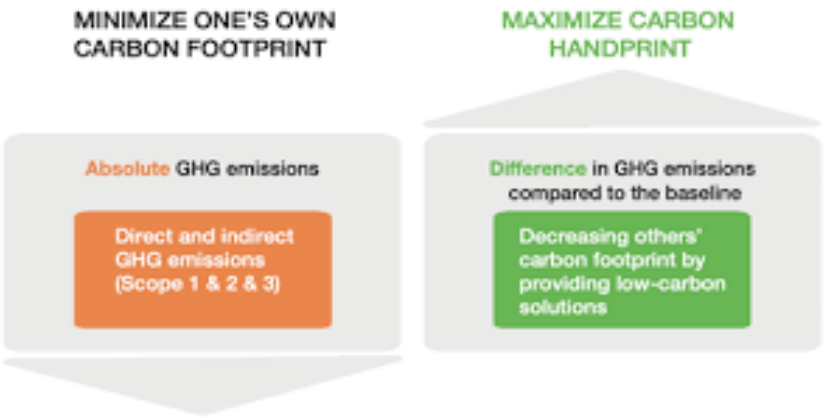


Figure 3 A footprint and handprint are separate measurement (Pajula et al,2021)

Normally, we can assess the positive impact of the service or product when the customer uses them. These results of handprint can used for marketing and communication, advising the decision makers and improve the product climate performance of the products. For products and services, carbon handprint refers to the difference between the GHG emissions caused over the lifecycle of a product compared to a baseline product. The

renewable and circular products have significantly lower GHG emissions over the life cycle compared to the other products. (Pajula et al,2021)

Carbon handprint is highly beneficial to businesses, for example it helps to focus on a strategic target in product development so that customers can reduce their carbon footprints. It also helps in business renewal and gives fact- based information about the climate benefits of products or services. It helps to quantify and communicate the climate benefits to the public and helps companies to allocate their resources to climate-friendly innovations and investments. It also helps the company to communicate the climate benefits to investors.

According to the Neste, the large fuel company of the Finland who secured the 4th placed on the Corporate Knights' Global 100 list of the world's most sustainable companies, they calculate the GHG emission of their products over their entire life cycle: from production of raw material to the end use of the final product. Neste's renewable products, such as Neste MY Renewable Diesel, Neste MY Sustainable Aviation Fuel, as well as Neste RE, our renewable feedstock for polymers and chemicals production, have 50-95 less GHG emissions over the life cycle compared to similar 100 fossil products. (Neste,2024)

There are not any well-established tools to measure the handprint. The VTT Technical Research Centre of Finland and Lappeenranta University of Technology has been developing the world's first science-based method for handprint calculation and communication since 2016. It helps to calculate the beneficial environmental and climate impacts of products and services over their life cycles, offering both scientific and practical guidelines. VTT -Technical Research Centre of Finland and LUT University has published the step-by-step methodology for calculating the carbon handprint named as Carbon Handprint guide (2.0). They are continuously improving and upgrading their methodology and more research are going on. (Pajula et al,2021)

Basically, there are two common approaches of creating handprint. The company has the chance to reduce the impact of their products on sustainable world by reducing the waste and consume energy, sustainable choices of material and increasing lifetime and overall, the performance of the product in comparison to a baseline product. This one is the first step towards creating the handprint for any company. The second approach is to develop

technologies that will have a smaller footprint during the usage phase, therefore directly improving the customer's performance in relation to the baseline. The handprint is always calculated from the perspective of the consumer or customer and then allocated to the organization or company who enabled the reduction of the customer's footprint in the first place. (Grönman et al., 2019)

Both approaches of creating handprint are stated in the Figure 4 (Pajula et al,2021).

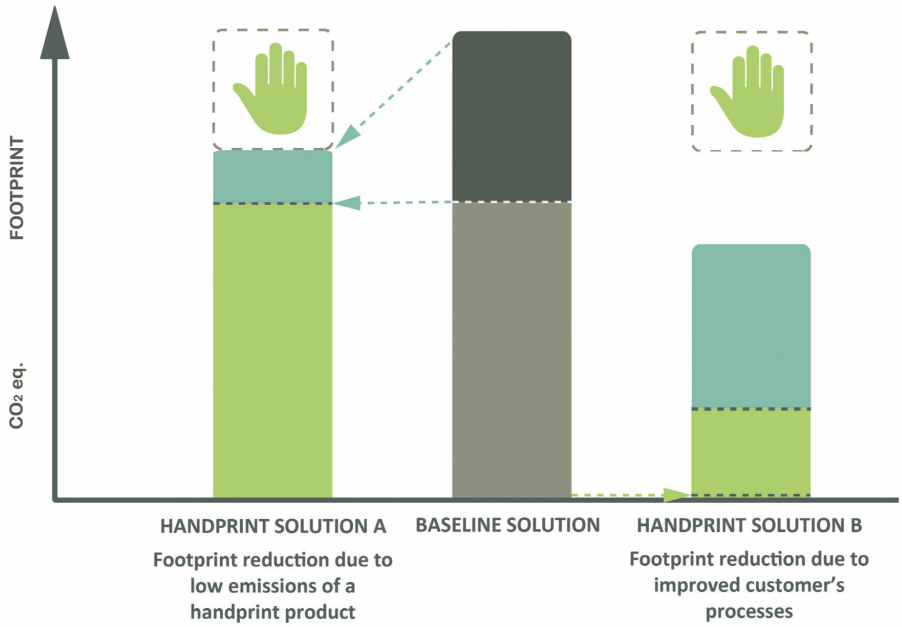


Figure 4 Baseline solution for carbon footprint

In Figure 4, the baseline solution consists of two parts that are responsible for emitting greenhouse gases: the manufacturing of the product with all related downstream and upstream activities (upper part), as well as its usage by the consumer (lower part). Handprint solution A causes less emissions during the manufacturing of the product, which therefore leads to a lower CFP for the customer buying this product - the upper part of the CFP is reduced compared to the baseline solution. Handprint solution B on the other hand, has the same emissions during the manufacturing, but its usage causes fewer emissions, leading again to a CFP reduction for the consumer and a handprint for the company – the lower part of the CFP is smaller in comparison to the baseline product.

2.5.1 Carbon handprint calculation

A carbon handprint is first and foremost calculated in strong relationship to a baseline carbon footprint. After calculating footprints for the baseline and the improved object, they are subsequently compared to each other, and the positive difference generated by emission mitigation for the consumer or customer is then defined as the handprint. (Pajula et al., 2021)

The handprint calculation process consists of four stages and thirteen steps and is closely based on the Life cycle Assessment (LCA) method (Pajula et al,2021).

First stage: This stage consists of five steps. At the very first step the scope of the product and service are set and calculate or target handprint are set. Then in second step identify the different handprint contributor, which make the product sustainable or climate friendly. Along this, identify the any kind of impact that product or services make in the environment are determined and analysis. In fourth step determine the user and beneficiary for the product they can be company, consumer, society or any specific geographical region. In final step the baseline of the product or services are set taking reference as same kind of product and services available in the market.

Second Stage: The second stage is based on the life cycle assessment (LCA) procedure and other relevant requirement like carbon footprint in accordance with ISO 14010-44 and ISO 14046or 14067. This stage consists of three steps. In very first, the functional unit is defined, which is a basis for quantifying the performance of the product (e.g. 1 kg of product, 1kg*km, annual output etc.). Then in second step of this stage the unit processes to be included in the system are defined named as system boundaries. The selection of system boundaries must be consistent with the goal of the study and equal in baseline and offered solutions. At final step of this stage, data needed are identified and collected. If users are specified, the most recent primary data are used if not statistical or average data are considered.

Third Stage: This is one of the main stages of the handprint calculation where actual beneficiary of the product or sustainability are calculated. This stage consists of two step, in first step the whole life cycle carbon footprint of the offered solution are calculate and in second step it is subtracted from baseline footprint of the product or services

determined at very first stage of the handprint calculation.

$$\textbf{Carbon handprint}_{\text{(product or service)}} = \textbf{Footprint}_{\text{Baseline}} - \textbf{Footprint}_{\text{offered solution}}$$

Fourth Stage: In this stage the results of the handprint are disclosed to the stakeholder and attract them towards the new solution. This stage also has three different steps. In first identified the different indicator of the product that is going to be disclosed. In second step critical review of the handprint must carry out before communicating the result. Then in final step the results are communicated about the best alternative solution to the market, end user and companies.

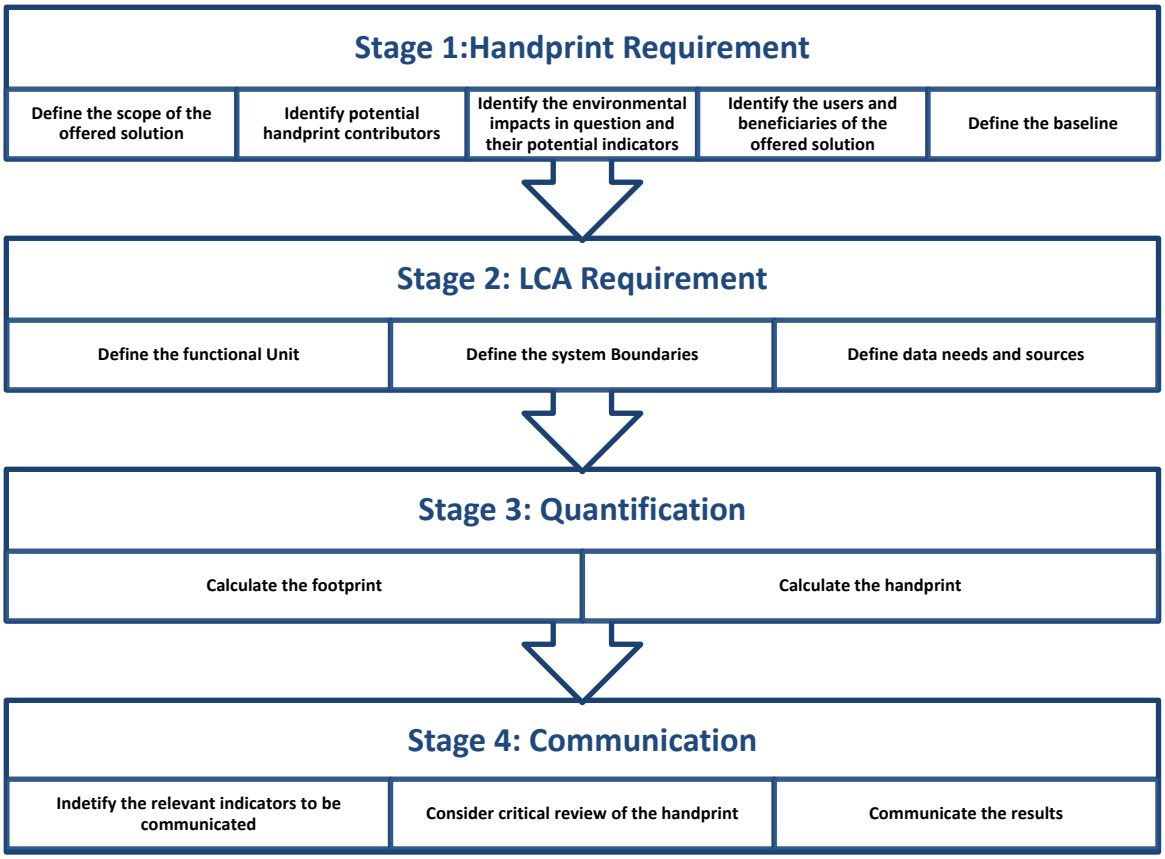


Figure 5 Handprint calculation Steps

(Pajula et al,2021)

2.6 Carbon Neutral University

The reducing the emission of the greenhouse gases and reach the goal of carbon neutrality is considered as the most important action to fight against the climate change. The higher education institute have the more responsibility on doing this and it is also considered as the best place for implementing climate friendly practices. The practices and research done

in education institution regarding the sustainability and climate change can easily reach to the society by means of their graduates. In another word, university action towards carbon neutral has also plays the vital role to reduce the greenhouse gases in the society. If you considered an example, child copied all the action from their surrounding and most of their habits reflect their society and surrounding environment same wise graduates also convey the message and show their actions on their society and workplace according to what they learn from the university after graduation.

In today's world most of the university set their own responsibility to support the nation and community by identity direction for the different problems from their research and education. In addition, they must proof themselves by result that they have implement the new technology and practices and they achieve the goal through it. As one of their tasks is to educate and prepare the young generation, the possibilities to influence the public opinion can't be neglected and should be used to increase the understanding for the necessity to become carbon neutral and more sustainable. Universities and similar institutions making official commitments towards net zero emissions would help spreading the message to other organisations or to governments, showing the willingness to act and to fight the climate change. (Disterheft et al., 2012; Gómez et al., 2016; Udas et al., 2018; UNIFI, 2020).

In general, all the university must consider these two procedures to become a carbon neutral university. The first one is selection of the correct pathway, methodology and proper utilization of the different tools in the process of reaching the goal of a net zero emissions. The second one is made a concrete commitment toward the goal and meanwhile study the how the process is implemented and achieve goals by other institutions are handling the matter to be a carbon neutrality on campus. Here is the some of the examples of the step or process followed by the university who have been already declared or aim to be the carbon neutral university in near future.

Name of the university	Process followed or following to be a carbon neutral university	Target achieved
American University, Washington DC	• Reduce our overall emissions (zero waste, transportation, energy saving program, water conservation, green building, community engagement) • Use renewable energy (solar energy, renewal energy credits) • Offset the small remainder (efficient trucking, tree planting, landfills gas)	2018 (Meet a target 2 year ahead as planned 2020)
IE University Spain (First carbon neutral university in Europe)	• Understand, measure, reduce and neutralise the institute carbon footprint. • Reduce paper consumption and water consumption as well. • Dedicates more than 12000 hours per year to train their graduates, topics related to sustainability.	Reduce its carbon footprint by 33 % in year 2022-2023.
London School of Economics and Political (LSE)	• Reduced its carbon emission. • Procuring electricity from renewable sources, such as solar and wind • Investments totalling £4.8 million, to implement a range of energy efficiency measures for campus and residence buildings	Reduced its direct emissions by 44% since 2005.
Turku University of applied science	• Promotes skills and attitude on sustainable development. • Calculates carbon footprint and initiates the correct measures.	Targeted Carbon neutral by 2025

	• Around 90 % energy consumed by campus building comes from renewable source. • Reducing carbon emission in their procurement.	

Table 2 Carbon Neutral University and their actions

In this section, I have mentioned all the background theory related to sustainability development, carbon footprint, carbon handprint, and current scenario of the carbon neutral university around the globe with few examples. In the next chapter I will state the research methodology used to drag the result expected from this work.

3 Research Methodology

Research is a process of seeking out the knowledge that can be the new one or support the fact that already known. The purpose of any research work is to inform or publish the result of any hypothetically set questions at the beginning with finding data. The data or finding are analysed and present in any form to support the result of any research. There are numbers of research methodology that are used in different research work according to their requirement. I have planned to use combination of two different methodologies: quantitative and qualitative.

Quantitative research methodology is a measurement of the phenomena by gathering and interpreting numerical data and used those data to support the finding or making prediction. In this type of research data are collected from the existing and potential parties or customers using different methods like online survey, polls, or questionnaires. This methodology used in scientific and field-based research. On other hand, qualitative research methodology is more considered on the quality of a certain phenomenon, it drives into the “why” alongside that “what”. This form of research is interested in going more depth on the research area or group. Among the different methods in these two methodologies, we are following some method like observation, survey, secondary research and focus group.

The research we are implementing in this work can be put under the opinion research. As mentioned earlier this thesis is inspired or covered most of the objectives of the Rectors’ Conference of Finnish University of Applied Sciences (ARENE) but not the part of that. It focuses mainly on the Novia tech Department. This thesis set a boundary for own research work. This work only includes or collects the information and data from the Novia tech department staff and the research group regarding their knowledge and initiative towards the sustainable development or carbon neutral University as well as the country.

According to the rectors' committee document the main objectives, commitment and associated measures are listed below (Arene, 2020):

Objectives	**UAS Commitment**	**Measures**
Carbon neutral society though expertise (Handprint)	Produce expertise through education and RDI. Be a role model and develop new sustainable solution. Promote or provide a high-quality learning about SD to every faculty and open learning for society as well.	Common learning outcome for SD. Reinforce the role of sustainability in each curriculum. Working cooperation with business and industry. Open source for learning and RD projects going on.
Solution to the challenges of sustainability (Research, Development and Innovation (RDI))	Produce solution for sustainability challenges. Ensure that development of sustainable and responsible RDI which equally considered three pillars of sustainability.	Evaluating and implementing the contents and results of RDI. Openness and transparency in RDI. Passes the results of RDI and practices to the society for their benefits.
Management and competent personnel	Be an economically, ecologically, socially, and culturally responsible employers. Make personal familiar and responsible to sustainable development policies related to their work and monitor it. annually. Develop our activities openly with personnel, students, and stakeholders. Include sustainable development in the orientation of employees.	Development of the personnel's expertise in the sustainable development and responsibility. Availability of SD online course and certification Include basics of sustainable development in employee orientation.

Carbon footprint	Develop calculation model and monitor a carbon footprint annually. Planned a different measure to reduce our carbon footprint and emissions. Research and develop different ways for university to be carbon neutrality in their target timetables.	Developing and existing carbon calculation model and its instructions. Compare the past and present information on the carbon footprint of universities and its improvement. Concrete roadmap containing objectives and steps towards carbon-neutral by 2030.

Table 3 Arene objectives and measures set for University of Applied Science

Considering these objectives and measures I have prepared the questionnaire and collected the data from the Novia tech personnel and analysed those data. To improve the quality of data and research there are also open questions on the survey that collect more informative data as well. So, our questionnaire set consists of both open and closed ended questions. By analysis those collected data I will figure out how well aware the staff at Novia's Tech department in Vaasa is about the issues covered in the Arene program and what kind of progress they have done. I will also try to be analyse what was done perfectly and where there is room for improvement. In addition, solutions are suggested to fulfil the target of the programs' and Novia owns goal being one of the leading universities of applied science. As a result, suggestions are outlined for further training, research and development and suggestion for daily action to make the university carbon neutral. The final aim to is prepare and suggest short and usable outline for sustainability.

As conclusion, this thesis work carried out by the combination of survey from the Novia technology department, research finding, and guidelines of Arene and different information published or stated by Novia in their websites and publication. So, this research work rather than following the particular methodology it follows combination of both qualitative as well as quantitative methodology.

4 Data Collection and Analysis

4.1 Background

The main source for the result of this work is data collected from the stakeholder. In this work stakeholder means the personnel, who are directly involved or working in under Novia technology department in different position or role. To collect the essential data, I have prepared the set of questionnaires and sent those questionnaires to around 82 persons involved in the Novia tech department. The set of questionnaire consists of 16 questions starting with the basic information of the respondent and their view about the sustainability and carbon neutral practises under the Novia tech department.

Among the sixteen questions 6 questions are open-ended question where respondent can write their views or clarify their answer and even their expectations as well. In addition, two rating questions are included in the questionnaire where range goes from 1 to 5, as usual 1 represents worse and 5 is good. Remaining other 8 questions is multiple or single choice questions according to their nature of the requirement of the answer. The questionnaires totally follow the Arene's guidelines and principle related to the survey and analysis of carbon neutral at university of applied science. In the questionnaire, we used a matrix to identify the maturity level of sustainability under the Novia tech, using those matrix respondents can select or mark own thinking of Novia tech maturity level related to the field stated in the question. To make research more practical and acceptable I completely adopt or used the same Arene's matrix to select the maturity level.

I have got 29 responses, which as slightly disappointing, but on the other hand a rather ordinary response rate (35%). The answer came are from the persons who are involved in the different role in Novia, which is good.

4.2 Graphical presentation of the collected data

4.2.1 Result of basic information (Q1-Q2)

There are 29 responses among them 14 respondents teach the vocation subjects, 4 of them teach math/science, 8 of them work in research and development and remaining 2 respondent work in the administration. As we take an age which may be reflects the

respondents experience and working history, 10 respondents are between 40-49 followed by 7 under 40 where are same number 6 respondents in each age range 50-59 and above 60. While considering the above responses, I meet my initial expectation of receiving responses from different persons working in different role. From the basic information of respondents, it can conclude that they have good knowledge and long work history in the field where they belong.

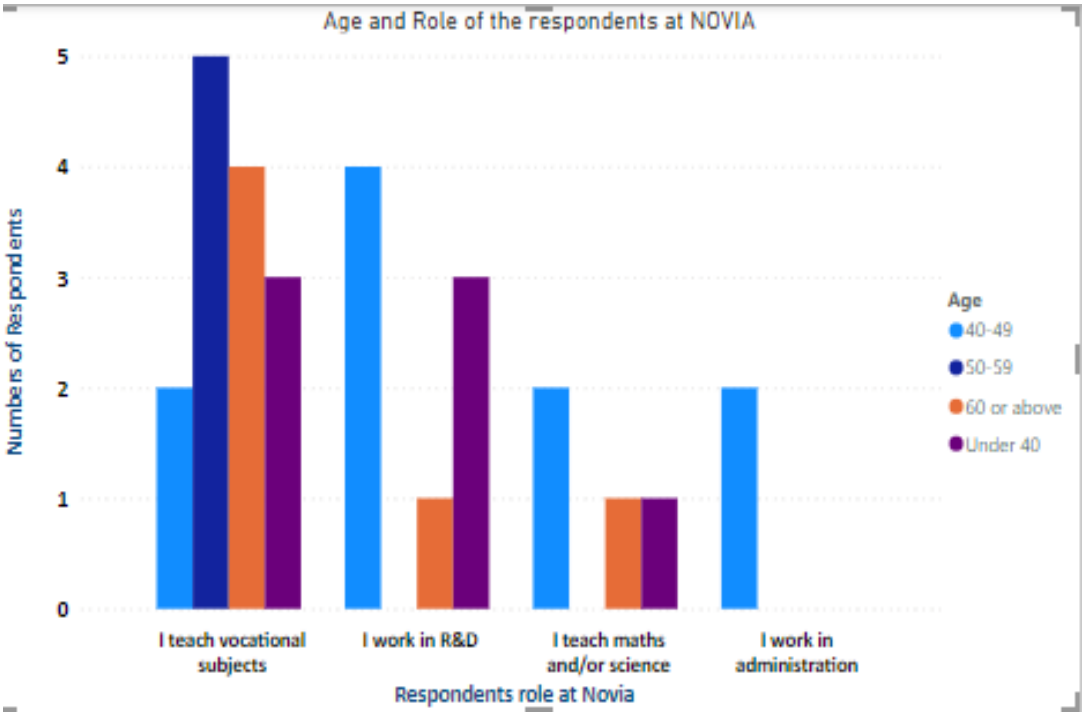


Figure 6 Numbers of respondents by age and role

4.2.2 Result of Maturity level of sustainability (Q3-Q10)

The survey had included the 4 different questions related to the maturity level of sustainability with 5 different options following the same guidelines matrix used by Arene's checklist. Each of these questions followed by open question where respondent can explain the reasons or ideas behind the selection of the option. Those five options are Starting, Progressing, Controlled, Advanced and Strategic where staring represents initial level and strategic means fulfil all the requirement. There is different matrix for these four questions where the explanation to select proper options. The respondent had also provided the same matrix in questionnaire, hopefully they take these matrixes as a base to choose the option according to their knowledge and feeling about maturity level of sustainability at Novia tech.

Maturity level of sustainability in Education and Training

The first question related to maturity level of sustainability in education and Training. According to the survey result 9 out of 29 believe that maturity level of sustainability at education and training is in progressing level followed by 8 replied that is in advanced level. In addition, equal numbers 5 out of 29 believe that it is in starting and controlled level. There is no one who think it is in strategic level and 2 respondents didn't answer about this question. The survey result of the maturity level of sustainability in education and training are presented in graphical form in a below diagram. The diagram has two-part first part shows the number of respondents in each option according to their role at Novia whereas second part shows that overall percentage of respondents in each maturity level options.

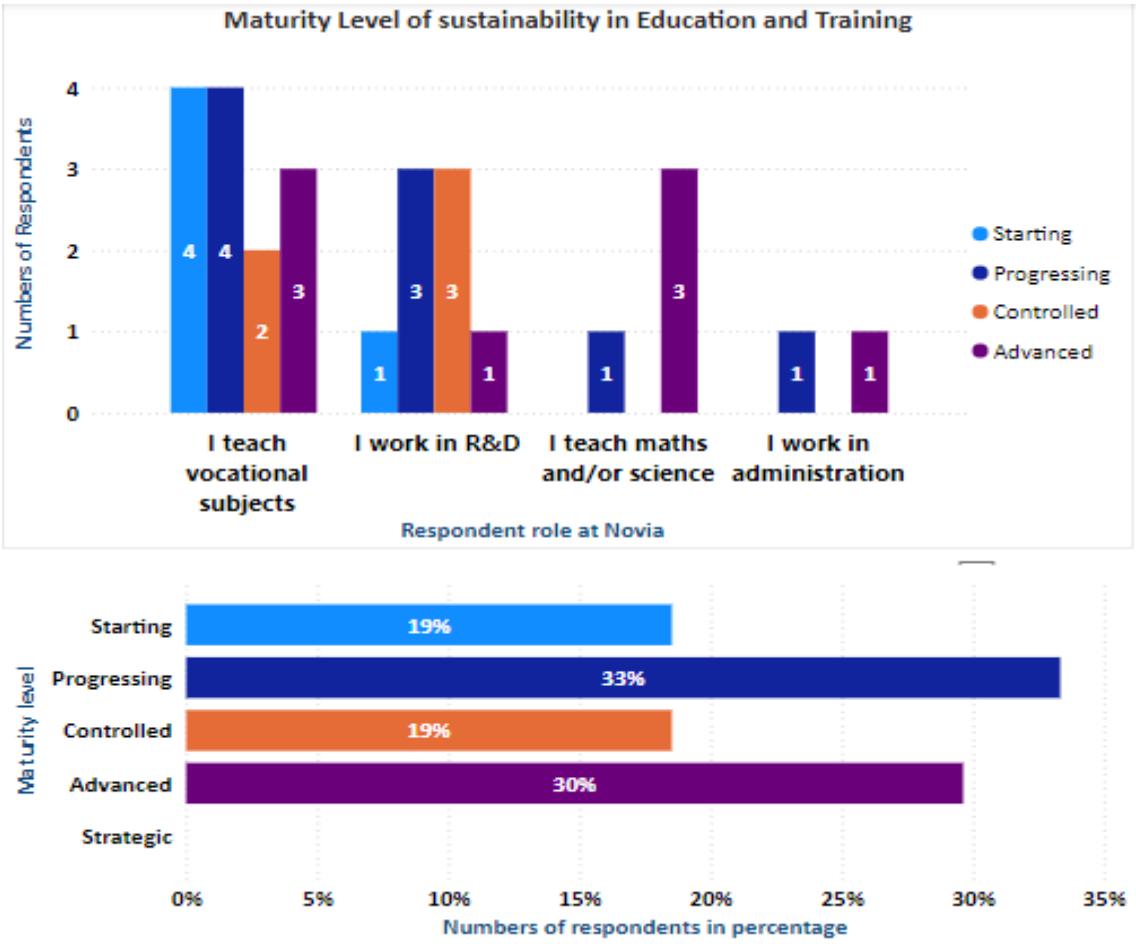


Figure 7 Survey result of maturity level: Education and training

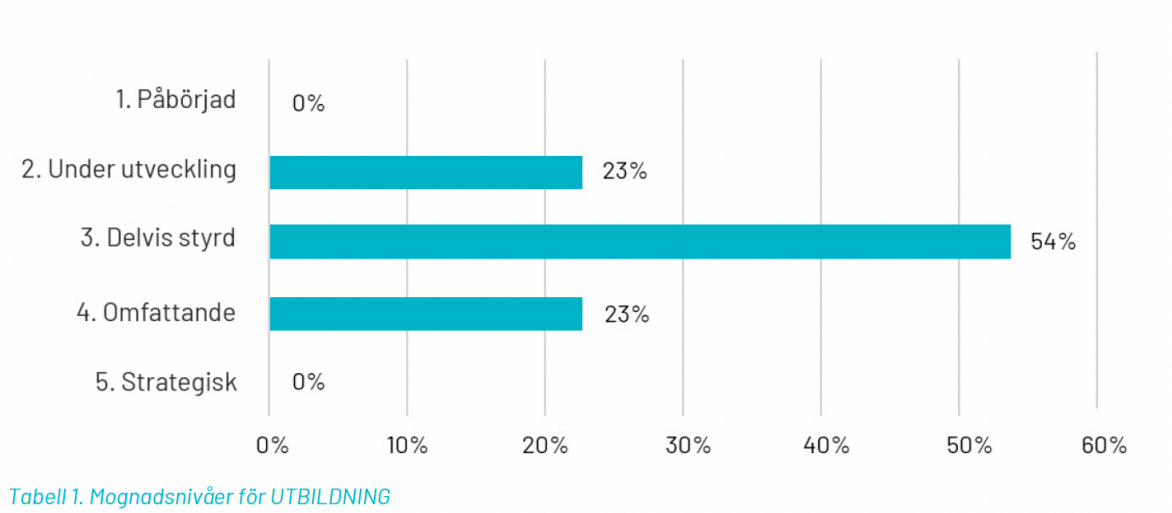


Figure 8 Results of maturity level/ education from Arene's intermediate report answered by 22 UAS'es (Arene, 2023)

We can see that the result in Arene's survey was clearly more to the middle and no answers indicating starting level.

The person who was involved in survey had also given the explanations about their own selection of the maturity level. Those explanation covers the action going inside Novia tech in the area mention in the question and what need to be improved. The common suggestion or answer group in one and distinct are stated as it is.

Starting	"I am not aware of any concrete actions in my surrounding. On the other hand, I think there are many other more important things that need to be addressed." "Mostly feels like a cliché that is used more than concretely; how should we implement this in everyday life??"
Progressing	"Novia has a person in charge, but I don't think it takes any more of a stand on the pedagogy". "It is currently not well established in a broad sense but progressing" "Noticed nothing in my area regarding this." "On my wall, I have a poster from 2013 about teacher competences for sustainable development but there are no guides how to implement in education. "

Controlled	"A responsible person named, policies in place, not full encompassing". "I haven't seen that educations that promote sustainable development have been highlighted. Sustainability is highlighted in the strategy and mentioned in the course content, but whether it is included in the teaching, I have no idea ."
Advanced	"Not been involved as a teacher for that long, but I feel that sustainability is highlighted to a great extent." "Feels that Novia has already for many years worked for sustainable development to the extent possible in terms of teaching and other activities."

Table 4 Respondents comments about sustainability level in education and training

The Matrix used to answer the question is stated in the below table.

Maturity levels of sustainability: Education and Training				
1. Starting	**2. Progressing**	**3. Controlled**	**4. Advanced**	**5. Strategic**
The operating culture of the university of applied sciences has not yet taken great steps towards taking sustainable de-velopment into consideration in curricula and the provision of continuous learning opportunities. Including the perspective of sustainable development in education and training is not actively encouraged, and compliance can be considered spotty. The guiding principles and policies are inadequate. Processes are not clearly defined. The significance of competen-ce in sustainable development is recognized in qualifications, but it is only starting to be sys-tematically included in teaching.	Including sustainable develop- in education and training is considered a part of the operating culture of the university of applied sciences, but there is no sufficient pedagogical sup-port availablc to implement it, and individual measures do not converge in the operations at large. Clear steps have been taken to include sustainable develop-ment in teaching, but this is not visibly encouraged. Sustainable development is re-flected in the strategy, but not as a core value, and there are not enough instructions for taking sustainable development into consideration in teaching, or the instructions are not complete.	The university of applied sciences has appointed a person responsible for the pedagogical development of sustainable development or sustainable curriculum work. Communicating about education and training in sustainable development is part of the communications of the university of applied sciences. The university of applied sciences has prepared policies related to sustainable development pedagogy and curriculum work. Development measures have been initiated, and they are mainly based on existing guidelines or operating principles in accordance with the objectives of the universities of applied sciences' programme for sustainable development and responsibility. However, the policies and measures are not yet a central part of the operating principles of the university of applied sciences, and the guidelines are not sufficient.	Education and training promoting sustainable development is an important part of the strategy and practices of the university of applied sciences. It has been integrated into the operating culturc of thc university of applied sciences and is communicated clearly and openly. Education and training promoting sustainable development is one of the guiding factors in the development of partnerships. The university of applied sciences is actively pursuing qualifications that promote sustainable development and continuous learning opportunities. A roadmap has been prepared to support education and training that promotes sustainable development and is known to the personnel and students. The measures of education and training promoting sustainable development and the development of students' competence are measured and evaluated, and the results are used in the development of operations. New research data related to sustainable development are used in the development of operations.	Education and training promoting sustainable development is a recognized part of the operating culture, values and attitudes of the university of applied sciences. It is one of the core values of thc university of applied sciences and an essential part of the strategy, guiding the work carried out with students. The university of applied sciences supports work that promotes sustainable development in the operations of its partners, tackles shortcomings and publicly encourages the promotion of sustainable development in society. Measuring and evaluating education and training that promotes sustainable development is part of the normal operations of the university of applied sciences, and the results are comprehensively available to the university of applied sciences and regularly reviewed. The results are also used proactively in, for example, curriculum work.

Figure 9 Maturity level Matrix: Education and training

Maturity level of sustainability in RDI

The second question is related to the maturity level of sustainability inside Novia tech RDI section. I have got 28 responses out of 29 respondents on this. According to result, highest number of respondents (13) replied that it is in controlled level. The second highest number (9) agree that it is in advanced level, 5 answered that it is in progressing level and only one response for starting level. The 5 respondents who work in research and development answered that it is in advanced level that means Novia has focus on the sustainability development inside its research and innovations teams. The survey result of the maturity level is presented in graphical form in the following diagram.

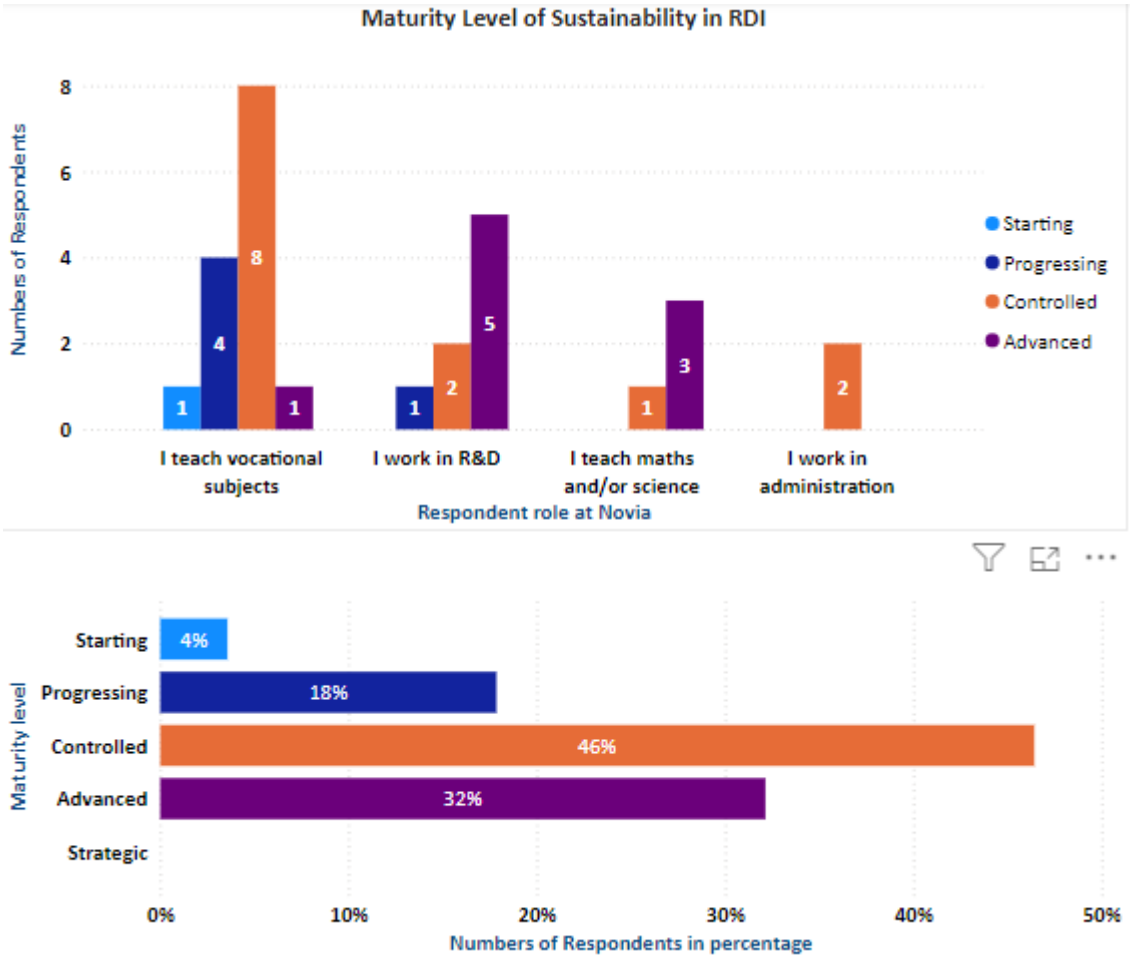
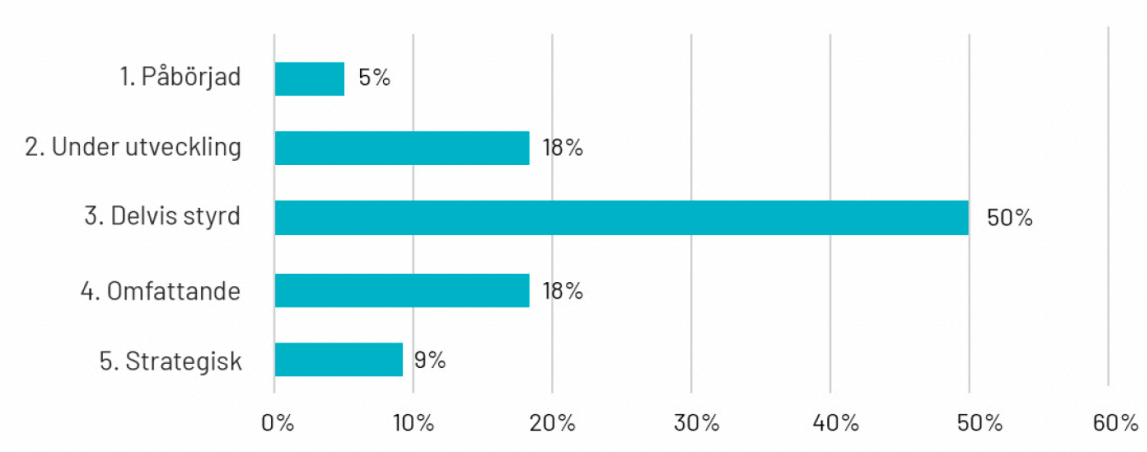


Figure 10 Survey result of maturity level: RDI



Tabell 2. Mognadsnivåer för FUI-verksamhet

Figure 11 Results of maturity level/RDI from Arene's intermediate report answered by 22 UAS'es (Arene, 2023)

The result in Arene's survey was quite similar to Novia's results with the exception that there were a few answers in the strategic level.

I have not got explanation regarding their option selection from each participant on this question, and I also left it as a non-mandatory question in the survey form as well. There are few important and considerable suggestions has been received which will be supportive for Novia to improve their policies inside the RDI. All the distinct comment stated below according to the option:

Starting	"No explanation for this option"
Progressing	"Some projects ongoing but not sure what they will bring to the table. "
Controlled	"The business is at a good level; communication could certainly be developed." "Cannot tell. Nothing I have knowledge of this but have to choose something." "It is included in various development projects but does not seem to go out to students and staff to any great extent." "Not familiar with the research projects. "
Advanced	"Forced since years back by financiers to detail their sustainability goals and methods, much more aware." "Often a criterion for the implementation of the project at all." "Something between partially controlled and comprehensive. We follow a lot of the comprehensive level, but maybe not all fully. FUI projects follow the financiers' rules for sustainability, e.g. the project selects several of the UN's sustainability goals that we work with. Equality, equal treatment, and diversity are also usually included in the criteria. The projects follow up on these in their work. The project communication highlights how the project supports sustainable development. " "Not yet been involved as a teacher for that long, but I feel that sustainability is highlighted to a great extent." "Selection was done by Discussions with colleagues"

Table 5 Respondents comments about sustainability level in RDI

The following matrix is considered as a base to select the appropriate option for the maturity level on this question.

Maturity levels of sustainability: RDI				
1. Starting	**2. Progressing**	**3. Controlled**	**4. Advanced**	**5. Strategic**
Sustainable development is taken into consideration in RDI activities, but it is not a key criterion for the activities. The guiding principles and poli-cies are inadequate. Sustainable development is not included in the RDI strategy or guidelines. Solving sustainability issues through RDI activities is identi-fied as an opportunity, but not as an objective.	Sustainable development is part of the objectives of the RDI activities of the university of applied sciences, but there is not enough support or instruc-tions available to implement it. RDI activities are understood as an opportunity to produce sustainability solutions, but sustai-nable development is not inclu-ded in the criteria for participating in RDI activities. The sustainability impacts of an RDI project are not assessed in the process.	Sustainable development is taken into consideration in the planning of RDI activities and it is part of the process guidelines. The university of applied sciences has appointed a person responsible for the development of sustainable and responsible RDI activities. The principles and objectives of Arene's programme for sustainable development and responsibility are complied with in the planning, implementation and dissemination of RDI activities. The RDI strategy of the university of applied sciences or other operating instructions considers sustainable development an objective of RDI activities. However, sustainable development is only taken into consideration on a general level. The university of applied sciences has projects promoting sustainable development, but no exclusion criteria have been defined (e.g., partners' commitment to sustainable development or the sustainability of procurement. Communications related to sustainability are part of project communications.	The strategic and operational objectives of RDI activities consider the perspectives of sustainable development and the criteria for RDI project approval include a sustainability assessment of the project. A roadmap has been prepared to improve the sustainability and responsibility of RDI activities. In its RDI projects, the university of applied sciences identifies which UN Sustainable Development Goals (SDGs) the project promotes. Project communications highlight how these goals support sustainable development. When partners are selected, their commitments to the principles of sustainable development are assessed. Sustainability is taken into consideration and assessed in procurements in RDI projects. Research related to sustainable development is taken into consideration in policies concerning RDI activities, and the newest information is used in the development of RDI activities.	All projects are required to pro- more than one UN sustainable development goal (SDG), and the sustainability roadmap for RDI activities is linked to the strategy. Progression on the roadmap is monitored systematically. The effectiveness of responsibility related to RDI activities is continuously assessed. Promoting sustainable development is part of project communications and impact communications at the university of applied sciences. Sustainability is one of the primary criteria in RDI project procurement, and partners are required to comply with the principles of sustainability and responsibility. The sustainability criteria set by the university of applied sciences for RDI activities are reviewed regularly and proactively. Each project promotes at least one element of sustainable development: ecological, economic, social or cultural sustainability and takes them all into consideration in its operations.

Figure 12 Maturity level matrix: RDI

Maturity level of sustainability in Management and competent personnel

I have got response from all the respondents regarding the maturity level of sustainability at Management and competent personnel. The height number of respondents (14) agree that it is in controlled level which include 2 respondents from administrative role as well.

The results followed by maturity level starting (7), advanced (5) and progressing (3). The result is quite impressive. The graphical representation of survey of the maturity level of sustainability at management and competent personnel is as follows.

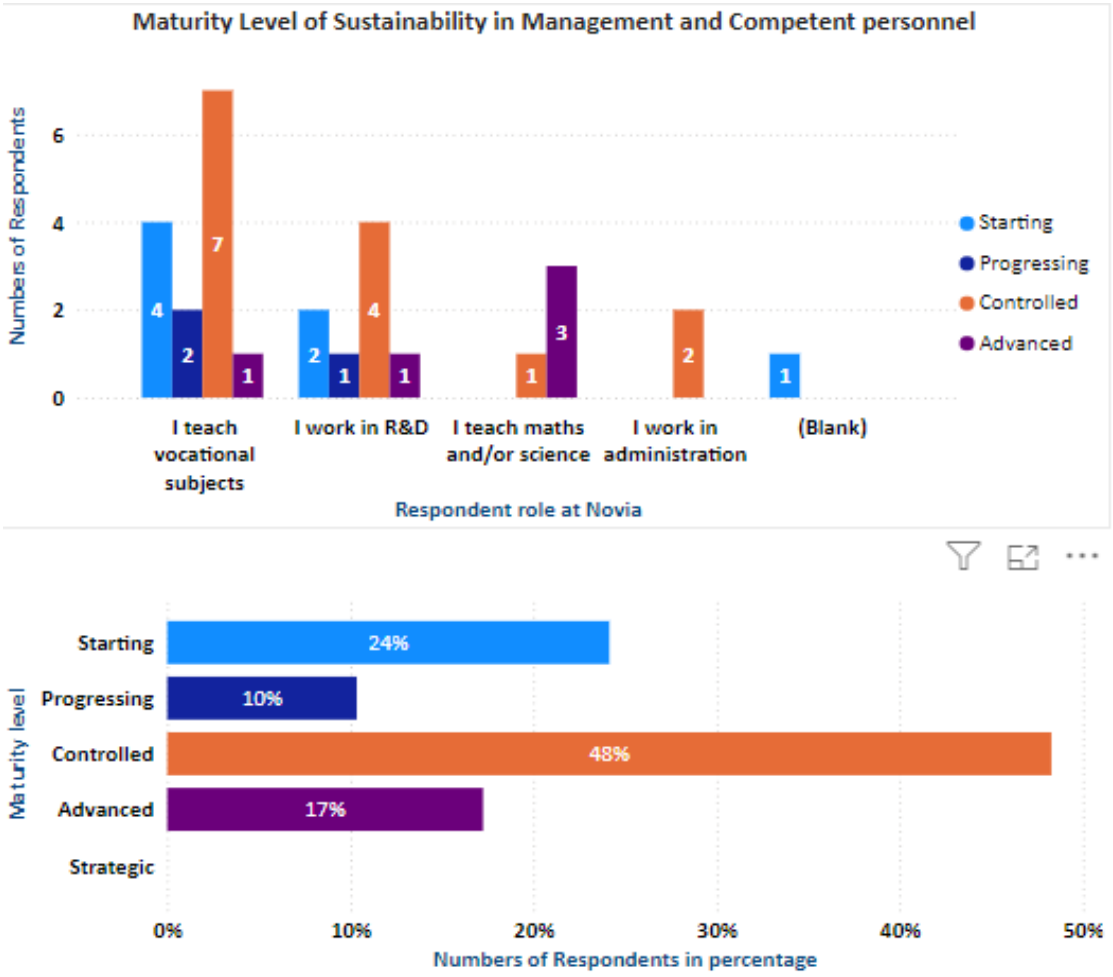
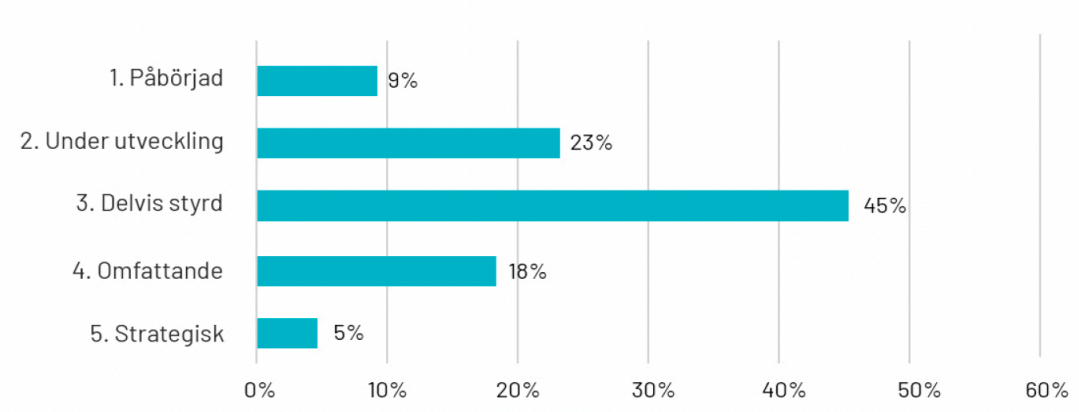


Figure 13 Survey result of maturity level: Management and competent Personnel



Tabell 3. Mognadsnivåer LEDNING OCH KOMPETENT PERSONAL

Figure 14 Results of maturity level/management from Arene's intermediate report answered by 22 UAS'es (Arene, 2023)

The result in Arene's survey was quite similar to Novia's results regarding the "controlled" level. Novia still had more answers indicating "starting" level and no answers indicating "strategic" level. So, the overall impression here is that Novia's perceived level is lower than in the 22 UASes in Arene's survey.

The respondents had given the explanations about the selection of the maturity level. Those explanation are stated below, and it is grouped according to the option.

Starting	• I believe the management thinks and wants to think that these things are already very far. Unfortunately, I think the management is living in their own world, not the same reality as us others.
Progressing	• it is currently not well established in a broad sense but progressing
Controlled	• The road map is still quite unclear. • A responsible person named, policies in place, not full encompassing. • Believe that management and administration's maturity level of sustainability is partly steered towards comprehensive. A lot of what's under comprehensive hasn't materialized yet as far as I know. But I could be wrong. • Can not tell. Nothing I have knowledge of but must choose something. • How is it passed on to other staff? • Discussions with colleagues
Advanced	No explanation received for this this.

Table 6 Respondents comments about sustainability level in Management

The Matrix used to measure or indicate maturity level of sustainability at management and competent personnel is as follows:

Maturity levels of sustainability: Management and competent personnel				
1. Starting	**2. Progressing**	**3. Controlled**	**4. Advanced**	**5. Strategic**
The operating culture of the university of applied sciences has not yet taken steps towards taking sustainable development into consideration in management, recruitment of personnel and competence. The guiding principles and policies are inadequate. Sustainable development is not included in personnel's orientation, personnel development measures or development discussions. The university of applied sciences has operating models for taking sustainable development into consideration in personnel's competence, but compliance is spotty. The importance of personnel's competence for sustainable development is recognized, but it is only starting to be promoted.	Sustainable development is seen as part of the management of the university of app lied sciences and the competence of its personnel, but there is no sufficient support available to implement it, and individual measures do not con verge in the operations at large. To take sustainable development into consideration, clear steps have been taken in terms of the orientation and development of personnel, but the implementation of sustainable development is not visibly encouraged nor is it part of personnel's development discussions. Sustainability is reflected in the strategy, but not as a core value, and there are not sufficient instructions for taking sustainable development into consideration in the personnel's activities or management, or their preparation has only been initiated in part.	The university of applied sciences has appointed a person responsible for sustainable development, and sustainable development is part of the personnel management and management in the university of applied sciences. The management supports the preparation and implementation of the sustainability strategy/ programme, but there is no comprehensive roadmap for the measures in terms of management and personnel development. The university of applied sciences has taken measures related to sustainable development, but they are not yet a central part of the opera- ting principles for the development and management of the personnel of the university of applied sciences, and the guidelines are not adequate in all respects. However, development measures have also been initiated in personnel management and management, and they are mainly based on existing operating principles in accordance with the objectives of Arene's programme for sustainable development and responsibility.	The university of applied sciences is progressing towards the principles and objectives of Arene's programme for sustainable development and responsibility in terms of management, personnel competence and its development in a goal-oriented manner. There is a roadmap for sustainable development and sustainable development is an essential part of management and personnel development practices. Sustainable development has been integrated into the learning outcomes of the personnel of the university of applied sciences and communicated clearly. Personnel are encouraged to develop their competence in sustainable development, for example, by offering training. The continuous flow of new information related to sustainable development is also taken into considcration in thc operations. The development of personnel's competence in sustainable development is monitored and actions are measured and evaluated, and the results are used in the development of operations.	Sustainable development is a recognized part of the operating culture, management, values, attitudes and social impact of the university of applied sciences. The management and personnel of the university of applied sciences promote sustainable development together with their partners, tackle shortcomings and publicly encourage sustainable development in society. The roadmap for sustainable development is integrated into the strategy, and the related objectives guide the activities of the entire community, emphasizing multidisciplinary and multi professional cooperation and a research-based approach. Sustainable development is included in the orientation of the entire personnel, competence development and development discussions. It is clearly communicated both within and outside the organization. The monitoring and evaluation of personnel's competence in sustainable development are systematic and integrated into the quality system. The results are also used proactively in the development of operations.

Figure 15 Maturity level matrix: Management and competent personnel

Maturity level of sustainability in Carbon footprint

The most important question is the maturity level of sustainability at Carbon footprint in Novia tech. I emphasized this question because Novia aim to be a carbon neutral university by year 2030. To achieve this goal, Novia must have to minimize the carbon emission and

handle the contributor of carbon footprint correctly. The 12 respondents agree that it is in controlled level whereas 9 respondents replied that it is on progressing level. Only 3 responses on favour of advanced level. The result is little bit different than my expectation. I am hoping that Novia has lots of progress on carbon footprint to be a carbon neutral university. The survey result of the maturity level is presented in graphical form in the following diagram.

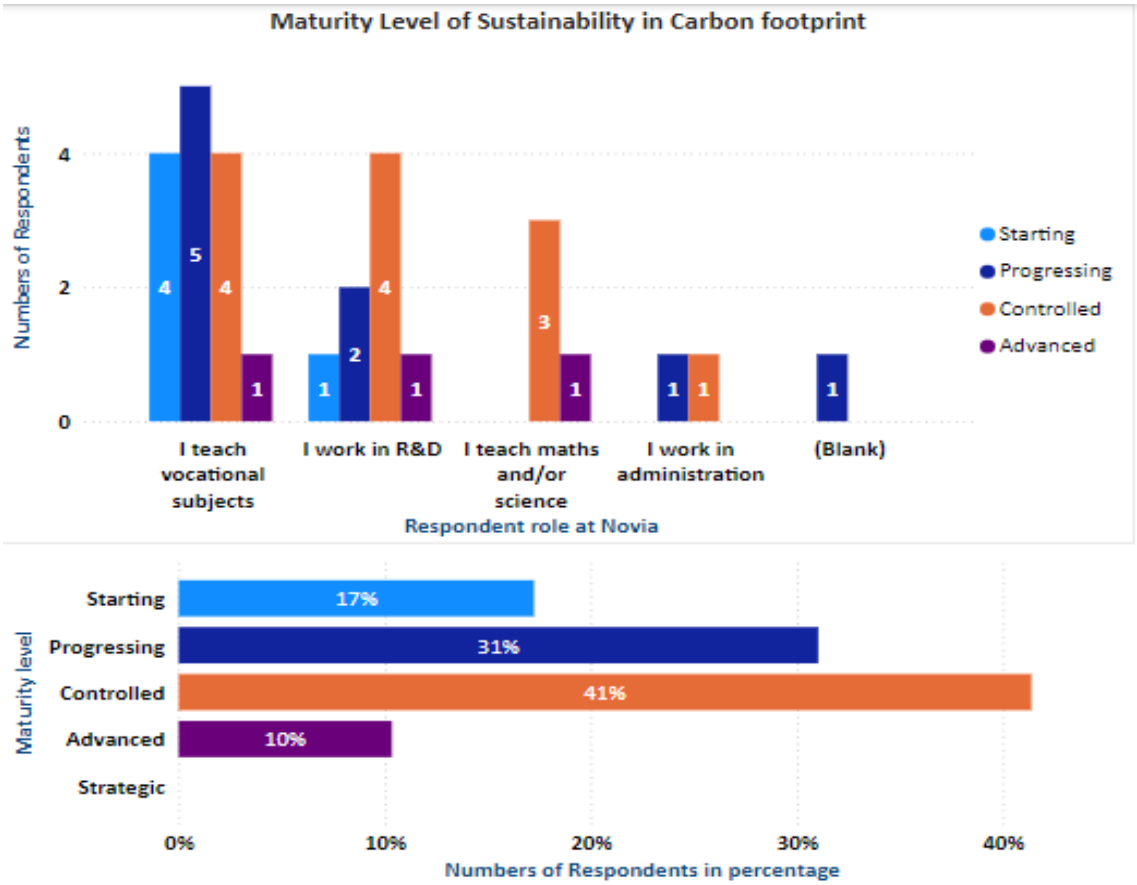
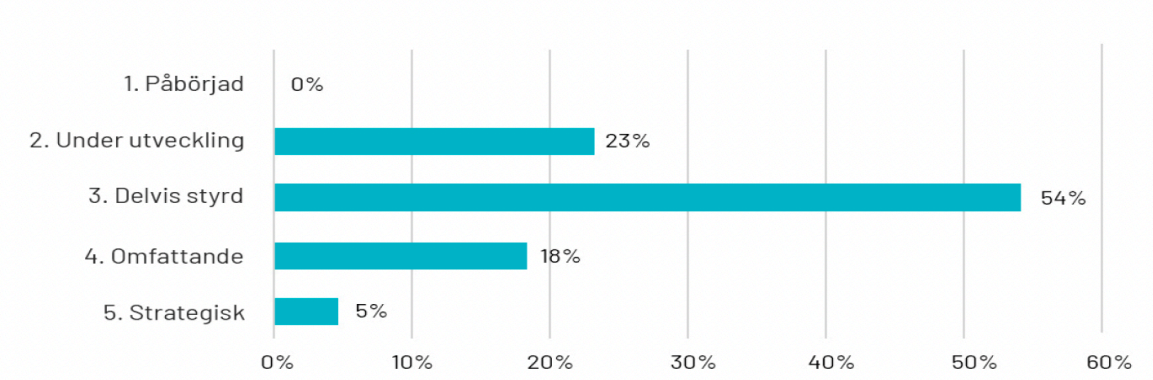


Figure 16 Result of maturity level: Carbon footprint



Tabell 4. Mognadsnivåer för KOLDIOXIDAVTRYCK

Figure 17 Results of maturity level/ carbon footprint from Arene's intermediate report answered by 22 UAS'es (Arene, 2023)

Here the Arene's survey indicates a rather clearly better level than Novia's survey.

The respondents had also given the explanations about their selection of maturity level. Those explanation are stated below, and it is grouped according to the option.

Starting	• I don't know of any big advancement in this topic
Progressing	• Plans in place, but the carbon footprint calculations have not been happening for many years. • Solar energy and charging stations are targets for development.
Controlled	• Some decisions that support the transition towards more sustainable solutions have been made, but there are absolutely no clear guidelines or any plan for how we will achieve carbon neutrality. • Projects on the way. I want to see though that money for needed investments is found before I fully believe. • I think it corresponds mostly to partially controlled. Has the carbon footprint of the technology been calculated? Didn't find anything about carbon footprint on the intranet other than the electric car that will help Novia reduce its carbon footprint. On novia.fi, the global goals that Novia invests in are described. There is also some about sustainability, but there is not much on the intranet. I rarely read anything on novia.fi. The information to the staff should perhaps be improved in case I missed that a carbon footprint was calculated. • Not all are aware in daily life
Advanced	No comment from respondents on this section.

Table 7 Respondents comments about sustainability level in carbon footprint

Arene had set a proper matrix to analyse the maturity level of carbon footprint. Every university can report or figure out their own level of maturity with this matrix. I have also implemented same matrix to get the response regarding the maturity level of carbon footprint which is as follows:

Maturity levels of sustainability: Carbon Footprint				
1. Starting	**2. Progressing**	**3. Controlled**	**4. Advanced**	**5. Strategic**
The organization's carbon footprint calculations have been implemented sporadically. There have been discussions on the carbon neutrality target and emission reductions.	The university of applied sciences is committed to a common carbon neutrality target through Arene's programme. Carbon footprint calculations have been carried out annually according to Arene's calculation model. Emission reductions have been planned and individual measu-res may have been taken.	The university of applied sciences has committed to the carbon neutrality target and reducing the carbon footprint is reflected in the strategy. Measures to reduce emissions have been planned and implemented. The university of applied sciences has a person responsible for coordinating the implementation of carbon footprint calculations and the promotion of measures.	The university of applied scien-ces has a carbon roadmap with defined quantitative emission reduction targets. Several measures have been taken to reduce emissions. New information in the sector is used in the planning and imple-mentation of emission reduc-tion measures (and calculations). Calculation has been automat-ed (e.g., Hankintapulssi, Visma Sustion) Carbon handprint assessment is planned.	Measures to reduce emissions have been systematically implemented in different categories, and the strategy of the university of applied sciences steers measures to reduce emissions. Compensation methods (including carbon sinks)to achieve carbon neutrality have been planned and implemented, taking into consideration any conditions related to state funding. Carbon footprint calculations are automated, and the data are part of the quality system of the UAS. Calculations are more extensive than required by Arene's calculation model (e.g., investments, commuting and/or lunches included). The carbon handprint has been evaluated. The entire organization of the university of applied sciences knows the carbon neutrality targets and works actively to achieve them

Figure 18 Maturity level matrix: Carbon Footprint

4.2.3 Novia maturity level of SD (Q11)

I have included a question if the respondent know which level of sustainable development Novia is aiming at. The target of this question is what kind of goal Novia set and how it passes their message to their branch, faculties and staffs. The result of this question is little bit unexpected; the result is around 55% of the respondent replied that they are unsure and around 27 % of the respondent replied that they are not familiar or don't know about the aim of sustainability. Only 17% ,5 respondents, stated that they are familiar with the Novia aim of sustainability. The surprising part of on these responses is that teaching (15 out of 18), research (6 out of 8) and administration (2 out of 2) had replied they are unsure or don't know about sustainability aim. The reasons behind that may be Novia has not

clearly stated or publish their aim of sustainability publicly or openly among their campuses, departments and staffs or their staff and faculties are not motivated to learn more about sustainability. This questionnaire is prepared on February 2024 and survey is carried out on March 2024 just in between the time, Novia has published its new strategy and goal about sustainability which I mention in the end of this chapter. There may be some difference in the result of this question after this but still it considerable that how Novia reach to their staffs with new strategy and how actively staff learn and adopt that new goals.

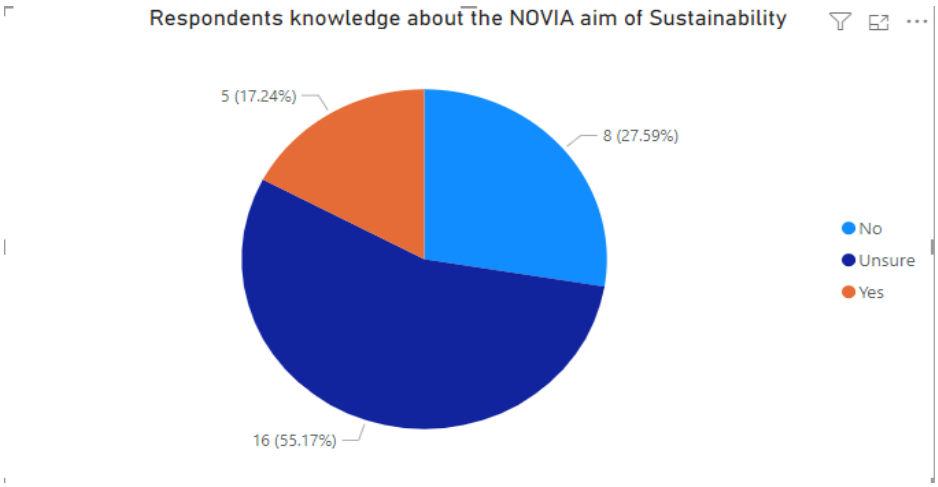


Figure 19 Respondent knowledge about Novia aim of sustainability

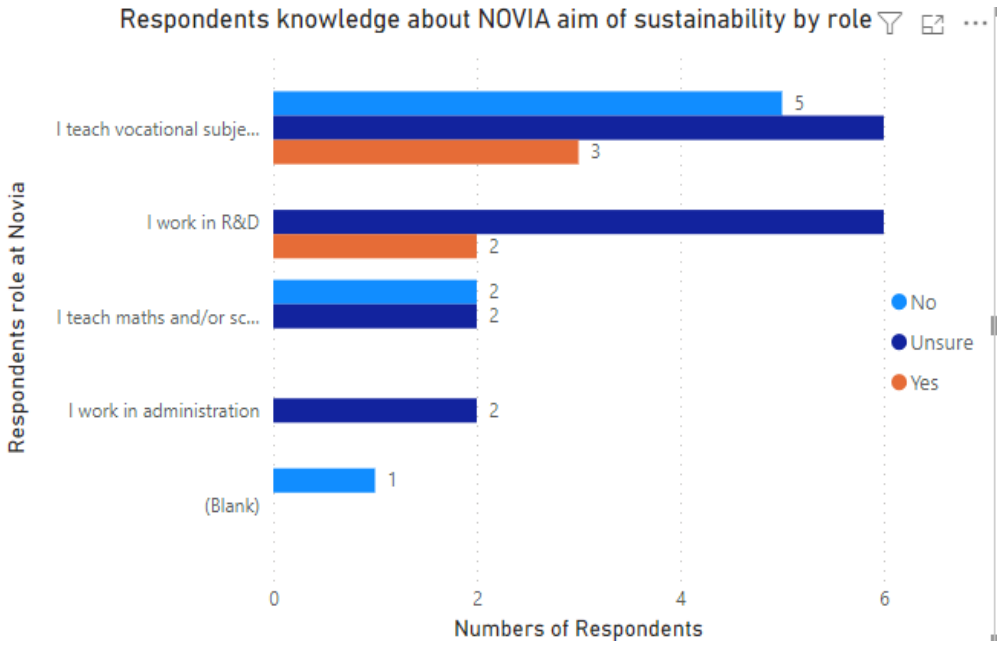


Figure 20 Respondent knowledge about Novia aim of sustainability by their role

4.2.4 Action and suggestion for SDG's (Q12-Q13)

The questionnaire also includes two questions related the sustainability development goals (SDG's). The first one is to identify the concrete measure that implement in Novia tech to achieve the sustainability goals and the other one is to collect suggestions from the respondents on how to achieve the SDG's goals. The result of the survey is presented in the tabular form below. I have listed all except than some of the repeated and unmatchable suggestion or answer.

Measure or action taken in Novia	**Action to be taken (Suggestion)**
Electric and hybrid car	Analyse the current footprint.
Less travelling	Automated light (movement sensor) and better building management system.
Integrate sustainability course in half of the curriculum courses.	Used green electricity
Novia Selected the SDG's from UN SDG's list.	Offer bicycle benefits to staff
sorting waste, reducing water and electricity consumption, reduce used of paper.	Measure carbon footprint and publish its breakdown as well to identified major contributor.

Table 8 Respondents noticed action and suggestion to Novia related to SDG's

4.2.5 Scope of sustainability in teaching (Q14-Q15)

Education is one core fields from where we can spread the knowledge to the society in broad. Taking this into account, I have included the two rating type questions (rating 1-5) to get the status of sustainability in the curriculum and teaching material. The first one is what the respondents think, is it important that they have to focus or emphasize sustainability in their teaching and second one is how they include or highlight sustainability in their own teaching and teaching materials. The result is very progressive the average of both questions rating is more than 3.5 which means that all the respondents think that sustainability is more important to include in their teaching and they able to include it in their own teaching. The graphical presentation of both questionnaire result are as follows:

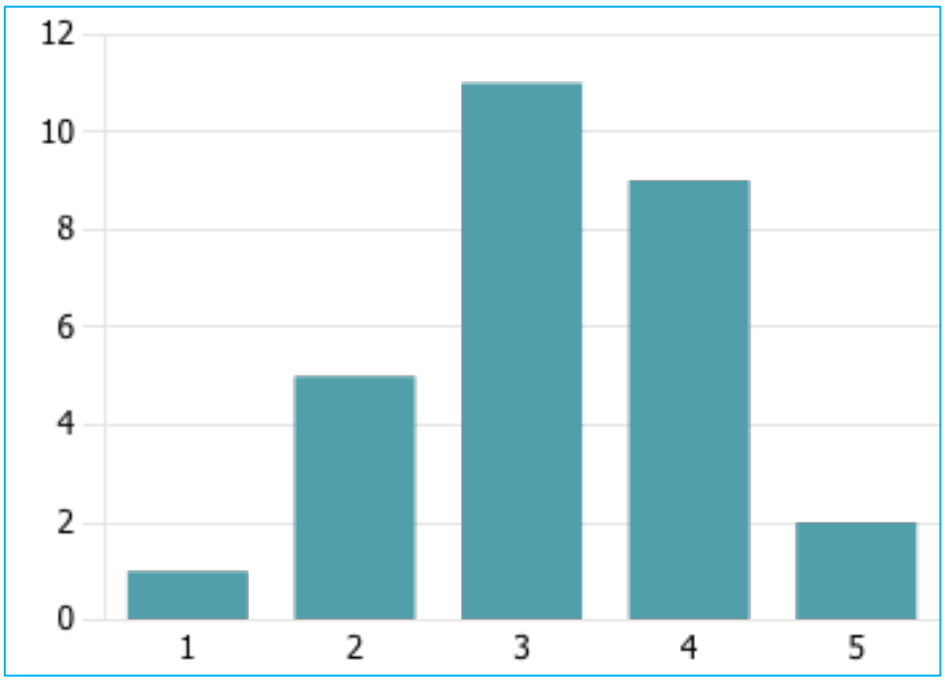


Figure 21 Result of Respondents rating of Sustainability in own teaching

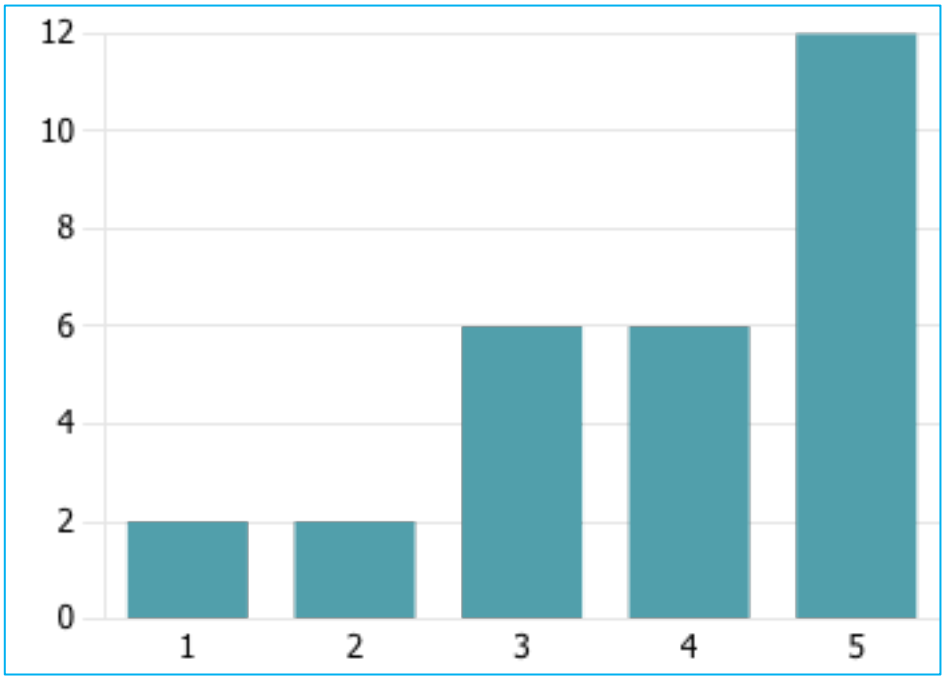
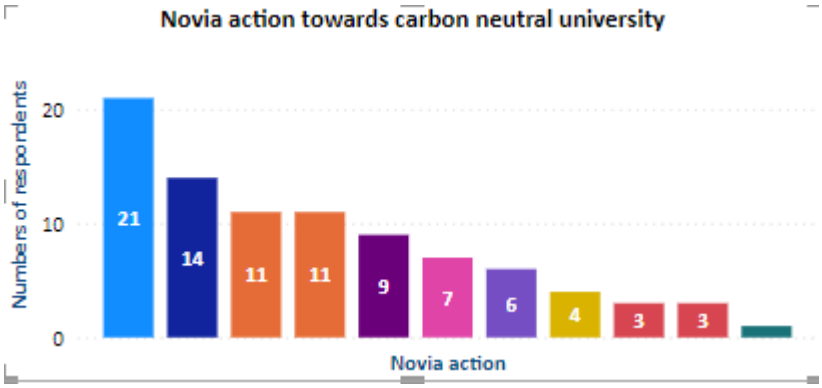


Figure 22 Respondents rating about how it is important to focus SD in teaching

4.2.6 Novia action towards Carbon neutral university (Q16)

Most of the Finnish university aimed to be a carbon neutral university by year 2030. Novia also set their goal and aim to be carbon neutral university of applied science by year 2030. The process of being a carbon neutral is not easy process and will not happen quickly. To

achieve that the well-planned pathway, proper strategy of plan execution, following the set rules and methods by every stakeholder. I have included the final question in questionnaire that what are the steps that Novia are following on these days and have respondents notice that kind of actions that are be supportive to be a carbon neutral university. The option provided in the questionnaire are basics or proved supportive action for carbon neutral and these are not only all key player for carbon neutral. The result that we get from the respondents are presented as below:



Novia acion towards carbon neutral	Numbers of respondents
Integrating sustainability into learning, teaching and research	21
Reducing waste and carbon emissions	14
Providing options for sustainable travel	11
Saving electricity	11
Creating partnerships with the local community	9
Considering sustainability performance of suppliers buying sustainable goods and services	7
Offering enough vegetarian options at food outlets	6
Using water efficiently	4
Others	3
Providing sustainability related learning opportunities, incentives and rewards for staff	3
Adhering to environmental building standards	1

Figure 23 Result of Novia action towards the carbon neutral

4.3 Novia Current Sustainability development goal and its considerations in RDI

In addition to survey, I have collected information regarding the sustainability in Novia through the different means such as Novia.fi, research articles and going on or completed projects. The previous survey result is mainly from Novia tech department but this section deal with the overall Novia policies and progress about the sustainability development.

Novia has published their sustainability development goals in their websites at the beginning (Approximate February) of this year 2024 where they stated that sustainability is an important issue for them, and they take it and climate change in an account while updating curricula and in their RDI projects as well. They also mentioned that they have measured carbon footprint, focus on handprint and be a responsible to educate for sustainable society. Novia selected 7 goals from UN SDG's and plan to focus on this. Those seven goals are listed in below table (NOVIA,2024):

Goals	**Targets**
Good Health and well-being	contribute to skills supply in health and well-being. Participate in management of health risks.
Quality Education	Place students, teaching and quality at core. Respond to needs of working life Support in lifelong learning, sharing knowledge, entrepreneurial way of working and personal development.
Sustainable industry, innovation and infrastructure	Develop and innovate industrial technology and process and working methods to secure increased sustainability. Develop new sustainable energy service and transport system. Seek a robust infrastructure, reduce environmental impact and promotes innovation.
Reduced Inequalities	Emphasize human right and the equal value of all people. Encourage everyone. Promote inclusion and ensure equal opportunities.
Responsible consumption and Production	Procure service, energy and goods in sustainable manner.

	Practice functional waste sorting. Enable flexible ways of working
Climate change	Carbon neutral by 2030. Increase the knowledge and capacity to manage climate change.
Partnerships for the goals	Share information, innovation and technology being on the principle of open science and education.

Table 9 Novia's newly selected SDG's

Apart from this, I have gone through the past and going projects listed in the institute websites. There are few projects stated and considered sustainability in their abstract which is a good sign for the consideration of the sustainability in RDI. In the Novia tech department there are sustainability development courses available and student can enrol and learn more about the sustainability. The active and motivated teaching staff of the Novia tech have somehow included sustainability development in their course and try to make student curious and alert on this topic. I found some of the done and running projects and thesis work within the department what will be the good assets for Novia to meet their goals and be a carbon neutral university by year 2030.

5 Discussions

I have mentioned Novia strategy for sustainable development, data analysis and graphical representation of the survey report in previous chapter. Now I am going to discuss more about the survey results, respondent's comment, Novia strength and weakness regarding the sustainability development, how it follows Arene's guidelines and is Novia moving along with that guidelines, and what Novia need to be improve or change to meet the goals of sustainability in this section. I am going to mention my own view in combination with the respondent's comment. So, there may be something what I mentioned already have been implemented in Novia and our research and analysis not able to catch it or not access to that resources.

According to the survey result Novia tech perceived maturity level for education and training lies in between progressing and advanced. No one select the strategic option. Some of the respondent answer that Novia has policies, person in charge but there is a gap of information sharing and complete guidelines are missing. Respondents also mention that policies have many things but the in practically implementation it is lost somewhere. Most of the respondents agreed that they include sustainability in their teaching and research activities despite of proper guidelines and policies. While following the Arene guidelines and respondents' comments some of guidelines for meeting the criteria of Advanced level like roadmap of sustainability training, introduce of orientation course and core policies for including sustainability in education are missing or not publish openly. Because of this I conclude that the maturity level of sustainability in education and training in controlled stage. In my opinion and other university successful stories I would like to suggest that Novia should have to developed and implement the guidelines for their staff how to include sustainability in their curriculum. From the Arene's progressing report 2023, some of the university of applied science already prepared and implement introductory or orientation course of sustainability for new recruitments. None of the respondents mentioned that Novia had that kind of course or they got any training on sustainability, and even I haven't found any information about orientation course related to sustainability in Novia publication and in websites as well. This is the point where Novia be slow or late in comparison with other university. I suggest Novia to prepare the short course which include SDG's, Novia strategies, actions to be a carbon neutral university and handprint guidelines. This course can be made as an open course for faculties and students

as well. In my own opinion, the course can include as a compulsory course for all the Novia students, which can be complete by online on their own pace and time before graduation or starting as a Novia staff. The suggestion behind that is graduate have an idea about sustainability development before graduate and they will be able to implement it in their working life and society as well, which help to make a secure world for the future generation. In addition, most of the respondents agree that sustainability should be focus on the teaching and most of them are doing that, but Novia have to encourage own faculties and gives the complete instruction how to do that.

While discussing about the maturity level of sustainability at research and innovation, the survey result is quite impressive. Most of respondent selected controlled and advanced, and few in progressing. As in education and training, there is no selection for strategic option. Actually, none of the respondents agree that Novia tech has reached the strategic level in sectors education, RDI, management and carbon footprint. According to some of the respondents they are not so much familiar with RDI projects and their results. I suggest Novia to provide access to the information regarding the implementation of sustainability in project and how environment and society benefits from that at least to the teaching staff if there are not any confidential clauses on the projects. Apart from this, respondents replied that the sustainability measure and policies are implemented or take in consideration in most of the research projects according to the project party or project provider policies rather than Novia own. The research projects itself defined what have to be considered or what not be done. From the responses and my own research, I haven't found any Novia's well written or published sustainability policies and guidelines for research and innovation. Even Novia has really good progress on RDI, I would like to suggest in developing concrete sustainability policy and guidelines for RDI considering sustainability factors like energy saving, material selection, procurement and implantation procedure, communication and partnership plan for society. My final conclusion is that Novia tech RDI sustainability maturity level is in the advanced level.

Novia management has to put more effort in preparing sustainability policies, responsibilities and its implementation. The survey result and comment received are not on the favour of Novia management. Respondents thinks that Novia management thinking and way doing are different or not matching. According to the respondents Novia just appoints the persons in charge and not focusing more on what they have to do next. There

is no initiation for the sustainability training for staff, lack of making roadmap to be carbon neutral, lack of making policies on sustainable procurement, use of green energy, environmentally friendly structure and many more. From the survey result maturity level of sustainability in management in somehow close to controlled level but the information I have collected, and analysis of respondents comment and comparing it with Arene guidelines matrix, Novia not completely meet criteria to be on a controlled level, it is ahead from progressing level but have to do more to reach on the controlled level. I suggest Novia management to make roadmap and policies required to be carbon neutral and make it accessible to all the faculties and students if it has been already done. Novia just published own set sustainability goals whereas some of the other university of applied science have to give sustainability training to their staff and students as well. As my conclusion on this level Novia have to put more effort to meet the own goal and be on same stage of the others university.

Novia has planned to be carbon neutral university by year 2030. Novia has not so much time to achieve this goal. From the survey result and my own research finding and comparing it with Arene guidelines I conclude that Novia has partially controlled or it may be better to say on progressing level on carbon footprint. Novia new strategic statement mentioned that they measured the carbon footprint, but I haven't found any open access report or documents of measurement. Even I am not able to find any overall figure of the carbon footprint and their contributors in Novia websites or in any publication. It raises the question; what the reasons behind that Novia is not willing to publish their carbon footprint report openly to their staff and students as well. Arene guideline had mention that university have to calculate their carbon footprint annually to be in progressing level, but I haven't got any of the year carbon footprint report. In addition, Arene guidelines also indicate that there must be personnel who is responsible for the carbon footprint calculation and promotion of measure, but I haven't got information about that kind of responsible personnel from respondents and Novia websites as well. Respondents replied that they have noticed some decision that supports the transition towards sustainable solution like solar energy, charging station, electric car, sorting of waste, saving water consumption, less print, less travel etc. Apart from this, there are few suggestions from respondents to minimize carbon emission like automated light, better building management system, green electricity, offer bicycle benefits to staff etc. In my opinion

these suggestions are really supportive to minimize the footprint and becoming a carbon neutral university. The most important thing is measure carbon footprint annually, breakdown and identify the major contributors and prepare plan for minimizing those contributors and execute it in proper way. Novia can compare current carbon footprint result from previous one and then take immediate action if some of the policies and plan not working properly. Besides that, Novia can focus sustainability introductory course for staff and students, research more on handprint and implement of communicate the successful solution to the society. These actions increase the awareness support in minimizing carbon emission. In my opinion it could be good to create some pamphlets or posters, provide it to the student or publish in notice board or websites related to the energy saving, water saving, less travel, omit the use of vehicle for short distance, sorting of waste etc. This kind of activities also help in minimizing carbon footprint and is supportive to meet Novia goals. The responses received for the final question regarding the action of Novia towards the carbon neutral also indicate these things. Finally, the respondent agree that they have seen more action on learning, teaching and research followed by reducing waste and carbon emission, less travel and saving electricity. Due to all the above mention result to become a carbon neutral university Novia have to take more and fruitful action on the remaining year otherwise it is really hard to them to reach in their own sets goal.

6 Conclusion

From the survey and available resources, I would like to conclude that Novia is in a good path to reach the goal of carbon neutral university. Not be on a time but currently Novia have set and published their policies and strategy for sustainability and how they are actively participating as a responsible part of society to achieve the UN SDG's goals. In addition, they also allocate the person in charge for sustainability actions and issues, which will help to manage the things and take immediate action inside the organization. This thesis work also conclude that Novia teacher and research staffs is really putting their own effort in integration of sustainability in education, training and RDI despite of the well stated vision of the management in the past few years. If Novia change and implement more policies and action from the management level to their staff to be a competitive in the field of sustainability and minimization of the overall carbon footprint, they will probably meet their goal and become a carbon neutral university by year 2030.

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Appendices

Questionnaire

Survey on Sustainable Development at Novia Technology Department, Vaasa

Please fill in this questionnaire which replicates ARENE's survey in a number of universities of applied sciences. It provides us with valuable information as a basis for further development of the organization in line with Novia's new strategy. The survey is done as a thesis by student Tek Gautam at Industrial Management and Engineering. The matrixes are all in Swedish due to practical/technical reasons.

1

Mention your role or position at NOVIA

- ○ I teach maths and/or science
- ○ I teach vocational subjects
- ○ I work in R&D
- ○ I work in administration

2

Mention your age group

- ○ Under 40
- ○ 40-49
- ○ 50-59
- ○ 60 or above

3

Choose the maturity level of sustainability that you think best describes the current situation in the EDUCATION and TRAINING at Novia Technology Department, Vaasa.

1. Påbörjad	2. Under utveckling	3. Delvis styrd	4. Omfattande	5. Strategisk
I yrkeshögskolans verksamhetskultur har vi ännu inte tagit några omfattande steg mot hur vi kan beakta hållbar utveckling i läroplanerna och i utbildningsutbudet för kvalificerad lärande. De styrande principerna och riktlinjerna är bristfälliga. Hållbar utveckling integreras inte i Novia strategier eller i ansvarsområden för verksamheten. Att kunna förespråka inom med hållbarhet relaterade verksamheten identifierar vi som en möjlighet, men inte som ett mål. Vi är medvetna om behovet av kompetens inom hållbar utveckling i vasaregina, men att systematiskt inkludera den i undervisningen är bara i början.	Att inkludera hållbar utveckling i utbildningen över vi som en del av yrkeshögskolans verksamhetskultur, men det erbjuds inte tillräckligt med pedagogiskt stöd för att genomföra den och en-skilda ämnen möter inte i verksamheten som helhet. Vi har tagit tydliga steg för att integrera hållbar utveckling i undervisningen, men vi upp-muntrar det inte syn-ligt. Vi kan se hållbarheten i strategin men inte som ett grundläggande värde, och det finns inte tillräckligt med an-visningar för att beakta hållbar utveckling i under-visningen eller så har man endast delvis börjat utarbeta dem.	Yrkeshögskolan har ut-sett en ansvarsperson för att utveckla peda-gogiken för hållbar ut-veckling eller för håll-bart lärsplansarbete. Att informera om ut-bildningar i hållbar ut-veckling är en del av yr-keshögskolans kom-munikation. Vi utarbetar och ut-vecklar lärsplanser-betet och program-matrisritderjarna för hållbar utveckling, men vi har inte skapat nå-gon heltäckande väg-karta för åtgärderna. Yrkeshögskolan har vidtagit åtgärder för pedagogiken för håll-bar utveckling och ar-betet med lärsplanen. Det är dock inte ännu en central del av yrkes-högskolans verksam-hetsgrundsatser och an-visningarna är bristfäl-liga. Vi har ändå inlett utvecklingsåtgärderna och de grunder sig i huvudsak på de befint-liga anvisningarna eller verksamhetsprinci-perna, i enlighet med målen för yrkeshög-skolornas program för hållbar och ansvarsfull verksamhet.	Yrkeshögskolan fram-skrider aktivt mot ovan-nämna och utbildningar för kontinuerligt lä-rande som främjar håll-bar utveckling. Utbild-ning som främjar håll-bar utveckling är en väsentlig del av dessa strategi och praxis. Vi har tydligt och fäppet lyft fram utbildning som främjar hållbar ut-veckling som en del av yrkeshögskolans verk-samhetskultur. Utbild-ning som främjar håll-bar utveckling är en faktor som styr part-nerskapens utveckling. Vi möter och utvärder-rar regelbundet åtgär-derna inom utbild-ningen som främjar hållbar utveckling och resultaten används vi också proaktivt för att utveckla verksam-heten. Vi tar aktivt tag i bristerna och beaktar forskningen och den ökade kunskapen om hållbar utveckling i verksamheten.	Vi har erkänt utbildning som främjar hållbar ut-veckling som en del av yrkeshögskolans verk-samhetskultur, värde-ringar och attityder och i synnerhet arbetet med de studerande. Yrkeshögskolan stöder arbete som främjar hållbar utveckling i sina partners verksamhet, tar tag i missförhållan-den och uppmuntrar offentligt till att främja hållbar utveckling i samhället. Utbildning som främjar hållbar utveckling är en av yrkeshögskolans kärnområden och en vik-tig del av strategin. Vi har nödvändigtvis inte uppnått alla mål i yrkeshögskolornas program för hållbar och ansvarsfull verk-samhet, men för att uppnå dem har vi utar-betat en vägkarta eller vägkartor som perso-nalen och de stu-derande känner till. Att mäta och utvärdera utbildning som främjar hållbar utveckling är en del av yrkeshögskolans normala verksamhet och yrkeshögskolan använder och granskar resultaten regelbundet på ett heltäckande sätt.

- ○ Starting
- ○ Progressing
- ○ Controlled
- ○ Advanced
- ○ Strategic

4

Comment or briefly justify your choice in the previous question

5

Choose the maturity level of sustainability that you think best describes the current state of RDI activities at Novia Technology Department, Vaasa.

1. Påbörjad	2. Under utveckling	3. Delvis styrd	4. Omfattande	5. Strategisk
I Fcch-verksamheten beaktar vi hållbar ut-veckling men det är inte ett centralt krite-rium för verksam-heten. De styrande princi-perna och riktlinjerna är bristfälliga. Hållbar utveckling in-går inte i Fcch-strate-gin eller i anvisning-arna för verksam-heten. Att kunna förespråka inom med hållbarhet relaterade verksam-heten identifierar vi som en möjlighet, men inte som ett mål.	Hållbar utveckling är en del av målen för yr-keshögskolans Fcch-verksamhet, men det finns inte tillräckligt med anvisningar eller anvis-ningar för att genom-föra den. Vi förstår Fcch-verk-samheten som en möjlighet att åstad-komma hållbarhets-lösningar, men hållbar utveckling ingår inte i kriterierna för att Fcch-verksamheten. Vi bedömer inte Fcch-projekt-ens inverkan på hållbarhet som en del av projektprocessen.	Vi beaktar hållbar ut-veckling när vi planer-ar Fcch-verksam-heten och den är en del av anvisningarna för projektprocessen. Yrkeshögskolans Fcch-strategi eller andra anvisningar be-aktar hållbar utveck-ling som mål för Fcch-verksamheten. Beak-tandet av hållbar ut-veckling är dock på en allmän nivå. Yrkeshögskolan har projekt som främjar hållbar utveckling, men har inte fastställt några utvärderande kriterier til ex. part-nernas engagemang i hållbar utveckling el-ler uppföljningsmetoder för hållbarhet). Kommunikation om hållbarhet är en del av projektkommunikat-ionen.	När vi planerar, ge-nomför, och delar Fcch-verksamhetens resultat följer vi prin-cipierna och målen i vår strategi för hållbar och ansvarsfull verksamhet. I de strategiska och operativa målen för Fcch-verksamheten beaktar vi perspekti-ven för hållbar ut-veckling. Till kriteri-erna för att bli god-kända som projekt hör en bedöm-ning av projektets hållbarhet. Yrkeshögskolan iden-tifierar för Fcch-pro-jektens del vilka av FN:s kriterier för håll-bar utveckling (SDG) som projektet från-går och projektets resultat/plan syftar vi-dare till. I Fcch-projektens upphandlingar beak-tar och utvärderar vi hållbarheten. Yrkeshögskolan har en person som ansva-rar för hållbarhet och ansvarsfullhet och som är med och pla-nerar och utvärderar Fcch-projekten enligt fyrennivåmo-dellen.	Utgångspunkterna för hållbar utveckling är ett villkor för Fcch-verksamheten och genomförandet av projekten. Vi strävar att alla projekt främjar fler än ett av FN:s kriterier för håll-bar utveckling (SDG). Hållbar utveckling är en obligatorisk del av Fcch-verksamhetens strategiska principer och vi bildar, följer upp och utvärderar systematiskt verk-samheten i enlighet med hållbar utveckl-ing. Att främja hållbar ut-veckling är en del av utgångspunkterna för projektplaneringen och yrkeshögskolans omgivande kommu-nikation. I Fcch-projektens upphandlingar är håll-barhet ett av de pri-mära kriterierna och vi förutsätter att partnerna följer prin-cipierna för hållbarhet och ansvarsfullhet. Vi granskar regelbun-det kriterierna för hållbarhet som yrkes-högskolan fastställt för Fcch-verksam-heten. Varje projekt främjar åtminstone en element inom håll-bar utveckling, ekolo-gisk, ekonomisk, socialt eller kulturell och beaktar alla dessa i sin verksam-het.

- ○ Starting
- ○ Progressing
- ○ Controlled
- ○ Advanced
- ○ Strategic

6

Mention your justification regarding the maturity level selection of RDI

7

Choose the maturity level of sustainability that you think best describes the current situation regarding MANAGEMENT and COMPETENT PERSONNEL at Novia Technology Department, Vaasa.

1. Påbörjad	2. Under utveckling	3. Delvis styrd	4. Omfattande	5. Strategisk
I yrkeshögskolans verksamhetskultur har vi ännu inte tagit några steg mot att beakta hållbar utveckling i ledningen, rekryteringen av personal och i deras kompetens. De styrande principerna och riktlinjerna är bristfälliga. Hållbar utveckling ingår inte i personalens inskolning, årsgranskningar för personalutveckling eller utvecklingssamtalen. Yrkeshögskolan har verksamhetsmodeller för att beakta hållbar utveckling i personalens kunnande, men iakttagandet av dem sker punktvis. Vi är medvetna om betydelsen av personalens kompetens i hållbar utveckling, men främjandet av den har bara börjat.	Vi tar hållbar utveckling som en del av yrkeshögskolans ledning och personalens kompetens, men det finns inte tillräckligt med stöd för att genomföra den och enskilda åtgärder möter inte verksamheten som helhet. För att beakta hållbar utveckling har vi tagit klara steg i att utbilda och utveckla personalen, men vi uppmuntrar inte synligt hållbar utveckling och den är inte en del av personalens utvecklingssamtal. Man kan se hållbarheten i strategin, men inte som ett grundvärde, och det finns inte tillräckliga anvisningar för att beakta hållbar utveckling i personalens verksamhet eller ledning, eller så har man endast delvis påbörjat utarbetandet av dessa.	Yrkeshögskolan har utsett en eller flera ansvarspersoner för hållbar utveckling som nu är en del av yrkeshögskolans personaladministration och ledning. Ledningen stöder utarbetandet och genomförandet av strategin/programmet för hållbar utveckling, men för åtgärderna finns ingen heltäckande vägkarta för ledningen och personalens utveckling. Yrkeshögskolan har vidtagit åtgärder till hållbar utveckling, men de är ännu inte en central del av verksamhetsprinciperna för att utveckla och leda yrkeshögskolans personal, och anvisningarna är inte till alla delar tillräckliga. Vi har dock inlett utvecklingsåtgärderna även inom personaladministrationen och ledningen, och de grundar sig i stora drag på befintliga verksamhetsprinciper i enlighet med målen i Arenes program för hållbar och ansvarsfull verksamhet.	Yrkeshögskolan framskrider målmedvetet mot principerna och målen för Arenes program för hållbar och ansvarsfull verksamhet i ledningen, personalens kompetens och utvecklingen av den. Hållbar utveckling är en väsentlig del av praxis för ledningen och personalutvecklingen. Vi har tydligt lyft fram hållbar utveckling som en del av kompetensmålen för yrkeshögskolans personal. Vi uppmuntrar personalen att utveckla sin kompetens inom hållbar utveckling bland annat genom att erbjuda utbildning. Vi följer upp utvecklingen av personalens kompetens för hållbar utveckling. Vi mäter och utvärderar åtgärdema regelbundet och resultaten används för att utveckla verksamheten.	Vi har erkänt hållbar utveckling som en del av yrkeshögskolans verksamhetskultur, ledarskap, värderingar, attityder och samhällsmiljö genomslag. Målen för hållbar utveckling styr hela samfundets verksamhet med betoning på tvärvetenskaplig och mångprofessionellt samarbete samt forskningsbaserad verksamhet. Vi har integrerat uppföljningen, utvärderingen och utvecklingen av personalens kompetens för hållbar utveckling i kvalitetssystemet. Hållbar utveckling ingår i hela personalens inskolning, kompetensutveckling och utvecklingssamtal. Vi informerar tydligt om detta både inom och utanför den egna organisationen. Yrkeshögskolans ledning och personal främjar hållbar utveckling tillsammans med sina partners, tar tag i missförhållanden och uppmuntrar offentligt till hållbar utveckling i samhället.

- ◯ Starting
- ◯ Progressing
- ◯ Controlled
- ◯ Advanced
- ◯ Strategic

8

Briefly comment or justify your answer to the question related to management and competent Personnel

9

Please select the maturity level of sustainability that you think best describes the current situation regarding CARBON FOOTPRINT at Novia Technology department, Vaasa.

1. Påbörjad	2. Under utveckling	3. Delvis styrd	4. Omfattande	5. Strategisk
Vi har ännu inte genomfört beräkningen eller förbundit oss till Arenes mål för koldioxidneutralitet år 2030. Vi funderar dock på att inleda arbetet.	Yrkeshögskolan har genom Arenes program förbundit sig till den gemensamma målet för koldioxidneutralitet år 2030. Vi har årligen beräknat koldioxidavtrycket enligt Arenes beräkningsmodell.	Vi har förbundit oss till målet om koldioxidneutralitet från till 2030 och vi kan i strategin se en minskning av koldioxidavtrycket. Vi har planerat och genomfört åtgärder för att minska utsläppen. Yrkeshögskolan har en representant i Arenes arbetsgrupp för att beräkna koldioxidavtryck som informerar om arbetsgruppens verksamhet vid den egna yrkeshögskolan.	Yrkeshögskolans mål för att uppnå koldioxidneutralitet är inkluderar än år 2030. Yrkeshögskolan har fått en egen vägkarta för koldioxidavtryck där vi fastställt kvantitativa mål för att minska utsläpp. Vi har valtagit flera åtgärder för att minska utsläppen. Yrkeshögskolan har en eller flera ansvarspersoner för att samordna beräkningen av koldioxidavtrycket och för att främja åtgärderna. Beräkningen är mer omfattande än vad Arenes beräkningsmodell förutsätter (t.ex. investeringar, hemresor och/eller lunchmåltider inkluderade). Beräkningen har automatiserats (t.ex. Upphandlingsguidtjänsten, Visma Suotion) Vi har planerat beräkningen av koldioxidavtryck.	Yrkeshögskolan är koldioxidneutral senast år 2025. Vi har systematiskt genomfört åtgärder för att minska utsläppen i olika kategorier och yrkeshögskolans strategi styr åtgärderna för att minska utsläppen. Vi har planerat och genomfört metoder för kompensering. (Även koldioxidobligation) för att uppnå koldioxidneutralitet med beaktande av villkoren för statlig finansiering. Vi har automatiserat beräkningen av koldioxidavtryck och uppgifterna är en del av yrkeshögskolans kvalitetssystem. Koldioxidavtrycket har beräknats. Hela yrkeshögskolans organisation känner till målen för koldioxidneutralitet och arbetar aktivt för att uppnå dem.

- ◯ Starting
- ◯ Progressing
- ◯ Controlled
- ◯ Advanced
- ◯ Strategic

10

Comment or briefly justify your above choice related to carbon footprint

11

Do you know what level of maturity Novia is aiming for in terms of sustainable development?

- ◯ Yes
- ◯ No
- ◯ Unsure

12

What concrete measures have been taken in your unit to achieve the Sustainability Development goals (SDGs)? (free text)

13

Do you have suggestions for concrete actions that could be taken in your unit to achieve the SDGs? (free text)

14

How important do you think it is to emphasize sustainability in your own teaching?

Not relevant ☆ ☆ ☆ ☆ ☆ Very Important

15

Do you think you manage to highlight sustainability in a functional way in your own teaching or activities?

No not at all ☆ ☆ ☆ ☆ ☆ Yes really good

16

What steps NOVIA had implemented or planning to implement to became the Carbon Neutral University of Applied Science (Select as much as option or mention more in other section)

- [ ] Reducing waste and carbon emissions
- [ ] Integrating sustainability into learning, teaching and research
- [ ] Providing sustainability related learning opportunities, incentives and rewards for staff
- [ ] Creating partnerships with the local community
- [ ] providing options for sustainable travel
- [ ] using water efficiently
- [ ] saving electricity
- [ ] adhering to environmental building standards
- [ ] offering enough vegetarian options at food outlets
- [ ] considering sustainability performance of suppliers buying sustainable goods and services
- [ ] Other