Mapping SustainAble and Greentech soLutions for enhancing best Practices in societal carbon footprint rEduction.

MAPLE

Presents

Best Practices: Green Tech Solutions

In collaboration with:

AFRIDAT Research & Innovation

Life Learning Development e.V.

Mine Vaganti NGO

Osengo Propulsez vos compétences by Aformac

Co-funded by the European Union

About

Project Maple is a comprehensive initiative that seeks to reinforce the commitment towards achieving a net-zero society and increasing awareness of climate change. With greenhouse gas concentrations reaching unprecedented levels and global temperatures on the rise, the United Nations IPCC has emphasised the urgent need for a stronger global response. The European Union has set ambitious targets of reducing greenhouse gas emissions by 55% by 2030 and attaining climate neutrality by 2050. Building upon the success of previous Erasmus+ projects like SLATE and N-ZERO, Project Maple aims to leverage social learning opportunities, workshops, handbooks, and advocacy to promote green technologies, sustainable solutions, and eco-friendly practices. By mapping partner countries' best practices on green tech and representing them on an e-blog, the project intends to disseminate knowledge and encourage the adoption of environmentally friendly approaches. Recognizing the importance of engaging young people, adults, small business owners, and workers across Europe, Project Maple aims to address the lack of attention and experience in green issues, ultimately supporting the continent's transition towards a carbon-neutral society.

Objectives

Sharing best practices amongst European countries & collating new trends available from the provider of sustainable and Greentech solutions across different regions of the participating countries.

To map out 10 green technological solutions per participating country that combat climate change through an open-source interactive blog. The platform shall provide insights for policymakers, academia, employers, training providers, and government on best practices available across EU partner countries in the project MAPLE.

Using the interactive blog to raise environmental awareness on green solutions across partner countries.

Co-funded by the European Union

Pic Reference: https://commons.wikimedia.org/wiki/File:Map_Germany_L%C3%A4nder-de.s

Green Technological Solution Best Practices in Germany

Co-funded by
the European Union

BEST PRACTICE 1:
E-Bus Berlin
International Showcase Program for E-mobility
Acronym: E-Bus Berlin
Where: Berlin, Germany When : Oct 2015-Oct 2018

At the ebus citizens' forum on July 9th, 2015 (© MPM)
(Ref : http://www.e-bus.berlin/galerie/)

E-bus citizen forum on July 9th, 2015 (© MPM)
(Ref : http://www.e-bus.berlin/galerie/)

E-Bus Berlin carries nearly two-thirds of a billion people annually using electric traction on its underground trams. Berlin now introduced itself as the First Capital City with a Wirelessly-Charged E-bus Line- a 100%. The largest public transportation provider in Germany has been using electric vehicles since August 2015. Four Solaris Urbino 12 electrics are now used solely on Line 204 between Südkreuz and Zoologischer Garten (Hertzallee). The environmental performance of the city will be greatly enhanced by the addition of four new wirelessly fueled e-buses. In addition to being emission-free, these vehicles also create little vibration and noise, which is advantageous to both passengers and nearby residents as well as the environment.

Some of the challenges faced were:

- High CO2 emission
- Diesel buses emit harmful pollutants
- Diesel buses require fueling infrastructure, which may not be as widely available

The sectors that were impacted by the economy are the public sector and the transportation sector. The best practice e-bus in Berlin likely refers to the use of electric buses as a sustainable transportation solution in the city of Berlin.

Co-funded by the European Union

Electric buses are a sustainable alternative to traditional diesel buses because they produce zero emissions while in operation, reducing air pollution and greenhouse gas emissions. They are also generally quieter and require less maintenance than diesel buses.

The use of electric buses can contribute to the achievement of environmental sustainability goals related to air quality and climate change mitigation.

The sustainable development goals that were addressed

Four Urbino 12 electric cars from the Polish manufacturer Solaris make up the e-bus fleet. The battery recharge system is made by Bombardier Transportation, just like the on-road charging infrastructure and the electric drive technology is made by Düsseldorf-based company Vossloh-Kiepe. The greatest distinction from a diesel bus is that the lithium-ion battery provides the power for driving instead of the fuel tank. This is "filled up" with green energy, ensuring that the fleet of e-buses operates with zero CO2 emissions.

The inductive charging technology used in the electric buses at the end of each stop is fully contactless and automatic. The vehicles are typically charged at night in the depot using a plug. If the buses are still connected to the charging station, the heating or cooling will immediately turn on before operation to conserve the batteries.

While implementing the best practice of using e-buses in Berlin, there are potential risks that can be identified. These risks include:

Technical risks: The operation of electric buses requires specific technical expertise and infrastructure. Technical risks may include battery failure, inadequate charging infrastructure, or lack of spare parts.

Financial risks: The high initial cost of purchasing electric buses and installing charging infrastructure can pose financial risks for operators. In addition, electric buses may require higher

Co-funded by the European Union

maintenance costs and replacement of batteries, which can be expensive.

Operational risks: The operation of electric buses may pose operational risks such as route planning, driver training, and maintenance scheduling.

Public perception risks: Due to their newness and unfamiliarity, electric buses may face public perception risks. These risks may include negative public perceptions about electric buses' safety, reliability, or range.

Some of the risk mitigation strategy devised by the project were:

Technical risk mitigation: The PRIMOVE charging system, developed by Bombardier Transportation, enables wireless charging of electric vehicles. Based on inductive power transmission, known as electric toothbrushes or induction cookers, this charging system frees e-buses from the limitations of cables, wires, and plugs. With inductive charging, an electromagnetic field is built up to transfer energy. At the charging stations, the energy is transferred completely contact-free from the charging plate installed invisibly on the floor to the current collector on the underside of the bus.

Operational Risk Mitigation: Opportunity Charging system is being used. The Department of Methods of Product Development and Mechatronics at the TU Berlin has examined various operating concepts with regard to their technical and economic feasibility.

The bus is powered by a 160 kW (218 hp) electric motor. The electric drive has a number of advantages over the diesel engine:

The bus is powered by a 160 kW (218 hp) electric motor. The electric drive has a number of advantages over the diesel engine:

NO EMISSIONS

LOW MAINTENANCE

LESS ENERGY REQUIREMENT

LONG LIFE

Co-funded by the European Union

The battery used in this bus is comparatively small and lighter and can be restored for the subsequent journey with only 4-7 minutes of charge at the end of each stop (the Südkreuz railway station and the Hertz Allee service stop).

The E-bus fleet in Berlin had been able to save the following since August 31, 2015:


The annual output of 261 cars - 161.1 tons of CO_2


5 Kg of fine dust from 131 cars in a year was reduced


61330 Lt of diesel


705 Kg of Nitrogen Oxide

The current situation

Emission-free: Electric buses do not produce any exhaust gases and are significantly quieter than diesel buses.


Efficient: Electric buses use up to 60% less energy than diesel buses.


Wireless: Electric buses are charged inductively -without cables, without overhead lines! People started using this bus then others in the concern of the environment.

The key lessons learnt from this experience are;

- **Infrastructure is essential**
- **Public acceptance is important**
- **Collaboration with manufacturers is key**

Target groups can learn about:

- Electrifying transportation
- Concerned authorities giving more priority to green transportation
- Awareness in micro level

Target groups can implement the practices through :

- Transportation companies inclining towards more green transportation
- Concern authorities from the different areas can learn from this best practice and can implement it in their area too.

Co-funded by the European Union

The best practices of e-buses have been applied in different scenarios around the world. The implementation of e-buses has been successful in many cities and regions, and best practices have been shared and replicated in other areas. For example, many cities have followed the example of Berlin in implementing e-bus fleets and developing the necessary charging infrastructure. Other cities have also adopted best practices in communication and public engagement to ensure public acceptance of e-buses.

Overall, the success of e-buses in various scenarios has led to their growing popularity as a sustainable alternative to traditional diesel buses.

The best practice application in different places:

- London, United Kingdom: London has one of the largest e-bus fleets in Europe, with over 300 e-buses in operation. The city has implemented a similar model to Berlin, with a centralised charging infrastructure and a commitment to transitioning to zero-emission buses by 2037.
- Amsterdam, Netherlands: Amsterdam has also implemented a large-scale e-bus fleet, with over 100 e-buses in operation. The city has focused on developing a network of fast-charging stations to support the e-bus fleet, with charging times of around 15 minutes.
- Shenzhen, China: Shenzhen has one of the largest e-bus fleets in the world, with over 16,000 e-buses in operation. The city has implemented a comprehensive charging infrastructure to support its e-bus fleet.

.

REFERENCE:

- E-Bus Berlin
- ZeEUS eBus Report
- Berlin will be the first capital to run 100% e-bus line with wireless charge | NGV Journal

Co-funded by the European Union

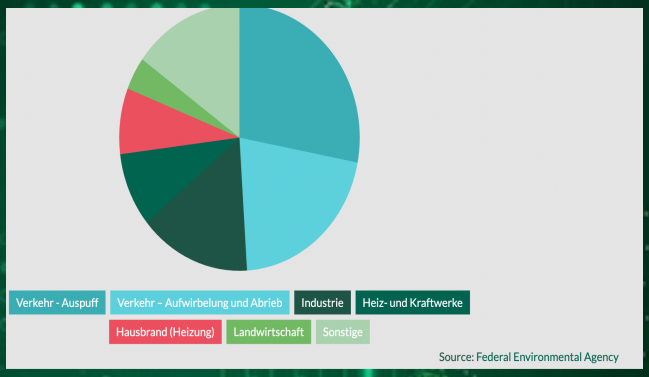
BEST PRACTICE 2:
Green City Solution
Where: Dresden , Germany
When : March 2014

(Pic Reference : https://greencitysolutions.de/en/solution/problem-fine-dust/)

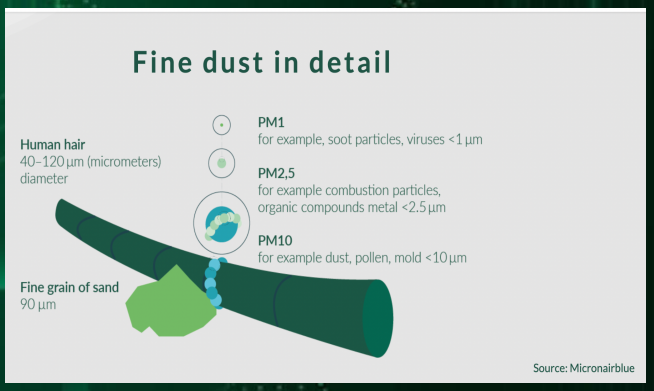
Green city solution has developed the world's first CityTree, which utilises natural moss to grow fresh air. With over half of the global population residing in cities, the deteriorating air quality poses a significant health threat. According to the World Health Organization, more than 91% of city dwellers breathe polluted air, leading to various health problems. Green City Solutions' innovative technology has the potential to impact urban development and sustainability by improving air quality, combating urban heat islands, and promoting urban greening. This can involve collaborations with construction companies, real estate developers, city planners, and public authorities. The technology also holds implications for the energy sector and the integration of sensors and data collection in the Internet of Things industry.

Co-funded by
the European Union

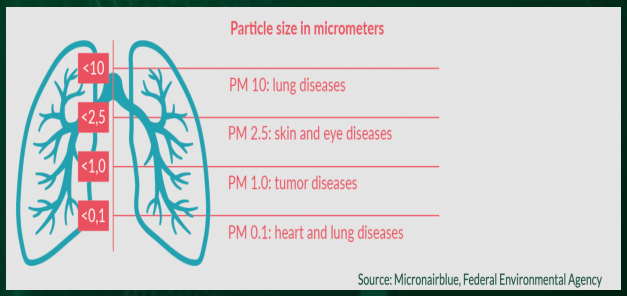
Previous Challenges



(Pic Reference : https://greencitysolutions.de/en/solution/problem-fine-dust/)



(Pic Reference : https://greencitysolutions.de/en/solution/problem-fine-dust/)



(Pic Reference : https://greencitysolutions.de/en/solution/problem-fine-dust/)

Best Practice Introduced

To address this issue, green city solutions have developed innovative regenerative bio-tech filters that can significantly improve air quality. Their goal is to ensure that fresh and clean air is accessible to all urban residents, making it a healthier place to live. Green City Solutions, aims to address this problem by developing the world's first bio-tech filter that can significantly improve air quality in a measurable way, promoting sustainable and healthy urban development.

Co-funded by
the European Union

MAPLE

Green City Solutions refer to several environmental sustainability factors, including air pollution reduction, combating urban heat islands, and promoting urban greening. Their main focus is on improving air quality in urban areas, which has a significant impact on human health and the environment.

Green City Solutions addresses several of the United Nations' Sustainable Development Goals (SDGs)

Green City Solutions can impact several sectors of the economy.

Construction and real estate: The use of green infrastructure such as CityTrees and moss walls can increase the value of real estate properties, attract tenants, and reduce energy costs.

Technology: Green City Solutions combines natural moss with IoT technology to create sustainable solutions for air purification and cooling. This can impact the technology sector by promoting the development and use of IoT sensors and data analytics in environmental sustainability.

Health: Air pollution can have negative impacts on human health, and Green City Solutions' air purification systems can help reduce the levels of harmful pollutants. This can have a positive impact on the healthcare sector by reducing the number of people affected by air pollution-related illnesses.

Tourism and hospitality: Moss walls and green roofs can enhance the aesthetic appeal of buildings and attract tourists. This can have a positive impact on the tourism and hospitality sector.

Co-funded by the European Union

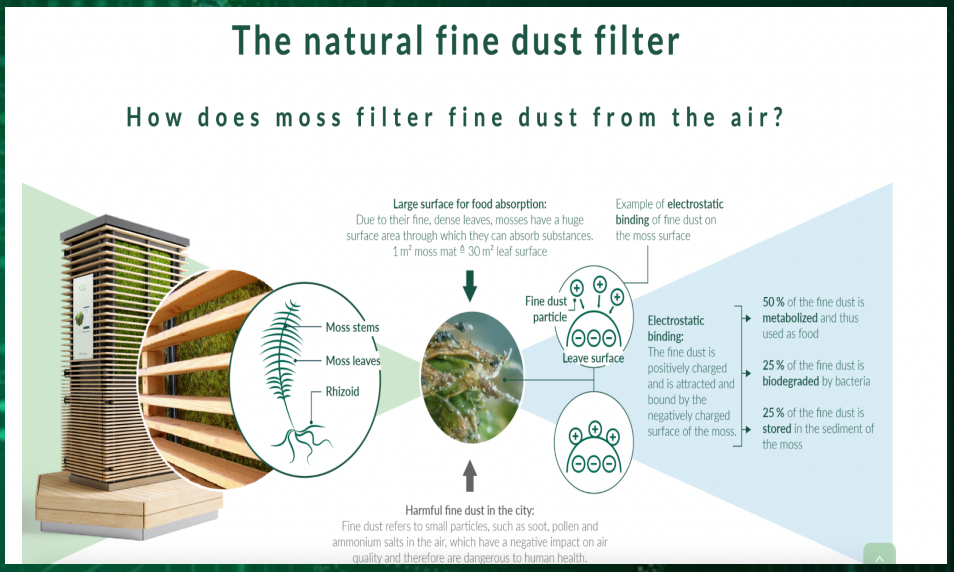
Process Implemented

Cultivation of the sustainable resource: Moss has the remarkable ability to absorb and retain up to 20 times its weight in water, which it can then evaporate. When combined with our active ventilation system, this process can reduce ambient temperatures by up to 4 degrees Celsius, equivalent to a cooling capacity of up to 6,500 watts. This cooling ability is especially useful in addressing the issue of urban heat islands, which are becoming a more significant threat to people and the environment as climate change progresses. In addition to the positive impact on the urban climate, the presence of moss and other greenery can also have a positive effect on mental health by providing fresher air and the pleasant scent of the forest.

After extensive research and development, green city solution was able to identify the ideal moss species out of 16,000 and have established their own moss farm where they grow them using a vertical cultivation method. This innovative approach not only allows them to optimise space usage, but it also enables us to cultivate over 1200m^2 of moss using only a 300m^2 footprint.

Green city solution developed a system that combines the innate abilities of moss with the latest technology in Internet Of Things (IoT) sensors, active ventilation, and irrigation. This system not only enables mosses to thrive outside of their natural habitat but also optimises their ability to cool and filter the surrounding environment. The built-in IoT sensors generate large amounts of real-time data, which are made available through a specialised online dashboard. This data provides detailed information about the environmental performance and condition of the bio-filters, as well as the surrounding air quality. This allows us to accurately and quantitatively measure the environmental performance of a single or multiple bio-filters, providing proof of their effectiveness.

Co-funded by
the European Union



(Pic Reference : https://greencitysolutions.de/en/solution/problem-fine-dust/)

Some of the potential risk identified while implementing the practice with its mitigation strategy are :

1. Technical Risks: There is a risk of technical failure in the IoT sensors and ventilation system, which could lead to poor air filtration and cooling. To mitigate this risk, regular maintenance and testing of the systems must be carried out.
2. Environmental Risks: There is a risk of the moss dying due to adverse environmental conditions or pollution. To mitigate this risk, the mosses must be regularly monitored and their environment must be kept clean.
3. Health Risks: There is a risk of the project not achieving its health benefits due to poor air quality. To mitigate this risk, the air quality must be regularly monitored, and the system must be adjusted if necessary.
4. Financial Risks: There is a risk of the project not achieving its financial goals or going over budget. To mitigate this risk, a comprehensive financial plan must be developed, and regular financial monitoring and reporting must be carried out.

Co-funded by
the European Union

The outcome can be observed in the **Leipziger Allee Center,**

(Pic Ref: https://invidis.de/2022/08/green-city-leipziger-mall-mit-city-breeze/)

A popular and well-frequented mall located in the Grünau district of Leipzig, now boasts a new technology that benefits thousands of daily visitors by improving the air quality. This technology consists of four CityBreeze information columns that feature a large outdoor screen and an air filter based on natural moss. The ambient air is drawn in from the sides and passed through mats of living and high-performance moss, which are visible at the back of the columns. The moss has the ability to eliminate harmful fine dust particles from the air and even metabolise them, while also cooling the air by a few degrees through its evaporative power. This additional cooling effect is especially beneficial during increasingly hot days, creating refreshing air oases around the information columns.

Co-funded by
the European Union

Telekom's Smart City Unit

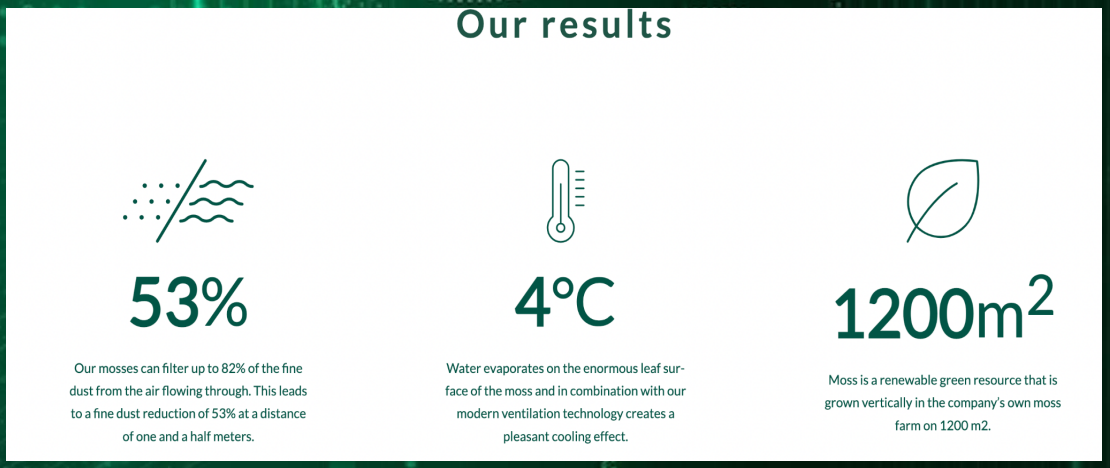
(Pic Ref: https://greencitysolutions.de/en/telekom-hq/)

Telekom's Smart City Unit is located at the company's headquarters in Bonn, where a **CityTree** has been installed to provide greenery, clean the air, and offer connectivity points for Smart City solutions. The CityTree uses living moss and Internet of Things technology to cool and purify the air, and it can also function as a WiFi hotspot or an electric charging station. A customised dashboard monitors the moss's health and regulates its supply, while collecting environmental and air quality data that can be accessed in real-time via a smartphone, computer, or the CityTree's screen.

The implementation of the green city solution has led to significant positive changes in the urban environment. The use of natural moss bio-filters has helped to reduce air pollution levels by filtering harmful pollutants such as fine dust particles. Additionally, the evaporative power of the moss has helped to cool the surrounding air, thereby mitigating the impact of urban heat islands.
The use of Internet of Things (IoT) sensors and real-time data analysis has also provided insights into the environmental performance and

Co-funded by
the European Union

condition of the bio-filters. This information can be used to make adjustments and improvements to the system to ensure optimal performance.By addressing air pollution and urban heat islands, the green city solution has improved the quality of life for residents and visitors alike. The use of natural and sustainable materials has also contributed to a more eco-friendly and sustainable urban environment.



(Pic Reference : https://greencitysolutions.de/en/solution/problem-fine-dust/)

Here are some key lessons learned from green city solutions:

1. **Collaboration is key**: The success of green city solutions depends on the collaboration of different stakeholders such as governments, private sector, and citizens. Collaboration ensures that everyone is involved in the decision-making process, and the solutions implemented are sustainable and effective.
2. **Technology plays a crucial role**: Technology has a significant impact on green city solutions, as it can be used to monitor, measure and optimize the effectiveness of the solutions implemented. The use of IoT sensors and real-time data analysis can help identify problem areas and improve the effectiveness of green city solutions.
3. **Customization is important**: Different cities have different challenges and requirements, which means that green city solutions need to be customised based on the specific needs of each city. This requires a deep understanding of the local context and collaboration with local stakeholders.
4. **Education and awareness are crucial**: Education and awareness programs are crucial to the success of green city solutions. Citizens need to be educated about the importance of environmental

Co-funded by
the European Union

sustainability and their role in achieving it. This can help to create a culture of sustainability, where citizens are more likely to support and participate in green city solutions.

5. **Monitoring and evaluation are essential**: Continuous monitoring and evaluation of green city solutions are essential to measure their effectiveness and identify areas for improvement. This requires the use of metrics and data analysis to track progress and adjust strategies accordingly.

The best practice of moss has been applied in several countries. The CityTree, which is a free-standing green air filter using moss, has been implemented in various cities around the world, including Berlin, Paris, Oslo, Amsterdam, and Hong Kong. The CityTree is designed to remove air pollution, reduce noise levels, and cool urban areas, making it an effective solution to combat the negative effects of climate change and urbanisation. The moss used in the CityTree can capture and metabolise pollutants, making it an eco-friendly and sustainable solution. Additionally, the CityTree is equipped with Internet-of-Things (IoT) technology, providing real-time data on air quality and performance, which can be used to monitor and optimise the system.

The CityTree has been used in the Amsterdam Zuidas district. In 2019, two CityTrees were installed on the Mahlerplein square, which is a busy area with many offices and businesses. The CityTrees were installed to help improve the air quality and provide a green space for the people in the area. The CityTrees are equipped with sensors that monitor the air quality, soil moisture, and other environmental factors, and the data collected is used to optimize the performance of the green infrastructure.

REFERENCE:

- https://greencitysolutions.de/en/
- https://www.eea.europa.eu/de/highlights/die-bekaempfung-von-umweltverschmutzung-und
- https://www.who.int/health-topics/air-pollution#tab=tab_1

Co-funded by the European Union

BEST PRACTICE 3:

Environmental Action Germany (DUH)

Where: Berlin , Germany

When : 2022

Partners: Environmental Bureau (EBB), GIZ, Horizon 2020

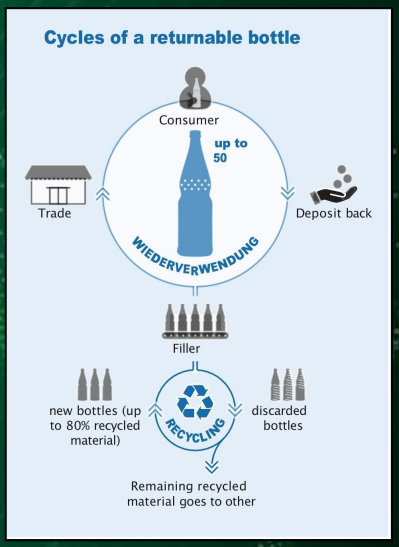
Environmental Action Germany is

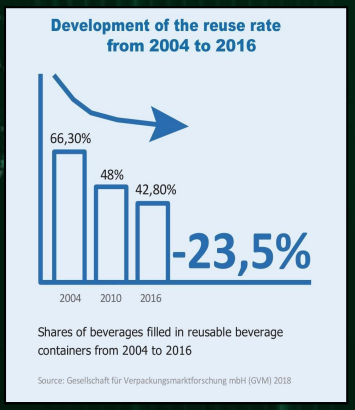
dedicated to promoting reusable packaging as the standard to combat the growing issue of waste generated by single-use items such as burger boxes, plastic cups, and disposable cutlery. Unfortunately, citizens often do not have the option to choose climate-friendly reusable alternatives when visiting events or restaurants. To address this, DUH's project "Reusable. Join us!" aims to inspire catering businesses, municipalities, and the events industry to reduce their carbon footprint by adopting reusable systems for to-go cups, bowls, and boxes. By switching to reusables, Germany could potentially save around 800,000 tons of CO2 annually compared to single-use products. Reusable packaging is a significant climate protector as it can be used repeatedly, resulting in an 84 percent reduction in CO2 emissions when compared to disposable items like aluminium bowls with cardboard lids. DUH provides valuable information on the climate impact of disposable versus reusable products and offers practical tips for the transition to reusable options.

With the project “Reusable. Join us!” THEY motivate catering businesses, municipalities, and the events industry to reduce their carbon footprint by using to-go reusable systems for cups, bowls, and boxes. We explain the climate impact of disposable and reusable products for takeaway consumption and give practical tips for switching to reusable.

Co-funded by
the European Union

Previous Challenges





Sustainable Development Goals (SDGs) that the project addressed

A key factor in the environmental friendliness of refillable bottles is the number of refills, also known as the circulation rate. Returnable glass bottles travel back and forth between the bottlers, the intermediate beverage wholesalers, and the consumers up to 50 times. In the case of refillable PET bottles, The logistics for the returnable bottles are generally coordinated by the beverage wholesaler. The 1,800 bottlers in Germany either market their bottled beverages directly or have them collected, stored, and delivered to retailers by GFGH, depending on the order. After consumers return the bottles and crates, the wholesalers themselves collect the empties, sort them and

Co-funded by the European Union

return them to the bottlers. The bottler also sorts the bottles himself and, if necessary, sells the foreign bottles to bottle dealers or exchanges them directly with other bottlers. The potential risk identified was the Ineffective or irresponsible disposal of used materials e.g plastics, papers, wood, metals, etc. Thus, polluting the environment and posing a public health risk.

The strategy implemented involves collaboration between team members to identify the possible risks and whether the consequences of the identified risks are acceptable.

Reusable is more environmentally friendly than the constant production of new disposable packaging used cups and food boxes once produced several times. Despite the more complex production process, these consume significantly fewer resources over their product life cycle due to frequent refilling, thus protecting the environment and climate. Reusable packaging can also significantly reduce the amount of waste from takeaway packaging

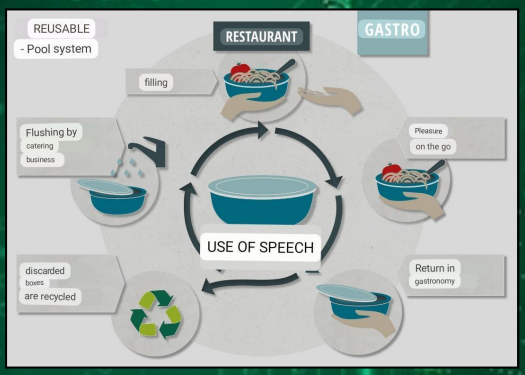
The reusable offer obligation from the Packaging Act provides for the offer of reusable cups and food packaging in the catering trade from 2023.

Outcome

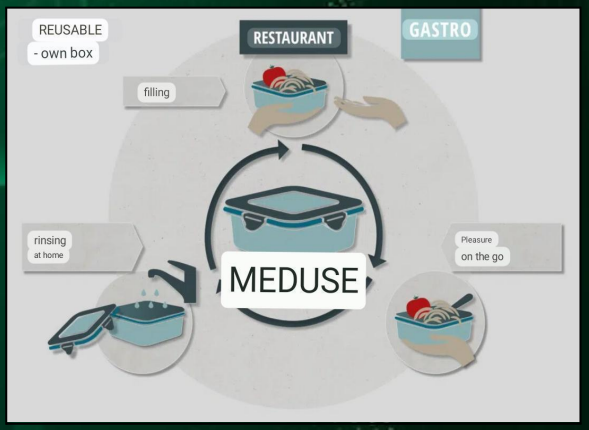
- Reduces the amount of waste sent to landfills and incinerators.
- Conserves natural resources such as timber, water, and minerals.
- Prevents pollution by reducing the need to collect new raw materials.
- Saves energy.
- Reduces greenhouse gas emissions that contribute to global climate change.

Co-funded by
the European Union

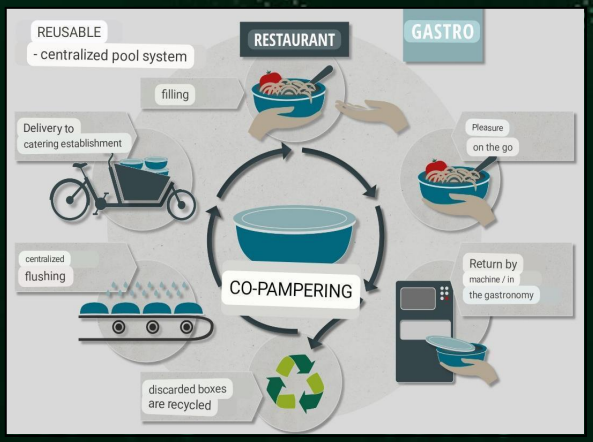
Current Situation



Use of Speech



MEDUSE



CO_PAMPERING

Co-funded by
the European Union

Key Lessons Learned

In pool reusable systems, Small businesses especially in catering establishments use the same packaging, it can be returned to all participating restaurants. There, they are rinsed and can be given to new customers. Rinsing a reusable box in a catering dishwasher uses only 900 millilitres of water and 0.05 kWh of electricity. For comparison: It takes more than five litres of water to produce a single pizza box.

- It avoids landfills and helps in reducing air and water pollution
- Valuable materials like aluminium cans, plastics, and glass are reused in other forms and not wasted.
- It promotes the judicious use of fossil fuels.
- By recycling materials, they create a healthier planet for all and the future generation.
- It reduces the need to extract resources such as timber, water, and minerals for new products (conservation of natural resources).
- It reduces waste and pollution
- It helps energy saving

REFERENCE:

- https://www.duh.de/englisch/

Co-funded by the European Union

BEST PRACTICE 4:
Ecolytiq
Where: Frankfurt, Germany
When : 2018

Ecolytiq is a German company that provides data analytics and risk assessment solutions for the financial sector. The company specialises in using artificial intelligence and machine learning to analyse large amounts of data in order to identify and manage risks related to financial crime, such as money laundering and fraud. Ecolytiq's solutions are designed to help financial institutions comply with regulations and prevent financial crimes. The company is headquartered in Frankfurt, Germany and was founded in 2018 by a team of data science and financial crime experts. They provide banks and financial institutions with the digital infrastructure for green finance. Their Sustainability-as-a-Service® solution enables financial institutions to offer their customers environmental footprinting as well as personalised impact offsetting and ESG investments

Previous Challenges

While Ecolytiq's primary focus is on data analytics and risk assessment solutions for the financial sector, the company's work can also contribute to sustainability efforts in several ways.

- Ecolytiq addresses the need to prevent financial crimes that can have negative impacts on the environment and society. For example, money laundering and fraud can be used to finance illegal activities such as wildlife trafficking or deforestation. By helping financial institutions to identify and manage these risks, Ecolytiq is supporting efforts to promote sustainable practices and protect natural resources.

- Another challenge that Ecolytiq can help address is the need for businesses to measure and report their environmental and social impacts. Ecolytiq's data analytics solutions can be used to collect and analyse data related to a company's sustainability performance, such

Co-funded by the European Union

as carbon emissions or supply chain impacts. This can help businesses to identify areas where they can improve their sustainability practices and report on their progress.

➔ Finally, Ecolytiq can also contribute to sustainability efforts by promoting transparency and accountability in the financial sector. By helping to detect and prevent financial crimes, the company is supporting efforts to create a more ethical and sustainable financial system that benefits both the economy and the environment

Impacted Sector

Banking sector
Banks are required to comply with regulations related to money laundering and other financial crimes, and failure to do so can result in significant fines and reputational damage. Ecolytiq's data analytics and risk assessment solutions can help banks to identify and manage these risks more effectively, potentially reducing the impact of financial crime on the banking sector.

Another sector that can be impacted by Ecolytiq's solutions is the **insurance sector.** Insurance companies are also subject to regulations related to financial crime and are at risk of fraud and other types of financial crime. By providing risk assessment and data analytics solutions, Ecolytiq can help insurance companies to identify and prevent fraud, which can help to reduce the impact of financial crime on the insurance sector.

Co-funded by the European Union

Ecolytiq has implemented several best practices to tackle the challenges related to financial crime and sustainability. Here are a few examples:

1. Use of artificial intelligence and machine learning: Ecolytiq's solutions use advanced technologies such as artificial intelligence and machine learning to analyse large amounts of data and identify patterns that may indicate financial crime or environmental and social impacts. This approach can help financial institutions and businesses to more effectively manage risks and improve their sustainability performance.
2. Collaboration with industry partners and regulatory bodies: Ecolytiq works closely with industry partners and regulatory bodies to understand the latest trends and requirements related to financial crime and sustainability reporting. This allows the company to develop solutions that are tailored to the specific needs of their clients and are in compliance with relevant regulations.
3. Continuous monitoring and improvement: Ecolytiq's solutions are designed to be continuously monitored and improved to ensure they remain effective in addressing the evolving challenges of financial crime and sustainability. The company regularly updates its technologies and processes to stay ahead of emerging risks and best practices.
4. Focus on transparency and ethics: Ecolytiq places a strong emphasis on transparency and ethics in all aspects of its work. The company is committed to ensuring that its solutions are used in a responsible and ethical manner, and it actively promotes transparency and accountability in the financial sector and beyond.

Overall, Ecolytiq's best practices demonstrate a commitment to innovation, collaboration, and ethical behaviour, which are essential for addressing the complex challenges related to financial crime and sustainability.

Co-funded by
the European Union

MAPLE

Ecolytiq's work addresses several Sustainable Development Goals (SDGs) established by the United Nations:

Ecolytiq's solutions help to prevent financial crimes such as money laundering and fraud, which contribute to instability and weaken institutions. By promoting transparency and accountability in the financial sector, Ecolytiq supports efforts to build strong institutions and promote sustainable development.

Ecolytiq's solutions can help businesses to measure and report their environmental and social impacts, which can promote sustainable practices and contribute to economic growth. Additionally, by helping financial institutions to manage risks related to financial crime, Ecolytiq supports the stability and growth of the financial sector.

Ecolytiq's solutions can help businesses to identify areas where they can reduce their environmental impacts, such as by reducing waste or improving supply chain sustainability. This contributes to the goal of promoting responsible consumption and production.

Ecolytiq's solutions can be used to measure and report on greenhouse gas emissions and other environmental impacts, which can help businesses to identify areas where they can reduce their carbon footprint and contribute to climate action.

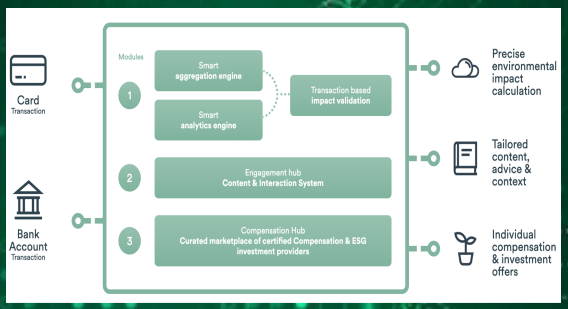
Co-funded by the European Union

When implementing its best practices to address the challenges related to financial crime and sustainability, Ecolytiq likely identified several potential risks and developed risk mitigation strategies to address them. Some examples of potential risks and mitigation strategies are:

Potential Risk	Mitigation Strategies
Data privacy and security risks	To mitigate data privacy and security risks, Ecolytiq likely employs strong encryption and security protocols to protect data, as well as strict access controls to ensure that only authorised personnel have access to sensitive information
Bias and discrimination risks	The use of artificial intelligence and machine learning algorithms in Ecolytiq's solutions could potentially lead to biased or discriminatory outcomes, particularly if the data used to train these algorithms is itself biased. To mitigate these risks, Ecolytiq likely employs rigorous testing and validation procedures to ensure that its algorithms are unbiased and do not discriminate against any particular group.
Implementation risks	Implementing new technologies and processes can be challenging and may require significant changes to existing systems and workflows. To mitigate implementation risks, Ecolytiq likely provides comprehensive training and support to its clients to ensure that they can effectively integrate its solutions into their operations.
Compliance risks	To mitigate compliance risks, Ecolytiq likely works closely with its clients to ensure that its solutions are aligned with relevant regulations and guidelines, and provides ongoing support to help clients stay up to date with changes to these regulations.

Co-funded by the European Union

Current Situation



Pic Reference (https://ecolytiq.com/ecoaware/)

Pic Reference (https://ecolytiq.com/ecoaware/)

Key Lesson Learned

- Financial solution can also be sustainable
- banks can act as agents for climate action using new, green banking products
- Empower customer behavior towards sustainability
- Payment transaction data help fight climate change
- Sustainability-as-a-Service ® is a game-changer in retail banking

Ecolytiq is a global company with operations in multiple countries, including Germany, the United Kingdom, and the United States. Its solutions for financial crime and sustainability are designed to be scalable and adaptable to different markets and regulatory environments, which suggests that the company has experience implementing its best practices in different countries.

REFERENCE:

- https://ecolytiq.com/

Co-funded by the European Union

BEST PRACTICE 5

Carbmee GmbH

Project: ESI Carbon Management Platform

Where: Berlin , Germany When : 2021

Partners: Carbmee Team and Clients

Introduction

The company was founded in 2021. The goal of the organisation is to assist carbon emission-intensive industries in gaining visibility about their emissions. Further to assist them in taking necessary steps to recognise hotspots and reduce emissions from those hotspots.They have realised the impact of Scope 3 emissions on the environment and shifted their focus towards reducing those emissions exhaustively.

They want to provide their contributions in achieving net-zero emission by 2050. Their headquarters is in Berlin, Germany with 2 additional offices in Munich, Germany and New York, USA. They offer carbon management solutions for reducing Scope 3 emissions across the automotive, logistics and manufacturing industries.

Previous Challenges

The manufacturing sector has been experiencing a tremendous challenge in reducing its carbon footprint. Recognising emission hotspots and recognising sustainability practices seems to be an even bigger challenge. Therefore, German manufacturing was responsible for 94.05 million tonnes of CO2e. This amount of emission can prove to be catastrophic for the environment in the long run.

Moreover, Scope 3 emissions are hard to control. Scope 3 emissions are not produced by the company in their day to day operations. However, these emissions are a result of indirect activities that are a part of the company's value chain. These activities can occur up or down the value chain. These emissions have been recognized as the hardest ones to reduce and are responsible for the highest amount of emissions from the manufacturing industry. Some examples of Scope 3 emissions

Co-funded by the European Union

MAPLE

are transportation, purchased goods and services etc.
According to a global survey, many companies have reported that approximately 80% of emissions from their day to day operations fall under the GHG protocol category Scope 3.
For international companies with extensive supply chains it is even harder to record the emission data efficiently due to the use of traditional means. Supply chain emissions are 11.4x impactful as compared to emissions from operations. The amount of these emissions have increased due to an increase in data accuracy and carbon transparency.

Therefore the company faces the following challenges:

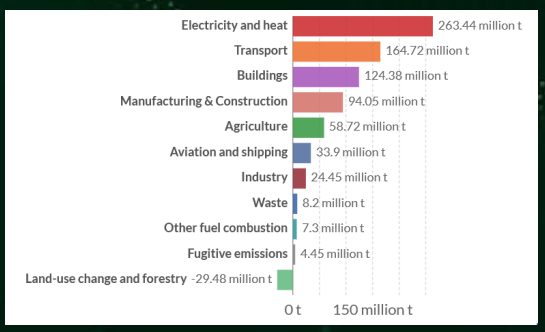
1. Absence of in-house experts.
2. Partially or misinformed about emission reduction techniques.
3. Missing the ability to be transparent about their status on the net zero journey.
4. No knowledge about data necessary for emission evaluation and measurement.

As a result of these challenges.

the manufacturing industry faces the following challenges:

1. Alignment of suppliers and production processes with the company's overall net zero goals.
2. Visibility in recognising indirect emissions as a result of supplier activities.
3. Ability to compare the environmental impact of current and alternative sources of production.

Some Picture describing the previous challenges



Co-funded by the European Union

Best Practices Introduced

The carbmee company has introduced the Environmental Intelligence System for Carbon Management. It is an automated platform that helps the companies in measuring, reducing and reporting their emissions. This platform guides the organisation through their decarbonization journey. It provides the company with tailor made recommendations to boost their sustainable transformation.

The following features makes the platform most efficient:

1. Automation through the net zero journey.
2. Efficient collaboration throughout the supply chain.
3. Focuses on carbon footprint reduction by yielding high return on investment.
4. Built by a team with extensive academic knowledge in the field of net zero emission strategy.

Moreover, the platform offers their clients the opportunity to import their emission data directly into the EIS carbon management platform. This saves a lot of time and produces results in a short span of time with exhaustive details.

The platform offers three modules to the clients to select from based on their emission data

1. Product Carbon Footprint: This focuses on reducing the emissions throughout the product portfolio. It has the ability to pinpoint emission hotspots and evaluate the room for reduction. Calculates carbon footprint of the product and helps carbon and cost savings.
2. Supply Chain Emissions: The companies require a detailed insight regarding the management and reduction potential of emissions from supply chain activities. This platform helps in achieving net zero targets and devise efficient sustainability strategies.
3. Carbon Accounting: This module ensures highly accurate and scalable carbon accounting. The results are provided within days. This module combines data from trusted global databases with precise carbon emission calculation.

Co-funded by
the European Union

MAPLE

Sustainable Development Goals (SDGs) that the project addressed

New Situation

After the establishment of the company. Many companies across industry sectors such as Automotive, Manufacturing and Logistics have collaborated with the green tech solution based company to recognise the emission as a result of their everyday operations. This reporting method brought a much needed transparency regarding the carbon footprint of the company. This enabled them in pinpointing the step or process with maximum emission as well as that have the potential for maximum carbon footprint reduction.

The green tech solution implements the AI based solution that provides the client with guidelines to help reduce the carbon emission from supply chain activities.

By implementing the various modules of the software the client would gain the following benefits:

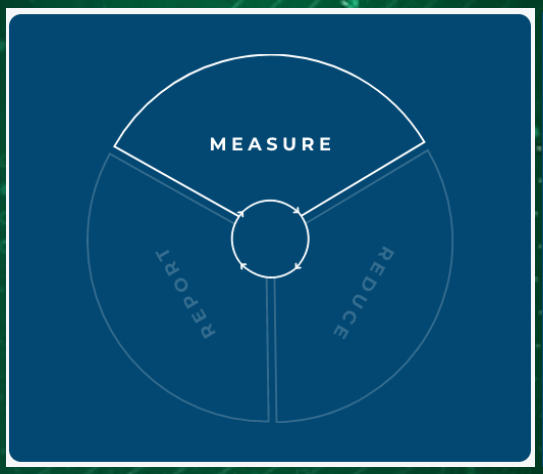
Carbon Accounting:
-60x faster reporting of carbon emissions.
-50% savings on operational costs.

Product Carbon Footprint
-77% savings on operational costs.
-Faster reporting

Supply Chain Emissions
- 75% savings on operational costs.
-80% reduction in carbon footprint.

Co-funded by the European Union

The platform also offers the client the opportunity to reduce their carbon footprint up to 80% by implementing various modules as a part of the EIS Carbon management Software.



Results and Outcomes

After the implementation of the product carbon footprint module, the company was able to reduce their operational costs by 77%. By the fast reporting ability of the platform, years of work was performed within weeks and the report was ready to be presented to the customers. Moreover, the company was able to increase their return on investment 4 times by substituting primary resources with alternative and environmental friendly resources.Various companies from SMEs to multinationals across automotive, manufacturing and logistics sectors have collaborated with Carbmee. With the implementation of the EIS Carbon Management Software, companies have the opportunity to be transparent about their carbon footprint emissions.

Moreover, the company can select one of the modules according to their requirements. The module offers a tailor made strategy for the client to pinpoint the step with maximum emission and the step with maximum potential for carbon footprint reduction. With successful implementation of this platform the client would have the opportunity to reduce their carbon footprint by 80%.More and more companies are collaborating with Carbmee to achieve the goal of net zero emissions in their day to day operations.

Co-funded by
the European Union

Key Lesson Learned

1. How to recognise the step of the supply chain with maximum emission.
2. How to recognise the step of the supply chain with the potential of maximum carbon emission reduction.
3. The implementation of AI to develop carbon footprint emission reduction strategy.
4. The modules offered by the EIS Carbon Management System.
5. The potential to incorporate carbon footprint reduction tricks in day to day operations.

REFERENCE:

1. Ritchie, H., Roser, M., & Rosado, P. (2020, May 11). *Germany: CO2 Country Profile*. Our World in Data. Retrieved February 19, 2023, from https://ourworldindata.org/co2/country/germany
2. *Carbon Management Solution*. carbmee. (n.d.). Retrieved February 19, 2023, from https://www.carbmee.com/solution
3. *Carbon Management Solution: Manufacturing*. carbmee. (n.d.). Retrieved February 19, 2023, from https://www.carbmee.com/solution/manufacturing
4. *Carbmee*. carbmee. (n.d.). Retrieved February 19, 2023, from https://www.carbmee.com/solution/product-carbon-footprint
5. *Carbmee*. carbmee. (n.d.). Retrieved February 20, 2023, from https://www.carbmee.com/solution/supply-chain-emissions
6. *Carbmee*. carbmee. (n.d.). Retrieved February 20, 2023, from https://www.carbmee.com/solution/carbon-accounting

Co-funded by the European Union

MAPLE

BEST PRACTICE 6

Name of the Company: Meetyoo

Title of the Project: Virtual Event Platform

Where: Berlin , Germany

Meetyoo was founded in 1999. Their objective is to revolutionise the event industry by being a key contributor to the transition from physical to either hybrid or virtual events. For this purpose they have created the meetyoo platform. The platform has various features and can help the organisations organise events such as trade shows, career fairs, conferences etc in a completely digitised environment. Their main goal is to inspire and empower businesses to become a part of the digital era by providing digital experiences that connect people from all over the world. Hence they offer innovative, engaging and sustainable solutions to their clients.

Their platform has the capability to sustain 50,000 participants simultaneously. They have organised 5000 virtual events catering to almost a hundred thousand participants. The platform is being implemented by organisations situated across more than 80 Countries.

Previous Challenges

As per Meetyoo Info sheet events such as career fairs, trade shows, conferences etc are responsible for more than 10% of the global Co2 emissions. The activities associated with a 3 day event organised for 100 people emit the following amount of CO_2:

1. Waste per day per attendee: 1.86 Kg including 1.16 kg of landfill.
2. 176.67 Kg of carbon emission per day. Car travel requires up to 1.2 barrels of oil leading to 530 metric tons of CO_2 emissions.

Moreover, every visit to Freiburg University for a 3 day conference leads to an emission of 0.5 to 1.5 tons of CO_2. International Conferences are a beast of their own. They lead to an emission of 2000 tonnes of Greenhouse gases. Out of this 500 - 1500 kg of CO_2 is emitted per conference round trip. This is the equivalent of emission by 270 UK citizens as mentioned by the Plan A report.

Co-funded by the European Union

Best Practice Introduced

Meetyoo has developed a virtual meeting platform. This platform offers various solutions depending on the requirements of the client. These solution various features to the clients:

❖ Meetyoo Pro:

➔ Fully customizable and flexible virtual event venue.

➔ Integrated streaming option for live presentations, Q&A and real time polling.

Virtual exposition halls and interactive booths.

❖ Meetyoo Go:

➔ Realistic virtual event environment.

➔ Efficient and cost effective model.

➔ Ready to edit template.

❖ Meetyoo Show:

➔ Browser based platform.

➔ Suitable for small and big groups.

➔ Interactive features

Co-funded by the European Union

MAPLE

Sustainable Development Goals (SDGs) that the project addressed

New Situation

After the introduction of various solutions offered by Meetyoo. Various companies have been able to execute their events in a virtual space. This has resulted in a complete omission of catering and travel costs associated with events. 500 - 1500 kg of CO_2e was prevented from releasing in the atmosphere. However, energy consumption still remains a big concern. Using electronic devices produces a huge amount of heat. To tackle this issue, the Meetyoo platform hosts their events via the AWS cloud servers which lead to 88% less carbon emissions.

As observed in the L'oreal, SAP and Immoscout24 case studies, we can observe that by organising the event virtually the host was able to save on travel and catering costs. These categories being major CO_2 emitters were completely avoided and the environmental impact of the event reduced by almost 95%.

Results and Outcomes

By collaborating with Plan A and adopting their carbon manager, the company was able to report the following statistics:

1. Total CO_2e 2021: 136.123 tonnes
2. Emission by scope:
    a. Scope 1: 4.89 tonnes CO_2e.
    b. Scope 2: 30.68 tonnes CO_2e.
    c. Scope 3: 100.57 tonnes of CO_2e.

Co-funded by the European Union

Meetyoo's decision to host their events via the AWS cloud servers. As a result of this decision CO2e would be reduced by 88%. Moreover, 77% fewer servers will be used which would lead to 84% of less power consumption.

The company provides a platform for checking the amount of CO2 that would be emitted while executing an event on site. That would be compared to the amount CO2 emitted via organising a virtual event. If the event has the following characteristics: No. of participants: 300. Average travel distance per participant: 500 km, Means of transport: Plane: 80%, Train: 10%, Cra: 10% Days of the event: 5, Size of the Location: 300m2, No Green energy at the location, Including catering and hotel stay.

With these characteristics of the event, if the event takes place on-site, then it would lead to 40.43 tonnes of CO2e. However, if the event takes place via the Meetyoo virtual event platform, then this would lead to 420 kg of CO2e. Therefore, organising the event virtually would lead to a prevention of 40.01 tonnes of CO2e. And if all the events are organised virtually, then the number will be significantly multiplied and would lead us further towards the goal of net-zero emissions.

REFERENCE:

- Carbon Neutral Virtual Events. Digital solution for sustainable virtual events with MEETYOO. (n.d.). Retrieved February 18, 2023, from https://www.meetyoo.com/en/virtual-event-solutions/sustainable-virtual-events
- https://www.meetyoo.com/sites/default/files/media-documents/MEETYOO%202021%20emission%20report.pdf
- Fteufel. MEETYOO. (n.d.). Retrieved February 18, 2023, from https://www.meetyoo.com/en/resources/how-reduce-your events-carbon-footprint
- Meetyoo pro – build your own virtual event. (n.d.). Retrieved February 18, 2023, from https://www.meetyoo.com/en/event-platform/meetyoo-pro

Co-funded by the European Union

- Meetyoo Go – build your own virtual event. (n.d.). Retrieved February 18, 2023, from https://www.meetyoo.com/en/event-platform/meetyoo-g
- Fteufel. Virtual- and Hybrid Events with a Human Touch. (n.d.). Retrieved February 18, 2023, from https://www.meetyoo.com/en/resources/how-sap-reignited-their-company-camaraderie
- Valentine. Virtual- and Hybrid Events with a Human Touch. (n.d.). Retrieved February 18, 2023,from https://www.meetyoo.com/en/resources/loreal-uses-virtual-event-find-new-talent
- Valentine. Case Study: How ImmoScout24 hosted a real-estate fair online. (n.d.). Retrieved February 18, 2023, from https://www.meetyoo.com/en/resources/how-immoscout24-hosted-real-estate-fair-online
- Bernoville, T. (2022, July 18). It's time to be more transparent about events' carbon emissions. Retrieved

Co-funded by the European Union

BEST PRACTICE 7
Name of the Company: Plan A
Title of the Project: Sustainable Encounters
Where: Berlin , Germany When: July 2022

Plan A was founded in 2017. Their aim is to provide any company or organisation that is looking forward to achieving net-zero emissions in their day to day activities. To achieve this objective, they have undertaken various projects in collaboration with various companies. They provide different packages to the companies according to their sustainability needs. They provided services to measure the CO2 emissions of employees and from daily company operations. They analyse the data and provide the company with their annual emission. Furthermore, they offer tailored solutions to companies to begin a journey towards reducing their carbon footprint and eventually eliminating it at all. So far the company has introduced 450 solutions to help decarbonise the economy.

Previous Challenge

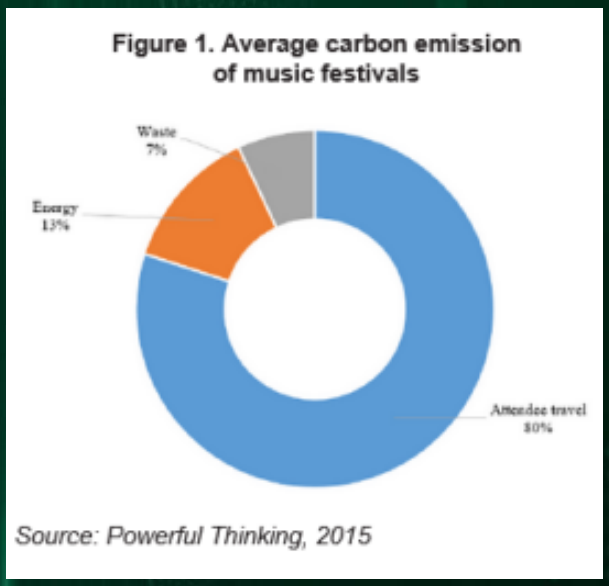


Figure 1. Average carbon emission of music festivals

Source: Powerful Thinking, 2015

According to Plan A, events have a substantial impact on the environment. Every visit to Freiburg University for a 3 day conference leads to an emission of 0.5 to 1.5 tons of CO2. International Conferences are a beast of their own. They lead to an emission of 2000 tonnes of Greenhouse gases. Out of this 500 - 1500 kg of CO2 is emitted per conference round trip. This is the equivalent of emission by 270 UK citizens.

On the other hand when we look at the emissions from music festivals, the greenhouse gases are released. Out of a total of 1,181,864.50 CO2 emissions, 80% of the emissions (945,491.6 Kg CO2) are a result of travel related activities.

Co-funded by the European Union

The events mentioned above come under the SCOPE 3 Activity. Scope 3 includes indirect emissions that are not a part of the value chain of a company. It incorporates 15 categories such as transportation and distribution, business travel , waste from operations etc.

Best Practices Introduced

Plan A has devised an event module management platform. Companies can use this platform to measure, monitor and reduce their carbon footprint. There are 3 different types of platforms:

1. Essential: One stop platform for measuring, monitoring and reducing carbon emissions.
2. Pro: This is also their most popular platform. This platform can streamline the company's carbon and ESG reporting across multiple locations. Enables them to develop a coherent sustainability strategy.
3. Enterprise: It offers the centralization and helps in automating ESG reporting across portfolio, business units and subsidiaries.

All the above-mentioned platforms offer features such as assisted data input, carbon emission calculator, event management module, automated decarbonisation action plan, automated annual emission report, online support etc.

Every company has different amounts of carbon emissions and categories leading to emission. Therefore, the company offers tailored solutions to the clients based on the emission report generated by the software platforms.

A panel discussion was organised by the company in the presence of sustainability experts. This discussion focused on tackling the decarbonisation of events.
The following points came to light for organising a sustainable event:

1. Select a sustainable venue: Local and close to public transportation facilities.
2. Keep it local: Inviting experts from nearby communities.
3. Go plastic free: Avoiding the use of plastic water bottles.
4. Organic food and drinks: Climate neutral wine and plant based meat.
5. Eliminate paper: Recyclable glass bottles.
6. Upcycle and recycle: Waste segregation.

Co-funded by
the European Union

7. Promote sustainable transportation: Encouraging use of public transport, e-scooters or bikes.
8. Logistics: Car pooling system.

Plan A organised an event called "Sustainable Encounters". While organising the event they kept in mind the practices mentioned. As a part of organising the event:

1. The selected venue was centralised and was in close proximity to the invited guests' location.
2. The speakers were situated in Berlin which omitted the emission from business travels.
3. Use of glass water jugs.
4. Arranging for plant based meat from nearby shops. 5. Beverages were served directly in recyclable glass bottles. 6. Rules regarding waste segregation were introduced to the participants. A strict adherence to these rules was observed.
7. The location of e scooters and electric carpooling services were shared with the participants.
8. The refreshments were transported to and from the venue using car sharing systems.

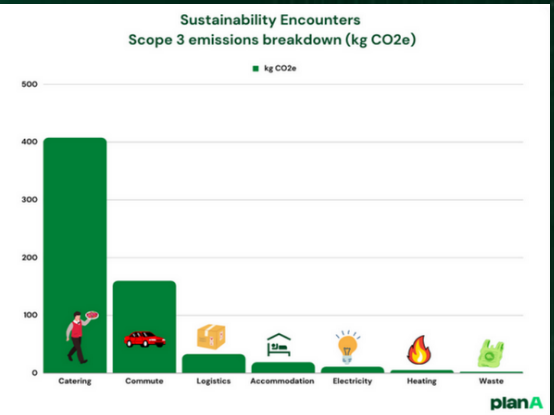
Moreover, every participant was asked to fill a survey which was accessible through a QR code. At the end of the event, the waste bins were weighted as per waste category. Other data regarding such as energy usage, logistics, production and choices of food and beverages. The aim was to gather data and figure out which activity leads to the maximum amount of carbon emissions. The event module management platform was used. The gathered data was entered into the software.

Sustainable Development Goals (SDGs) that the project addressed

Co-funded by the European Union

New Situation

Provide recycling bins with clear labelling.
Credit: Plan A



Our event's scope 3 emissions breakdown. The unit used is kg CO2e.
Credit: Plan A

REFERENCE

- Bernoville, T. (2022, July 18). It's time to be more transparent about events' carbon emissions. Retrieved February 17, 2023, from https://plana.earth/academy/transparent-sustainable-events-carbon-emissions

- Kendall, M. (2021, November 26). *36 top Greentech Startups and companies in Germany*. BestStartup.eu - The EU Startup Magazine. Retrieved February 17, 2023, from https://beststartup.eu/36-top-greentech-startups-and-companies-in-germany/

- Larasti, A. K. (2020, June). Environmental impacts management of the Coachella Valley Music and Arts ... Retrieved February 17, 2023, from https://www.researchgate.net/publication/350184155_Environmental_Impacts_Management_of_the_Coachella_Valley_Music_and_Arts_Festival

Co-funded by the European Union

MAPLE

BEST PRACTICE 8

Name of the Company: Tier Mobility

Title of the Project: Corporate Sustainability Strategy

Where: Berlin , Germany

Tier Mobility

is based out of Germany and was founded in 2018. They have become the leading shared micro-mobility provider. Currently they are operating across 22 countries and 250 cities. They have realised the negative impact of public transportation activities on the environment and introduced a fleet of 172,000 e-vehicles responsible for 142 million rides. They are encouraging cities to reduce their dependence on cars and join the company on the net zero journey. The company has itself embarked on a journey of being climate neutral and have taken several steps as a part of this initiative. They are committed towards halving the emissions from Scope 1 and 2 categories in their operation fleet, office and warehouse, and by implementing an environmental management system.

Previous Challenges

Transportation sector poses a huge threat to the environment because of the amount of carbon emitted from various vehicles. It accounts for 24% (9.9 Billion Metric tonnes) of the total global greenhouse gas emissions. The German transport system is responsible for 165.1 million tonnes of CO_2e which is higher than all other EU countries.

Moreover, in 2018 3.4 million cars were sold in Germany, which were responsible for 129.9 gCO_2 per Km per vehicle. Among all the transposition categories; road transportation followed by air and rail. However the transportation emissions recorded across Germany have witnessed a growth of 1.8% per year since 2012. The transport sector accounts for 21.3% of emissions across Germany.

Co-funded by
the European Union

The company itself is in the production business and is responsible for greenhouse gas emissions. Even though the use phase of e-scooters leaves a minimum amount of carbon footprint still the process to produce is responsible for more greenhouse gas emission if compared to production of a car. Moreover, emissions related to scope 3 category accounted for 90% emissions from the production process.

Best Practice Introduced

Studies have shown that 40% car rides can easily be replaced via using different micro mobility modes such as e scooters, bikes and mopeds. Moreover, these modes can be used for short, mid-range distances. The company has introduced a fleet of e-scooters and bikes. In addition to a fleet of scooters, they have created a mobile application across platforms such as IOS and Android.

Introduced a new revised corporate sustainability strategy. The implementation of thai strategy in the company's day to day activities will target the Scope 1 and 2 carbon emission categories. The strategy will target 4 action areas:

1. Driving Climate actions.
2. Closing Resource Loops.
3. Shaping sustainable Urban Environment..
4. Embedding Sustainability in Value Chain.

The app created by the company can be downloaded from the IOS and android app store. The user can sign up on the app using their existing google account. The app provides the following features:

1. Location of TIER e scooter in your proximity.
2. The battery percentage of the vehicle.
3. The distance the vehicle can travel.
4. The pay structure for using the service.

After approaching the e scooter, the user can scan the barcode on the vehicle via the app. Once successfully scanned, the user can ride the vehicle to their destination. Moreover, the app shows the initial steps for the rider to follow to start riding.

Co-funded by
the European Union

As a part of their Corporate Sustainability Strategy, the company has defined 5 key action areas and defined specific goals, targets and KPIs to measure the impact and benefit of the strategy.

1. Driving climate Action: With the objective to be at the forefront of climate change. They have incorporated 100% renewable energy resources in their production processes. Inclusion of 130 fully electric vehicles in the field. Adoption of sea and rail logistics system. The use of recycled carbon. The decision to swap primary aluminium with recycled aluminium.

2. Closing resource loop: The company has introduced ways to keep their vehicles and resources in a cyclic process for as long as possible. In addition to this they have found ways to avoid waste during production, use phases and end of life. They have used the LCA (Life Cycle Assessment) to measure the environmental impact of their resources. They have continuously iterated their design in response to this strategy. Inclusion of modular parts in 97% of their vehicles. The company has collaborated with battery repair and recycling companies that are able to repair and return them to the market.

3. Shaping sustainable Urban Environment: The company is committed to supporting cities and citizens in reducing their dependence on cars. They promote trip intermodality, passenger safety and accessible mobility.

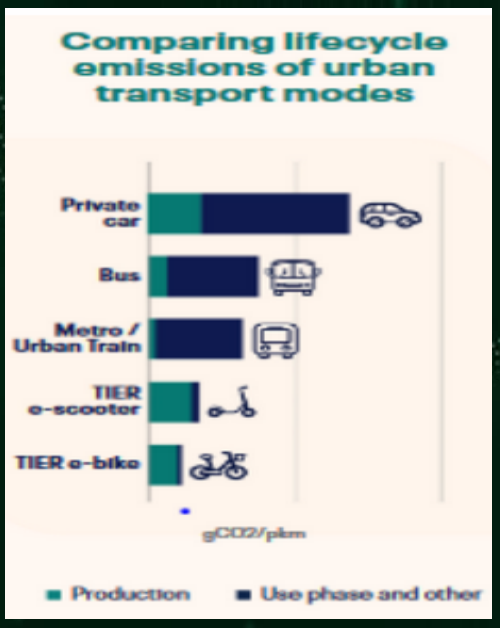
4. Embedding sustainability in the value chain: The company is motivated to incorporate sustainability practices in their supply chain management. Therefore, they have developed necessary structures and processes to facilitate sustainable decision making.

Co-funded by
the European Union

MAPLE

Sustainable Development Goals (SDGs) that the project addressed

Result and Outcomes

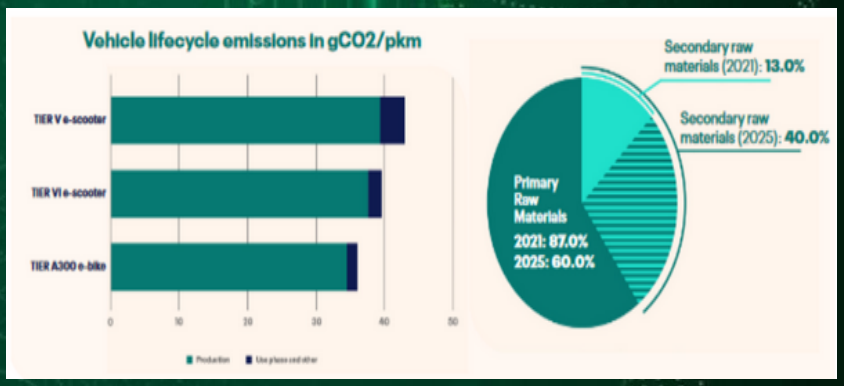


By encouraging the use of e-scooters and bikes, 45 million car kms and 7.5 million kg of CO2 emissions can be avoided. Moreover 44% users have incorporated these modes in the first and last mile of their travel.
The use of recycled aluminium leads to only 5% emission of the primary aluminium. 26.1% of vehicles are produced of recycled aluminium.
The implementation of the iterative design increased the lifespan of the vehicle from 2 to 5 years. Inclusion of modular parts make it easier to perform service and repair activities. Their TIER fleet is made from 85.6% fully recyclable materials. The company is able to repair 80% of the batteries used in their vehicles.
The company has been able to replace 17.3% car rides with TIER rides. Evey TIER ride is able to offset the emission of 120 g CO2 per trip. The company has been able to promote shared micro mobility and have successfully combined public transport facilities with TIER rides accounting for 23%.

Co-funded by the European Union

A code of conduct to be followed by the suppliers. The conduct is based on the 10 principles defined by the UN Global Compact. By 2025, the company aims to achieve 100% of sustainable suppliers.
After the introduction of the e scooters in the shared micro mobility industry. More and more commuters have opted for this option to reach the nearest public transport facility. With the increase in demand more and more e-scooters are being produced using the new corporate sustainability strategy.

The company has made several hot spots for a huge number of electric vehicles. The app is easy to download and navigate through which encourages people to use the service extensively. As a result they have been able to replace 17.3% car rides. Moreover, the company regularly updates the structure of their electric vehicles adhering to the corporate sustainability strategy. This makes the system more efficient and environment friendly. In addition to this they released a series of electric bikes and mopeds. These vehicles offer the ability to ride for an extended distance. This would encourage more people to use this service and result in further decrease of the carbon footprint. In return this would lead us closer to the goal of achieving net zero emissions.



REFERENCE

- Published by Ian Tiseo, & 6, F. (2023, February 6). *Global GHG emission shares by Sector*. Statista. Retrieved February 18, 2023, from https://www.statista.com/statistics/241756/proportion-of-energy-in-global-greenhouse-gas-emissions/
- Anders, F. (2022, October 24). *Tier mobility announces corporate sustainability strategy as data reveals it has replaced an estimated 48 million car km and avoids 8 million kg of CO2 emissions*. TIER.

Co-funded by the European Union

Retrieved February 18, 2023, from https://about.tier.app/corporate-sustainability-strategy/

- *Germany - climate chance*. (n.d.). Retrieved February 18, 2023, from https://www.climate-chance.org/wp-content/uploads/2019/11/cp7-transport-germany_en_20191112.pdf
- Ailin Huang, H. of S. and P. A. (n.d.). *How can micro-mobility best contribute to the Sustainable Mobility Transition?: Tier blog*. tier.app. Retrieved February 18, 2023, from https://www.tier.app/en/blog/how-can-micro-mobility-best-contribute-to-the-transition

Co-funded by the European Union

BEST PRACTICE 9

Use of low energy systems and integrated insulation in the renovation of apartment buildings

LowEx-Konzepte für die Wärmeversorgung von Mehrfamilien-Bestandsgebäuden (Verbundvorhaben) LowEx-Bestand

Where: Germany When: 2016 - 2021

In Germany, half of all apartments are located in multi-family houses (MFH), with most large MFHs constructed in the 1970s. Currently, the provision of space heating and hot water in these buildings is mostly through gas-fired heating systems. To improve this, LowEx system concepts using heat pumps were developed and evaluated through system simulations. The objective is to make the developed measures cost-effective, comfortable for users, and achieve the highest possible CO2 savings. In addition, the renovation measures should have minimal impact on residents. An analysis of the German stock of apartment buildings and building types was conducted to gather data for the implementation of low-exergy systems (LowEx) in various work packages. The technology developments investigated include

- gas and electric heat pump
- facade-integrated heating and cooling
- modulating brine heat pump with multi-source system and decentralised ventilation systems
- high-temperature heat pumps with new generation of low-GWP refrigerants for heating and hot water preparation
- gas adsorption heat pump for renovation measures

Previous Challenges

Some of the challenges the best practice addresses are :

- ➢ installing a heat pump is the significantly higher investment costs,
- ➢ the availability of qualified craftsmen and planners. On the planning side, a digitalization push can still significantly reduce the effort per property; on the craft side, recruitment and qualification campaigns are also required.

Co-funded by the European Union

Best Practice Introduced

Dimensioning and operating strategies for bivalent systems, consisting of electric heat pumps and gas boilers, are being developed and implemented. Different hydraulic connections for space heating and drinking water heating as well as several optimization goals (CO_2 emissions, investment costs,...) are taken into account. A heat pump with a reduced-volume cooling circuit using natural refrigerants is being developed.

In the analysis phase of the project, the researchers assess existing apartment buildings and the processes involved in their refurbishment. They develop and analyse LowEx system concepts with heat pumps and evaluate them using system simulations, taking into account factors such as achievable user comfort, economic considerations, and potential reductions in CO_2 emissions. The remediation solutions are designed to minimise disruption to residents. Finally, the results of monitoring demo projects are scientifically evaluated and compared with simulation calculations to determine the most economically and technically optimal configurations for refurbishment in multi-family housing.

The market for electric heat pumps in the multi-family building sector is challenging due to the high heating requirements and the use of radiators, which require high heating circuit temperatures. Additionally, ensuring hygiene in hot water preparation is also a concern. The dense urban development in the surrounding areas of these buildings makes it challenging to develop a heat source. As a result, Bosch Thermotechnik GmbH, Robert Bosch GmbH, and Fraunhofer ISE are working on a joint project to develop two heat pump solutions for renovation purposes. Bivalent (hybrid) systems that integrate environmental heat are a promising solution for heating purposes. These systems comprise of an electric heat pump and a fossil heat generator, which operate under a higher-level control system for effective implementation of a common operating strategy. Typically, the fossil heat generator operates below a defined outside air temperature (bivalence point), while the heat pump operates above it. This ensures that the entire system can provide the necessary heat up to the design point without overburdening the heat pumps or the heat source. Moreover, such a regulation ensures that the heat pump always operates at an acceptable efficiency level. The goal of

Co-funded by
the European Union

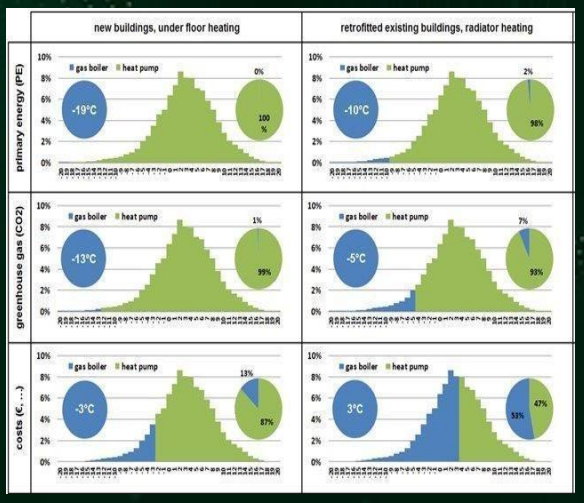
the project is to develop and implement strategies for sizing and operating bivalent systems for multi-family buildings while considering these factors

- ➔ different hydraulic connections for room heating and drinking water heating
- ➔ different optimization goals (primary energy, CO2,...) of network usefulness
- ➔ building and heat transfer system

A project is underway to create a heat pump suitable for existing apartment buildings that will help reduce emissions of fluorinated greenhouse gases as required by the F-Gas Regulation (Regulation (EU) No. 517/2014). The heat pump will use natural, combustible refrigerants and the refrigeration circuit is designed with innovative evaporator concepts to minimise its risk potential. Additionally, a security concept is being developed for the system. To address noise emissions in densely built-up urban areas, the project incorporates the latest findings in psychoacoustics into the development process.

New Situation

© Fraunhofer ISETest-rig for the measurement of heat exchangers exposed to refrigerant (evaporators and condensers)(Pic Ref: https://www.ise.fraunhofer.de/en/research-projects/lowex-bestand-htwp.html)



© Fraunhofer ISE
Bivalence temperatures and the proportion of both heat generators (gas boiler and heat pump) in meeting the heating load under different variations: new building, retrofitted existing building as well as the operational targets with respect to primary energy consumption, carbon dioxide emissions and consumption costs.(Pic Ref: https://www.ise.fraunhofer.de/en/research-projects/lowex-bestand-htwp.html)

Co-funded by the European Union

Sustainable Development Goals (SDGs) that the project addressed

SDG 7 - Affordable and Clean Energy: By developing energy-efficient and low-carbon heating and cooling systems, the project helps to increase access to affordable and clean energy.

SDG 9 - Industry, Innovation and Infrastructure: The project involves the development of innovative LowEx system concepts with heat pumps, which can help to improve infrastructure and foster innovation.

SDG 11 - Sustainable Cities and Communities: The project aims to reduce emissions of greenhouse gases in densely built-up urban areas, which is crucial for creating sustainable and resilient cities.

SDG 12 - Responsible Consumption and Production: The project takes into account economic aspects and potential savings in CO2 emissions, which is in line with the goal of promoting sustainable consumption and production.

SDG 13 - Climate Action: By reducing emissions of fluorinated greenhouse gases and CO2, the project contributes to global efforts to combat climate change.

Co-funded by the European Union

Results and Outcomes

The LowEx-Bestand project has the potential to have several positive impacts and benefits, including:

1. Reduced CO2 emissions: By developing and implementing energy-efficient and low-carbon heating and cooling systems, the project can significantly reduce emissions of greenhouse gases, including CO2, which is crucial for combating climate change.
2. Improved air quality: The project can also help to improve air quality in densely built-up urban areas by reducing the use of fossil fuels and other high-emission heating systems.
3. Increased energy efficiency: LowEx systems are highly efficient, meaning that they require less energy to operate and can help to reduce energy consumption and costs.
4. Improved user comfort: The project aims to ensure that the remediation solutions have as little impact as possible on residents, while still providing comfortable indoor environments.
5. Economic benefits: By reducing energy consumption and costs, the project can provide significant long-term economic benefits for building owners and residents.
6. Innovation and knowledge sharing: The development of innovative LowEx system concepts with heat pumps can foster innovation and promote knowledge sharing in the field of sustainable heating and cooling systems.

Overall, the LowEx-Bestand project has the potential to contribute to several Sustainable Development Goals, including SDG 7 (Affordable and Clean Energy), SDG 11 (Sustainable Cities and Communities), and SDG 13 (Climate Action), while also providing significant economic and social benefits for building owners and residents.
developed the simplified categorization of possible implementation variants of heat pumps in multifamily buildings The second result worth mentioning is the database of case studies with examples of the use of heat pumps in multi-family buildings in several European countries.
The newly developed ventilation control strategies and the implementation of self-learning control were demonstrated in a demonstration building, the Energy Smart Home Lab, at KIT.

Co-funded by
the European Union

REFERENCES

- https://www.cleaner-production.de/index.php/en/topics/cleanup-technology/building-remediation/6990-use-of-low-energy-systems-and-integrated-insulation-in-the-renovation-of-apartment-buildings#summary
- https://www.lowex-bestand.de/index.php/ergebnisse/?lang=en

Co-funded by
the European Union

BEST PRACTICE 10
Munich RE's Green Tech Solutions
Renewable Energy and Energy Efficiency
Where: Munich , Germany When: 2021

Munich Re's Green Tech Solutions

unit provides the necessary protection backed by Munich Re's financial strength. Our insurance guarantees the long-term performance of green technologies and is a seal of approval for outstanding technical product quality. Our globally experienced and locally accessible team will guide you safely through all uncertainties, providing coverage for potential performance or warranty claims.

We are pioneers – with a track record of more than 12 years in renewables, we support the energy transition by absorbing the technical risks – enabling entrepreneurs to concentrate on their business and boost their sales. Today we already have 55 GW of renewable energy production, backed by our warranty insurances. That is more than two thirds the capacity of all photovoltaic systems operating in Germany.

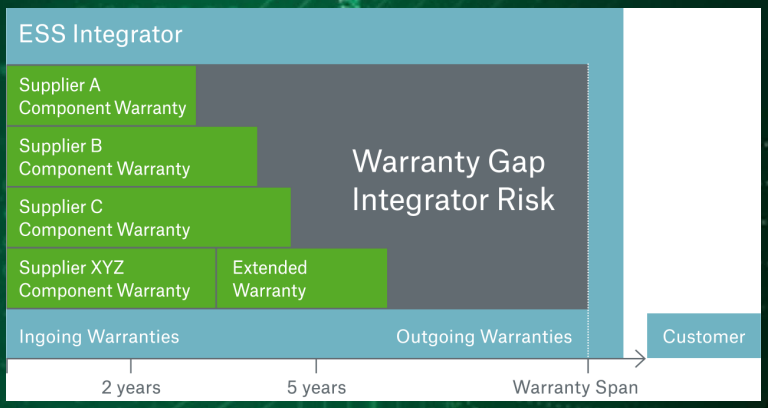
Be it wind, photovoltaic or hydrogen; sustainable technologies like carbon capture or energy storage – we enable sustainable growth and make sure your investment will still be profitable for decades to come.

Previous Challenge

Energy storage systems often involve the complex integration of multiple high-tech components. These are all prone to failure and malfunction, particularly over long periods of ten years and more.
As a manufacturer and system integrator you have to provide your customers with warranties. However, excessive warranty claims or a gap of warranties can negatively affect your financial stability.

Co-funded by
the European Union

Energy storage systems often involve the complex integration of multiple high-tech components. These are all prone to failure and malfunction, particularly over long periods of ten years and more.



As a manufacturer and system integrator you have to provide your customers with warranties. However, excessive warranty claims or a gap of warranties can negatively affect your financial stability.

Best Practice Introduced

Renewables like wind and solar energy are intermittent by nature. To successfully master the energy transition, reliable energy storage systems are a must to provide the necessary supply stability. This opens up attractive growth opportunities for solution providers – but also requires huge investments, whose profitability depends on the long-term performance of assets.

The conditions around the East African Rift Valley are ideal for using geothermal energy. With a newly designed policy, Munich Re protects against the discovery risk and helps ensure that such projects for sustainable power generation find enough investors.

Inside the earth it boils and bubbles – volcanoes, geysers or hot springs testify to how much. The deeper you go into the core of the earth, where temperatures are around 5,000 °C, the hotter it gets. Geothermal energy makes use of this enormous energy potential. She is trying to find hot layers in the earth's crust by drilling at suitable locations in order to use the thermal energy available there. In hydrothermal geothermal energy, water or water vapor from hot, lower-lying reservoirs is harnessed. The major advantage of geothermal energy compared to other renewable energy sources is its constant availability, regardless of the weather conditions or the time of day or year, it is base load capable.

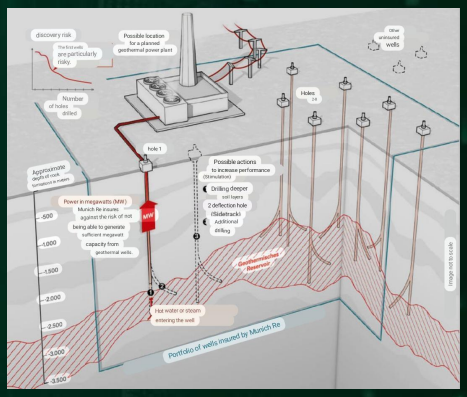
Co-funded by the European Union

As base load energy, geothermal heat can make an important contribution to the energy supply. For project companies and investors, however, the uncertainty is particularly high at the beginning of the drilling phase: if the geothermal reservoir cannot be tapped in sufficient quantity, the project is usually stopped and the investments are lost. The financing of geothermal projects is correspondingly difficult. With the Multi-Well-Exploration Risk Insurance, Munich Re offers protection against the risk of discovery and helps to realize ambitious projects. Munich Re's solution has advantages for investors and operators: it makes investments in hydrothermal deep geothermal projects considerably safer, easier to plan and more attractive for investors. At the same time, planning security is increased for the operator. They also find it easier to convince investors that ambitious projects are feasible and can be realised. As a technically experienced and financially strong partner, Munich Re bears the risk of not finding it.

Sustainable Development Goals (SDGs) that the project addressed

New Situation

With the Kenyan project, Munich Re is pursuing a new coverage concept with multiple-well exploration risk insurance: Unlike in low-enthalpy regions like Germany, projects here do not consist of a duplicate of two wells, but of a portfolio of many production and injection wells. Accordingly, Munich Re insures the minimum energetic performance of an entire portfolio of wells in several project phases. Success parameters are defined



Co-funded by the European Union

between Munich Re and the project for each of these phases, in which case it is either aborted due to a lack of success and an insurance benefit becomes due or the next phase is carried out due to the successful results. These phases result in close exchange and alignment of interests between the project and Munich Re. This concept has advantages for both silks. The risk balancing over earlier, more risky, and later less risky phases makes the project insurable, and the investors receive a comprehensive protection solution for the entire project duration. The option of an early exit if unsuccessful is also in the interest of both parties since the risk of financial loss for the investors is thus more limited.

Results and Outcomes

In the case of the insured Kenyan project, there is a good chance that the target of a power plant output of 70 megawatts of electricity will be achieved by the end of 2018. At the neighbouring Olkaria field, a few kilometres away, 500 megawatts from geothermal projects have already been installed. Geologists confirm that the region around the East African Rift Valley has great potential for using geothermal energy. In Kenya, the government is pushing the expansion of geothermal projects to cover the growing demand for electricity. According to the state power company, the increasing supply has pushed down electricity prices for private and commercial customers by more than 30 percent since August 2014 (source: World Bank). The current project is being financed by local and international companies, which also receive funding from KfW, among others.

REFERENCE

- https://www.munichre.com/en/solutions/for-industry-clients/risk-transfer-solutions-for-on-and-off-shore-wind-power.html

- epa.gov/stateloc

Co-funded by the European Union

DISCLAIMER

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Co-funded by
the European Union