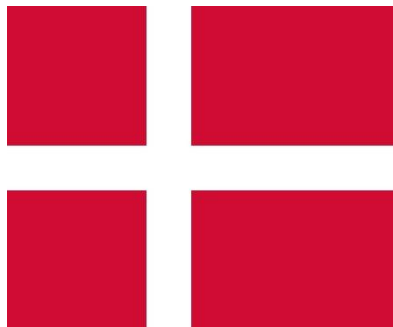


Sustainable Development Goal 13: Climate Action

DENMARK



Group 9

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I. COUNTRY PROFILE

Denmark is a rich, democratic country in Scandinavia that acts a leader in renewable energy and climate-friendly governmental policy. Denmark actively engages in environmental sustainability projects with respect to the UN's Sustainable Development Goals (SDG).

Given Denmark's geography, it faces relatively few prospects of natural disaster. However, due to Denmark's topographic and coastal attributes, climate change has exacerbated flooding, coastal erosion, and saltwater intrusion in drinking water. The government proactively invests in climate resilience, such as coastal levees and beach nourishment. This can be seen through the €174 million investment into protecting towns, cities and infrastructure against rising sea levels and future storms. The Danish government presents plans to ramp up climate adaptation (State of green, 2023).

The Danish government has made a decisive move towards phasing out fossil fuel extraction in the North Sea by reaching a broad agreement, which entails the cancellation of the ongoing and all subsequent rounds for oil and gas extraction activities. According to Climate Programme 2020, Denmark has committed to a definitive phase-out timeline, aiming to cease all fossil extraction by the year 2050 (VNR, 2021).

The Danish Climate Act set a short-term goal for 2030 of reducing greenhouse gas emissions by 70% (as compared to 1990 numbers). Strategic direction to achieve this involves creating financial incentives for low-emission vehicles; and the 'development track,' which aims to support green initiatives and research such as increasing grants on green energy research (OECD 2021).

The public are well-informed about the environment and are widely supportive of national environmental planning and policy. This allowed environmental policy to be largely decentralised to local authorities, which makes climate issues and policy more conspicuous and empower the public to make their difference. Given that Denmark faces relatively fewer competing priorities, with income inequality being low and standards of living high, it holds a competitive advantage in being more able to devote its resources towards tackling climate-related problems.

The 2021 voluntary national review of Denmark's contribution to the UNs SDGs suggests that Denmark contributes around DKK 2.1 billion in climate-relevant development aid in 2019. These aids developing nations, supports transitions towards green economies and adaptation to climate change, in line with the objectives of the Paris Agreement. Moreover, Denmark's decision to double its contribution to the Green Climate Fund, reaching DKK 800 million in 2022, highlights its dedication to assisting developing countries in mitigating and adapting to climate change impacts, thereby ensuring the execution of the UN Framework Convention on Climate Change.

In summary, the government is actively involved in national environmental policy, strategy, and planning. Furthermore, it is pre-emptively mitigating the risks of its climate hazards. The Danish people are already well-educated and involved in climate issues due to Denmark's decentralised environmental policy powers. Denmark also contributes well towards global climate funds.

II. SPECCTRe ANALYSIS

Social	Danish businesses, civil societies and others are engaging actively in the implementation of SDG 13 (the Danish government, 2021). The typical Danish citizen is highly environmentally conscious.
Political	Denmark's research and innovation policy prioritizes climate challenges. A significant portion of the total budget in 2022 and 2023 was designated for green research, development, and projects for the transition to green. (the Danish government, 2023). Denmark recently implemented a green tax reform strategy aimed at achieving a reduction of CO2 emissions (the Danish government, 2023).
Economic	62% of Danish businesses are engaged in efforts to mitigate their emissions. However, the absence of climate action measures is notably pronounced within SMEs (the Danish government, 2021). Denmark's exported environmental technologies account for 9% of Danish exports in 2022, with wind and water technology dominating green exports (Danish energy agency, 2023)
Competitor	United Kingdom, another global leader in offshore wind energy, is a competitor in green exports (UK Research and Innovation, 2024) Costa Rica, which supplies 99% of its electricity energy by renewables, is a potential competitor in renewable electricity export (U.S. Department of Commerce, 2022).
Customer	The Danish government acts for Danish citizens. They are the most apt 'customer' for this context.
Technology	Danish enterprises hold a prominent position in green technology (the Danish government, 2021). Renewable energy sector, e.g electrification and biogas production companies, which support to generate and distribute green electricity and green fuels (the Danish Government, 2020). The country invests heavily in renewable energy sources, including wind, solar, and bioenergy, with policies supporting the transition away from fossil fuels. (the Danish Government, 2020).
Regulation	The Danish Climate Act adopted by the Danish Parliament in 2020 is the current framework for Denmark's energy and climate policy (the Danish government, 2023). Denmark signed into the Paris Agreement for 2021-2030 period for greenhouse gas emission reduction targets. (the Danish government, 2023).

Table 1: Summary of SPECCTRe Analysis

Danish politics have a strong impact in promoting SDG 13 issues as it sets the stage for the development and implementation of policy aimed at addressing climate change. Denmark's political environment demonstrates a strong commitment to climate action. This involves prioritisation of climate challenges in research and innovation policies and implementation of a green tax reform strategy. This creates an ideal environment for Denmark to achieve its climate goals and work towards objectives outlined in SDG 13. Moreover, support for environmental policies lead to increased access to clean energy sources and reduced reliance on fossil fuels, resulting in improved air quality and public health. By establishing mechanisms that facilitate the connection of renewable energy projects to the grid and providing access to agricultural markets for regenerative products, Denmark can further leverage its competitive position in the green export market.

Technological advancements enable the development of more effective solutions for mitigating climate change and transitioning to renewable energy sources. Denmark's strong emphasis on innovation in green technologies enhances their ability to achieve their climate goals in a cost-effective manner. Technological innovation allows Denmark to optimise its use of resources (such as energy, land, and water). This contributes to the country's efforts to reduce its carbon footprint, minimize environmental impact, which benefit citizens to experience healthier ecosystems and reduced pollution levels, contributing to overall quality of life. Innovative technologies also enhance Denmark's resilience to the influence of climate change, such as sea-level rise and extreme weather events. By investing in climate-resilient infrastructure and adaptation measures, Denmark can prepare for and effectively respond to climate-related challenges. Denmark's leadership in green technology innovation provides it with a competitive advantage in the global market. By continuously developing and adopting innovative technologies, Denmark can maintain its position as a leading exporter of renewable energy solutions and environmental technologies.

Businesses are one of key players, having substantial influence in the implementation of SDG 13 due to their economic power and innovation capacity. However, only 13% of businesses are setting climate targets and measuring their own emissions (the Danish government, 2021). Thus, it is essential to develop strategies to support businesses in improving the Danish economic environment. Businesses may reduce their emissions by implementing energy efficiency measures, transitioning to renewable energy sources, and adopting low-carbon technologies. This contributes directly to SDG 13 targets aimed at limiting global warming and mitigating climate change. Businesses can also drive innovation in green technologies by allocating resources to internal research efforts focused on developing new green technologies or improving existing ones. The investment in research and development enables businesses to develop and commercialize technologies that facilitate the transition to a low-carbon economy. Ultimately, the economic environment can be transformed to incentivise businesses to set climate targets and reduce emissions.

III. SWOT ANALYSIS

Denmark is recognized globally for its efforts toward combating climate change and promoting sustainability. This section provides an analysis of the country's strengths, weaknesses, opportunities, and threats in relation to its climate action initiatives.

STRENGTHS <ul style="list-style-type: none">• Green energy leader• Heavy investment in wind-power• Economic stability• Innovative Green Technologies• High public support and awareness for climate action	OPPORTUNITIES <ul style="list-style-type: none">• Opportunity to invest and use new tech as it becomes available.• Export green technology• Export excess electricity• Room for improvement in SME's adopting climate impact targets.
WEAKNESS <ul style="list-style-type: none">• Reliance on fossil fuels and imported energy sources• Economic Dependency on International Trade	THREATS <ul style="list-style-type: none">• Long coastline and low-lying so potentially effected by rising sea levels (e.g. flooding).• Reliance on global markets poses a risk to Denmark's climate-focused economic stability.

Table 2: Summary of SWOT analysis

Strengths and Weaknesses

A major strength for Denmark is its leadership in the green energy sector, especially in wind power. Denmark has managed to grow its economy without increasing carbon emissions by focusing on three areas: generating energy from renewables, making power plants more efficient, and using cogeneration to produce heat and electricity simultaneously (Van Est, 2022). Despite lacking hydropower, Denmark leads in renewable energy, with a significant portion of its electricity produced by wind. These advancements have transformed the Danish energy landscape.

The country's stable economy backs its ability to innovate and invest in green technologies (Wang et al, 2019). Denmark's green energy success is built on three pillars: the integration of wind energy and climate policies, political commitment to incorporating wind technology into the power grid, strategic industry policies for local and international market development, and careful planning for turbine placement to garner community support, significantly aided by policies promoting local ownership of wind energy projects.

Public awareness and support for climate action is also high, reducing friction in implementing environmental policies and technologies. This awareness is partly due to Denmark's early commitment to sustainable practices, including the implementation of Agenda 21 - an all-encompassing action plan aimed at fostering worldwide collaboration for sustainable development, to enhance the quality of human life and safeguard the environment. Local governments in Denmark have actively involved communities in implementing Agenda 21 (Agger, 2021).

A notable weakness for Denmark is its reliance on imported energy and fossil fuels (IEA, 2023). This dependence poses risks to energy security, especially in times of global market volatility. Efforts to diversify energy sources and boost domestic renewable energy production are vital to mitigate this vulnerability.

A weakness identified in Denmark's economic structure is its high dependency on trade. This reliance subjects the Danish economy to global market fluctuations, potentially impacting its financial stability and growth. Adapting to such economic uncertainties requires Denmark to diversify its trade partnerships and develop sectors less sensitive to global fluctuations, ensuring a more resilient economic framework (OECD, 2024).

Opportunities and Threats

Denmark can lead in the adoption of new and emerging green technologies, potentially becoming a significant exporter of both technology and renewable energy (ITA, 2024). Denmark's unique position, with abundant wind resources and a coastline conducive to wave energy, presents vast opportunities for renewable energy development. The country's commitment to green energy, evidenced by its extensive use of combined heat and power systems and the ambitious Green Roadmap, positions Denmark as a leader in sustainable energy practices. This strategic approach, emphasizing energy efficiency and the transition towards renewable sources in both electricity generation and transport, not only supports Denmark's climate goals but also offers a model for renewable integration globally. There is also potential for growth in small and medium-sized enterprises (SMEs), particularly in terms of integrating climate impact goals into their operations.

In terms of threats, Denmark's geographical features, such as its extensive coastline and low elevation, make it vulnerable to the effects of climate change, including the risk of flooding due to rising sea levels (*World Bank Climate Change Knowledge Portal*, 2024). Furthermore, Denmark's economic structure, characterized by high wages, personal taxes, and dependency on international trade, underscores the importance of integrating economic resilience with environmental sustainability. This balance supports long-term climate action goals by ensuring that economic policies and trade relationships are aligned with sustainability objectives, thereby enhancing Denmark's capacity to invest in green technologies and adapt to global market shifts in a way that supports the Sustainable Development Goals.

In conclusion, Denmark's strong commitment to green energy and climate action has positioned it favourably on the international stage. To maintain and strengthen this position, it will need to address its current reliance on imported energy and manage the risks associated with its geography. Harnessing new opportunities in technology and exports while mitigating environmental vulnerabilities will be crucial for Denmark's continued leadership in climate action.

IV. SCENARIO THINKING

To anticipate and prepare for plausible future scenarios and for strategic planning, we have employed ‘scenario thinking’. Initially, we gathered and clustered the ‘driving forces’ behind our focal concern (SDG-13). Our two most impactful, uncertain, and interrelated clusters are ‘geopolitics/geoeconomics’ (cluster 1) and ‘global energy supply’ (cluster 2).

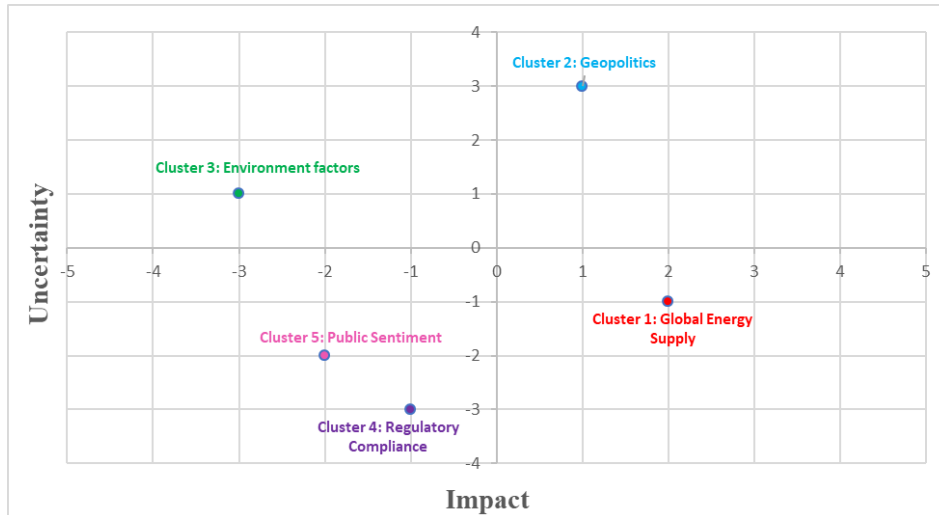


Figure 1: Impact/predictability matrix

Further insight into the driving forces behind each of these clusters is provided below. Particularly central is the idea of ‘global prioritisation of climate issues’. We recognise that competing priorities create less effort taken towards sustainable development controls. Other significant and well-connected driving forces are the ‘state of the Russo-Ukrainian War’ and the ‘relative global supply of non-renewable energy’. The greater the uncertainties in the supply of fossil fuels, especially from Russia, the more pressure there would be for Denmark to grow its green energy production and energy independence.

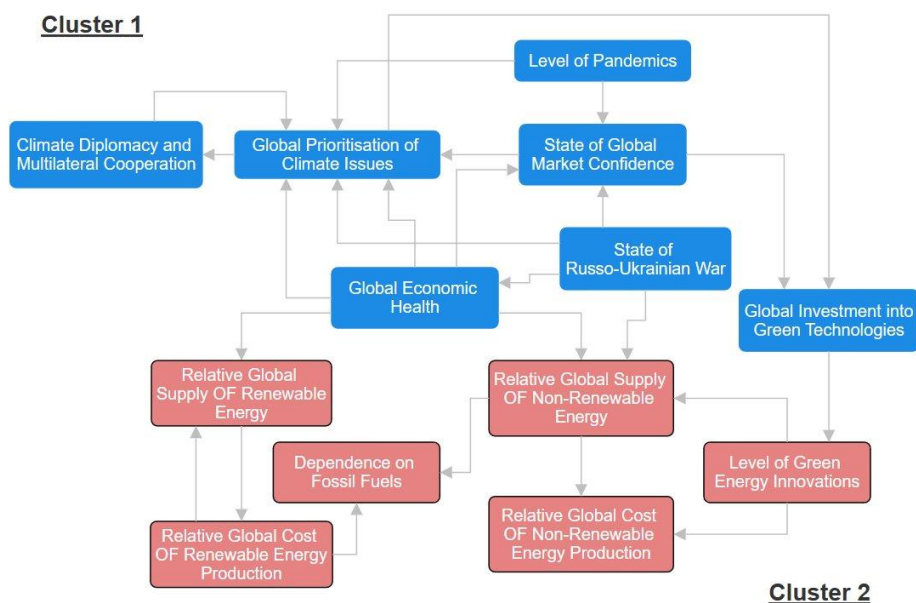


Figure 2: Identified linkages between clusters

We began developing our 4 scenarios that represent combinations of the extreme outcomes for our 2 clusters. These were refined and developed into a greater narrative.

Scenario 1: Increased Global Innovation in Green Technologies, Short-lived War

As global conflict subsides, the subsequent period of increased global willingness to cooperate allows for greater focus and attention to environmental matters. Investment by countries into green tech is increased with the reduction in the opportunity cost of using those funds for war-time activities. However, despite many innovations in green tech, the robust global supply of fossil fuels has decreased the pressure on countries to adopt them.

Scenario 2: Increased Global Innovation in Green Technologies, Long-lasting War

Prolonged conflict between Russia and Ukraine disrupts supply lines for fossil fuels, pushing Denmark to develop its native energy production and become more energy independent. War-time investment and pressure spur on global innovations in green technologies. On the one hand, the conflict has disrupted global cooperation, so technologies are withheld from some countries and the speed of accessing materials for implementation is reduced. Conversely, allies on either side share a greater cooperation. Denmark has accelerated its conversion to a low-carbon economy and exports excess clean energy.

Scenario 3: Decreased Global Innovation in Green Technologies, Short-lived War

The Geopolitical conflict, though short, has hindered Denmark's ability to meet sustainability goals. What investment has gone into green technology has yielded relatively few results. Consequently, Denmark continues to struggle at balancing its energy consumption and production of clean energy. Denmark remains energy dependent on external fossil fuel suppliers, failing to insulate itself from more external shocks.

Scenario 4: Decreased Global Innovation in Green Technologies, Long-lasting War

The extended duration of the war has reduced global market confidence. As a result, funding into green energy R&D runs dry and there is decreased multilateral pooling of resources into innovation as attention shifts further towards the current global crisis. Efforts into renewable energy solutions are side-lined so Denmark remains vulnerable to future external shocks and environmental hazards, with relatively low progress made towards sustainability goals.

Some interesting interactions in our scenarios include the possibility for the rate and implementation of green innovations to be improved by a longer war, as Denmark is pressured to grow energy independent, or by a short war where global cooperation and attention into climate matters is greater.

To mitigate any risks and damage that might be caused by these scenarios occurring, the Danish government should pre-emptively utilise its national resources to gain greater energy independence. Denmark's distinct competitive advantages in wind energy production could be leveraged here to both meet SDGs and be more insulated from external shocks in the global energy market. Furthermore, Denmark could seek greater cooperation and commitment into investing in climate action from other countries to ensure a steady supply of resources and attention despite any competing priorities such as a future war or pandemic.

V. DISTINCTIVE COMPETENCES

The competence mapping process for Denmark, as outlined in this report, reveals a robust and interlinked system of assets, competences, and outcomes that collectively contribute to the nation's high economic health, social welfare, and environmental sustainability.

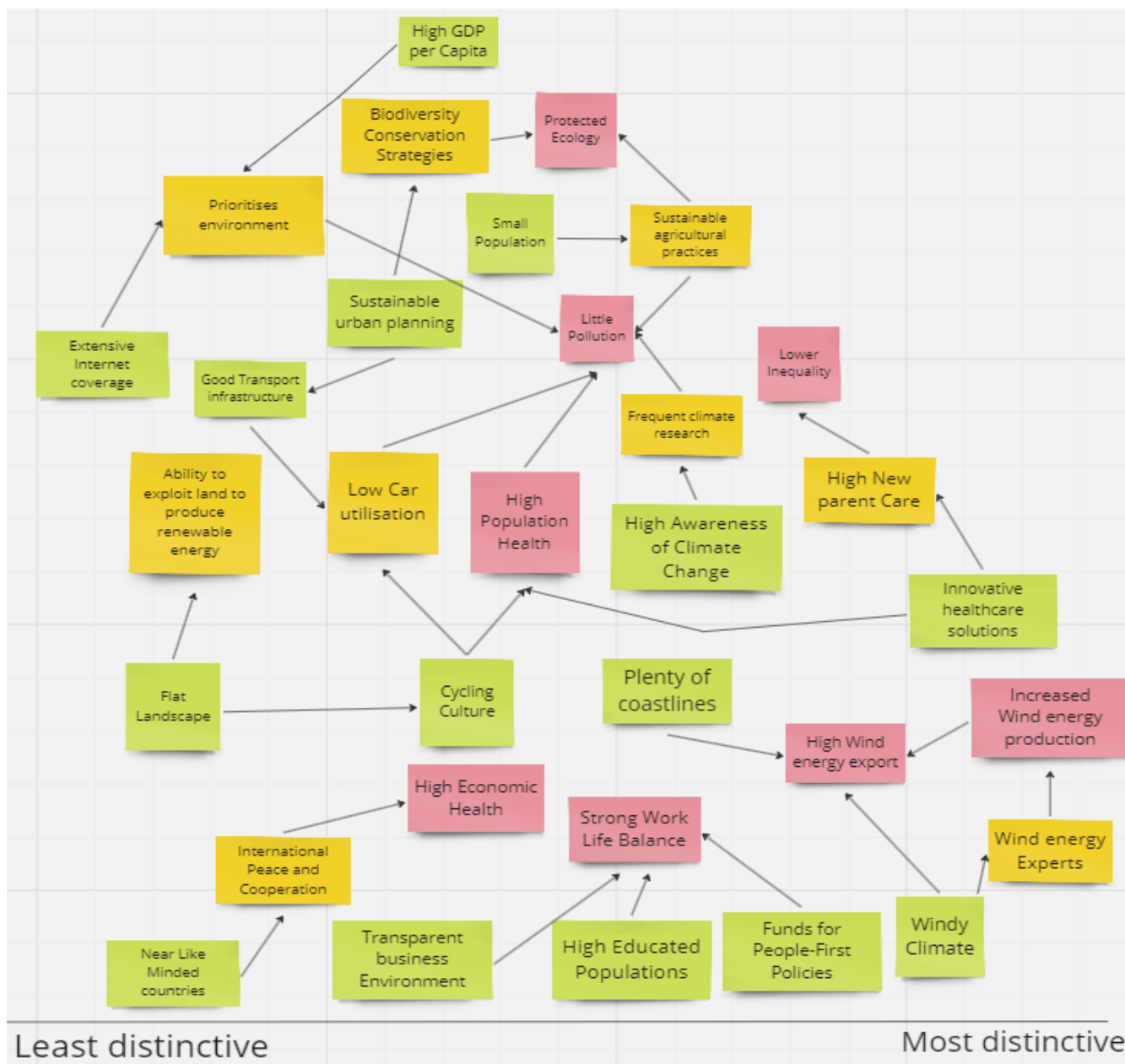


Figure 3: Ordered and linked competences

This mapping highlights Denmark's distinctive competences, including a strong emphasis on environmental priorities, biodiversity conservation, sustainable agriculture, renewable energy production, and international peace cooperation. These competences are not isolated strengths but are deeply interconnected with Denmark's assets, including its high GDP per capita, extensive internet usage, innovative healthcare solutions, and natural features like a flat landscape and windy climate.

The main conclusions highlight how well national assets can be used to support competencies and produce desired results. For instance, Denmark has prioritised the environment, resulting in lower pollution levels, thanks in large part to its high GDP per capita and widespread internet coverage. The high GDP per capita provides Denmark with the financial resources necessary to invest in environmental initiatives, infrastructure development, and clean technologies, while widespread internet coverage facilitates communication and the implementation of digital solutions for environmental monitoring and management.

In a similar vein, the country's level terrain and cycling culture have promoted low car usage while simultaneously improving public health and reducing pollution. The well-developed transportation infrastructure, including efficient public transit networks and cycling-friendly urban planning, facilitates the widespread adoption of alternative modes of transportation beyond traditional car use. Moreover, the country's strong cycling culture encourages individuals to choose environmentally friendly and healthy transportation options, further reducing reliance on fossil fuels and mitigating carbon emissions. These connections demonstrate the thoughtful and effective integration of sustainable practices into many facets of the economy and society.

Another key finding from the mapping is the significant impact of innovative ideas and policies on Denmark's socioeconomic and environmental improvement. In addition to raising the standard of living for its people, the nation's approaches to urban planning, transportation infrastructure, and healthcare have established a global standard for sustainable living. Moreover, Denmark's emphasis on renewable energy, especially wind energy, is a prime example of how natural resources paired with professional know-how and ingenuity can boost output and exports, improving economic stability and lowering dependency on non-renewable energy sources. The distinctive assets such as wind resources and extensive coastline have facilitated the development of expertise in wind energy technologies, fostering increased wind energy production which then enabled Denmark to become a major exporter of wind energy technologies and expertise. This pathway emphasises Denmark's strategic use of its natural resources and general expertise in renewable energy to increase their wind production and export it around the world.

In summary, Denmark's competence map underscores its leadership in sustainability, driven by their innovative use of national resources to enhance environmental, economic, and societal well-being. Key strategies include investing in diverse renewable energies, boosting green technology exports, advancing digital environmental management, and promoting sustainable transportation. Coupled with Denmark's commitment to education, transparency, and social welfare, these initiatives not only solidify its stance in global sustainable development but also offer valuable insights for other nations striving for similar achievements.

VI. CONCLUSION & RECOMMENDATIONS

This report contains a detailed review of Denmark's position in handling climate issues with regards to SDG 13. We found that Denmark is well-placed to prioritise tackling environmental issues due to its relative lack of competing priorities and competitive advantages as a green energy leader. Denmark has already made significant progress towards its sustainability goals.

A SPECCTRe analysis was performed, and what was known and found through research about Denmark was categorised to create a digestible overview. This was expanded further on the politics and technology sections to detail how Denmark's unique political environment affects its national effort towards sustainability and SDG 13. Additionally, it found that Denmark is a big exporter in green technologies and is a leader in wind energy production.

A SWOT analysis was conducted in this climate report to systematically identify and evaluate the strengths, weaknesses, opportunities, and threats related to Denmark's climate situation. This will help in informing strategic planning and decision making to tackle climate change in the future. The key takeaways from the SWOT analysis includes Denmark's leadership in wind energy and public support for sustainability as major strengths, resilience on energy imports and trade weaknesses, opportunities in exporting green technologies, and threats of climate change impacting rising seas levels.

We conducted a scenario analysis to investigate the underlying driving forces that affect Denmark's ability to achieve its sustainability goals. These were organised into clusters, from which we found that one of the most central driving forces was the 'global prioritisation of climate issues'. We created plausible four scenarios which can be used for planning and informed decision-making. To proactively tackle some of the issues faced in our scenarios, this report recommends that Denmark seek greater energy independence through greater investment into its native green energy production. Denmark should also act to secure resources and funding towards green initiatives, to insulate progress in green energy innovation.

This report ended its method with a competence mapping exercise. Here, the assets, competences, and outcomes that Denmark has or has achieved are organised by their causal relationships. This process identified that Denmark has strong competencies related to transparency, education, and social welfare. It was also recommended that Denmark should focus on diversity in its green energy, boosting green technology exports, advancing digital environmental management, and promoting sustainable transportation.

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