Case Study






From Oil and Gas to Wind

Esbjerg's Offshore Academy in Denmark

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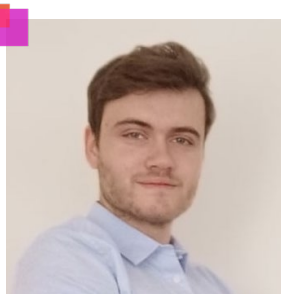

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Overview

Location	**Esbjerg, Denmark (North Sea coast)**
Initiative	***Offshore Academy***
Program snapshot	Esbjerg is Denmark's energy hub, historically focused on oil and gas. The *Offshore Academy* program aims to transition workers from this hub to offshore wind jobs to ensure that Denmark's workforce is equipped with the skills needed to accommodate the expansion of wind power installations and exports, and to ensure that the local economy stays central to the country's broader net-zero goals. Port Esbjerg is home to more than 200 companies that employ more than 10,000 people. The *Offshore Academy* is governed through a partnership between Port Esbjerg (a municipally-owned port authority), the United Federation of Workers (the largest Danish general workers union) and local learning institutions. The program is funded through public funds, the European Commission's Just Transition Fund and private investments such as pension funds. It promotes the skills needed to grow the wind industry by providing local, paid training to oil and gas workers at the port, allowing them to smoothly transition to offshore wind without needing to relocate or forgo income.
Sector focus	The focus is on the energy sector, specifically the transition from offshore oil and gas to offshore wind and green hydrogen.
Time frame	The program has been in development since 2020. An agreement between Port Esbjerg and the United Federation of Workers took place in 2022 to establish the training facilities at the port. The program is currently active.

Foundations of the Transition

Background and Context

Esbjerg — long known as Denmark's energy centre (Krawchenko & Gordon, 2022) — hosts about half the country's oil and gas jobs (Sperling et al., 2021). Denmark's 2020 *Climate Act,* which came with the mandate to reduce greenhouse-gas emissions by 70 per cent by 2030 (compared with 1990 levels), is driving the transition away from fossil fuels (Danish Ministry of Climate, Energy and Utilities, 2020a). Known for its pioneering work in wind turbines and offshore wind farms (United Nations, n.d.), Denmark is leaning into its competitive strengths by targeting wind as a major source of future energy (International Energy Agency [IEA], 2023). Despite operating more than 55 platforms across 19 oil and gas fields in the North Sea, Denmark has boldly cancelled all future oil-and-gas-extraction tender rounds under the North Sea Agreement (Danish Ministry of Climate, Energy and Utilities, 2020b; Krawchenko, 2022). This shift has substantive implications for Esbjerg, where the municipally-owned port houses more than 200 companies and 10,000 workers (Port Esbjerg, n.d.). In 2022, The Danish Business Authority (2022) estimated that about 15,000 jobs in the Esbjerg area (including direct and indirect employment tied to the North Sea oil industry) could be affected by Denmark's oil phase-out.

At Port Esbjerg, the transition is already underway. The Esbjerg region continues to be the key energy producer, with wind power increasingly taking centre stage. According to 2023 estimates, around two-thirds of the energy-sector jobs in Esbjerg are still related to oil and gas, while about one-third is in offshore wind (Pictet North America Advisors, 2023). Oil and gas projects coexist with wind energy and emerging hydrogen projects. In 2023, the port invested 61.13 million euros, including port infrastructure and expansions that will allow it to accommodate the larger installation vessels used in the wind power industry (Port Esbjerg, 2023). The policy shift sent a strong market signal to firms and allowed them to align their long-term plans with government priorities (Kiernan, 2019).

To support this shift, Port Esbjerg (2020), the United Federation of Workers (3F) and local learning institutions developed and now lead the *Offshore Academy,* a place-based training program. Their main goal is to support and expand skills training in the offshore wind industry, leveraging the existing skills of offshore oil and gas workers in the region. In 2022, the port agreed to host on-site training facilities, allowing port workers and students from local vocational schools to develop hands-on skills in the renewable energy sector (Port Esbjerg, 2024).

Enablers

Further supporting the transition is Denmark's robust social welfare state, which eases job transitions for workers. The Danish "flexicurity" model combines flexible hiring and firing with social supports, including up to two years of unemployment insurance for workers who lose their jobs (Danish Agency for Labour Market and Recruitment, 2024; Krawchenko, 2022). The highly unionized workforce is also key to maintaining job quality, including wages and working conditions (International Labour Organization [ILO], 2022). Through collective bargaining agreements, 3F ensures that workers at the port can receive up to six weeks of paid training from the *Offshore Academy* each year (3F, n.d.; Bygge-, Jord- Og Miljøarbejdernes Fagforening, 2022).

Broad political consensus is also essential to providing certainty for investors. For example, the cancellation of new oil and gas tenders, strongly backed by political parties across the spectrum, has reinforced Esbjerg's commitment to offshore wind. Despite an economic shift, there is consensus that the region will preserve and strengthen its energy economy while maintaining its identity (Krawchenko, 2022).

Denmark's strategy also emphasizes domestic innovation and international collaboration, with systems in place to globally share offshore wind expertise (Krawchenko, 2022). For instance, Denmark is an active member of the IEA Wind Technology Collaboration Programme (IEA, n.d.a). When combined with public participation and policy advisory bodies, such as the Environmental Economic Council and the Council on Climate Change, this comprehensive approach ensures that Denmark's climate policies, including its expansion of the offshore wind sector, are built on a foundation of broad political and societal support (Kiernan, 2019).

Place-based strategy

The *Offshore Academy* builds on more than two decades of direct public and private investments in Esbjerg's wind industry, which has enabled local companies to test and transfer their oil and gas know-how to a new sector (Quantifying Business Impacts on Society, 2020). Its success thus far hinges on co-ordination between local energy-based businesses and trade unions, with financial support from the European Union (Kiernan, 2019). As part of Denmark's broader decarbonization strategy, Esbjerg's transition is managed in place, leveraging oil-and-gas-transferable skills for wind energy.

Denmark has had a long-standing tradition of close engagement between governments, industry and relevant associations (Kiernan, 2019), which has enabled local stakeholders in Esbjerg to co-design solutions that ease the transition of workers from oil and gas to renewable energy. Port Esbjerg actively communicates its transition plans and seeks input through public meetings, surveys and consultations to better understand and address local community concerns (Tänzler et al., 2024).

Further, the port collaborates closely with local education and research institutions, including technical colleges, to create clear employment pathways at the port (Tänzler et al., 2024). Denmark's national innovation system includes several institutes already offering training in the field of wind energy (United Nations, n.d.), providing a local asset base for the *Offshore Academy.* The academy builds on this work by formalizing and scaling these existing efforts in anticipation of the needs for skilled labour in Denmark's growing offshore wind sector. This is achieved by offering locally-based paid training at the port, with a particular focus on opportunities for blue-collar workers to develop or refine the necessary skills where they live and without forgoing income.

Addressing net-zero transition workforce challenges

While Esbjerg's transition to offshore wind presents substantial opportunities for Denmark's broader climate goals, it also highlights several workforce challenges common to net-zero transitions (Krawchenko, 2022). The *Offshore Academy* targets these issues by leveraging local assets and Denmark's supportive social policies. Table 1 summarizes the main challenges and how the academy tackles them.

TABLE 1.
Denmark's *Offshore Academy* addresses several workforce challenges common to net-zero transitions

Potential challenges	The *Offshore Academy*'s mitigation strategies
Workforce displacement	The decline of the oil and gas sector could lead to job losses, income reductions and social disruptions in Esbjerg. High concentrations of employment in these high-emitting, declining sectors could lead to heightened challenges in everything from housing markets to social services. The *Offshore Academy* minimizes workforce displacement in Esbjerg by enabling workers to transition directly from oil-and-gas to wind-energy jobs at the port, allowing them to remain locally employed, maintain their incomes and stay rooted in their community.
Skills mismatches	As high-emitting sectors phase out, the skills of oil and gas workers may not directly align with new and emerging jobs in the low-carbon economy. The *Offshore Academy* provides targeted training programs that harness congruences among the skills requirements of local offshore-energy workers, enabling them to transfer their existing skills from oil and gas to offshore wind.
Lack of diversity and inclusion	Energy-sector jobs, including those in oil and gas and wind, may lack diversity, with an unequal representation of workers in emerging, high-demand sectors, especially women. Port Esbjerg is working actively to bring those on the edge of the labour market back by collaborating with the Local Authority of Esbjerg to offer inclusive employment options, such as flex jobs, part-time jobs, job testing and internships. Local learning institutions are essential for introducing younger generations to careers in the wind sector as well as promoting access to the industry to immigrants and women.
Worker shortages	Shortages of trained workers in the growing wind sector could create high competition for talent and potential hiring challenges. The *Offshore Academy* promotes inter-sectoral workforce planning, enabling local oil and gas workers to transition into offshore wind roles, supporting local industry growth. The program at the port targets blue-collar workers in particular, who typically face higher barriers to relocation. This ensures a larger pool of local workers ready to work in the emerging wind industry as multiple countries in Europe transition to renewable energy and struggle with a competition for talent.

Potential challenges	The *Offshore Academy*'s mitigation strategies
Insufficient training infrastructure and delivery	A lack of sufficient training facilities, trainers and resources to meet the growing demand for specific skills can create bottlenecks in skills development, contributing to worker shortages. The *Offshore Academy* optimizes training delivery by using existing port infrastructure at the port for on-the-ground training. By leveraging domestic capabilities in the wind sector, the program optimizes the use of existing human and capital resources via a place-based approach.
Barriers to geographic mobility	If there are labour-market mismatches and imbalances in job opportunities, workers may need to relocate to access jobs. The *Offshore Academy* allows workers to transition in place to new employment, meaning they do not need to relocate for work.
Lack of cross-sector collaboration	A lack of co-ordination across industries and governmental bodies could fragment workforce development and create inefficiencies. The *Offshore Academy* fosters collaboration between government, unions and learning institutions, ensuring a cohesive workforce-development strategy for affected workers.
Income insecurity	When oil and gas workers are displaced from their jobs, they may face a loss of income and increased financial instability. Some workers may be unable to retrain for different jobs in emerging green sectors if the training is unpaid or comes at a cost. The *Offshore Academy* ensures that workers do not need to forgo training due to income constraints, as they are paid while they undertake the training. Salaries are paid through collective bargaining agreements and union training funds, which provide up to six weeks of fully salaried training for workers each year.

Source: IRPP based on information from Danish Agency for Labour Market and Recruitment, 2024; Esbjerg Havn, 2023; Göçmen, 2024; IEA, n.d.b; Port Esbjerg, 2022; 2023; 2024; Samson et al., 2025; Schmutz et al., 2021; Segal, 2023; United Nations, n.d.; Wind Europe; 2024.

Program Implementation

Program delivery

The *Offshore Academy* offers flexible, salaried training for oil and gas workers transitioning to offshore-wind-energy jobs (Segal, 2023). Entry programs typically last about three weeks, but training may take place over several years as workers gradually transition from oil and gas to wind projects. Skills transferability from a declining sector (oil and gas) to the emerging one (offshore wind) is a critical component of managing Denmark's energy transition in place, minimizing displacement and unemployment.

By integrating on-the-job training, leveraging Port Esbjerg's infrastructure and aligning with Denmark's flexicurity framework and collective bargaining agreements, the *Offshore Academy* provides a scalable model for skills building and job security in a rapidly growing wind energy sector and in the context of Europe's ambitious offshore wind targets, which include a fivefold increase in offshore wind capacity by 2030 and a 25-fold expansion compared with 2020 levels by 2050 (Port Esbjerg, 2020).

Governance

Denmark's Ministry of Environment and Ministry of Climate, Energy and Utilities co-ordinate national policies for the transition from oil and gas to renewables (Krawchenko, 2022). Municipal and regional co-ordination is also central to the country's climate strategy (Kiernan, 2019). National governance reforms in 2007 reduced the number of municipalities and expanded local governments' responsibility for environmental management (OECD, 2019). These reforms have enabled more strategic municipal planning while the national government has maintained oversight through overarching planning directives (Kiernan, 2019).

Funding mechanisms

Port Esbjerg's transition hinges on both public and private investment, aiming to further increase the economic importance of the port (Højberg Mernild, 2022). Nationally, Denmark ranks among the highest in the OECD for "green taxation" as a share of GDP (OECD, 2019). Such taxes finance energy-efficiency programs and research and development in renewables (Kiernan, 2019). In 2022, Denmark entered into a

partnership agreement with the European Union's Just Transition Fund, whereby the European Union provided 656 million Danish krone to support the country's transition away from fossil fuels (European Commission, 2022). The Danish government made a national contribution of about 625 million Danish krone in the same agreement. Of these funds, 178 million Danish krone went specifically to green technology and skills programming, with additional funds set aside for transitioning regions in the North and South Jutland, including Esbjerg (European Commission, 2022).

Private investment also plays a pivotal role. Pension funds regard wind as a safe investment (United Nations, n.d.). PensionDanmark, the labour-market pension fund, is investing almost 800 million euros in the port's development, including new facilities for the production of offshore wind turbines (Memija, 2023). The Nordic infrastructure fund Infranode is making investments in the port to expand facilities for the storage, pre-assembly and manufacturing of offshore-wind-turbine components, anticipating the creation of up to 2,000 jobs at the port (Skopljak, 2020).

Implementation challenges and adaptations

Drawing on Denmark's policy framework and robust social systems, the *Offshore Academy* provides targeted solutions and adaptations to ease the transition to offshore wind. Widely recognized climate targets and cross-party consensus has provided a stable policy environment in which stakeholders and investors can plan with confidence (Kiernan, 2019). Meanwhile, decades of wind sector investment — and the flexicurity model's robust social supports — have helped minimize risks for workers shifting from oil and gas. This blend of proven industry viability and job-security mechanisms has eased the transition (Krawchenko, 2022). Although offshore wind can involve higher upfront costs, targeted subsidies offset financial burdens for low-income households. Strong public demand for climate action has further bolstered the acceptance of short-term expenses in favour of long-term gains (OECD, 2019).

Impact and Relevance

Outcomes and impact

The primary expected outcome of the *Offshore Academy* is that Denmark's expanding wind energy sector will have the supply of both blue- and white-collar workers it needs to meet market demand in the coming decades. Estimates show that Europe's wind industry is set to grow from 370,000 jobs in 2024 to 600,000 by 2030, requiring that more than 200,000 new workers be recruited and trained in the coming six years (WindEurope, 2024).

As of 2023, Esbjerg had already created at least 4,200 new wind energy jobs — a figure expected to rise as the academy accelerates training (T. Jensen, 2023). Overall, Denmark's wind sector employed 33,159 people in 2019, far surpassing the 1,565 in oil and gas (Dusyk et al., 2023; State of Green, 2021). Projections in 2015 estimated that 50,000 additional jobs per year may be created to meet 100 per cent of Denmark's renewable energy needs by 2050 (Mathiesen et al., 2015). This exceeds the scale of jobs lost in oil and gas, meaning the region stands to experience net employment growth. Generally, investments in the green transition are expected to generate approximately 290,000 full-time equivalent jobs by 2030, with around 120,000 needed for offshore wind installations in Denmark (Port Esbjerg, 2020). For every 1 gigawatt of offshore wind capacity installed in Denmark, it is estimated that approximately 14,600 full-time equivalent job years are generated over the project's life cycle (State of Green, 2021).

Local firms are actively shifting their focus from oil and gas to offshore wind, including the shipping company ESVAGT (previously focused on rescue services for the oil industry's drilling platforms), which now derives almost 40 per cent of its revenue from North Sea offshore wind farms, and engineering firm Semco Maritime, with 70 per cent of the tasks in its order book coming from wind farms instead of oil rigs (T. Jensen, 2023). Thanks to such shifts, most of the North Sea oil and gas workers are expected to find new employment in renewables. Only a portion of the oldest workers will take early retirement (Krawchenko & Gordon, 2022). Oil and gas workers in the area have already started rebranding themselves as "energy workers" ready to hop between projects as jobs become available (Beer, 2022; Segal, 2023).

The academy's training programs are a key measure for securing as many of those jobs as possible by redeploying people into green energy roles. While still in early stages, the training uptake shows promise for job preservation — for example, 3F's local union offices have noted that short, targeted offshore courses in Esbjerg have smoothed the transition of workers from other fields into offshore wind, preventing them from slipping into unemployment (Bygge-, Jord- Og Miljøarbejdernes Fagforening, 2022).

Lessons learned and relevance to Canada

Denmark's experience in Esbjerg offers several insights for other regions, including those in Canada, seeking to balance economic diversification and net-zero transitions.

Lesson 1

Wind power's economic viability as a replacement industry for oil and gas

Similar to Denmark, Canada's oil and gas sector employed around 1 per cent of its workforce in 2021 (Krawchenko, 2022). Denmark's success in making wind a viable replacement industry — supplying 58 per cent of its electricity in 2023 (IEA, 2023) — demonstrates the potential for Canadian coastal provinces with high-quality wind resources. Canada currently has no offshore wind farms, though the provinces of Nova Scotia and Newfoundland and Labrador are actively pursuing projects (Gorman, 2024; Government of Nova Scotia, n.d.; Natural Resources Canada, n.d.).

Lesson 2

Place-based transitions

Esbjerg's transition from offshore oil and gas to offshore wind is managed in place, minimizing socio-economic disruption. The city retains its status as an energy hub, allowing workers to transfer existing skills to the emerging wind industry without relocating or sacrificing their quality of life. This localized approach to workforce transitions could be effective in Canadian communities where a single industry has historically dominated, particularly if new local economic development investments offer job opportunities.

Lesson 3

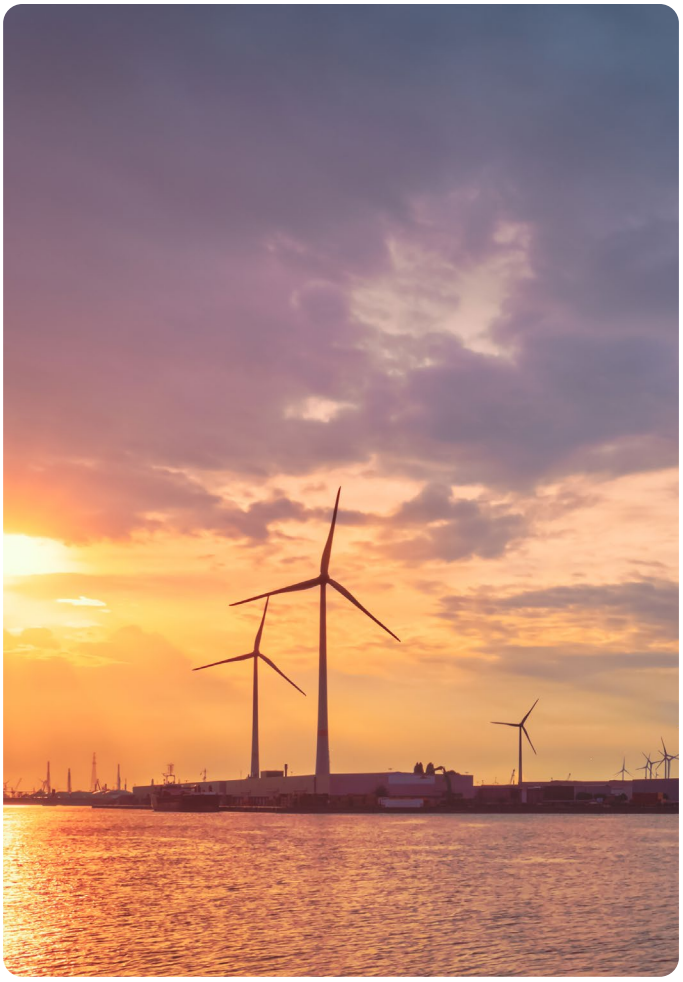
Co-ordination and consensus

Denmark's strong traditions of tripartite collaboration (government, unions, industry) and multiparty climate commitments have provided the policy certainty and strong regulatory framework needed to support large-scale decarbonization investments (Krawchenko, 2022).

Lesson 4

Leveraging existing strengths

Decades of research and development in wind technology and Port Esbjerg's well-established infrastructure help the *Offshore Academy* build on local competencies. Canadian coastal regions with shipbuilding, offshore oil and gas or maritime experience can similarly adapt existing assets to accelerate a transition to offshore wind. Atlantic Canada, for instance, has been noted for its strong capabilities in marine industry and technology (Xodus Group, 2025). In 2022, onshore wind energy generated 5.7 per cent of Canada's electricity. The growth of offshore-wind-power production off the coasts of Nova Scotia and Newfoundland and Labrador offers the potential for economic growth and job creation in regions with higher levels of unemployment (Daborn et al., 2024; Statistics Canada, 2025).



Lesson 5

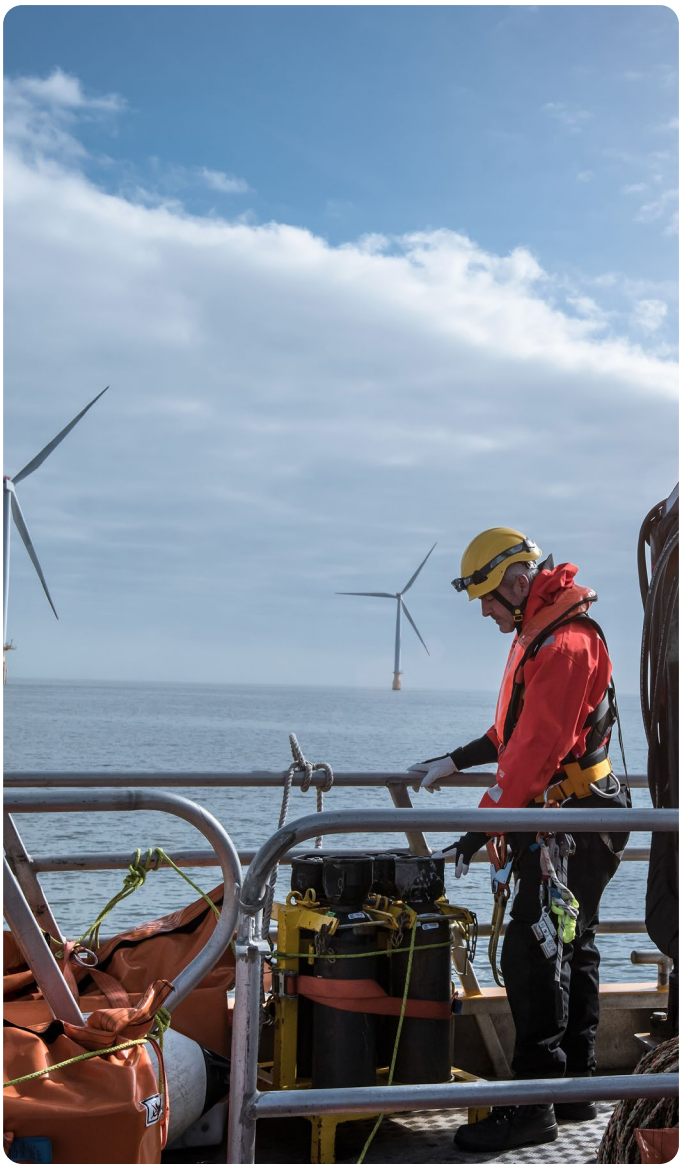
Transferability of skills

The academy's short, salaried training programs tap the overlaps between offshore oil and gas and wind sector skill sets (Krawchenko, 2022; Segal, 2023). Iron and Earth, based in Alberta, also provides training to oil and gas and other workers as part of its renewable-skills initiative (Iron and Earth, n.d.). However, the academy's more place-based approach, targeted at communities undergoing major economic transformations, could be beneficial when there are new investments and transferable skills.

Lesson 6

A strong social safety net can smooth workforce transitions for workers

A strong social safety net can smooth workforce transitions for workers — Denmark's robust social welfare system mitigates the risks workers face during an economic transition (C. S. Jensen, 2015). Flexible hiring and firing policies give companies adaptability, and robust social supports help workers navigate job transitions (Bacchetta et al., 2019). Further, *Offshore Academy* trainees receive full salaries thanks to collective bargaining agreements (3F, n.d.; Segal, 2023), which reduces household financial strain and facilitates the in-place transition. Loss of income is often a key concern for workers contemplating training for a new career (European Centre for the Development of Vocational Training, 2014).



Appendix

URLs and Official Websites

Programs, Initiatives and Strategic Frameworks

***Offshore Academy* (Program Announcement)**
https://portesbjerg.dk/en/news/new-offshore-training-programme-to-ensure-the-right-skill-sets-for-offshore-wind-adventure

North Sea Agreement (Framework for Oil and Gas Phase-Out)
https://www.en.kefm.dk/news/news-archive/2020/dec/denmark-introduces-cutoff-date-of-2050-for-oil-and-gas-extraction-in-the-north-sea-cancels-all-future-licensing-rounds

Danish *Climate Act (2020)*
https://www.en.kefm.dk/Media/1/B/Climate%20Act_Denmark%20-%20WEBTILGÆNGELIG-A.pdf

Danish Flexicurity Model
https://www.star.dk/en/about-the-danish-agency-for-labour-market-and-recruitment/flexicurity

IEA Wind Technology Collaboration Programme
https://iea-wind.org/

Organizations and Implementing Bodies

Port Esbjerg
https://portesbjerg.dk/en/

3F (United Federation of Workers)
https://www.3f.dk/english

Danish Ministry of Climate, Energy and Utilities
https://en.kefm.dk/

Funding, Investment and Support Mechanisms

European Commission's Just Transition Fund
https://commission.europa.eu/funding-tenders/find-funding/eu-funding-programmes/just-transition-fund_en

Danish Green Taxation Framework
https://www.oecd.org/tax/tax-policy/taxing-energy-use-denmark.pdf

PensionDanmark
https://www.pensiondanmark.com/en/

Infranode
https://www.infranode.eu

Canadian Programs and Systems Mentioned for Comparison

Iron and Earth
https://www.ironandearth.org/

Natural Resources Canada (Wind Energy)
https://natural-resources.canada.ca/energy-sources/renewable-energy/wind-energy

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