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SCOTWIND: THE INVESTMENT NEEDED TO SECURE MANUFACTURING JOBS IN SCOTLAND

Report commissioned by
Scottish Trades Union Congress and
written by **Transition Economics**.

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FOREWORD

Our latest report analysing the ONS figures on jobs and turnover in Scotland's Low Carbon and Renewable Energy Economy must serve as a wakeup call.¹ There is a widening gap between the income made by companies and the number of jobs in Scotland. Wealth from our renewable resources is being extracted by private companies, bypassing workers and their communities. The STUC has warned of this outcome after years of promises without policy, and ambition without action.

By mid-2023, there was **over 12GW** of offshore and onshore wind capacity operational in Scotland, rising from 4.5GW a decade earlier.² This is **more than 22 of the 27 EU member countries**, behind only the likes of Germany and France, but ahead of Denmark and the Netherlands.³ Despite the rapid growth in capacity, jobs in these sectors have not risen at anywhere near the same rate. There were more offshore wind jobs in Scotland in 2021 than in 2022, and more onshore wind jobs in 2015 than 2022.⁴

Experience should have made it abundantly clear that the development of new wind farms does not translate into a jobs bonanza in Scotland. Yet we are seeing a repeat of these mistakes with rhetoric on jobs from the development of ScotWind projects, without serious policy for building and securing work in our supply chains.

Following our analysis of the ONS figures, we commissioned further in-depth research into the ScotWind projects. Transition Economics have estimated the potential economic implications of ScotWind if developers deliver on their own commitments and the obstacles to delivering domestic jobs and benefits at this scale.

Crucially, the analysis shows that there needs to be an enormous ramp-up in the Scottish supply chain for offshore wind to deliver the scale of investment committed. There are **currently no significant fabrication sites for offshore wind components** in Scotland, and **only two in development** with approved sites and funding.

There is less than a quarter of the investment needed to scale up our supply chains currently on the table between UK and Scottish Government commitments. Without plugging these gaps, limitations in the supply chain will undermine the potential for investment into Scotland and the green jobs that could be created.

Two years after the original Supply Chain Statements, developers from four ScotWind projects lowered the share of investment committed to Scotland.⁵ This analysis provides more impetus for an Industrial Strategy that brings the active involvement of the public sector into the green economy. The Scottish Government must use ownership at a national and local level to build our supply chains, alongside strictly enforcing the commitments made by ScotWind developers. Without these interventions, past failures will be repeated with investment taken overseas, and opportunity lost.

As ScotWind projects are taken forward we will be monitoring the actions of developers and how they perform against their stated commitments. With expected profits from the projects estimated to be between **£7 billion - £29 billion**, there is no excuse for failing to ensure the wealth from Scotland's natural resources is used to support the creation of new jobs on fair work terms and to build community wealth across the country.

SUMMARY

20 offshore wind projects received option agreements from Crown Estate Scotland as part of the ScotWind Leasing round in 2022. The 20 projects have a potential total capacity of **almost 30 GW of offshore wind** - both floating and fixed.⁶ The companies that won these leases were required to publish Supply Chain Development Statements estimating the level of investment they expect to make as part of the projects, broken down between Scotland, rest of UK, EU and rest of world.

Based on the data from the updated Supply Chain Development Statements published in summer 2023⁷, Transition Economics has estimated the potential economic implications of these projects if developers deliver on their own commitments - and obstacles to delivering domestic jobs and benefits at this scale.

Our analysis finds that:

- ScotWind developers have **committed to invest 38%** of their overall supply chain spend in Scotland - equivalent to **almost £30 billion**.
- If ScotWind developers do actually source from Scotland at the scale committed to, this could potentially deliver peak direct employment of **25,000 jobs**.
- The potential average direct & indirect jobs per annum are **3,500 over 10 years** of development, **19,700 over 9 years** of manufacturing & fabrication, **7,100 jobs over 9 years** of installation, **2,000 jobs over 26 years** of operations, and **455 jobs over 8 years** of decommissioning if ScotWind developers meet their commitments. These phases will be partially overlapping as individual projects are initiated at different times.
- However, to reach the job creation potential and domestic procurement ScotWind developers have promised, there **needs to be an enormous ramp-up** in the Scottish supply chain for offshore wind.
- Scotland will **need 19 significant fabrication sites for offshore wind components** (e.g. blades, nacelles, towers, foundations, floating substructures, cables). **Currently, Scotland has 0 significant fabrication sites**. Only 2 significant fabrication sites are currently in development, with approved sites and initial funding allocated.
- Existing public investment to scale up Scotland's domestic supply chains for offshore wind is a drop in the ocean compared to the **£2.5 billion - £4.5 billion required**. Currently there is **less than £600 million on the table** - between 13% and 23% of what is needed.
- We estimate the total Net Present Value (**value of future profits**) of ScotWind projects at **between £7 billion** (at an Internal rate of return of 4%) **to £29 billion** (at an Internal rate of return of 8%).
- Greater public investment also needs to be combined with an industrial strategy setting accountable conditions to grow domestic supply chains, alongside a **publicly-owned Scottish energy champion** able to use its heft to make long-term commitments to domestic suppliers.

INTRODUCTION

This report, commissioned by the **Scottish Trades Union Congress** and researched and written by **Transition Economics**, sets out the potential investment necessary to deliver ScotWind projects, and what is needed to scale up Scotland's supply chain to be able to secure jobs domestically.

The research is broken down into six sections:

1. Projected investment in ScotWind projects
2. Potential job creation from ScotWind projects
3. Supply chain constraints and the role of government action in securing manufacturing job creation
4. What public investment is available to scale Scotland's offshore wind manufacturing supply chains, and what is needed?
5. Estimated profits of ScotWind projects

1. Projected investment in ScotWind projects

The committed investment in ScotWind projects, according to Transition Economics & STUC analysis of the developers' Supply Chain Statements⁸, is as follows:

- **£29.5bn** in Scotland (**38%**)
- **£13.2bn** in the rest of the UK (**17%**)
- **£26.7bn** in the EU (**34%**)
- **£8.3bn** in the rest of the world (**10%**)

The actual levels of future domestic investment may be lower. In fact, STUC analysis showed that between the initial Supply Chain Statements published in 2022 and their updates in 2023, **four projects decreased commitments in investment in Scotland** and only one increased it. The most significant factors that are likely to bring down the overall levels of investment are:

- **Project cancellations.** Not every project may go ahead and some cancellations are to be expected depending on market conditions for offshore wind developers - see e.g. Vattenfall's cancellation of the Boreas windfarm off the coast of Norfolk.
- **Supply chain limitations.** Since the Supply Chain Statements are published by individual developers and not coordinated, there is no requirement on developers to assess whether there will be domestic capacity to meet all of their collective stated domestic source needs. If every project goes ahead and every company aims to source components from Scottish suppliers according to their commitments, there may not be enough manufacturing capacity - see more on this in Section 3.

It should also be noted that developers have an interest in presenting an over-optimistic forecast for domestic investment, with very limited accountability to ensure this is delivered. Analysis by Common Weal showed that the nominal conditions placed on the minimum commitments indicate that it would be profitable for companies to break the majority of these commitments.⁹

2. Potential job creation from ScotWind projects

Based on the ScotWind Supply Chain Development Statements published by the companies involved, Transition Economics has modelled the potential job creation from the 20 proposed offshore wind projects. This analysis estimates potential jobs over the lifetime of the projects during pre-development, construction & installation, operations & maintenance, and decommissioning.

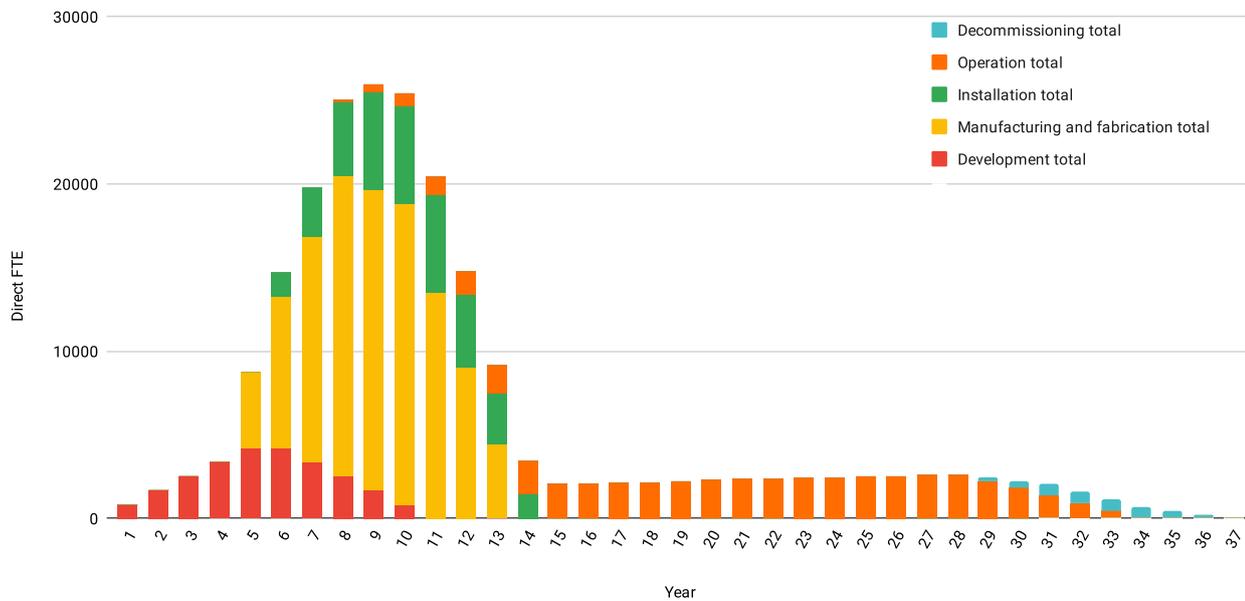
Taking SCDS commitments at face value, we estimate possible job creation in Scotland across all ScotWind leases as:

Table 1: Potential average direct & indirect jobs created per phase of ScotWind

	Development (+ pre-construction)	Manufacturing and fabrication	Installation	Operation	Decommissioning
Average length of phase per project (first 3 phases partially overlapping)	5 years	4 years	4 years	20 years	3 years
Average length for all ScotWind projects (if projects staggered over 6 years)	10 years	9 years	9 years	26 years	8 years
Direct jobs per year during phase (average)	2,555 jobs	13,125 jobs	4,425 jobs	1,488 jobs	311 jobs
Indirect jobs per year during phase (average)	958 jobs	6,623 jobs	2,655 jobs	468 jobs	144 jobs
Total jobs per year during phase (average)	3,513 jobs	19,748 jobs	7,080 jobs	1,956 jobs	455 jobs

Assuming that all ScotWind projects receive a final investment decision within six years of each other, we estimate the potential for job creation over time as shown in **Graph 2** (on page 6). During the peak year (**9 - 10 years in**) over **25,000 direct jobs** could be created by ScotWind projects, including **20,000 in manufacturing and fabrication**. Depending on when projects receive Contracts for Difference and final investment decisions, this peak could take place around 2034.

Graph 2: Job creation from ScotWind projects over time, if investment matches Supply Chain Plan commitments.



Our methodologies for estimating potential job creation from new offshore wind projects was developed in our analysis for the Scottish Trades Union Congress, and published in the Green Jobs in Scotland report in April 2021.¹⁰

The approach adopted for this report is a **three step process**:

1. Take figures for investment in Scotland in the development, manufacturing & fabrication, installation and operational phases of offshore wind projects, provided by the companies in their Supply Chain Development Statement commitments (SCDS). Create a more granular breakdown of investment within each phase, based on the percentage breakdown of wind farm cost components published by Offshore Renewable Energy (ORE) Catapult. SCDS do not provide decommissioning figures, so an **additional investment of 1.8% is assumed** based on ORE Catapult figures.
2. Identify relevant Standard Industrial Classification (SIC) codes for each cost component, identify employment effect and employment multipliers for each SIC code as published by the Scottish Government in Supply, Use and Input-Output Tables, and calculate average employment effect (“total jobs”) and average employment multiplier (“indirect jobs created per direct job created”) across relevant SIC codes for each cost component. Cross-check against ONS published employment effects and multipliers.
3. Calculate the number of potential full time direct and indirect jobs created in Scotland each year for each phase of the offshore wind projects using inputs from (1) and (2), applying assumptions about the sequencing and length of phases within each project, and staggering of projects across the whole portfolio. Calculations also **assume an annual efficiency improvement of 2%**, based on PWC’s UK Productivity Tracker.¹¹

3. Supply chain constraints and the role of government action in securing manufacturing job creation

Securing ScotWind's domestic jobs potential will be an enormous challenge - especially the manufacturing and fabrication components.

Despite the scale of local content that the offshore wind developers have committed to source domestically, Scotland is hampered by:

- A **small supply chain** base across construction, manufacturing and O&M
- The **limited government support** mechanisms and public investment available to increase this
- The **privatised** nature of the **ScotWind developers**
- The **privatised** nature of Scotland's ports and its **manufacturing base**

Existing offshore wind farms in Scotland have been criticised for relying too heavily on components manufactured in other countries, offshoring the labour required to deliver the projects.¹² The 2023 report of the UK Government's Offshore Wind Champion identified that privatisation of ports is the key reason they have failed to capture benefits from offshore wind deployment to date, "due to a shorter term more commercially-focussed risk appetite than publicly-owned ports in continental Europe, with longer-term investment horizons."¹³ Many ports across Europe are owned by local or regional authorities that are actively engaged in growing local supply chains, for example Danish and German ports like Esbjerg and Cuxhaven benefited from significant public investment and attracted subsequent private investment.¹⁴

Much of ScotWind is floating offshore wind. As floating offshore wind is a less mature technology, there is more potential for Scotland to capture more of the manufacturing supply chain. This creates an opportunity to improve on local job creation and economic benefit, as compared to the experience with fixed bottom offshore wind.

However, **Scotland (and the UK) has been slow** to prepare the infrastructure and strategic supply chain capability to deliver large scale floating offshore wind farms.¹⁵ Without the domestic capacity to manufacture, to install, or to operate, projects will be delivered from outside Scotland. This would both result in the **direct loss of value** of these activities to the UK and present a significant barrier to the broader supply chain in securing a share of related activity.¹⁶

Transition Economics has analysed the necessary scale-up in Scotland's supply chain capability, in order for the ScotWind developers to deliver on their commitments to source from domestic manufacturing sites. We have focused on manufacturing, as this makes up the largest portion of potential job creation in the near and medium term.

We identified the number of manufacturing sites needed in Scotland to deliver specific components (e.g. blades, towers, cables, foundations, anchors etc) that would be required to deliver the domestic manufacturing investment commitments in the ScotWind Supply Chain Development Statements.¹⁷

This was compared to the number of existing manufacturing sites in Scotland for each component, and to the number of planned manufacturing sites in Scotland for each component. This analysis on the following pages focuses on the "**big-ticket items**",

and those where Scotland could achieve a competitive advantage.¹⁸ Some existing manufacturing sites delivering less substantial components were not included, such as the additional balance of plant fabrication currently delivered by Global Energy Group at Nigg.¹⁹

Planned manufacturing sites have been listed where there has been public announcements that a manufacturer has secured a location and some financing. We have **not included sites where plans are at an earlier stage**, including potential projects announced recently in Stage 2 of the the Strategic Investment Model (e.g. Dajin Heavy Industry Co. Ltd’s proposed Tower and Foundation Manufacturing Facility, or Mingyang’s proposed Wind Turbine OEM Facility).²⁰

Note that these are not the total manufacturing sites needed to deliver the ScotWind wind farms as a whole, but only those estimated as necessary to meet the existing SCDS commitments for domestic manufacture.

Arguments have been made that Scotland will not manage to build up manufacturing capacity across the breadth of these components, and should focus on certain specialisms. To meet the targets set out in SCDS, a reduction in domestic manufacturing of one component would need to be matched by concomitant increase of other components. For example, **if Scotland does not manage to secure domestic production** of nacelles (including the drive train and other internal components, as well as assembly), this would need to be **counterbalanced with significant increases in manufacturing sites of other components**.

Table 3: A comparison of the significant manufacturing sites needed to deliver the ScotWind jobs potential, and those in the pipeline

	How many manufacturing sites needed to meet SCDS commitments?	How many manufacturing sites exist in Scotland? ²	How many manufacturing sites in development in Scotland? ²
Inter-array and export cables	4	0	2 ²³
Towers	1	0	0 ²⁴
Monopile foundations	2	0 ²⁵	0 ²⁶
Offshore substation	1	0	0
Blades	2	0	0 ²⁷
Nacelle assembly, drive train, electrical system	3	0	0
Floating substructure	3	0	0 ²⁸
Mooring & anchoring	1	0	0 ²⁹
Vessels for logistics and for installation	2	?	?

*Note that some of those that are in development may not be realised. As evidenced by the existing prior plans that have been put on hold, e.g. to develop a tower factory at GEG’s Nigg site, or the former Bifab yards being reoriented away from foundation fabrication.

4. What public investment is available to scale Scotland's offshore wind manufacturing supply chains, and what is needed?

Significant public investment and an active industrial strategy will be needed for Scotland to grow and anchor the domestic manufacturing supply chains for ScotWind.

Existing and recently announced public support schemes include:

- **Scottish Government:** £500 million to upgrade “ports, manufacturing and assembly work to support major supply chain opportunities in Scotland”.³⁰
- **UK Government:** The £160 million Offshore Wind Manufacturing Investment Scheme is now closed. This was expected to support Global Energy Group's plans for a tower fabrication facility at Nigg, prior to Haizea pulling out.³¹
- **UK Government:** The £160 million Floating Offshore Wind Manufacturing Investment Scheme was open for applications until August 2023.³² The Port of Cromarty Firth was one of two ports shortlisted for the primary list of this grant scheme.³³

Note that both Cromarty and Nigg are within freeport areas. Trade unions have noted concerns that workers' rights may be limited under freeport rules.³⁴

Additional public investment committed by political parties in the run-up to a 2024 UK General Election:

- **UK-wide:** Labour Party commitment to £1.8 billion investment to upgrade ports for the climate transition.³⁵
- **UK-wide:** Labour Party commitment to British Jobs Bonus of up to £1.5 billion over Parliament in annual capital grants towards developers of offshore wind, hydrogen and other technologies to invest and create jobs in coastal communities and industrial heartlands.³⁶

Transition Economics estimate of Labour's commitment is that Scotland would at best win 35% of the port investments and 25% of the BJB - equivalent to £1.005 billion.

The growth in local supply chain and job creation potential that would result from realising ScotWind's SCDS commitments is similar to the job creation potential estimated in the 2021 Green Jobs in Scotland report commissioned by the STUC from Transition Economics.³⁷ The analysis for this 2021 paper estimated that to achieve the target social and economic benefits and job outcomes from large scale offshore renewables, **Scotland would need to see £2.5 - £4.5 billion of public investment** into ports, alongside a Scottish National Energy Company aiming to build 35 GW of renewables.³⁸

In comparison, existing public investment commitments by the Scottish and UK Government reach approximately £0.58 billion - between 13% and 23% of that required. Even adding our estimate of Labour's commitment to what is currently in place would reach £1.585 billion - still significantly short.

The Scottish Renewables response to Port of Cromarty Firth being placed on the primary list for FLOWMIS public investment applies to the overall scale of public

investment support currently on the table for upgrading supply chains: “This funding is only a drop in the ocean and supply chain support like this needs to be delivered at pace to establish a world-class renewable energy supply chain in Scotland.”³⁹ **Public investment is needed at scale, and should lead to public equity stakes in supply chains and infrastructure.**

5. Estimated profits of ScotWind projects

Based on expected internal rate of return figures published by offshore wind developers, it is possible to estimate lifetime returns of the ScotWind projects. These returns are the interest generated by financial institutions that fund the wind power projects (e.g. investment banks), plus profit made by the companies themselves.

Simply put, the returns of a windfarm project are the income a windfarm generates (i.e. what customers pay the company that owns the windfarm), minus the costs of building, operating, and eventually decommissioning the windfarm. Figures published by offshore wind developers estimate the internal rate of return (IRR) in relation to the cost of a given windfarm: for example, Orsted has recently estimated that a number of its windfarms are **expected to generate a 7% to 8% return on investment**, and Equinor **expects a 4% to 8% return**. Based on our literature review of reporting by a variety of companies involved in North Sea offshore wind development, every company **expects a return (IRR) between 4% and 8%**.

Using the investment total figures as reported in the ScotWind Supply Chain Statements, together with the expectation of IRR between 4% and 8%, we have modelled the Net Present Value (NPV) of the ScotWind projects added together. Net Present Value represents the future profits of an investment, discounted for the decreasing value of currency over time.

We estimate the total NPV of ScotWind projects at between £7 billion (at IRR of 4%) and £29 billion (at IRR of 8%).

Table 4. Estimated profitability of ScotWind projects

	Lower profit scenario	Higher profit scenario
Total investment	£79,095 million	£79,095 million
Internal Rate of Return (represents profitability)	4%	8%
Net Present Value (represents current value of future profits from projects)	£7,006 million	£28,536 million

Our modelling assumes: development, manufacturing, fabrication and installation of projects is evenly spaced out with projects initiating development within a six-year period. Discount rate of 3%.

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- 18 | UK Government | [Offshore Wind Net Zero Investment Roadmap & OWIC | 2023 Supply Chain Capability Analysis](#)
- 19 | Offshore Wind | [Global Energy Starts Fabricating Moray West J-Tube Frames](#)
- 20 | Offshore Wind Scotland | [Stage 2 SIM Projects](#)
- 21 | Based on Transition Economics analysis of the existing landscape.
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