How much can the British Jobs Bonus boost supply chains and job creation?

Estimating the potential for the British Jobs Bonus to deliver domestic supply chain growth and job creation in offshore wind

Contents

Published September 2024.

transitioneconomics.net
@transition_econ

This analysis was commissioned from Transition Economics by Uplift.

Research questions

1. **What can the British Jobs Bonus deliver in terms of domestic job creation and local content, and how does it get there?**
    a. **What numbers of workers can the BJB deliver jobs for with different levels of investment?**
    b. **What are the number and type of tangible investments required for job creation in terms of, for example, fabrication sites, cable making factories etc.**

Findings

Number and Type of Tangible Investments into manufacturing plants

- This analysis demonstrates the potential for the British Jobs Bonus to help establish 29-30 new or upgraded manufacturing facilities as part of the offshore wind supply chain, supporting over 10,000 direct manufacturing jobs.
- Manufacturing plants that should be created include
    - the equivalent of 4 new blade factories, 3 tower factories, 2 jacket or gravity-based foundation fabrication yards, an expansion to deepwater monopile foundation manufacturing, and one additional transition piece fabrication yard.
    - 2 fabrication yards for floating platforms and 3 factories for anchors & moorings - to meet additional needs of floating offshore wind
    - 3 facilities for nacelle assembly, as well as factories to manufacture drivetrain components: 2 for generators, and one each for gearboxes and power convertors.
    - 2 cable factories and one facility to manufacture large power transformers for substations and grid upgrades
    - Boosting domestic production of critical materials for components, with two facilities for glass fibre and one each for zero carbon concrete and for steel plate.
- These new and upgraded manufacturing plants would enable the UK supply chain to supply 50% of the *targeted* components and critical materials needed for the offshore wind pipeline from 2029-2040. These are not all the components and critical materials required for the pipeline. For example, we have not included metal castings, offshore substations or installation vessels, or carbon fibre, resin, primary steel or copper in this analysis.

Job Creation

- We estimate the potential direct manufacturing jobs created within these yards and factories as just over 10,000.
- These are not temporary jobs in constructing the facilities, but long-term jobs within the factories, that would continue as long as the manufacturing plants operate.
- Potential indirect jobs are estimated at between 7,300 and 13,300.
- Given the need to repower and replace offshore wind turbines approximately every 25 years, these should be permanent jobs.

Role of British Jobs Bonus is delivering this boost to offshore supply chains

- The total public and private investment to deliver these new factories is estimated at just over £7 billion.
- Our mid-range estimate for the public support to leverage these investments into new manufacturing facilities is £1.4bn. Our analysis also includes a higher estimate of £2.1bn and a lower estimate of £0.7bn. The lower estimate is based on past state support through Offshore wind manufacturing investment support scheme (OWMIS) - which likely captured the “lowest-hanging fruit” where investment costs were lower. Achieving the scale of additional manufacturing capacity described in this analysis would likely require between our mid-range and our high-range estimate.
- The government has stated that the British Jobs Bonus will be allocated £500 million per year for three years from 2026/2027 - 2028/2029. The British Jobs Bonus has various aims, in addition to boosting domestic manufacturing supply chains.
- Transition Economics’ proposal for the policy implementation of the British Jobs Bonus includes providing BJB payments to renewables developers to ensure job quality (£70 million) and to support a just transition for the North Sea oil & gas workforce (£50 million).
- We propose that per year, £380 million is directed towards driving additional manufacturing investments in the UK.
- Over the three years of the British Jobs Bonus allocated in this Parliament, that totals £1.14 billion.
- To reach the mid-range subsidy estimate to deliver the target manufacturing facilities, a further £290 million in government investment would be required. To reach the high-range subsidy estimate, an additional £1.003 billion in government funding would be required.

Upgrading underlying infrastructure

- Most of the targeted manufacturing facilities would be in coastal locations, and require significantly improved dockside and port facilities. Given the size of modern offshore wind turbines, including components, this will require large lay-down areas.

- UK ports are not currently in a fit state to host this level of manufacturing capacity, after decades of underinvestment. While UK ports are predominantly privatised, ports elsewhere in Europe are predominantly publicly-owned, and have access to more pro-active investment into upgrades.
- Without public investment to upgrade the UK's ports and dockside spaces, including establishing large enough lay-down areas, the proposed scale of manufacturing facilities cannot be built in the UK.
- Labour's manifesto commitment to invest £1.8 billion of its National Wealth Fund to upgrade the UK's port infrastructure will be essential. Any rollback on this planned public investment will directly undercut the UK's ability to hit its clean energy targets, to become a clean energy superpower, and to deliver the investment and jobs benefits from the British Jobs Bonus.

Additional Notes:

- This analysis focuses on the potential of the British Jobs Bonus to grow the supply chain and jobs for offshore wind. The British Jobs Bonus support for supply chains could be targeted entirely at the offshore wind sector or also additional renewable sectors such as onshore wind, solar, tidal stream.
- There is some overlap, with certain supply chain companies supplying onshore and offshore wind, including fabricators like Hutchinson Engineering, as well as cable, generator, gearbox and steel plate manufacturers.
- Although we identify a target of 50% domestic volumes per component, and from these the target number of plants to deliver these volumes - in reality flexibility is important. Rather than aiming for 50% for each component, for some components it would make sense to produce 80% or 100% domestically, whereas for others 25% or less is more likely. This would lead to higher numbers of plants for some components, and lower for others.

Findings tables:

Table 1: Components and critical materials for the British Jobs Bonus to target

Table 1: Components and critical materials for the British Jobs Bonus to target	
Component / Critical Material	**Ease of securing domestic production**
Blades	Easier
Nacelles	More challenging
Towers	Easier
Monopile foundations	Easier
Jackets / gravity-based foundations	Easier
Transition Pieces	Easier
Floating Platforms / Semi-submersibles	Easier
Cable	Easier
Anchors & Moorings	Easier
Power convertors for drive train	More challenging
Generators for drive train	More challenging
Gearboxes for drive train	More challenging
Large Power Transformers for substations and grid upgrades	More challenging
Steel Plate	More challenging
Glass Fibre	Easier
Zero carbon concrete	Easier

Table 2: Estimates for state support required per facility

Table 2: Estimates for state support required per facility				
Component / Critical Material	**Average investment cost per facility (£m)**	**Low subsidy (£m)**	**Medium subsidy (£m)**	**High subsidy (£m)**
Blades	228	22	46	68
Nacelles	190	18	38	57
Towers	250	24	50	75
Monopile foundations	304	29	61	91
Jackets / gravity-based foundations	70	7	14	21
Transition Pieces	152	15	30	46
Floating Platforms / Semi-submersibles	200	19	40	60
Cable	350	34	70	105
Anchors & Moorings	100	10	20	30
Power convertors for drive train	134	13	27	40
Generators for drive train	266	26	53	80
Gearboxes for drive train	157	15	31	47
Large Power Transformers for substations and grid upgrades	134	13	27	40
Steel Plate	1,520	146	304	456
Glass Fibre	126	12	25	38
Zero carbon concrete	321	31	64	96

Table 3 Average annual deployment of new offshore wind

Table 3: Average annual deployment of new offshore wind (2029-2040)		
Technology	Capacity	Turbines
Fixed Offshore Wind	5.5 GW	393
Floating Offshore Wind	2.5 GW	179

Table 4 Total annual volume of components to support offshore wind pipeline

Note: This is the total volume of components required, both manufactured domestically and imported.

Table 4: Total annual volume of components needed to support offshore wind pipeline		
Component / Critical Material	Annual volume required to meet pipeline	
Blades	1,714	units
Nacelles	571	units
Towers	571	units
Monopile foundations	196	units
Jackets / gravity-based foundations	196	units
Transition Pieces	482	units
Floating Platforms / Semi-submersibles	179	units
Cable	2,418	km
Anchors & Moorings	714	units
Power convertors for drive train	571	units
Generators for drive train	571	units
Gearboxes for drive train	571	units
Large Power Transformers for substations and grid upgrades	30	units
Steel Plate	2,133,333	tonnes

Table 5 Domestic manufacturing facilities to be delivered by the British Jobs Bonus

Table 5: Domestic manufacturing facilities to be delivered by the British Jobs Bonus					
Component / Critical Material	**Number of domestic factories to build/upgrade**	**Total investment required (£m)**	**Subsidy (low) (£m)**	**Subsidy (medium) (£m)**	**Subsidy (high) (£m)**
Blades	4	912	88	182	274
Nacelles	3	570	55	114	171
Towers	3	750	72	150	225
Monopile foundations	0.5	152	15	30	46
Jackets / gravity-based foundations	2	140	13	28	42
Transition Pieces	1	152	15	30	46
Floating Platforms / Semi-submersibles	2	400	38	80	120
Cable	2	700	67	140	210
Anchors & Moorings	3	300	29	60	90
Power convertors for drive train	1	134	13	27	40
Generators for drive train	2	532	51	106	160
Gearboxes for drive train	1	156.8	15	31	47
Large Power Transformers for substations and grid upgrades	1	134	13	27	40
Steel Plate	1	1520	146	304	456
Glass Fibre	2	252	24	50	76
Zero carbon concrete	1	321.3	31	64	96
Total	**29.5**	**7,126**	**684**	**1,425**	**2,138**

Table 6 Job creation to be delivered by the British Jobs Bonus

Table 6: Job creation to be delivered by the British Jobs Bonus					
Component / Critical Material	**Number of domestic factories to build/upgrade**	**Jobs per facility**	**Direct jobs in the UK**	**Indirect jobs in the UK (high estimate)**	**Indirect jobs in the UK (low estimate)**
Blades	4	500	2,000	2,033	1,318
Nacelles	3	230	690	*	*
Towers	3	290	870	1,140	331
Monopile foundations	0.5	550	275	583	250
Jackets / gravity-based foundations	2	500	1,000	867	417
Transition Pieces	1	300	300	667	125
Floating Platforms / Semi-submersibles	2	240	480	1,857	512
Cable	2	230	460	667	418
Anchors & Moorings	3	110	330	400	300
Power convertors for drive train	1	580	580	720	527
Generators for drive train	2	580	1,159	1,441	1,054
Gearboxes for drive train	1	396	396	493	360
Large Power Transformers for substations and grid upgrades	1	580	580	720	527
Steel Plate	1	460	460	433	585
Glass Fibre	2	250	500	901	308
Zero carbon concrete	1	210	210	379	316
Total	**29.5**		**10,289**	**13,301**	**7,347**

Note on policy design and estimates: Although we identify target domestic volumes per component - and from these target number of plants to deliver these volumes - in reality flexibility is important. Rather than aiming for 50% for each component, for some components it would make sense to produce 80% or 100% domestically, whereas for others 25% or less is more likely. This would lead to higher numbers of plants for some components, and lower for others.

Note on indirect job creation: Indirect jobs represent jobs in the supply chain that inputs into the production of a particular good (e.g. the metal components, fixings and coatings used to produce a particular part). Estimates of indirect job creation are unavoidably more uncertain than those for direct jobs, therefore two estimates are included.
We have not included any indirect jobs for nacelle assembly, because the major components of the nacelle (generator, gearbox, power converter) are included in the direct jobs analysis. Direct jobs in Steel plate, Glass Fibre and Concrete are also indirect jobs for other components. We have therefore reduced the indirect jobs (for Towers, Blades and Floating Platforms) by the direct jobs for those critical materials.

Methodology

Identifying opportunities for manufacture of components/critical materials for UK offshore wind

1. We conducted supply chain analysis of the UK and international offshore wind inputs, including assembly, key components and critical material.
2. UK existing strengths and weaknesses were assessed, as well as existing and planned international supply chain capacity elsewhere within Europe and in Asia (primarily India and China). We discounted US production, as this is forecast to likely supply the US market.
3. This enabled us to identify target focus components and critical material for the UK to aim to manufacture and process.
4. These are identified in Table 1, with a summary assessment on the ease of securing these within the UK.
5. Components and critical minerals that this analysis concluded were either weaker opportunities for domestic manufacture, or where there was insufficient data, included metal castings, offshore substations or installation vessels, or carbon fibre, resin, primary steel or copper in this analysis.

Investment cost per manufacturing facility

1. For each component/critical materials, data was sourced on required investment to construct or upgrade manufacturing facilities.
2. This included
    a. Data on investments into UK manufacturing facilities delivered or in delivery (e.g. the Sumitomo High Voltage Cable factory in Nigg[1])
    b. Data on investments into manufacturing facilities beyond the UK that were delivered or in delivery (e.g. Siemens facility for Large Power Transformers planned for Charlotte, North Carolina[2])
    c. Industry forecasts for future investment required to expand the UK offshore wind supply chain (e.g. the 2024 Offshore WInd Industrial Growth Plan from Renewable UK and the Offshore Wind Industry Council[3])

[1] https://www.hie.co.uk/latest-news/2024/february/23/245m-to-secure-350m-inward-investment/

[2] https://www.siemens-energy.com/global/en/home/stories/transformer-manufacturing-and-service-expansion-in-us.html

[3] https://cdn.ymaws.com/www.renewableuk.com/resource/resmgr/publications/reports/Offshore_Wind_Industrial_Gro.pdf

   d. International forecasts and estimates for the investment cost of new manufacturing facilities (e.g. the US National Renewable Energy Laboratory's Supply Chain Road Map for Offshore Wind[4])
3. Data was assessed and combined with Transition Economics market and investment intelligence, to determine the best estimate for UK investment costs per facility

Public Support per Facility

1. To identify the public support required per facility, we conducted subsidy analysis, examining existing state aid support schemes for offshore wind manufacturing investments in EU countries, in the US, and in the UK
2. This included sourcing data on UK public support provided to secure offshore wind manufacturing facilities in the UK (including those supported through the Offshore Wind Manufacturing Investment Scheme[5])
3. This was used to calculate a ratio of public support to total investment cost, for existing UK facilities. We used this proportion - 9.6% - as our lower range estimate for the proportion of public support required per facility.
4. We also identified the EU's allowance for state support under the Temporary Crisis and Transition Framework for the production of wind turbines, key components and critical materials (as well as solar panels, batteries, heat pumps, hydrogen and CCUS) as a key comparator.
5. Several EU countries have announced state aid schemes under this framework to support the production of strategic equipment for the transition to a net-zero economy, including Germany (€3 billion across a range of measures[6]), France (€2.9 billion in tax credits[7]), Spain (€1.1 billion in grants[8] and €837 million in loans[9]).
6. The TCTF applies ceilings for the maximum state aid total and proportion of support per project (although proportions can be higher if it is provided via tax breaks). These ceilings are based on the location of the manufacturing facility on the EU's Assisted Areas Map, and the size of the enterprise supported.[10] We took Assisted Area C and large enterprise (20% support) and Assisted Area C and medium enterprise (30% support) as most relevant proportions of support.

---

[4] https://www.nrel.gov/docs/fy23osti/84710.pdf

[5] https://www.gov.uk/government/publications/offshore-wind-manufacturing-investment-support-scheme-investment-programme

[6] https://ec.europa.eu/commission/presscorner/detail/en/ip_23_3779

[7] https://ec.europa.eu/commission/presscorner/detail/EN/ip_23_6751

[8] https://ec.europa.eu/commission/presscorner/detail/en/IP_23_5727

[9] https://ec.europa.eu/competition/state_aid/cases1/202322/SA_107094_90587688-0100-C6D7-ACB4-CA1BAA6A45F1_63_1.pdf

[10] https://competition-policy.ec.europa.eu/document/download/ddb5f752-659a-41dc-9c39-fa01cc5eb880_en?filename=overview_of_TCTF_section_2.8_schemes.pdf

7. The USA also provides 30% support to new relevant manufacturing facilities under the Inflation Reduction Act's Qualifying Advanced Energy Project Credit.[11]
8. These inputs were used to identify a range of Subsidy Proportions:
    a. Low Public Support: 9.6%
    b. Medium Public Support: 20%
    c. High Public Support: 30%
9. Combining these proportions with the total investment cost per facility, allowed estimates for a low, medium and high figure for public support per facility - as shown in Table 2

Target volumes of domestically-manufactured components required for UK offshore wind pipeline

1. The Government's budget for the British Jobs Bonus starts in the third year of the Parliamentary term (2026-2027). Manufacturing facilities supported in 2026/2027 will not come on stream until 2028 at the earliest, and at very best support offshore wind farms coming on stream in 2029/2030.
2. To assess the long term demand for offshore wind components in the UK, we examined the future pipeline. Recent award volumes under the now annual CfD allocation rounds have been volatile. However, there is clear political consensus backing the industry.
3. Between 2029/2030 and 2040, we estimate average annual deployment of
    a. 5.5 GW of fixed bottom offshore wind
    b. 2.5 GW of floating offshore wind. This would lead to a total of 30-31 GW of FLOW by 2040, less than Renewable UK's target of 34 GW.[12]
4. From these annual GW deployment numbers, we identified the annual number of wind turbines deployed. We assume an average of 14 MW per turbine. There are already more powerful turbines being produced, but there are also increasing calls to cap the size of turbines in a bid to press pause on the wind turbine scale "arms race" and allow manufacturers to deploy economies of scale over time[13]. Using a larger number for the MW per turbine would reduce the number of turbines, but we estimate that costs per manufacturing facility and workforce would go up.
5. From the number of turbines deployed per year, we calculated the volume of components required.

[11] https://www.menon.no/wp-content/uploads/2023-51-Offshore-wind-subsidy-regimes.pdf

[12] https://cdn.ymaws.com/www.renewableuk.com/resource/resmgr/docs/flow_tf_-_inegrated_report_f.pdf

[13] https://reneweconomy.com.au/size-limits-urged-to-stop-wind-turbine-arms-race-as-factories-struggle-to-keep-up/

   a. Blades, towers, export & array cables, nacelles, drive train components (generators, power convertors, gearboxes) are required for all turbines, as are critical materials including steel plate and glass fibre
   b. Foundations are only required for fixed bottom turbines. We estimated a split between monopile, jacket and gravity-based foundations.
   c. Transition pieces will likely not be required for all floating turbines, so we estimated a proportion of these as well as the fixed turbines.
   d. Floating platforms and anchors & moorings are only required for floating turbines.
   e. Large power transformers will be required for substations and associated grid upgrades to allow offshore wind hook-ups.
6. We used a target of 50% of domestic production per component, to identify target volumes for each component.
7. Note: Although we identify target domestic volumes per component - and from these target number of plants to deliver these volumes - in reality flexibility is important. Rather than aiming for 50% for each component, for some components it would make sense to produce 80% or 100% domestically, whereas for others 25% or less is more likely.

Annual Production per Plant

1. Annual production per plant was identified either based on data from the US National Renewable Energy Laboratory, from Renewable UK's Industrial Growth Plan, or industry media coverage of specific existing plants.[14]

Number of manufacturing facilities per component to target in the UK

1. Using the target volumes for each component identified above and the annual production per facility, we identified the number of facilities that the UK would need to deliver this level of production.
2. Where specific target volumes were not possible to estimate due to limited data (e.g. large power transformers, glass fibre, concrete) and because these critical materials are required for many other industries (e.g. glass fibre is in high demand from construction, automotive, aerospace and telecommunications), we used Transition Economics industrial and market analysis to estimate the opportunity for new facilities to supply offshore wind growth.

[14] https://cdn.ymaws.com/www.renewableuk.com/resource/resmgr/Industrial_Growth_Plan-Vf-1-.pdf https://www.nrel.gov/docs/fy23osti/84710.pdf

3. Analysis of the UK's existing and in construction manufacturing facilities identified those that already exist (e.g. Siemens Hull blade facility, Vestas Isle of Wight blade facility, SeAH Monopile factory at Teesside, Smulders Tyneside transition piece yard, JDR Blyth cable factory and Sumitomo cable factory at Nigg, Nippon Electric Glass factory for glass fibre at Wigan)
4. This allowed gap analysis, to show the number of additional plants required for each component.
5. This was supplemented with a comparison with RenewableUK's Industrial Growth Plan - where this proposed a larger increase in domestic production or number of facilities, these were used instead.

Public support required to deliver these manufacturing facilities

1. The number of manufacturing facilities targeted for each component was combined with the investment cost per facility, to identify the total investment cost to reach target production levels for each component.
2. The number of manufacturing facilities targeted for each component was combined with the low, medium and high estimate of public support per facility for each component, to identify low, medium and high estimates of total public support required to reach these target production levels for each component.
3. Adding together the investment cost for each component gave a total for investment required, adding the public support for reach component together gives a total public support required.

Direct workforce created by these target manufacturing facilities

1. Where there are existing UK offshore wind supply chain manufacturing sites, data was sourced on the existing workforce.
2. For components where there is no existing domestic production, employment data was sourced on comparative manufacturing facilities or analysis (e.g. National Renewable Energy Laboratory[15]) in other countries.
3. For each component or critical material, employment numbers per facility were combined with the target number of facilities, to identify the number of potential jobs.

[15] https://www.nrel.gov/docs/fy22osti/81602.pdf

Indirect workforce created by these target manufacturing facilities

1. Indirect jobs are estimated by combining the direct jobs estimate by plant, and a multiplier.
2. For the low estimate on the number of indirect jobs for each plant, multipliers from ONS's 2019 input-output tables were used.
3. For the high estimate, multipliers from the US National Renewable Energy Laboratory were used and downgraded to account for the relative smaller size and capacity of the UK economy.

Published September 2024.
transitioneconomics.net

@transition_econ

This analysis was commissioned from Transition Economics by Uplift.

.