The Green Economy in Scotland: CXC research event

Jayne Winter and Jeremy Hanks

Net Zero Economy Team

Climate Change Division, Scottish Government

Question 1: How many businesses are currently active in offshore wind in Scotland?

A) Over 9,250

B) 1,000

C) Nobody knows

Question 2: How much is forestry worth to the Scottish economy?

A) £1bn

B) £766.9m

C) Nobody knows

Question 3: How many people will work in Scotland's Hydrogen sector by 2045?

A) 300,000

B) 4,072

C) Nobody knows

How many businesses are currently active in offshore wind in Scotland?

A) Over 9,250 – SDI webpage statement on wind energy supply chain businesses that are relevant to the offshore wind sector

B) 1,000 – LCREE

C) Nobody knows

How much is forestry worth to the Scottish economy?

A) £1bn – 2015 report from Scottish Forestry

B) £766.9m – most up to date figure from Scottish Annual Business Statistics, excludes public sector activity

C) Nobody knows

How many people will work in Scotland's Hydrogen sector by 2045?

A) 300,000 – Hydrogen Action Plan – 'potentially supporting more than 300,000 jobs'

B) 4,072 – SE analysis based on power company projections and current LCREE baseline

C) Nobody knows

Why does this matter for policy makers?

- Policy making
- Prioritisation
- Credibility
- Having an evidence-based conversation
- Celebrating our strengths…
- …but also understanding our weaknesses

Net Zero Economy Project

Net zero economy project initiation	**Internal evidence base review**	**Sector baselining** methodology	**Sector reports** onshore wind offshore wind H2	**SWOT analysis** of the Net Zero and Climate Adaptation economy	Policy work

Start of 2023

Start of 2024

Now

UNIVERSITY of STRATHCLYDE FRASER OF ALLANDER INSTITUTE

RAMBØLL

climate change
Scotland's centre of expertise connecting climate change research and policy

Scottish Enterprise

Green Economy SWOT analysis
Stage 1: Defining the sector/ longlisting

UK Standard Industry Classification (SIC)

- Agriculture, forestry and fishing
- Mining and Quarrying Industries
- Manufacturing
- Electricity & Gas Supply
- Water Supply & Waste Management
- Construction
- Distribution, Hotels and Catering
- Transport, Storage and Communication
- Business Services and Finance
- Government, and Other Services

National Strategy for Economic Transformation (NSET) opportunity areas

- Renewable energy
- The hydrogen economy
- The decarbonisation of transport
- Space
- The "blue economy"
- Sustainable farming & forestry
- Financial services and fintech
- Industrial biotechnology
- Emerging technologies such as photonics and quantum technologies
- Digital technology
- Life sciences
- Food and drink innovation
- Creative industries and tourism

Climate Change Plan

- Electricity
- Buildings
- Transport
- Industry
- Waste and the circular economy
- Land use, land use change and forestry
- Agriculture
- Negative emissions technologies

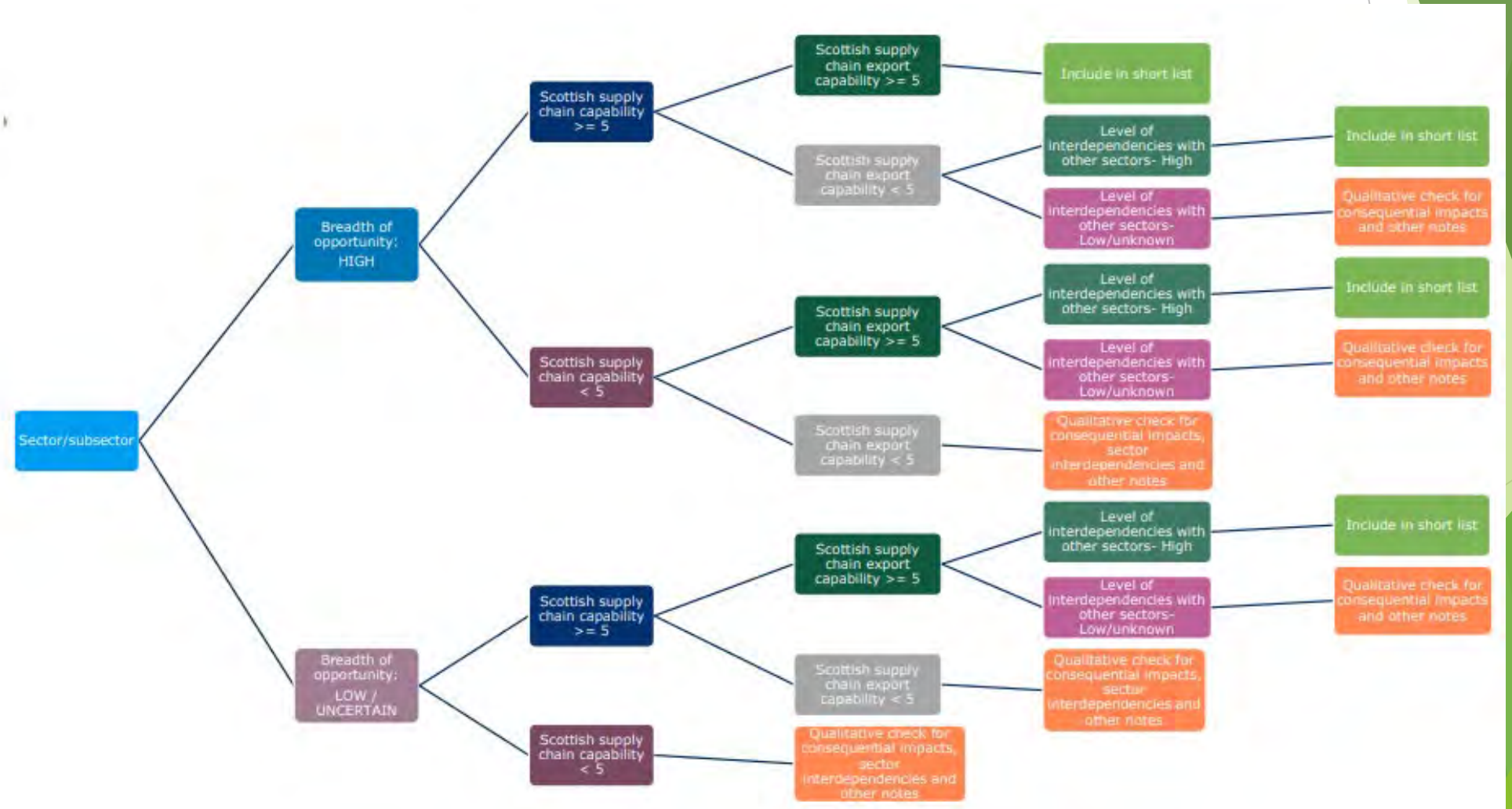
Climate Emergency Skills Action Plan (CESAP) priority areas

- Energy transition
- Construction
- Transport
- Manufacturing
- Agriculture and land use management

Low Carbon and Renewable Energy Economy (LCREE) categorisation, as per the Office for National Statistics

- Offshore wind
- Onshore wind
- Solar
- Hydropower
- Other renewable electricity
- Bioenergy
- Alternative fuels
- Renewable heat
- Renewable combined heat and power
- Energy efficient lighting
- Energy efficient products
- Energy monitoring, saving or control systems
- Low carbon consultancy, advisory and offsetting services

Green Economy SWOT analysis
Stage 2: Shortlisting

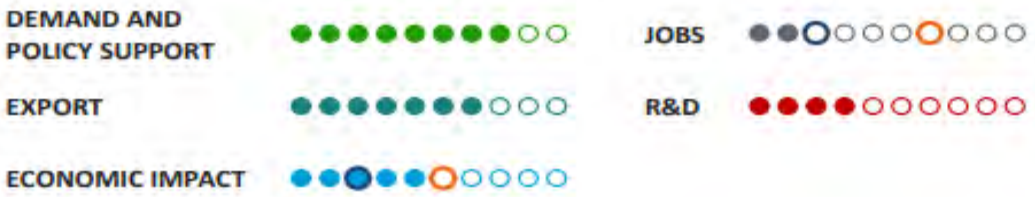


Green Economy SWOT analysis
Stage 3: SWOT analysis

1. **Offshore Wind**
2. **Onshore Wind**
3. **Wave and Tidal**
4. **Hydrogen** (production end use storage and distribution)
5. **Carbon Capture, Use and Storage** (storage, transport and utilisation)
6. **Low Carbon Fuels** (synthetic fuels, including SAF)
7. **Low Carbon Heavy Duty Vehicles**
8. **Forestry**
9. **Sustainable Building Materials**
10. **Renewable Heat**
11. **Professional Services** (engineering, planning and environment, digital and data)
12. **Sustainable Financial Services**

Onshore Wind

Sector definition: The production of electricity from onshore wind. Includes all value chain stages, including the operation and maintenance of the infrastructure for producing electricity from onshore wind, and the businesses supplying all goods and services involved in the development and deployment of onshore wind.



The scales show a Low to High opportunity (from left to right) and are based on a combination of qualitative and quantiative data sources.

Current

	FTE	Turnover	Business Count	GVA	Exports	Imports
2022	3,100	£4bn	5,000	£1.4bn	£121m	£233.5m

Scenario-based projections

	FTE	Turnover	Business Count	GVA	Exports	Imports
2030	14,307	£6bn	-	£2bn	-	-
2050	4,436	£1.9bn	-	£712m	-	-

Scotland's onshore wind sector has notable strengths, with abundant natural resources, a skilled workforce, and an established position owing to early adoption. Opportunities arise in service-based exports, circularity initiatives, and increasing domestic component content. However, in a capital-intensive sector where global supply chains are stretched, challenges for Scotland include limited exportability in many value chain stages, planning constraints, and grid connection and capacity capabilities. Addressing these weaknesses and threats, along with overcoming technical bottlenecks and competition for skills (particularly from other renewable electricity sectors), is crucial to realising Scotland's bold onshore wind ambitions and unlocking the potential domestic demand for goods and services to drive economic activity.

Strengths

- Well-established industry with supportive policy environment and strong public backing.
- Abundant natural resources suitable for onshore wind energy production.
- Scotland excels in exporting specialised engineering consultancy services, including wind farm design and financial due diligence.
- Strong economic impact owing to early adoption.
- Skilled workforce with strong capabilities across the supply chain, particularly in project development, installation, operation and maintenance, and specialised consultancy services.

Weaknesses

- Installation and operation and maintenance services are highly localised, protecting Scottish companies domestically but restricting export potential.
- Compared to sectors such as offshore wind, relatively few areas of the onshore value chain can be easily exported due to the importance of local expertise and content, and high transport costs.
- High capital investment required for new onshore wind developments.
- Scotland's lack of manufacturing infrastructure leave it reliant on imports for new projects, hindering the sector's growth.

Opportunities

- Generally strong public support, facilitating the development of new sites and repowering of existing sites.
- High installation ambitions of 20GW by 2030.
- Opportunities to increase Scottish content in components.
- Onshore wind jobs are highly productive, particularly those in operation and maintenance, which are anticipated to grow as Scotland's onshore wind fleet grows.
- R&D advances are anticipated from recycling, repowering and decommissioning, as Scotland's fleet reaches its end-of-life earlier than some competitor countries.
- Significant growth potential in circularity, repowering, recycling, decommissioning, and other end-of-life value chain services.

Threats

- Grid connection and capacity constraints threaten the expansion of new projects.
- Existing and anticipated bottlenecks in planning and require resolution to achieve installation ambitions.
- High capital investment requirements leave the sector vulnerable to interest rate fluctuations.
- Strong competition for skills from other, often higher-paying, renewable electricity sectors.
- Levels of R&D spend in onshore wind are low compared to other, more nascent sectors.

SWOT key findings

- **Build on strengths** and be **cognisant of weaknesses**.
- Make **effective policy that drives demand** to catalyse business confidence and growth.
- Recognise and crowd in behind Scotland's **early mover opportunities**.
- **Aggregate and combine** to maximise economic opportunities.
- Build from Scotland's **integrated and horizontal supply chains** to capture emerging opportunities in different net zero markets.
- Target **international growth markets**.
- Secure Scotland's **future workforce**.
- Recognise and capitalise on the value of Scotland's **natural environment**.
- Recognise the **importance of investment**.

Lessons learned

- It's very difficult to get comparable data – much of what we know comes from LCREE (Low Carbon, Renewable Energy Economy Survey – ONS)
- There are some potentially innovative approaches out there – for example using data scraping from the web – but the reliability is shaky
- Different reports are presenting data for different reasons – and there are a wide range of valid reasons for looking at data in different ways
- So much of what we think might happen or change is determined by policy decisions and wider economic circumstances
- What story are we trying to tell?

Question for today – how can we help citizens, policy makers, businesses, investors and other stakeholders to best understand Scotland's net zero economy?