Scottish Engineering

Route map to net zero

Securing a Green Recovery on a Path to Net Zero

House keeping

> Please place your microphone on mute and camera off

> Webinar will be recorded and the recording made available

> Slides will be made available

ESP Webinar
5 November 2024

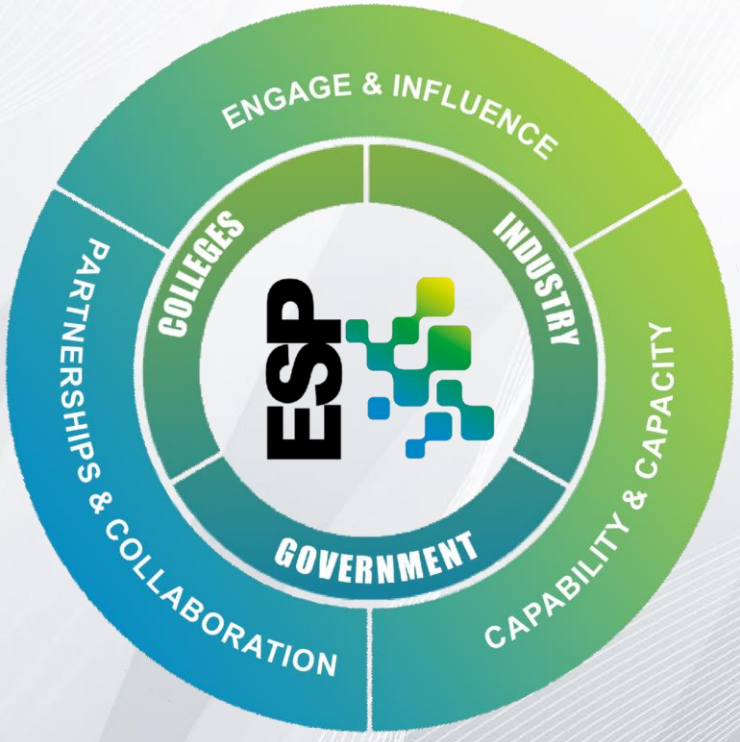
Rachel Tulloch
Dougie Knox

Scottish Funding Council
Promoting further and higher education

Scotland's colleges – delivering skills for the energy, engineering and construction sectors

About ESP

ESP is a collaboration of Scotland's colleges and industry partners established to increase the capability and capacity to deliver the right skills for the **Energy, Engineering and Construction** sectors with a lead role for **STEM**.



Vision

A college sector working in partnership with Government, agencies and industry to meet national and regional skills needs, maximising investment and job opportunities aligned with emerging technologies, the Climate Emergency and the Just Transition to Net Zero.

Scotland's colleges – delivering skills for the energy, engineering and construction sectors

ENGAGE AND INFLUENCE

POLICY DRIVERS

- Climate Change Plan
- Climate Emergency Skills Action Plan
- Energy Efficiency Scotland
- Energy Strategy and Just Transition Plan
- Equality, opportunity, community: New leadership - A fresh start
- Heat in Buildings Strategy
- Hydrogen Action Plan
- Making Scotland's Future
- National Transport Strategy 2
- North Sea Transition Deal
- Offshore Wind Sector Deal
- Onshore Wind Sector Deal
- The Scottish Government's STEM Education and Training Strategy
- The National Strategy for Economic Transformation

COLLEGE SECTOR

- Business Development Group
- College Development Network
- College Principals' Group
- Colleges Scotland
- Vice Principals' Group

INDUSTRY

- **Energy Transition**
  - Energy Skills Alliance
  - EU Skills
  - Hydrogen Scotland
  - Hydrogen Skills Alliance
  - ORE Catapult
  - OWIC
  - RenewableUK
  - Scottish Renewables
  - SOWEC
- **Transport**
  - IMI
- **Engineering**
  - ECITB
  - Engineering Skills Leadership Group
  - EngineeringUK
  - Enginuity
  - IET
  - Scottish Engineering
- **Construction**
  - CECA
  - CITB
  - Federation of Master Builders
  - Historic Environment Scotland
  - Scottish Builders Federation
  - Scottish Decorator Federation
  - SELECT
  - SNIPEF

PUBLIC SECTOR

- **Scottish Government**
  - Construction
  - Energy Efficiency
  - Energy Strategy & Just Transition Plan
  - Hydrogen
  - Transport Scotland
  - Wind
- Department for Transport
- Education Scotland
- Energy Savings Trust
- Enterprise Agencies
- Scottish Development International
- Scottish Funding Council
- Skills Development Scotland

Scotland's colleges – delivering skills for the energy, engineering and construction sectors

FUTURE VISION

1. **Energy Transition Leadership:** ESP has solidified its role in leading Scotland's energy transition, particularly focusing on offshore wind, hydrogen, and other low-carbon technologies. ESP continues to lead on skills development for the Scottish Offshore Wind Energy Council and engages with government and industry on hydrogen and energy strategies ensuring Scotland's Colleges are at the heart of skills delivery for a Just Transition to Net Zero.

2. **Developing the Future Workforce:** There is a real need to build on existing programmes and introduce new technologies which will be required for new entrants, the existing workforce and those transitioning across sectors. With up to 80% of the future workforce requiring skills up to SCQF level 8, ESP continues to advise and engage on key conversations with industry to ensure the right skills at the right level are accessible to a variety of entrants into the workforce.

3. **A Place for Traditional Skills:** Traditional skills are incredibly important in across all our sectors and the whole supply chain. The college sector is working with industry partners to update and enhance its existing courses to maximise the economic impact. ESP will advocate colleges continued place within the traditional skills system.

4. **Capacity Building in Low-Carbon Technologies:** Emerging technologies and policy drivers are driving the need to build capability and capacity in low-carbon areas like hydrogen and electric vehicles. ESP's voice on behalf of the college network is vital to build capacity. Our conversations with industry and Government and its agencies allow ESP to invest on the right low carbon areas.

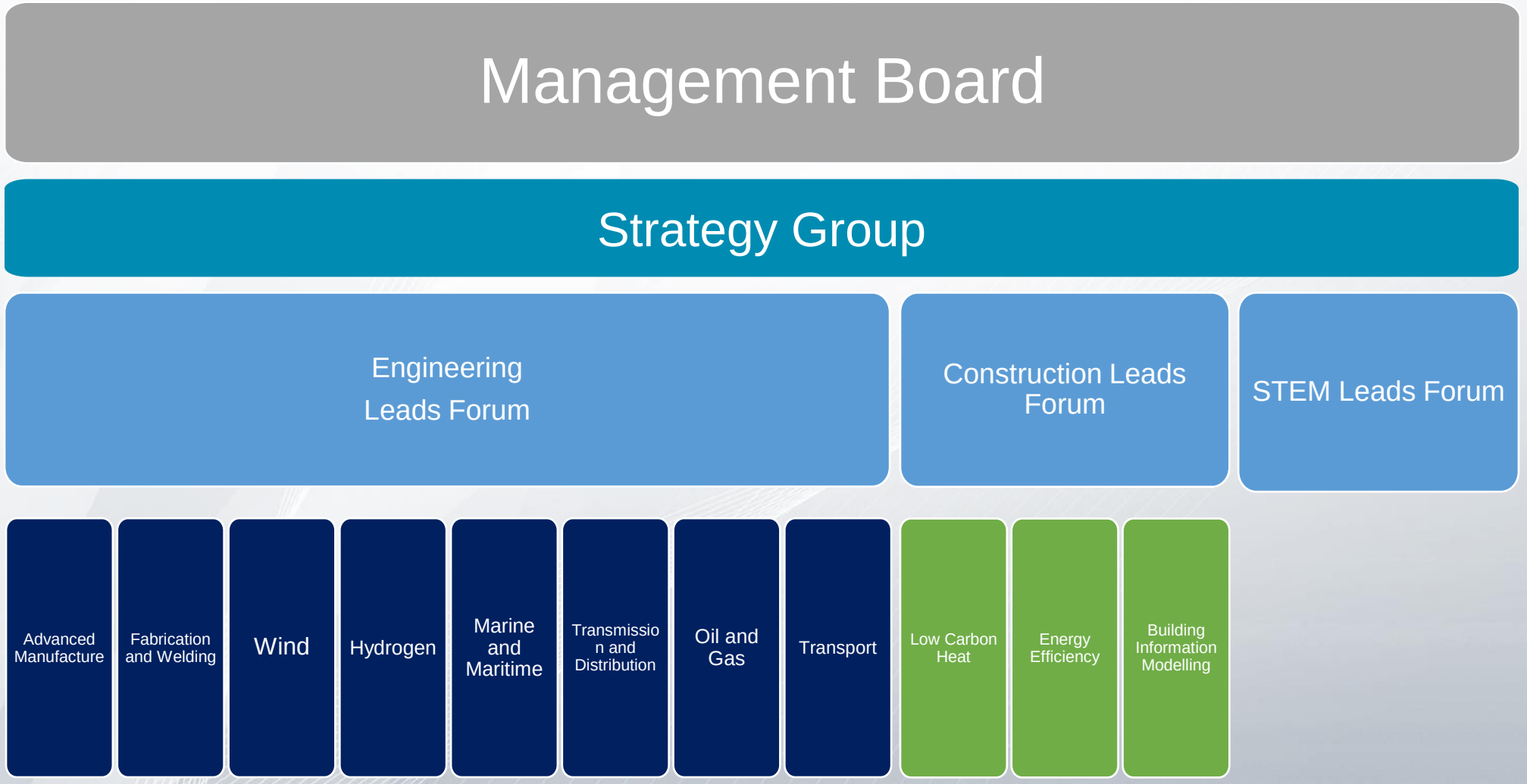
5. **Innovation in Education:** ESP continues to work with partners to create online courses, virtual reality training environments, and upskill college staff across Scotland and will ultimately equip students with skills fit for the future. This allows for these new and emerging skills to have a broad reach across the college landscape.

6. **Collaborative Partnerships:** ESP has formed strategic partnerships with industry and government bodies like Transport Scotland and Energy Saving Trust, focusing on advancing skills in the green economy through projects like the Energy Transition Skills Leaders programme. Our continued focus on colleges as strategic delivery partners for industry and government agencies priorities once again places colleges at the centre of the Just Transition to Net Zero.

7. **Influence on Government and Policy:** ESP has maintained significant influence on shaping policies around green energy and skills development by engaging in consultations and partnerships with various Scottish Government departments and public sector agencies. Our involvement in helping to shape policy, enhances current skills provision and the colleges as providers.

Scotland's colleges – delivering skills for the energy, engineering and construction sectors

ESP Structure



Scotland's colleges – delivering skills for the energy, engineering and construction sectors

Training Networks

- Advanced Manufacture
- Automotive
- Fabrication & Welding
- Hydrogen
- Marine & Maritime
- Wind
- Energy Efficiency
- Low Carbon Heat
- Building Services Engineering
- Construction Crafts
- Construction Trades

	Advanced Manufacture Training Network	Automotive Training Network	Fabrication & Welding Training Network	Hydrogen Training Network	Marine & Maritime Training Network	Wind Training Network	Energy Efficiency Training Network	Low Carbon Heat Training Network	Building Services Engineering Training Network	Construction crafts training Network	Construction Trades Training Network
Ayrshire College	✓	✓	✓			✓	✓	✓	✓	✓	✓
Borders College	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
City of Glasgow College	✓		✓		✓		✓	✓	✓	✓	✓
Dumfries & Galloway College	✓	✓	✓			✓	✓	✓	✓	✓	✓
Dundee & Angus College	✓	✓	✓	✓		✓					
Edinburgh College	✓	✓	✓	✓			✓	✓	✓	✓	✓
Fife College	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
Forth Valley College	✓		✓	✓							
Glasgow Clyde College	✓	✓	✓				✓	✓	✓	✓	✓
Glasgow Kelvin College	✓	✓	✓				✓	✓	✓	✓	✓
NESCol	✓	✓	✓	✓	✓	✓		✓			
New College Lanarkshire	✓	✓	✓				✓				
Orkney College UHI				✓	✓						
South Lanarkshire College							✓	✓	✓	✓	✓
UHI Argyll					✓	✓					
UHI Inverness	✓	✓	✓			✓	✓	✓	✓	✓	✓
UHI Moray	✓	✓	✓			✓		✓		✓	
UHI Outer Hebrides			✓	✓	✓						
UHI North Highland	✓		✓	✓		✓					
UHI Perth	✓	✓	✓				✓	✓	✓	✓	✓
UHI Shetland			✓		✓	✓	✓			✓	✓
UHI West Highland	✓				✓						
West College Scotland	✓	✓	✓				✓	✓	✓	✓	✓
West Lothian College	✓	✓	✓	✓			✓	✓	✓	✓	✓

Scotland's colleges – delivering skills for the energy, engineering and construction sectors

Current Activity

Zero Carbon Transport

Booking System for Shared Resources

OVER 100 STAFF FROM 15 COLLEGES UPSKILLED TO IMI LEVELS 2&3 ELECTRIC VEHICLE MAINTENANCE

Electric Vehicle Training Rigs

1 Cartrain + 1 TruckTrain + First Responder units with cloud based learning

8 Electrical & Hydrogen Fuel Cell units

5 Nissan Leaf vehicles purchased and placed in colleges across Scotland as shared training resources

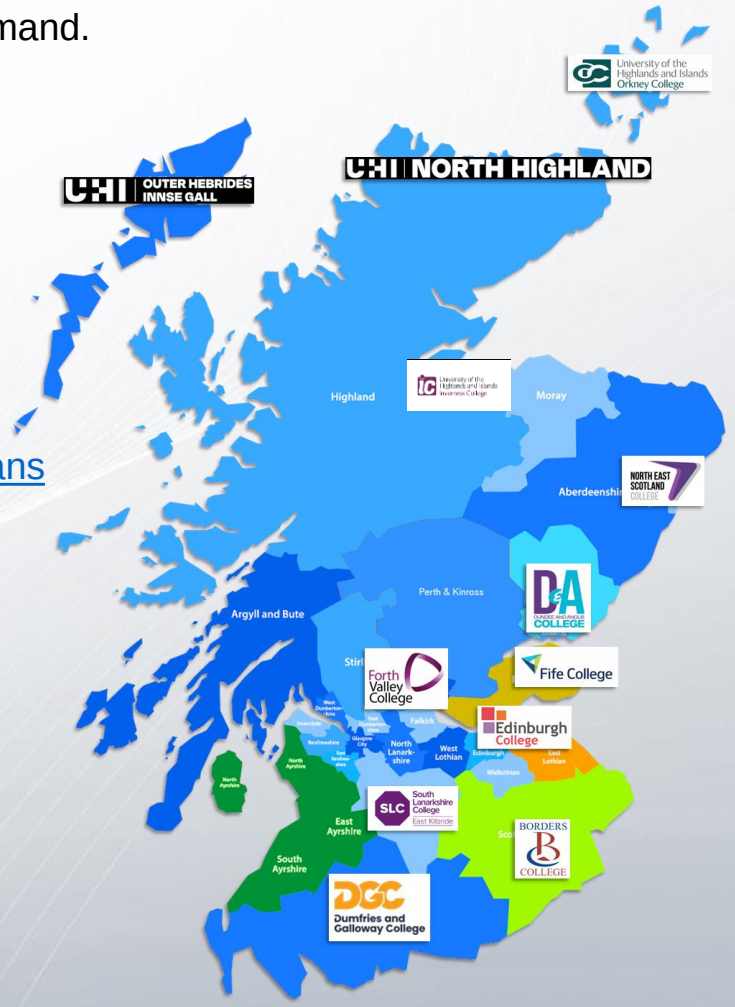
17 ELECTUIDE HIGH VOLTAGE TRAINING AIDS WITH RELATED CLOUD BASED LEARNING PURCHASED.

TS Zero Emission Skills Baselining Maritime and Aviation, Space Scotland Skills Group

Scotland's colleges – delivering skills for the energy, engineering and construction sectors

Hydrogen

ESP's Hydrogen Training Network was established in September 2019 to address the expected demand for hydrogen skills. Initially around 9 colleges where hydrogen projects existed and with some expertise already in place, growing rapidly with expected industry demand.



Curriculum & Resources

Online Hydrogen General Awareness Course

Hydrogen for Transport Online course

IMI Level 1 Award in Hydrogen Vehicle Awareness

IMI Level 2 and Level 3 Hydrogen Vehicle - Pilot stage

Professional Development Award - Hydrogen: An Introduction for Technicians

- Safe H2 Gas Handling
- Operating Principles of an Electrolytic Hydrogen Facility
- Design Principles of a Hydrogen System

Desktop Hydrogen Fuel Cell Trainers

Fuel Cell Trainer

Energy Lab System

Hydrogen Refuelling Station – VR programme

H2GP – Hydrogen Car Grand Prix STEM Challenge

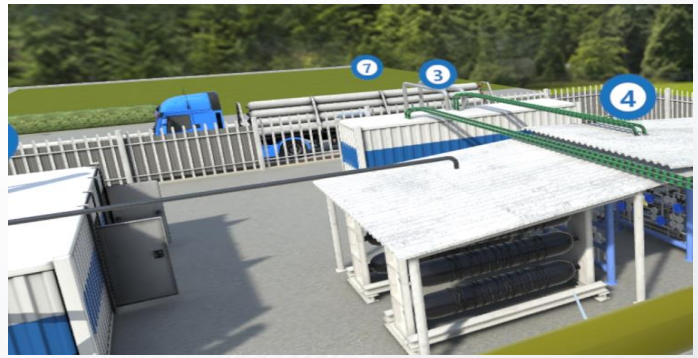
Hyundai Nexo Hydrogen Car

Scotland's colleges – delivering skills for the energy, engineering and construction sectors

2024-25 Activity

Low Carbon Heat
Heat Pump Training for 3rd/4th Year
Plumbing & Heating Apprentices

Further VR Developments
Heavy Duty Vehicle



Scottish Enterprise Factsheets
For Hydrogen Supply Chain

EV Charge Point
Installation & Maintenance
Train the Trainer
Industry Upskilling for
Qualified Electricians

Scotland's colleges – delivering skills for the energy, engineering and construction sectors

SOWEC

The Scottish Offshore Wind Energy Council (SOWEC) is a partnership between the Scottish public sector and the offshore wind industry, co-chaired by Dr Alasdair Allan, Acting Minister for Climate Action, and Brian MacFarlane of SSE.

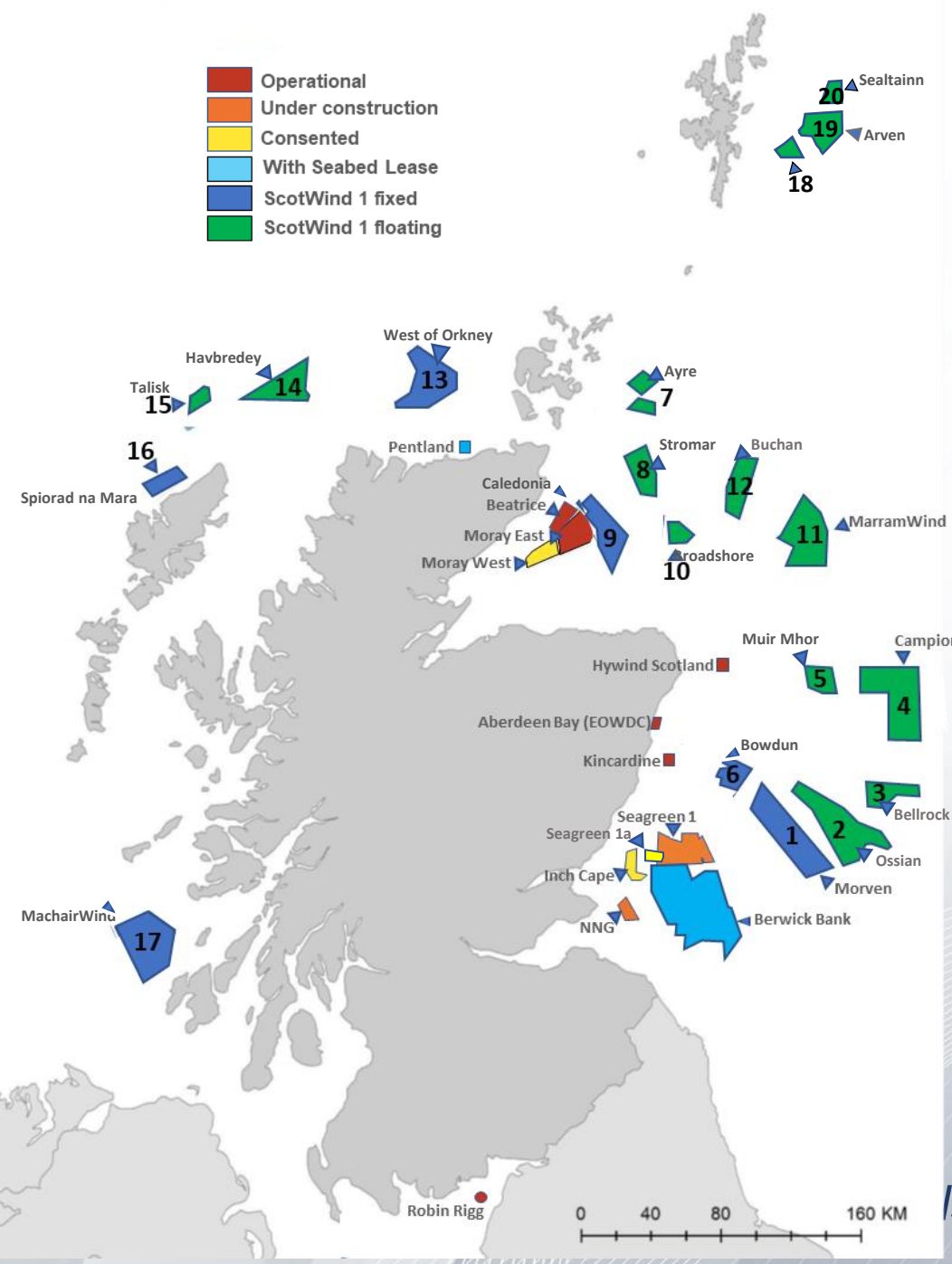
Vision

A world-class offshore wind sector that underpins the transition to net zero by 2045 and maximises the value to Scotland.

Mission

To coordinate and grow the sector, ensuring the Scottish offshore wind industry is more sustainable, competitive, and commercially-attractive, both domestically and in the global offshore wind market.

ScotWind Round



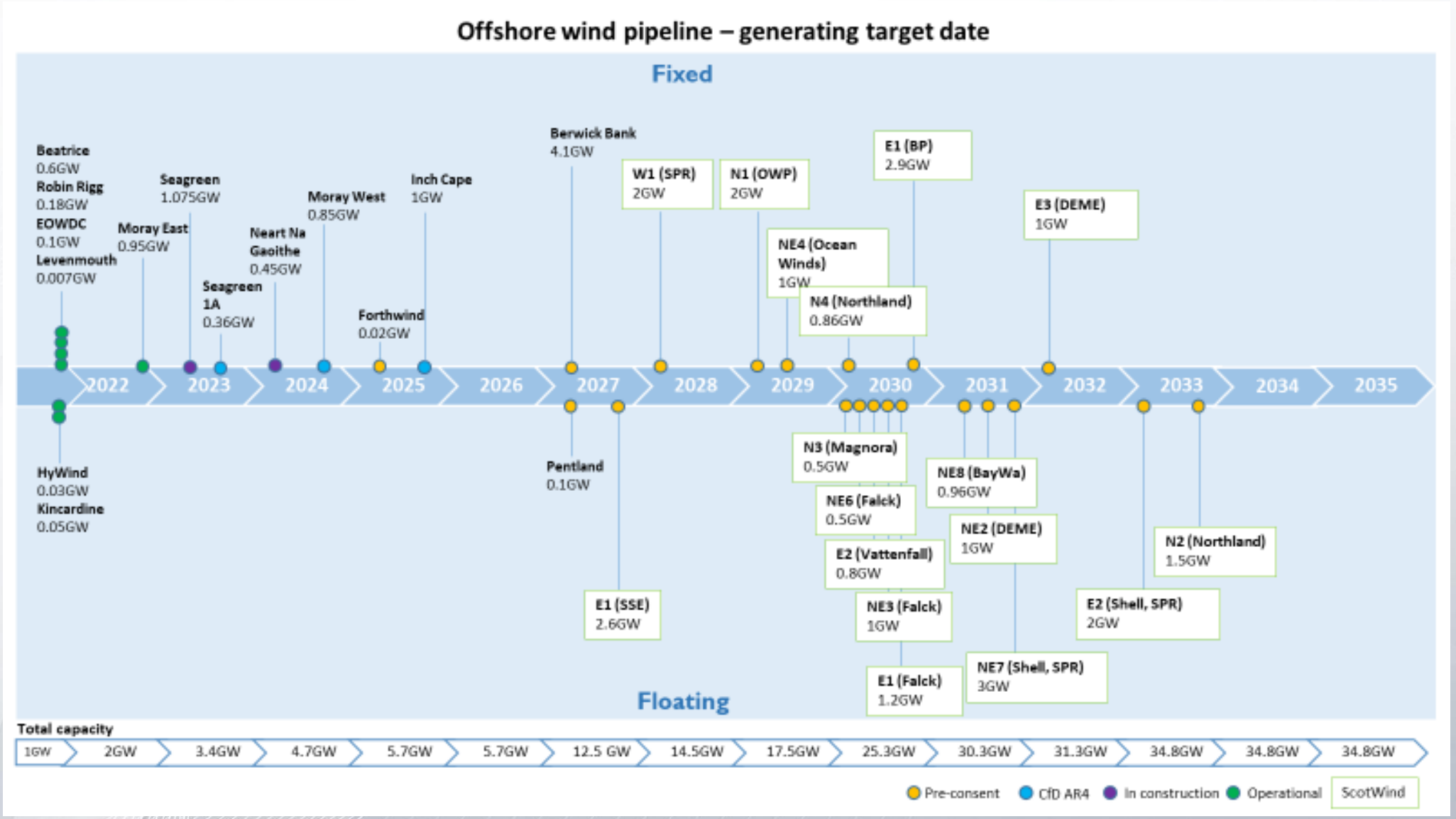
Total = 27,626MW

Floating Wind = 17,871MW (65%)

SITE	DEVELOPERS	CAPACITY
1	BP and EnBW	2,907MW
2	SSE Renewables, CIP and Marubeni	2,610MW
3	Renatis and BlueFloat Energy	1,200MW
4	ScottishPower Renewables and Shell	2,000MW
5	Vattenfall and Fred Olsen Seawind	798MW
6	Thistle Wind Partners	1,008MW
7	Thistle Wind Partners	1,008MW
8	Renatis, Orsted and BlueFloat Energy	1,000MW
9	Ocean Winds	1,000MW
10	Renatis and BlueFloat Energy	500MW
11	ScottishPower Renewables and Shell	3,000MW
12	Floating Energy Allyance	960MW
13	RIDG, Corio Generation and TotalEnergies	2,000MW
14	Northland Power	1,500MW
15	Magnora Offshore Wind	495MW
16	Northland Power	840MW
17	ScottishPower Renewables	2,000MW
18	Ocean Winds	500MW
19	Mainstream RP and Ocean Winds	1,800MW
20	ESB Asset Management	500MW

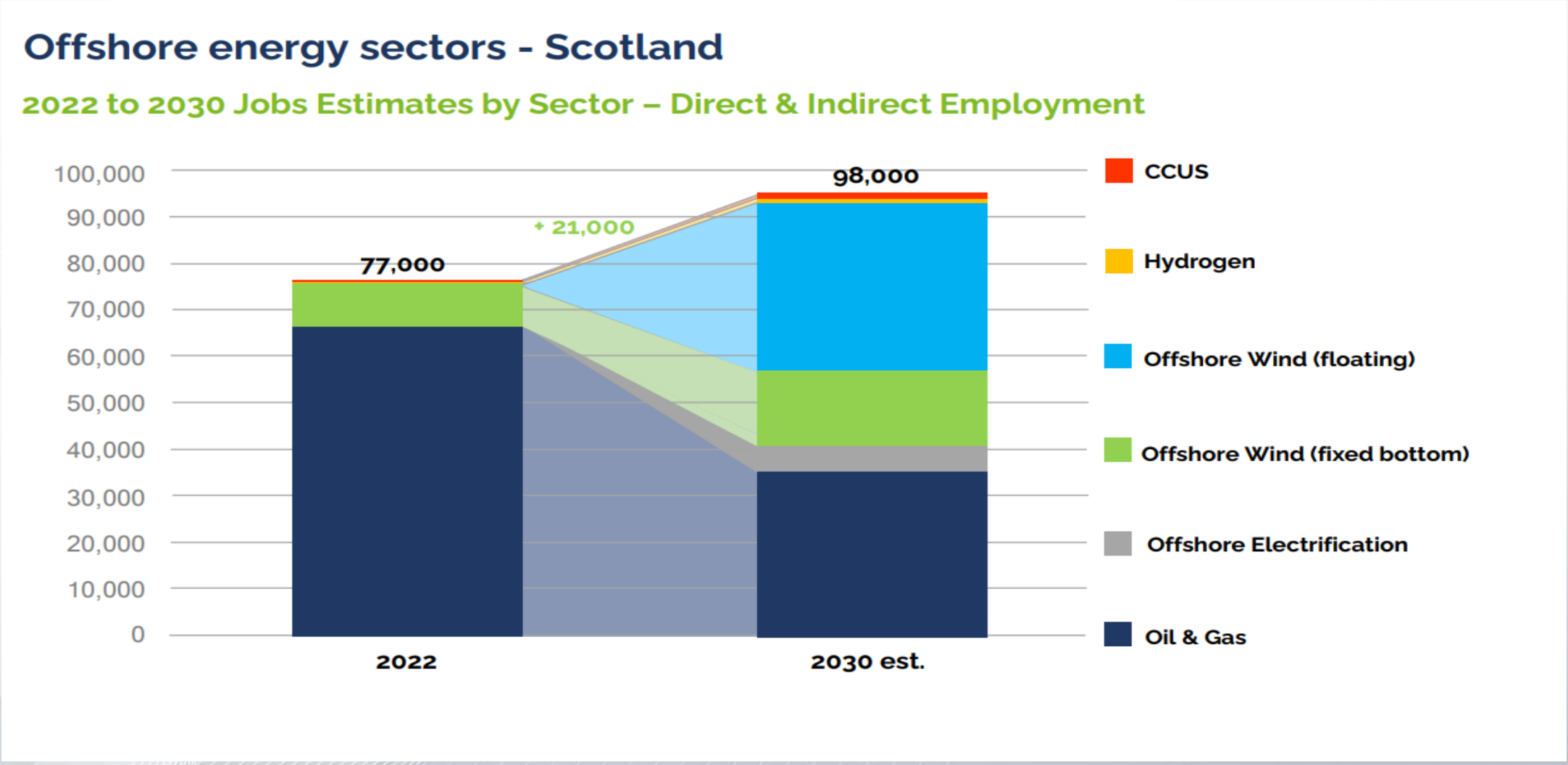
ls for the energy, engineering and construction sectors

Timeline of Projects



Scotland's colleges – delivering skills for the energy, engineering and construction sectors

Scotland Energy Sector: Offshore Energy Demand



Scotland's colleges – delivering skills for the energy, engineering and construction sectors

OWIC Skills Intelligence Model

OWIC published its skills intelligence report during Global Offshore Wind just over a week ago.

https://www.owic.org.uk/_files/ugd/1c0521_94c1d5e74ec14b59afc44cebe2960f62.pdf

Scotland Offshore Energy Demand-example of skills need

Fixed Bottom Wind

Skill Sub Family (top 6 skills)	Current 2022	Requirement 2030	Difference
Engineering Professions	1,324	2,397	1,073
Manual Construction	1,019	1,846	827
Skilled Operations & Maintenance	825	1,493	668
Operational Management	450	816	366
Skilled Construction	285	516	231
Skilled Mechanical	239	432	193
Sub-Sector total	**9,325**	**16,890**	**7,565**

- Engineering Professions increase, which reflects the need for large volumes of these skill during onshore and offshore construction of turbines. This group consists of Engineers of all types and surveyors. Similarly skilled mechanics
- Manual Construction which covers everything from Labourer, Groundworker, to Quayside Operative skilled at Level 4/5 makes up the backbone of the fabrication industry

Floating Wind

Skill Sub Family (top 6 skills)	Current 2022	Requirement 2030	Difference
Manual Construction	0	3,621	3,621
Semi - Skilled Construction	0	2,644	2,644
Manual Mechanical	0	2,380	2,380
Skilled Construction	0	2,176	2,176
Engineers/Surveyors	0	2,065	2,065
Semi-Skilled Mechanical	0	1,942	1,942
Sub-Sector total	**0**	**37,140**	**37,140**

- Skilled O&M individuals to service and maintain the turbines that are in operation.
- Similarly there needs to be managers to control the maintenance activities and manage the round the clock operations of the arrays

- Professional Services like Legal, Audit, Medical and Consultancy is also an area of huge increase,

Grid

Investment of over £700bn is needed by 2037 to meet net zero according to Treasury analysis

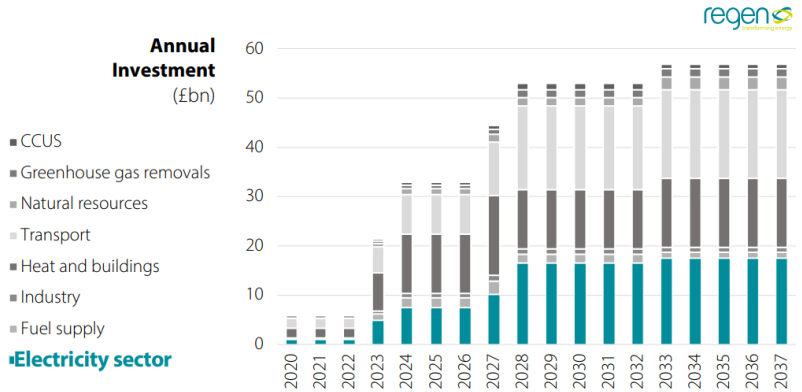


Figure 6: Additional annual investment required to reach net zero 2020-2037 excluding network investment (£bn, undiscounted 2020 prices). Source: **BEIS Net Zero Strategy** – Build Back Greener supporting workbook, using mid point average investment in each carbon budget period.

Preparing the grid for net zero will require between £100-140bn of additional investment

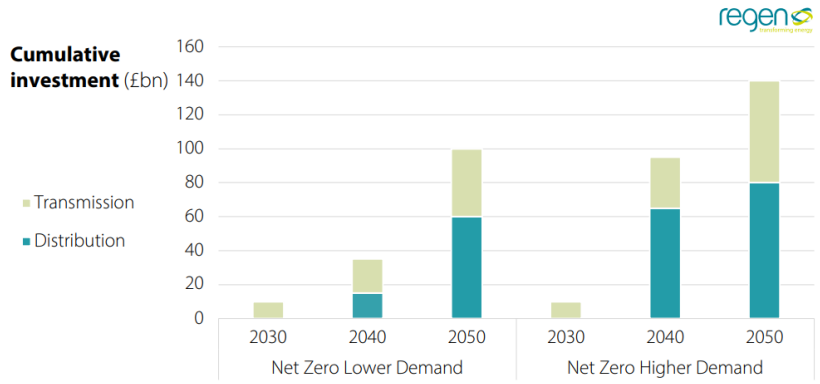


Figure 7: Cumulative onshore network investment required under two electricity demand scenarios (PV 2021-2050, 2020 prices). Source: Electricity Networks Strategic Framework **Appendix I** (BEIS/Ofgem).

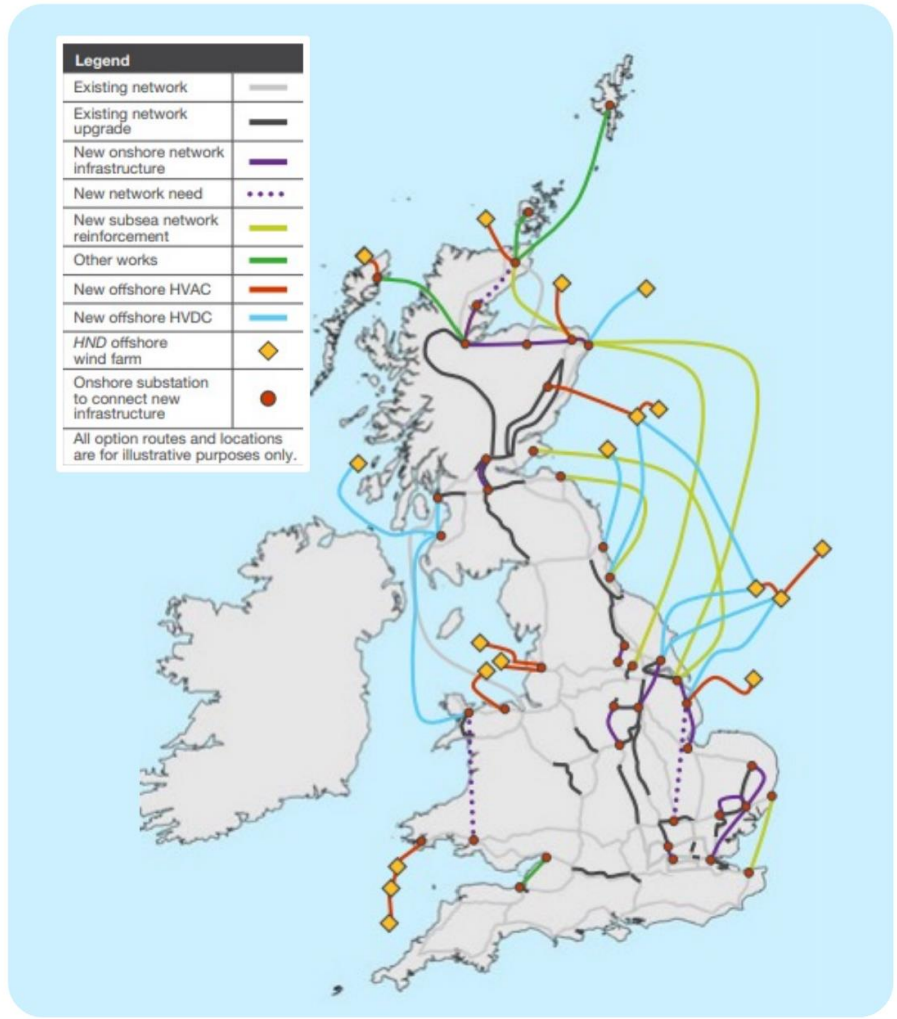


Figure 14: Holistic Network Design Pathway to 2030, project map.

2024-25 Activity

- Focus on increasing Fabrication and Welding capability & capacity
- AR welding equipment as shared resource for Colleges
- VR headsets for wind turbine technical training
- Advanced manufacturing CPD
- SOWEC sector attractiveness events
- Inward Investment Opportunities

Thank You

Questions?

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Scottish Funding Council

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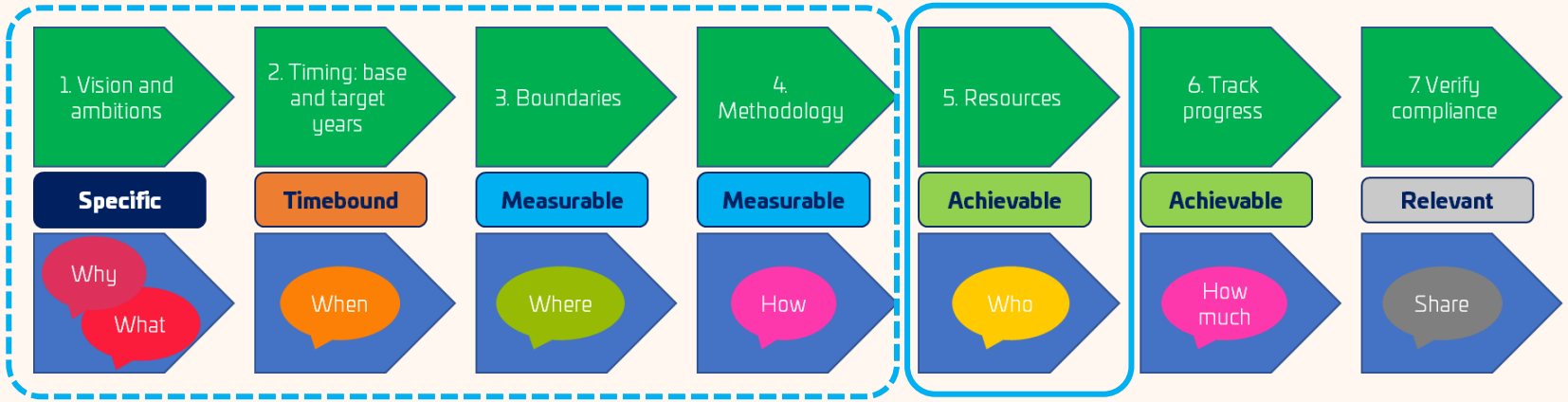
Agenda

The 5Ws and 2 Hs of Net Zero - Who



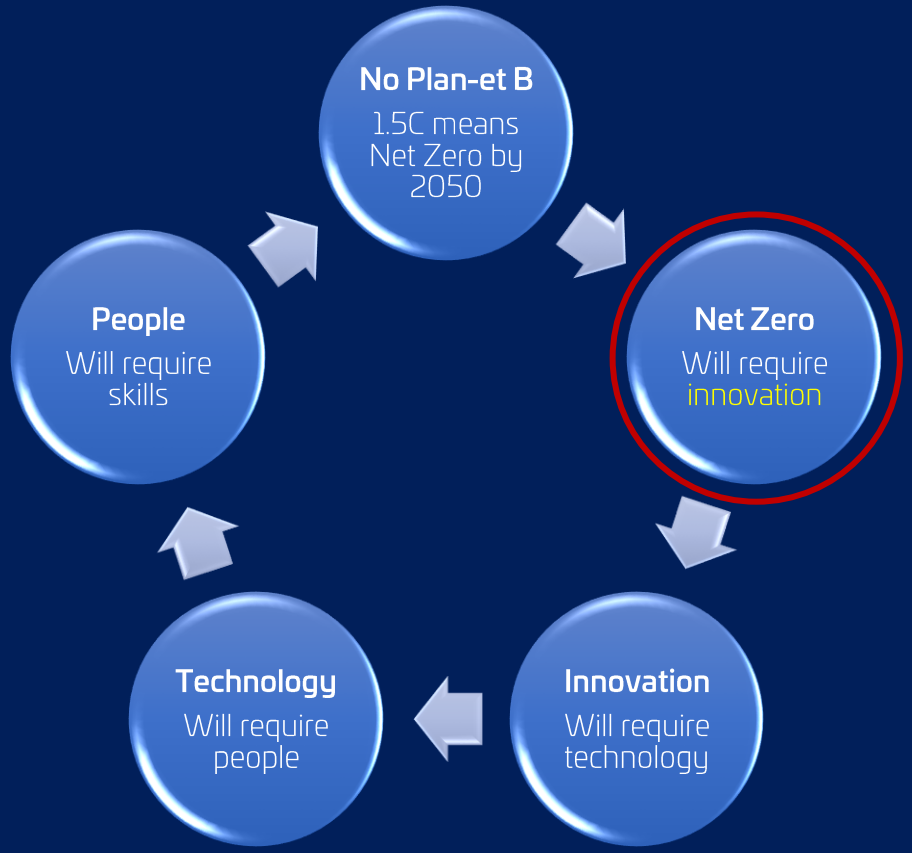
- Update on the Who or resources of Net Zero
  - Financial resources
  - Human resources

Green transition

What are green skills?

- Green skills are the knowledge, abilities, values and attitudes needed to live in, develop and support a **sustainable and resource-efficient society** (UNIDO)
- Employability – it is not about new green skills but '**greening**' of traditional skills
- Just as most roles now require digital and safety skills, jobs can be performed in **a more sustainable way** if workers have green skills

Roadmap to Net Zero



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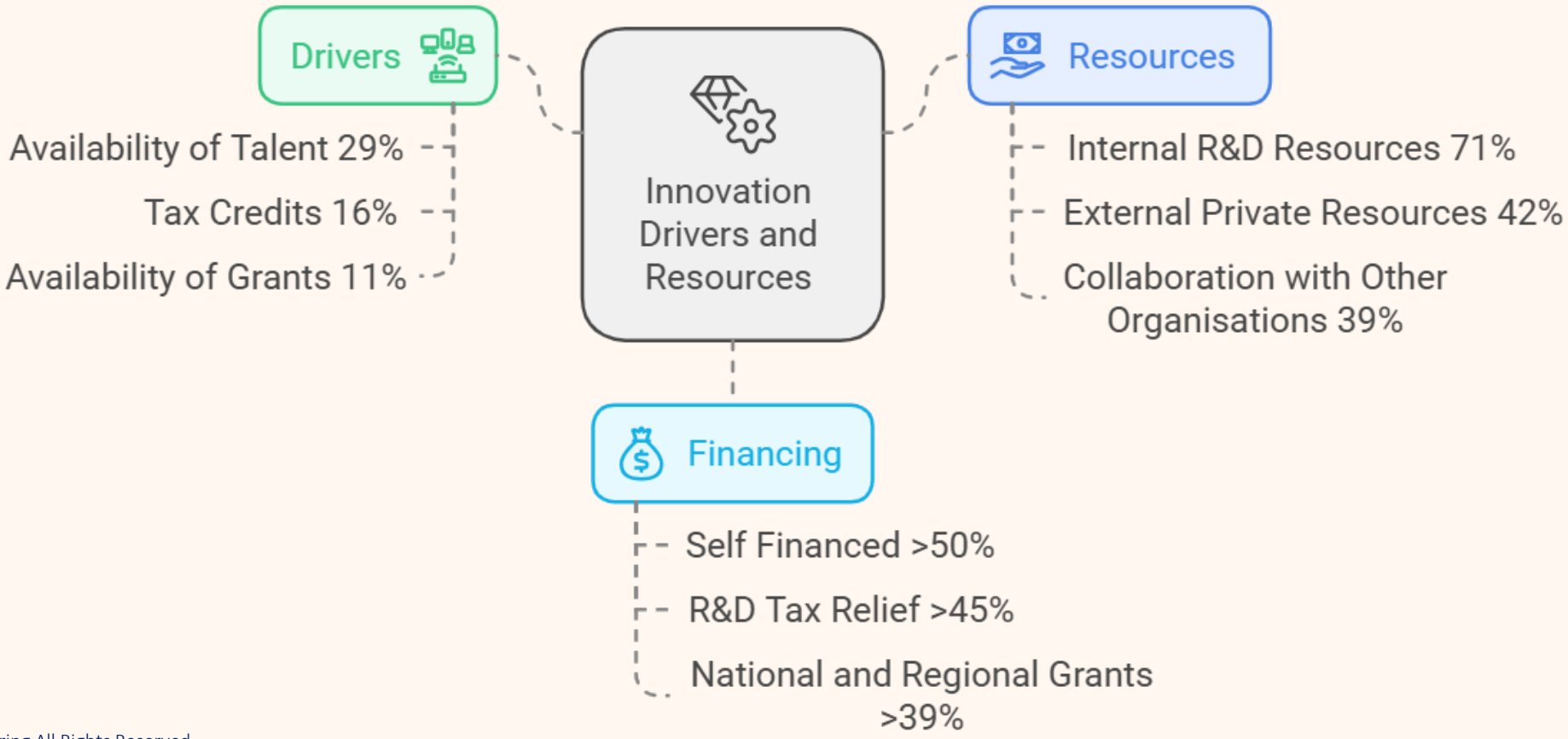
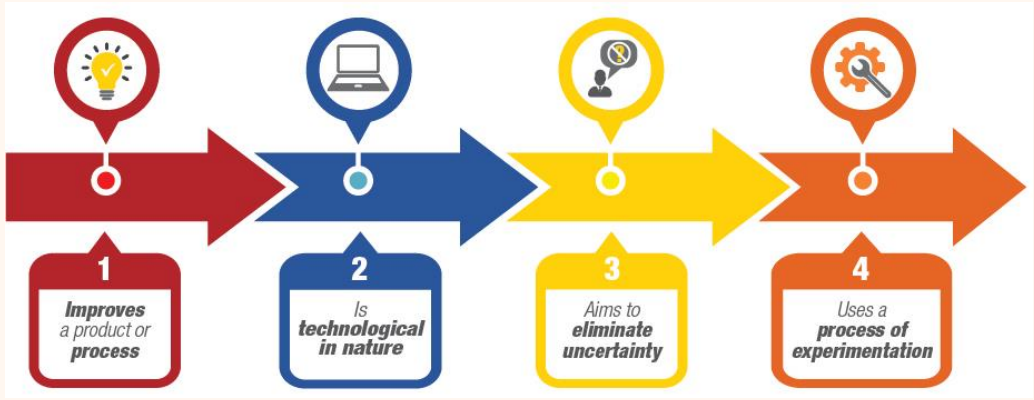
Innovation

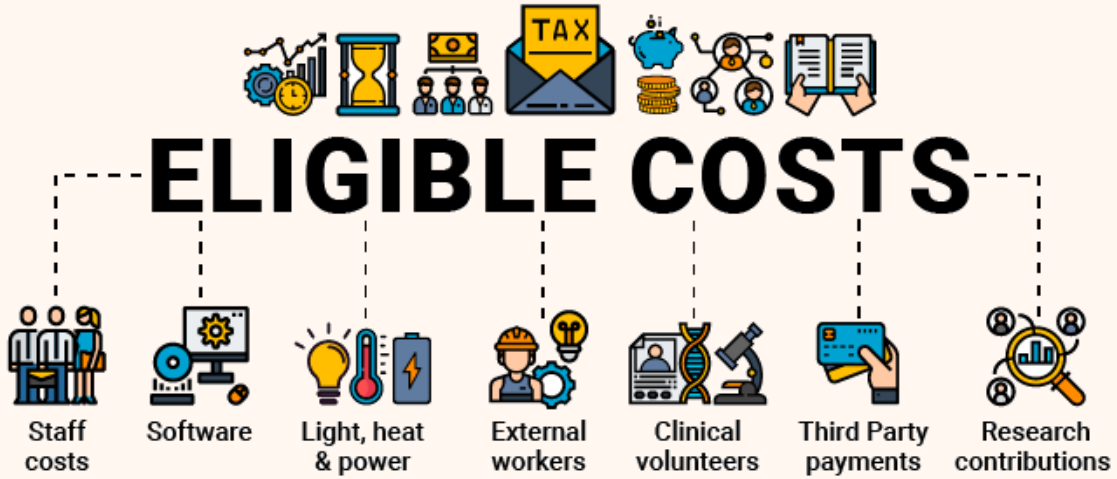
The UK's consumer goods and manufacturing sectors



Financing

R&D tax credit



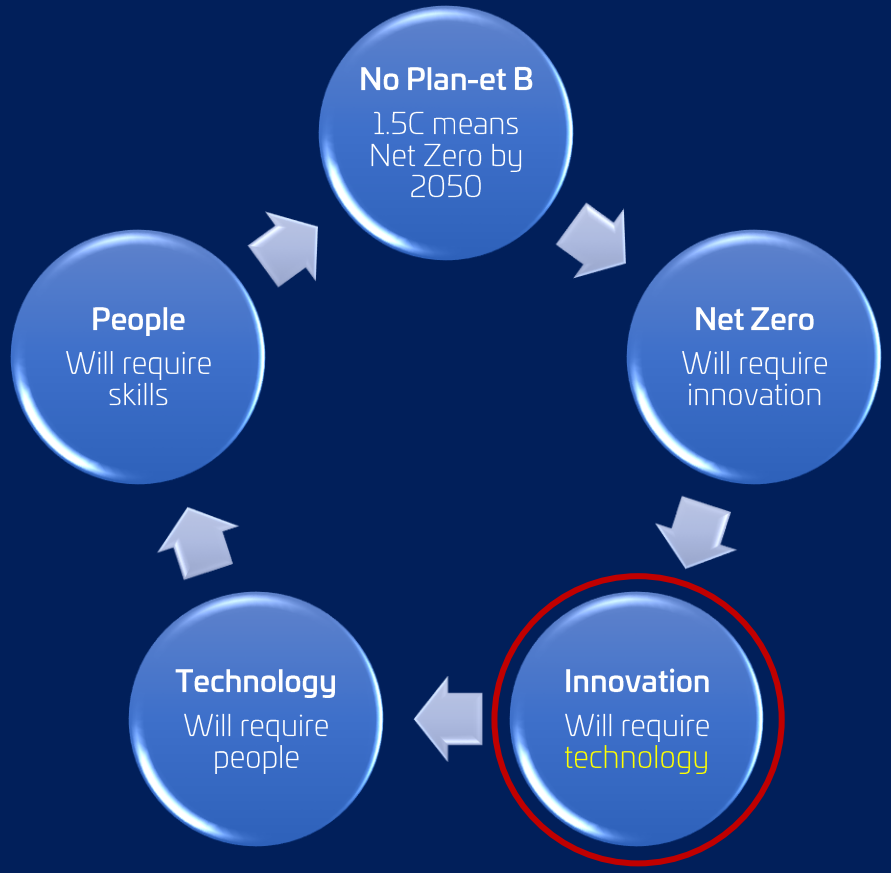


Your estimated R&D spend:	Your estimated tax refund or reduced tax liability:
£250,000 →	£26,325
£500,000 →	£52,650
£1,000,000 →	£105,300
£10,000,000 →	£1,053,000

Funding opportunities

Monthly newsletter

Roadmap to Net Zero



Scottish Engineering

2020

Active travel

£500 million investment in active travel projects over five years, £500 million to improve bus priority infrastructure and £9 million Scottish Ultra Low Emission Bus Fund.

Low Emission Bus

Energy Transition Transformation

£62 million Energy Transition Fund and £34 million Scottish Industrial Energy Transformation Fund (SIETF) launched. Hydrogen Policy Statement published.

Buildings

Hydrogen

Heat pump

£1.6 billion Heat in Buildings fund announced, to be invested over the next Parliament; £6.9m support for H100 hydrogen for domestic heat demonstration; and initiation of Heat pumps cashback schemes.

2021

Plastics

Legislation to restrict supply of specified single use plastic items comes into force. Consultation launches on a charge on single use disposable beverage cups and legislation to increase the carrier bag minimum charge from 5p to 10p.

£70 million fund to improve local authority recycling collection infrastructure established.

Recycling

Environmental conditionality introduced to extend requirements to all farmers and crofters to undertake environmental actions.

Energy Strategy Update published.

Hydrogen Action Plan published.

Farmers

Low Carbon Manufacturing Challenge Fund launched.

At least 20,000 ha of peatland restored annually.

First tranche of funding available from the £180 million Emerging Energy Technologies Fund.

£120 million over the next five years for Zero Emission Buses.

Manufacturing

Peatland

Technologies

Zero Emission Bus

2022

Electricity generation

Updated Electricity Generation Policy Statement reviewed and published.

Carbon Capture and Utilisation Challenge Fund initiated, concluding in 2024.

CCUS

Implementation of Deposit Return Scheme (DRS) for single use drinks containers.

DRS

2023

Subject to the passage of the Heat Networks (Scotland) Bill, district and communal heating systems become regulated.

Heat network

Regional Land Use Frameworks developed.

Bioenergy Action Plan published.

Local Heat and Energy Efficiency Strategies launched across all local authorities.

Land use

Bioenergy

2024

18,000 Ha of new woodlands created annually.

Woodland

New Build Zero Emissions from Heat Standard.

Acorn Project Development begins, concluding with Direct Air Capture and Storage operating from St Fergus Gas Plant in 2026.

DACS

2025

4th Climate Change Plan published.

Need for any new petrol and diesel light commercial vehicles in public bodies phased out.

Vehicles

Food waste reduced by 33% from 2013 baseline and 70% of all waste recycled. Landfilling of biodegradable municipal waste has ended.

Food waste

Landfill

Zero emissions heating systems account for at least 50% of new systems being installed each year.

Heating

2030

Need for new petrol and diesel cars and vans phased out and car kilometres reduced by 20%.

At least 250,000 hectares of peatland restored.

Peatland

Vehicles

Renewable energy generation in Scotland accounts for the equivalent of 50% of our energy demand across electricity, heat and transport.

Renewable

At least 50% of Scotland's building stock is heated using zero emission systems.

First delivery-scale NETs installations begin operation.

Buildings

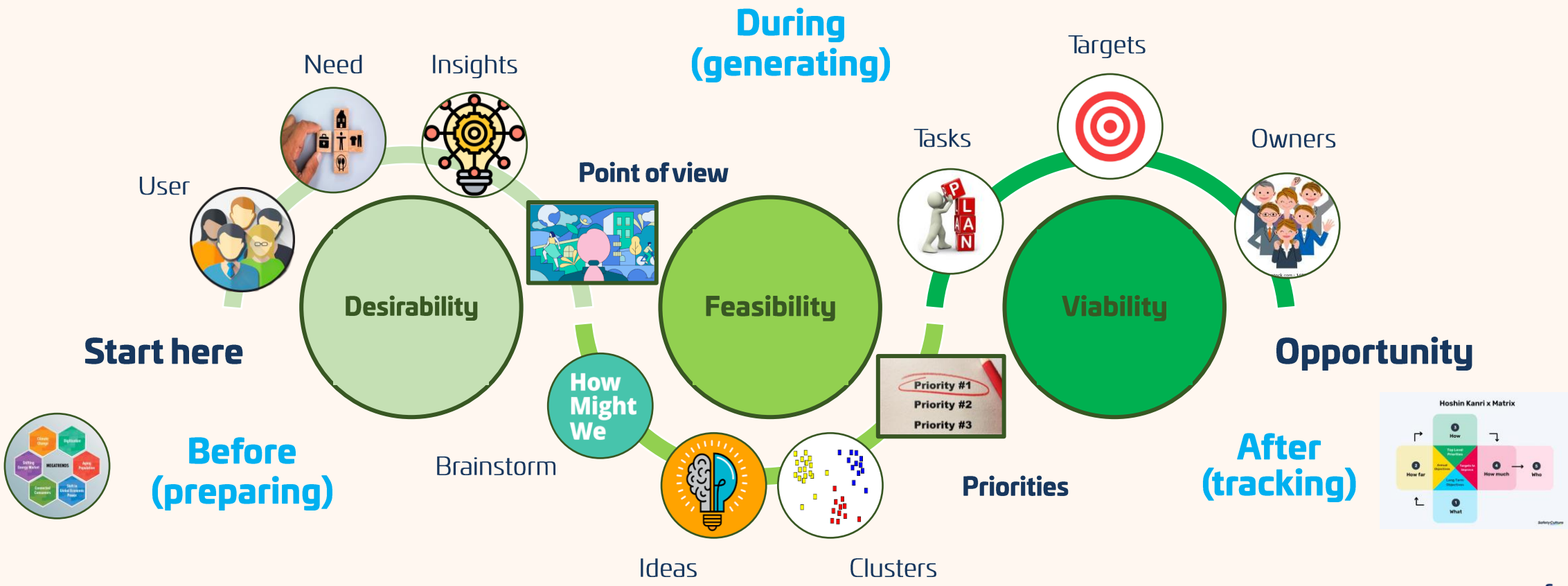
NETs

2032

Scotland's passenger rail services considerably decarbonised, with just a few years to go until they are fully decarbonised (in 2035).

Rail

Innovation skills



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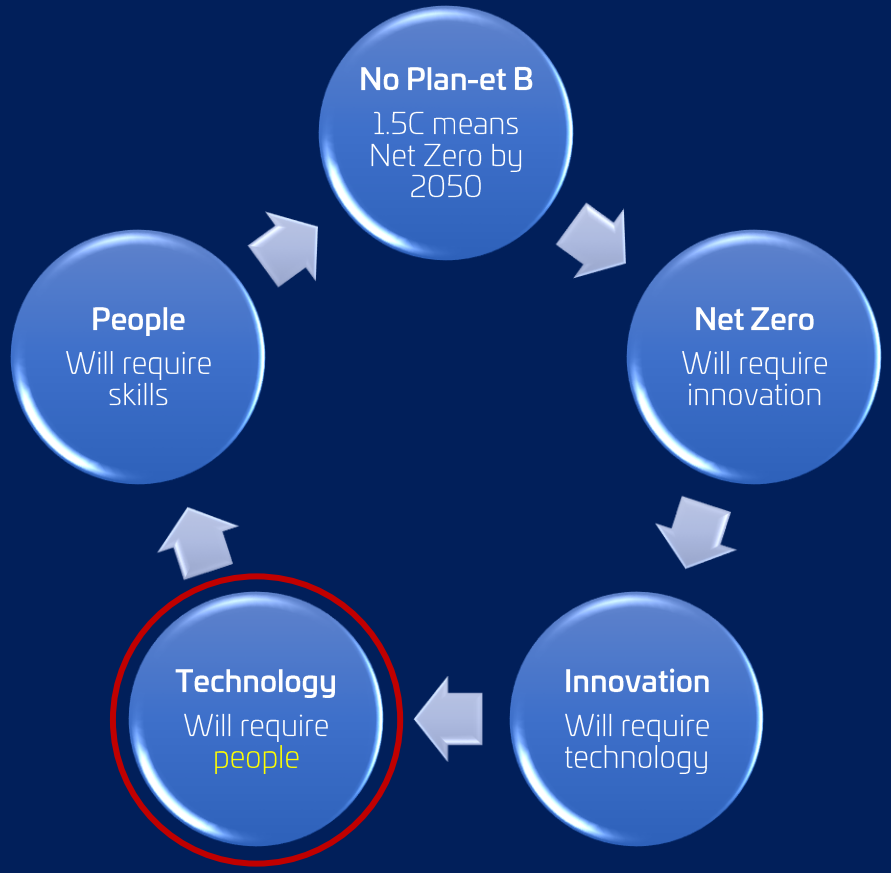
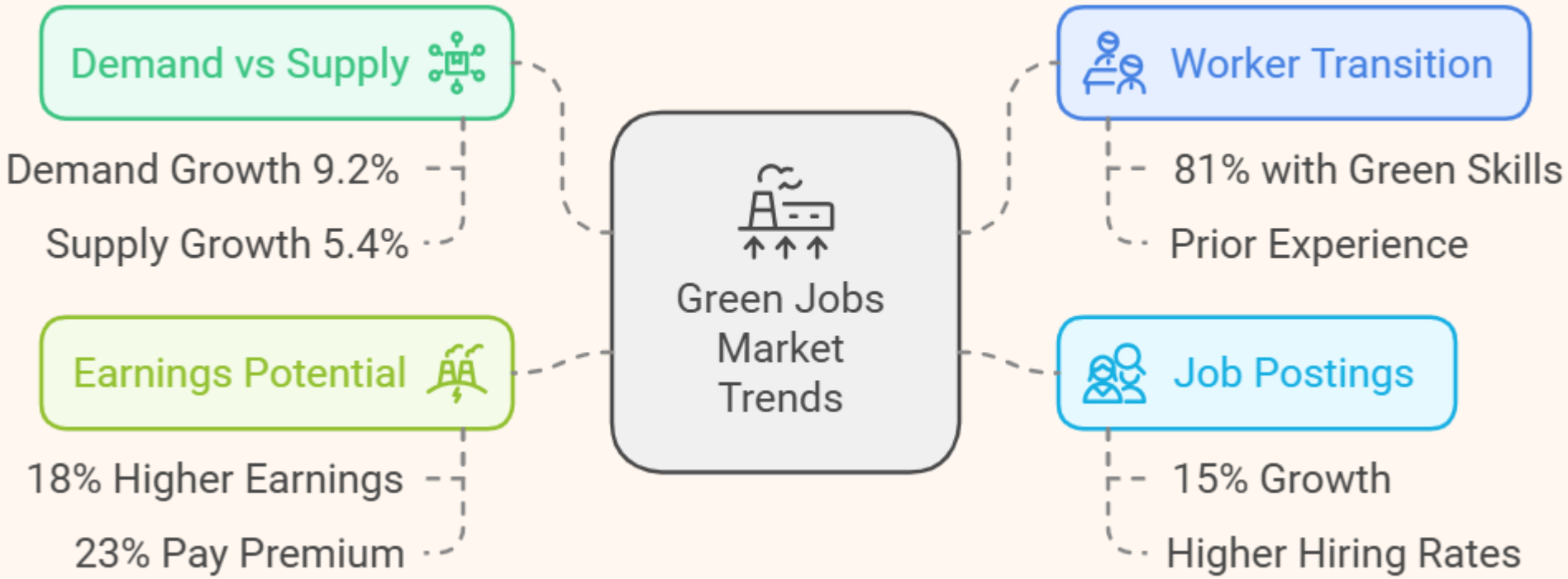
Roadmap to Net Zero



Scottish Engineering

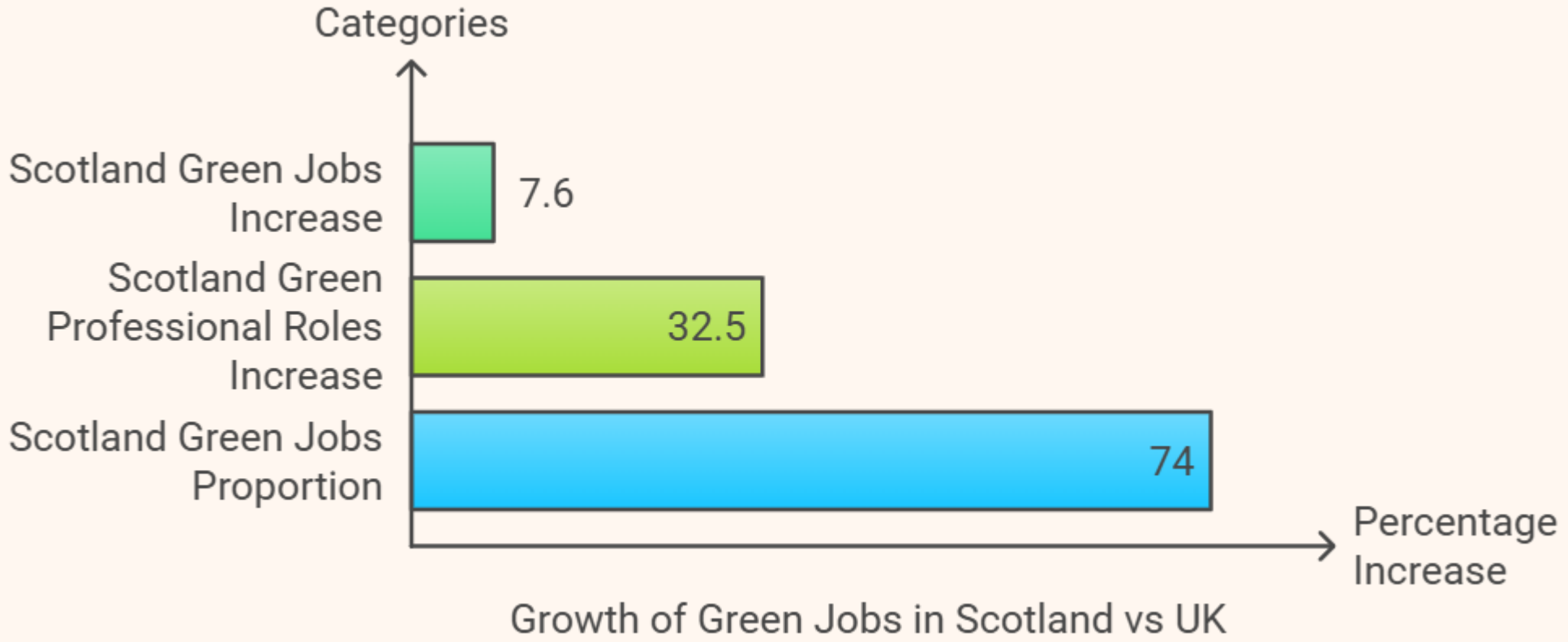
Employee

The demand outpaces the supply



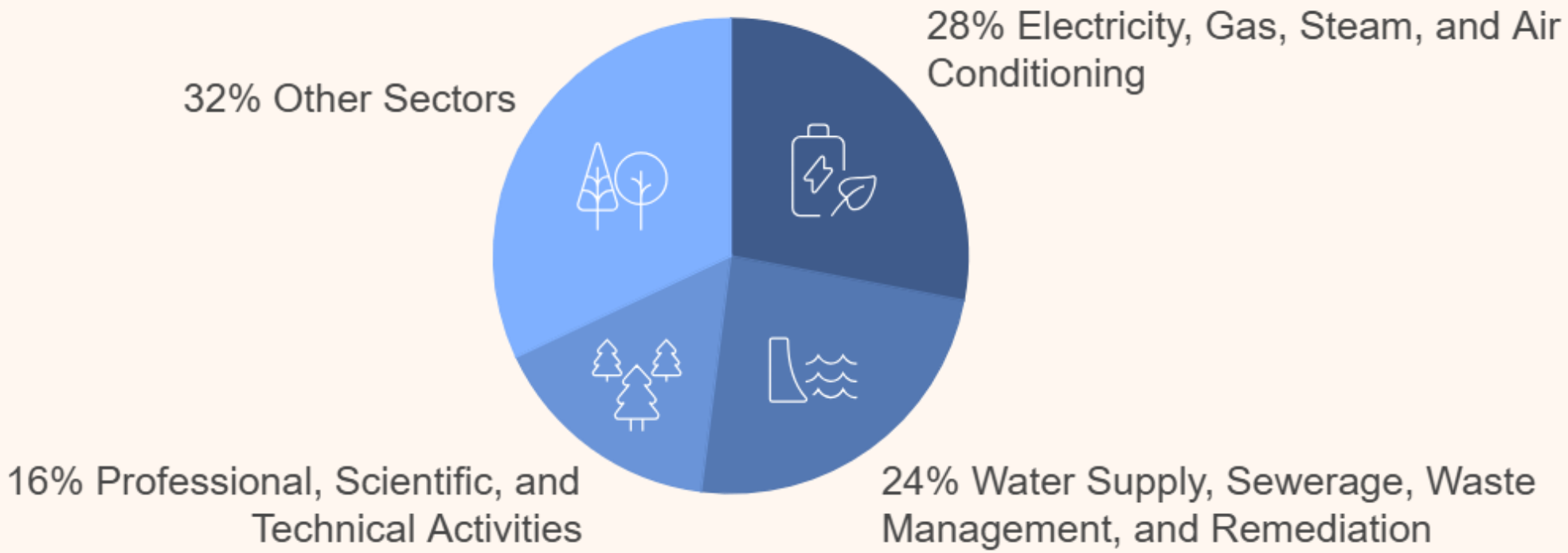
Employee

The Scottish ecosystem – 2023 vs 2022

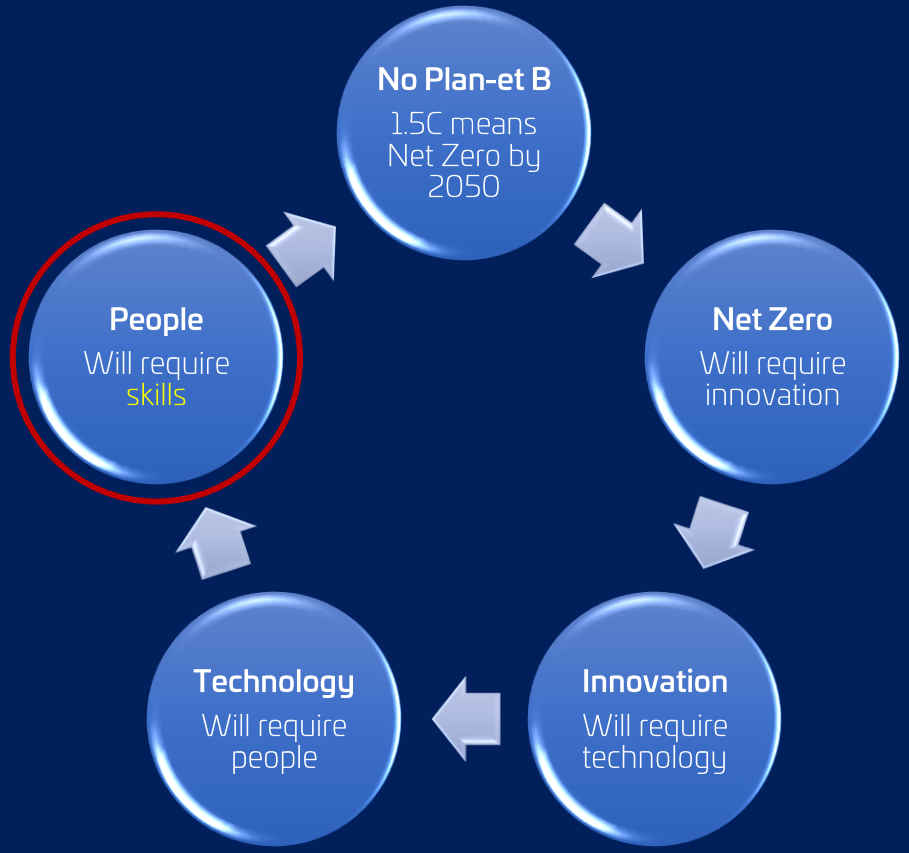


Employee

Green Job in Scotland (2023, 18 sectors)



Roadmap to Net Zero



Scottish Engineering

Green skills

Purpose

Contributing to environmental goals indirectly

Supporting the Green Economy Indirectly

Producing Environmentally Friendly Products

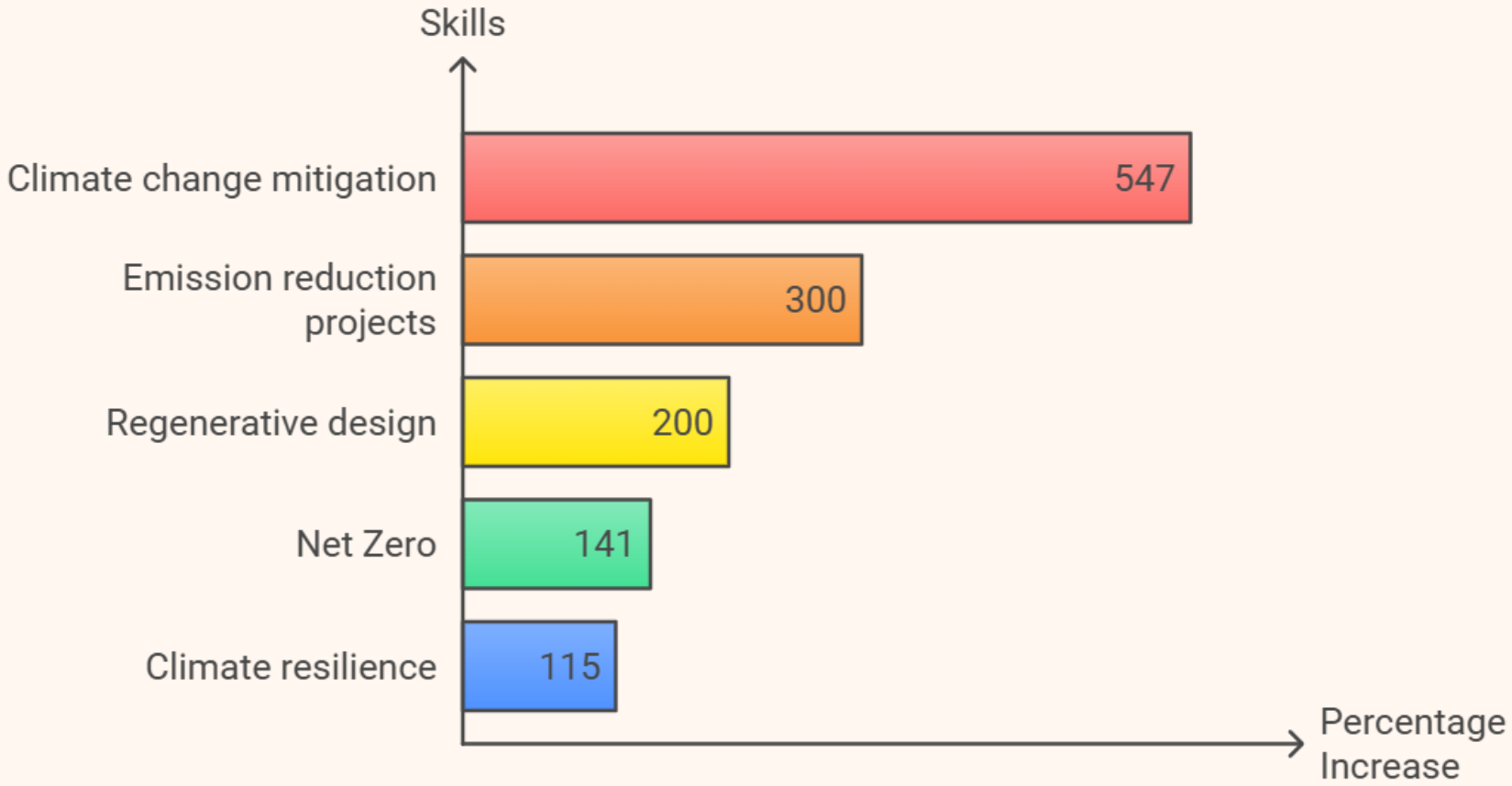
Creating sustainable goods and services

Adapting Work Processes

Modifying processes to reduce resource use

Skills for net zero

The fastest growing and most popular skills (UK and US)



Sustainable skills

Example: Finance – a critical enabler that is starting to green

Carbon Accounting (130%)

Emphasizing the importance of tracking carbon footprints.

Emissions Trading (131%)

Reflecting rising interest in market-based emissions reduction strategies.

Sustainability Reporting (88%)

Underlining the need for transparent sustainability practices.

Climate Action Planning (153%)

Highlighting increased focus on climate strategies.

Impact Assessment (74%)

Showcasing the need to evaluate environmental and social impacts.

Step 5: Takeaway

Financial resources

Human resources

Are the stakeholders interested in using green skills?

Is the project real ? Is the project a winner ? Is the project worth doing ?

Do the stakeholders have green skills?

Do the stakeholders have innovation skills?

Scottish Engineering programme

Support available

Barriers	Support
Lack of tools (52%)	Roadmap, Innovation, Lean
Lack of data (39%)	Webinars (20-off)
Lack of time (29%)	1-2-1 (330-off)
Lack of policy/funding (52%)	Newsletters (12-off)
Lack of skills (29%)	Training courses (2-off)
Lack of knowledge (29%)	Library (489 reports)

- Please make a note of interest to:
  - scoteng.org.uk
  - 0141 221 3181

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Thank you

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