Llywodraeth Cymru
Welsh Government

Net Zero Sector Skills Consultation

Draft Emission Sector Skills Roadmaps

September 2024 | Version 1

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Introduction

The Welsh Government launched the Stronger, Fairer, Greener Wales: Net Zero Skill Action Plan in February 2023. It aims to understand and support the changing skills needs in Wales for achieving net zero emissions. The plan focuses on seven key areas and contains 36 actions to equip the workforce with the right skills and opportunities.

A public consultation was undertaken towards the end of 2023. A published report of the findings will be available / is available

The outcome of the consultation has informed the development of Sector Skills Roadmaps, one for each emission sector in Wales. The roadmaps capture the high level findings and provide a clear, visual overview of three key areas;

- Milestone / Timelines
- Skills Needed
- Workforce Demand

The roadmaps are the next step in developing and strengthening the understanding of current and future skills needs.

Next steps

2023	Spring 2024	Summer 2024	by end of 2024
Net Zero Skills Action Plan https://www.gov.wales/net-zero-skills-action-plan	Net Zero Sector Skills Consultation Outcomes	Publish first draft of Sector Roadmaps / Awareness Raising	Development of next stage shared Delivery Actions

- The draft roadmaps are informed by information and proposals provided by respondents to the consultation.
- They are not all reflective of Welsh Government policy decisions, nor are they exhaustive.
- They will evolve and we will work with stakeholders and partners to understand the challenge and work on agreed solutions as the next phase of the process.
- Sectors should not be viewed stand alone, whereas they have been categorised per emission sector we recognise the significant interdependencies that exist and will be supported in the next phase.

Heat and Electricity Generation roadmap

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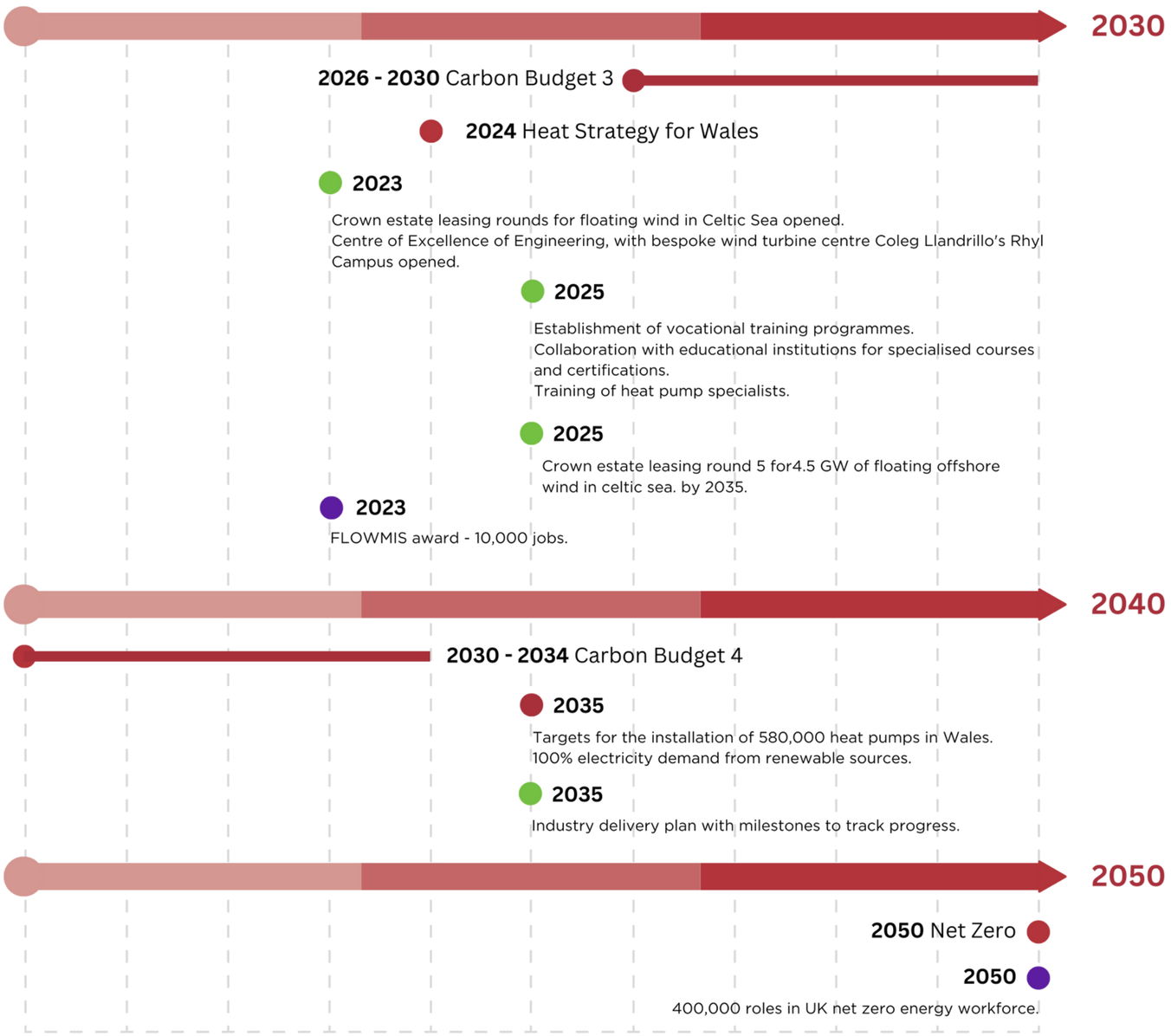
Timeline



Skills needed

- Engineering skills including mechanical, civil and electrical engineering
- Offshore construction skills including fabrication and welding
- High-voltage engineering skills for offshore wind farms
- Wind turbine maintenance and installation skills
- Marine and port operation skills for offshore energy projects
- Renewable energy production maintenance skills including wind, solar and marine energy systems.
- Environmental specialist skills including environmental impact assessments, biodiversity preservation
- Carbon capture science and emission reduction skills
- Data analysis skills for energy consumption, distribution patterns and optimisation
- Artificial intelligence and robotic skills for predictive maintenance and system optimisation
- Digital infrastructure management skills for cybersecurity, network management for smart grids
- SCADA system skills for monitoring and controlling energy distribution systems.
- Heat pump installation and maintenance including air source heat pumps
- district heating design, installation, operation and maintenance.
- Project management skills for overseeing large-scale renewable energy projects
- Solar PV system installation and maintenance
- Smart meter and battery storage systems installation and management
- Vocational training skills for new technologies including floating offshore wind and hydrogen power
- Collaboration, teamwork, innovation, and problem solving skills
- Manufacturing and construction skills including knowledge in sustainable materials, and their Lifecyle, strategies for reducing waste, and techniques for extending product lifecycles

Workforce demand

- 100,000 skilled workers by 2030 predominately in the offshore wind industry to meet renewable energy targets. Offshore Wind Industry Council Skills Intelligence Report 2023.
- Specialist installers for heat pumps, solar PV, and smart metering systems
- broad upskilling across sectors in digital, environmental, and technical fields.
- Construction Industry Training Board requiring additional 350,000 jobs including 80,000 project managers and support staff.

Key:

- Key milestones
- Required actions identified by sector
- Identified workforce demands

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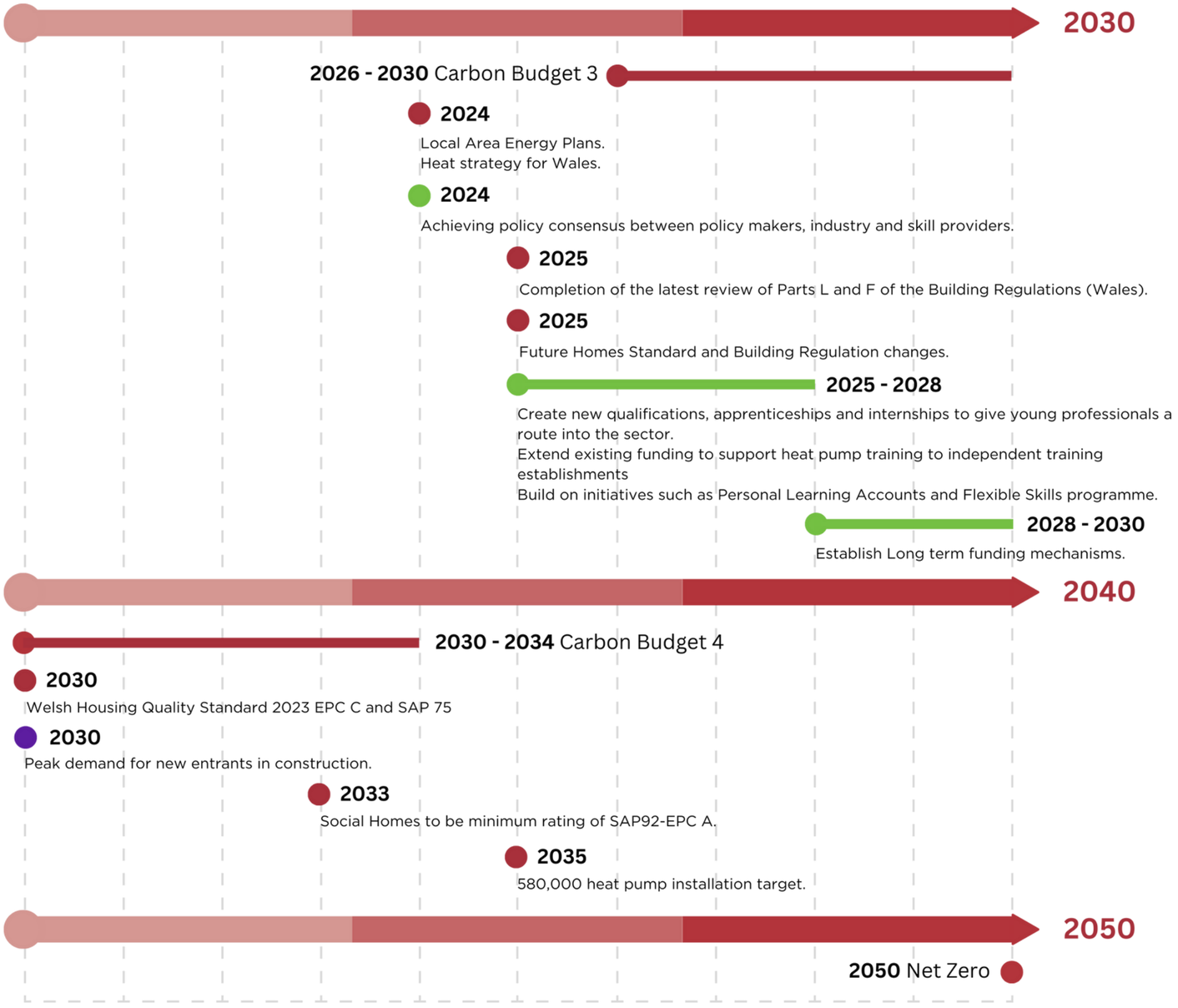
Residential Buildings roadmap

Timeline



Skills needed

- Proficiency in new energy sources, including in nuclear, tidal, wind, and hydrogen
- AI
- Whole life embodied carbon assessment
- Retrofitting evaluators and related specialist insulation specialisms
- Site Quality Control
- Building Performance Analysis
- Advisory for how to use technology such as effective use of air source heat pumps
- Property surveyors (including for retrofit) and building performance evaluation including awareness of the new PAS 2035 and PAS 2038 processes.
- Small scale renewables
- Mechanical and electrical engineers, particularly with crossovers in both
- Engineering for emerging technologies such as solar PV, battery storage, and air source heat pumps
- Installation experts for both overhead and underground infrastructure installation and maintenance skills
- Installation experts in heat pumps Mechanical Ventilation with Heat Recovery (MVHR) and photovoltaic panels with battery storage will also be needed
- Project managers and coordinators in retrofitting
- Quantity surveyors with an awareness of embodied carbon

Workforce demand

- Anticipated increased demand includes advisory services for technology utilisation such as air source heat pumps, property surveyors with knowledge of PAS 2035 and PAS 2038 processes, small scale renewables, mechanical and electrical engineers with interdisciplinary skills, engineering for emerging technologies like solar PV and battery storage, installation specialists for infrastructure and heat pumps, as well as project managers and coordinators for retrofitting initiatives, and quantity surveyors with an understanding of embodied carbon

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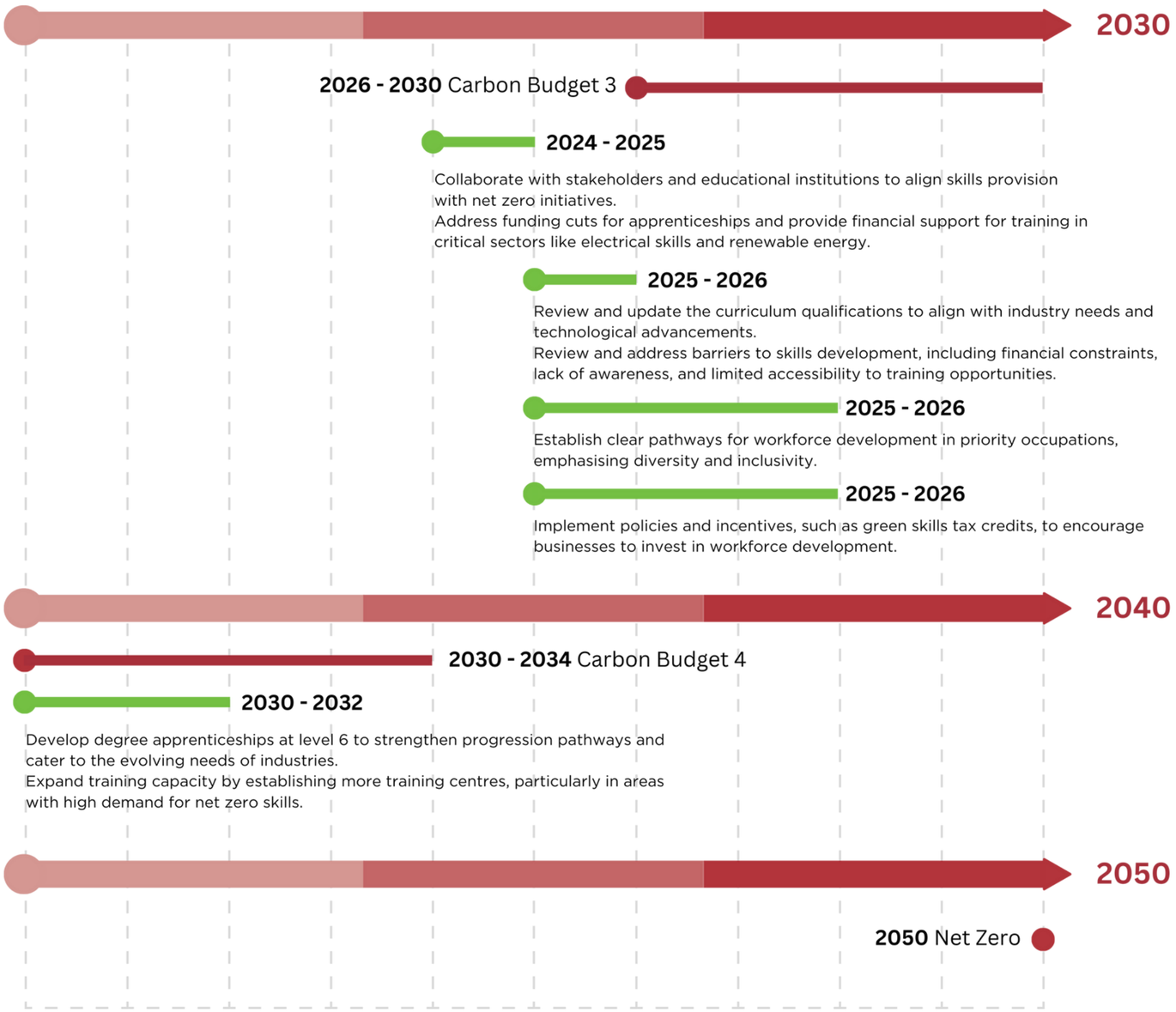
Industry and Business roadmap

Timeline



Skills needed

- Digital skills, including software development, IT, data analysis and artificial intelligence for optimising energy use and predictive modelling.
- New and emerging skills demands will be linked to new technologies
- Project management and administrative skills, with expertise in planning. Communications, compliance, and legislation.
- Collaboration and sharing best practices through cross-border learning to prevent silo-working and facilitate greater information sharing
- Communications support and advice during planning through to operation of new technology and projects.
- Proficiency in environmentally-friendly practices across various industries
- Environmental impact assessment skills e.g. sea bed ecologists required for new projects.
- Engineering and technical skills including in physics, compound semiconductors, and renewable energy.
- Construction and manufacturing, embedding net zero knowledge and skills in more traditional trades – such as bricklaying, welding - as well as upskilling in modern methods of construction.
- Sustainability and decarbonisation skills in carbon accounting and management.
- Skills in designing and installing emerging technologies such as carbon capture, battery development, and hydrogen production

Workforce demand

- The development of net zero technologies will lead to the creation of new roles such as battery manufacturing technicians and sustainability business specialists. Regional industry developments, like floating offshore wind in the Celtic Sea, will also impact employment opportunities. These new opportunities will require new skill sets and provide more job prospects, particularly for young people.

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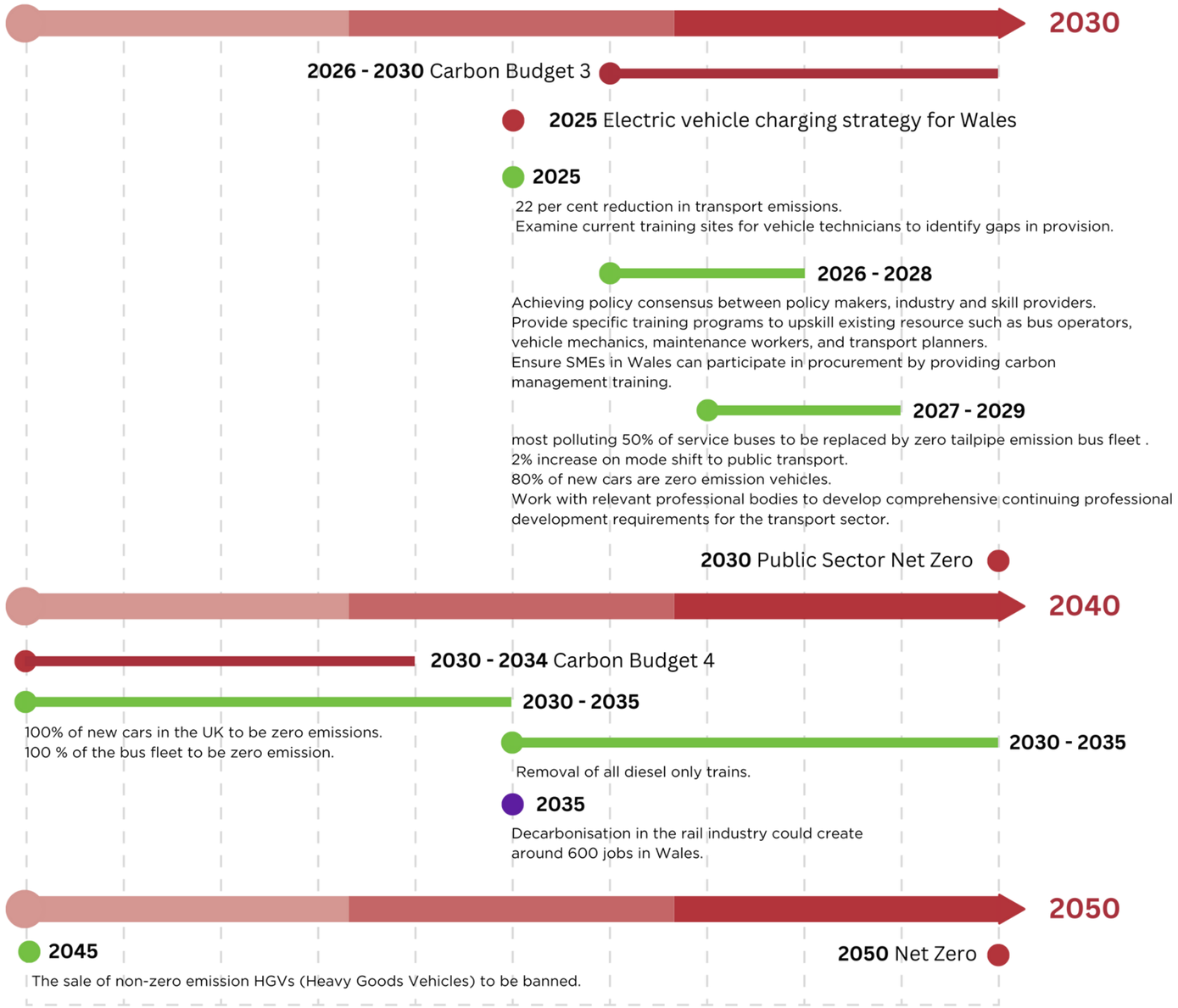
Transport roadmap

Timeline



Skills needed

- Installing, maintaining, and operating electric vehicles and associated infrastructure
- Hydrogen generation
- Carbon/energy management
- Building climate resilient infrastructure
- Flood management and mitigation
- New planning policy familiarity
- Recycling skills for vehicle mechanics
- Battery repurposing
- Battery storage
- Vehicle to grid (V2G) technology
- Low carbon construction for electric vehicle hubs/bus depots e.g. BREEAM

Workforce demand

- As electric vehicles become more common on the roads, the sector will need a much greater number of qualified electric vehicle technicians than it presently has available.
- There are some uncertainties if the shift to electric vehicles will lead to a net increase in more specialised jobs, as some professions may decrease in demand and require skillset adjustments.

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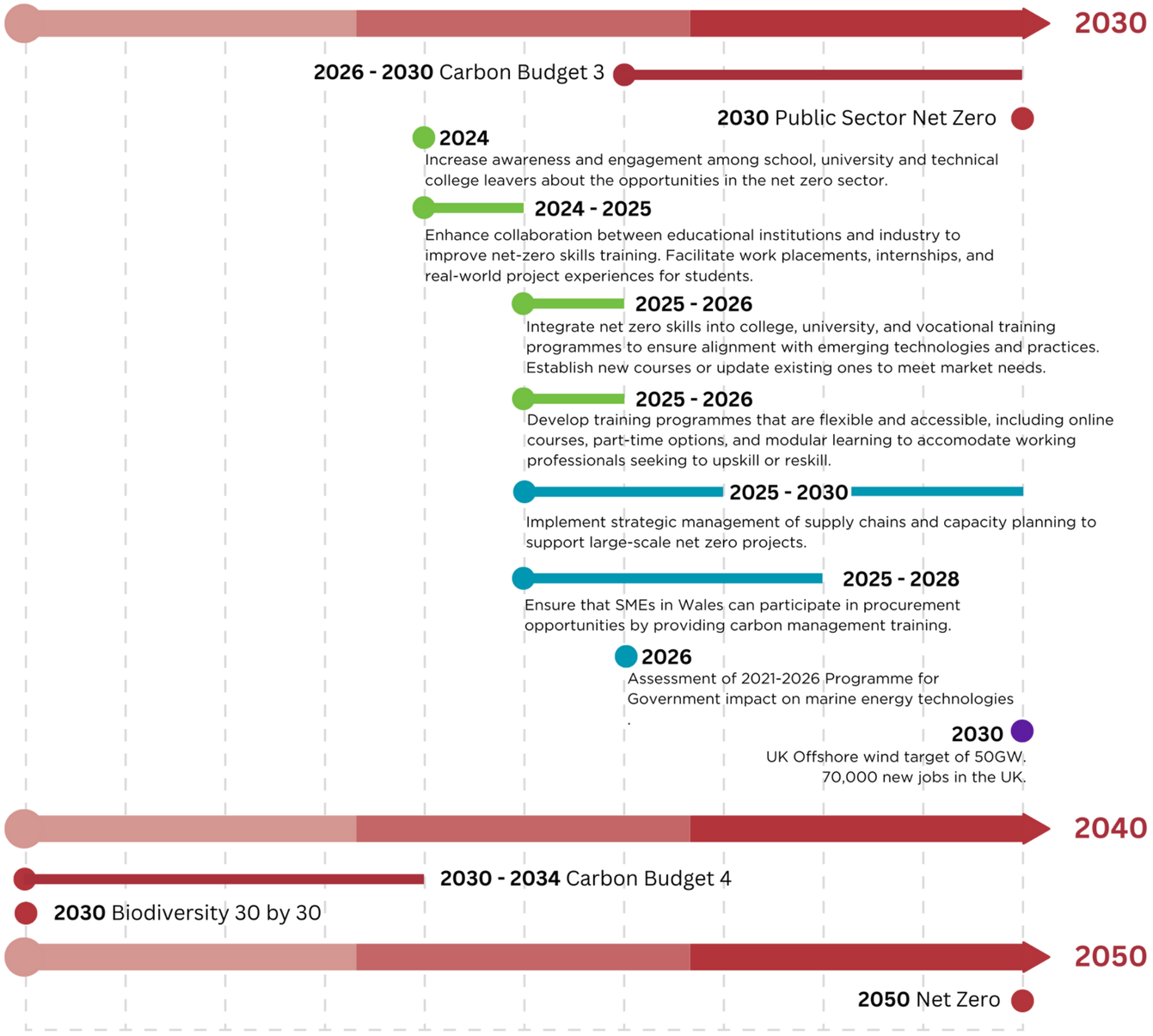
Public Sector roadmap

Timeline



Skills needed

Public Sector Skill Needs

- Digitalisation and data analytics, Internet of things, AI
- Administration , project management and agile processes
- Emission monitoring and reporting
- Planning policy, and legislation
- Procurement expertise including low carbon procurement practices
- Circular economy skills
- Soft skills in communication, collaboration, problem solving and innovation
- Leadership and management training focused on sustainability
- Environmental impact assessment and sustainability management
- Life cycle analysis
- Safety regulations and compliance, particularly concerning zero emissions technologies
- Skills in managing natural resources sustainably
- Skills in the development and adoption of innovative technologies

Wider Skill Needs

- Renewable energy manufacture, installation, and maintenance
- Heat pump installation and maintenance
- Electric Vehicle charging infrastructure installation
- Retrofit coordination, assessment, survey, and energy efficiency evaluation
- Engineering and scientific skills across sectors
- Skills for educators and trainers to deliver up to date content on net zero technologies and practices

Workforce demand

- Job creation expected across various renewable energy technologies and energy efficiency measures, including solar, tidal, hydrogen, and retrofitting of buildings.
- Additional roles within the public sector to support the delivery of renewable energy projects and net zero targets, including in planning, environmental decision-making, and regulatory compliance.
- An anticipated benefit to retrofit skills and supply chains throughout Wales, addressing skill gaps in low carbon construction and retrofit, including roles such as Retrofit Coordinators, Assessors, and Surveyors.

Key:

- Key milestones
- Required actions identified by sector
- Identified workforce demands
- Wider actions identified to support sector

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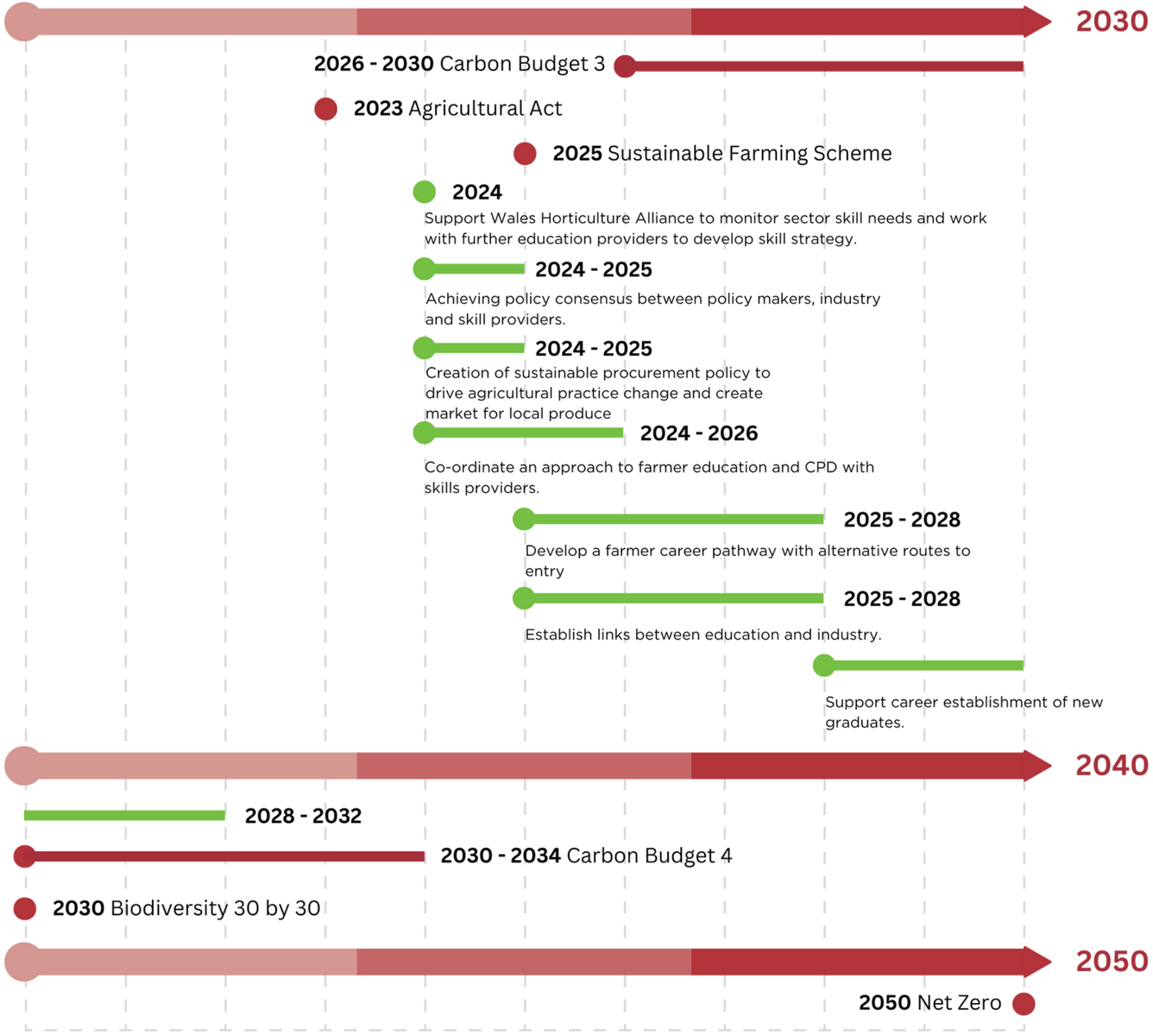
Agriculture roadmap

Timeline



Skills needed

- Carbon accounting
- Sustainable management principles, including diversification and business resilience
- Nature-based solutions
- Carbon sequestration
- Understanding cultural heritage, landscapes, and biodiversity conservation.
- IT skills, robotics, artificial intelligence, and data collection for livestock monitoring and GHG analysis
- Localised renewable energy generation and battery storage
- Innovation in horticulture (e.g. vertical farming)
- Transition to electric vehicles and sustainable transportation
- Peatland restoration, environmental literacy,
- Circular economy planning and ecodesign (e.g. biopackaging)
- Sustainable resource use, including soil and water management
- Upskilling in woodland management and tree advice

Workforce demand

- Respondents identified the need for upskilling the existing agriculture workforce, as well as supporting new entrants. Opportunities for new jobs were identified in horticulture and supporting farmers restore peatland, manage woodland and create habitats.

Key:

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- Identified workforce demands

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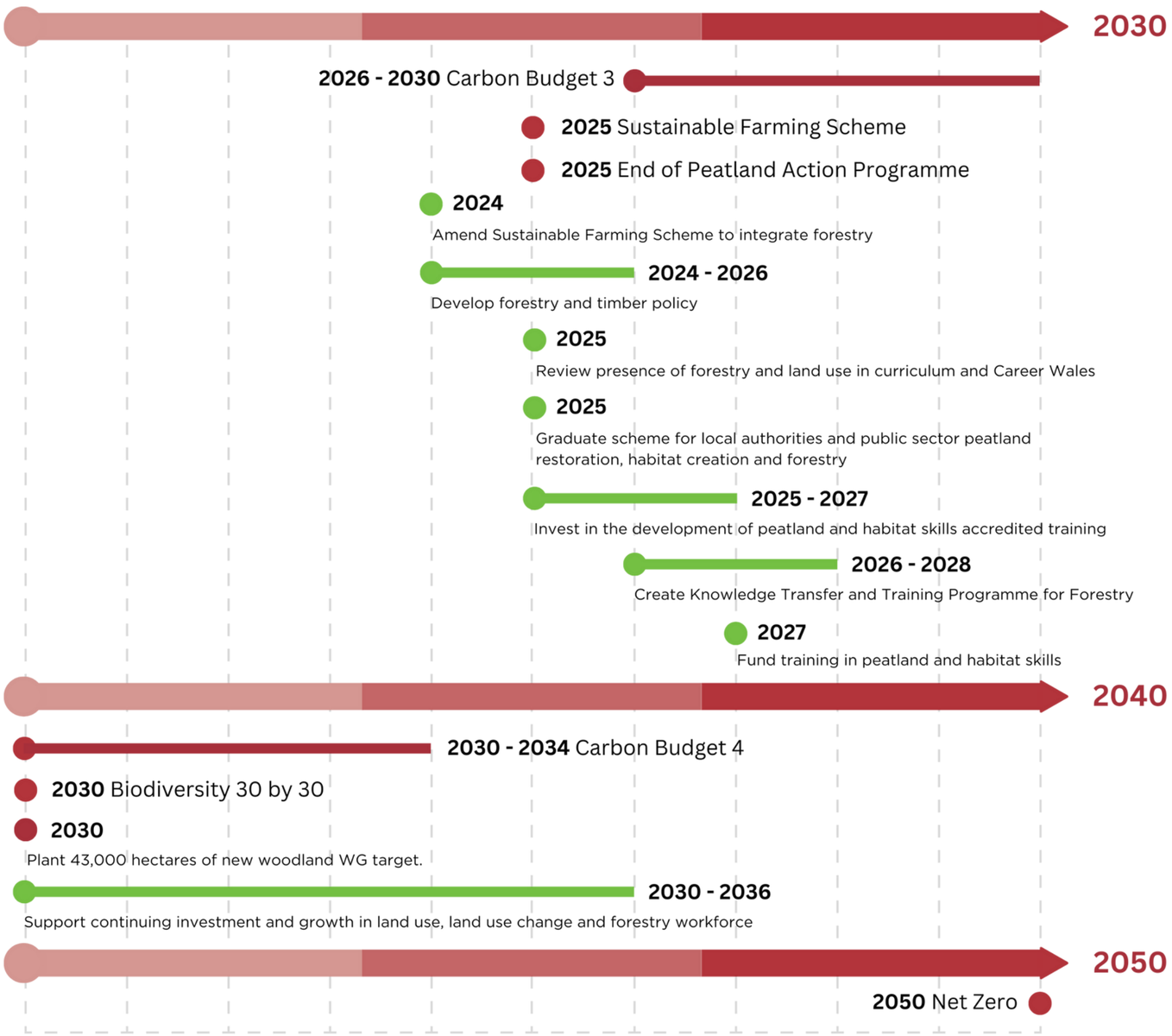
Land use, Land Use Change, and Forestry

Timeline



Skills needed

- Forest management
- Knowledge of regenerative agricultural systems
- Soil husbandry
- Carbon auditing and advice
- Biodiversity expertise
- Habitat restoration
- Peatland restoration
- GIS mapping
- Plant health control and management

Workforce demand

- Potential creation of up to 5000 jobs in land use, land use change, and forestry, with a need to increase the existing forestry workforce by up to 72% to meet Welsh Government targets.

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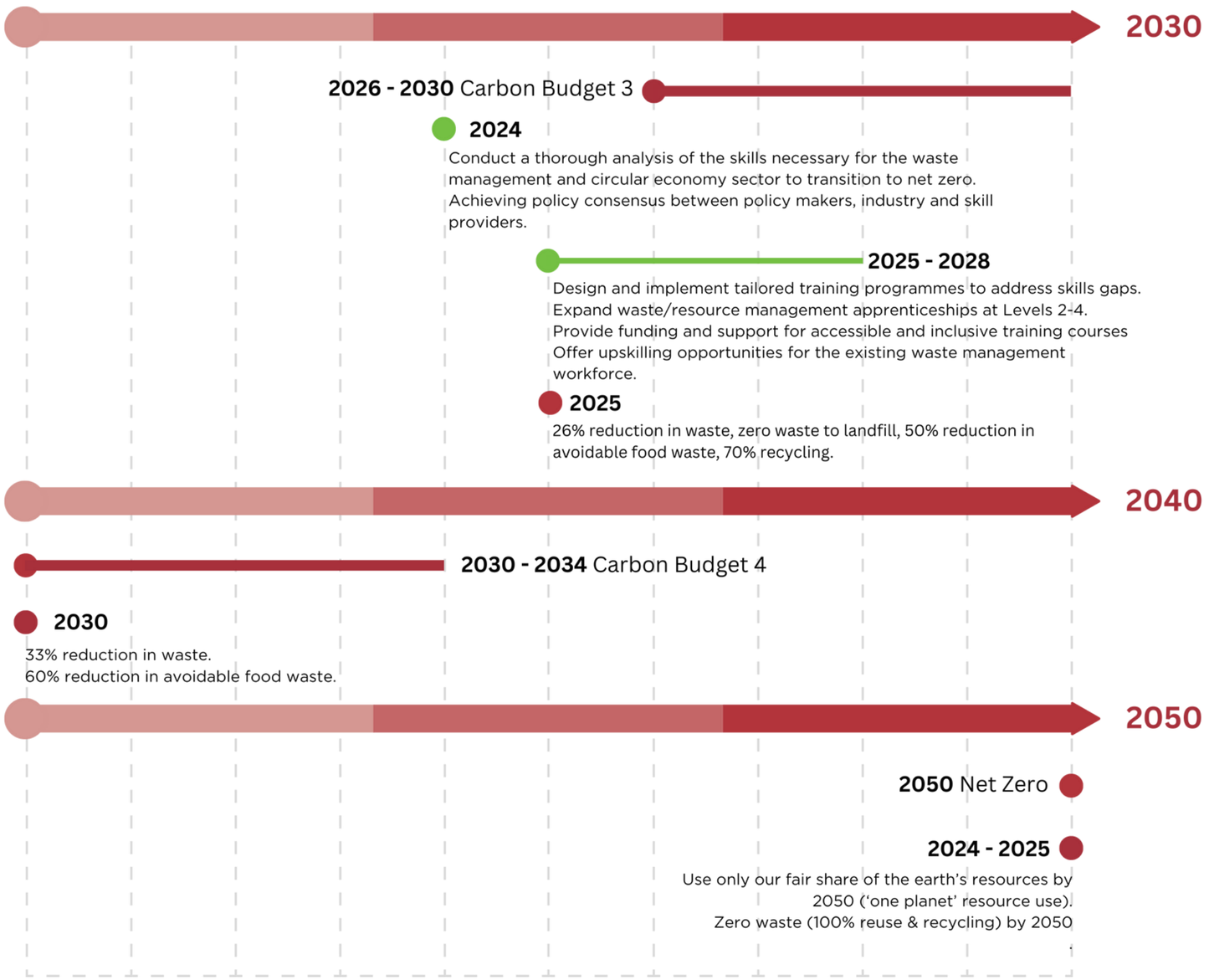
Waste and Circular Economy roadmap

Timeline



Skills needed

- There was an emphasis from respondents that many of the skills identified are cross-cutting skills, due to the holistic nature of circularity, and should therefore be considered across all sectors, these include:
- Data analysis, in particular, waste consultants skilled in mapping processes from manufacture to remanufacture
- Supply chain expertise
- Material scientists
- Engineers
- Proficiency in marketing, business, negotiation, communications, and contracting with a focus on sustainability
- Preservation of practical skills and trades within the repair and reuse sector, particularly concerning the aging workforce and potential loss of skills due to retirement

Workforce demand

- Many of the skills needed now for reuse and repair will also be needed in the future. There are concerns about securing enough skills and capacity to meet the growing demand for reuse and repair services. Increasing capacity is a challenge as skilled trades and practical skills are being lost due to retirement. Upcoming programs and investment in CE are expected to bring jobs. The specific jobs and skills needed include an increase in apprenticeships at Levels 3 and 4, jobs in eco design, CE consultancy, and CE business models.

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