Qualification Specification for:

OCN NI Level 5 Award in Green Technologies
- **Qualification No: 610/0594/0**

OCN NI Level 5 Certificate in Green Technologies
- **Qualification No: 610/0593/9**

OCN NI Level 5 Extended Certificate in Green Technologies
- **Qualification No: 610/0592/7**

Qualification Regulation Information

OCN NI Level 5 Award in Green Technologies
Qualification Number: 610/0594/0

OCN NI Level 5 Certificate in Green Technologies
Qualification Number: 610/0593/9

OCN NI Level 5 Extended Certificate in Green Technologies
Qualification Number: 610/0592/7

Operational start date: 15 March 2022
Operational end date: 28 February 2027
Certification end date: 28 February 2032

Qualification operational start and end dates indicate the lifecycle of a regulated qualification. The operational end date is the last date by which learners can be registered on a qualification and the certification end date is the last date by which learners can claim their certificate.

All OCN NI regulated qualifications are published to the Register of Regulated Qualifications (**http://register.ofqual.gov.uk/**). This site shows the qualifications and awarding organisations regulated by CCEA Regulation and Ofqual.

OCN NI Contact Details

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Foreword

This document explains OCN NI's requirements for the delivery and assessment of the following regulated qualifications:

→ **OCN NI Level 5 Award in Green Technologies**
→ **OCN NI Level 5 Certificate in Green Technologies**
→ **OCN NI Level 5 Extended Certificate in Green Technologies**

This specification sets out:

- Qualification features
- Centre requirements for delivering and assessing the qualification
- The structure and content of the qualification
- Unit details
- Assessment requirements for the qualification
- OCN NI's quality assurance arrangements for the qualification
- Administration

OCN NI will notify centres in writing of any major changes to this specification. We will also publish changes on our website at **www.ocnni.org.uk**

This specification is provided online, so the version available on our website is the most up to date publication. It is important to note that copies of the specification that have been downloaded and printed may be different from this authoritative online version.

Contents

About Regulation

OCN NI

Open College Network Northern Ireland (OCN NI) is a regulated Awarding Organisation based in Northern Ireland. OCN NI is regulated by CCEA Regulation to develop and award professional and technical (vocational) qualifications from Entry Level up to and including Level 5 across all sector areas. In addition, OCN NI is regulated by Ofqual to award similar qualification types in England.

The Regulated Qualifications Framework: an overview

The Regulated Qualifications Framework (RQF) was introduced on 1st October 2015: the RQF provides a single framework for all regulated qualifications.

Qualification Level

The level indicates the difficulty and complexity of the knowledge and skills associated with any qualification. There are eight levels (Levels 1-8) supported by three 'entry' levels (Entry 1-3).

Qualification Size

Size refers to the estimated total amount of time it could typically take to study and be assessed for a qualification. Size is expressed in terms of Total Qualification Time (TQT), and the part of that time typically spent being taught or supervised, rather than studying alone, is known as Guided Learning Hours (GLH).

Qualification Features

Sector Subject Area

5.2 Building and construction

Qualification Aim

The aim of the OCN NI Level 5 Award, Certificate and Extended Certificate in Green Technologies is to provide the learner with an understanding of the application of green technologies including installation practices and processes.

Qualification Objectives

The objectives of the OCN NI Level 5 Award, Certificate and Extended Certificate in Green Technologies are to enable learners to gain skills and knowledge in the following areas:

- solar photovoltaic systems
- anaerobic digestion
- solar thermal decarbonisation of hot water systems
- electrical vehicle charging systems
- ground and air source heat pumps
- hydrogen production systems and technologies
- sustainable alternative biofuels
- electrical energy storage systems

Grading

Grading for these qualifications is pass/fail.

Qualification Target Group

The OCN NI Level 5 Award, Certificate and Extended Certificate in Green Technologies are targeted at learners who wish to develop skills and knowledge in the areas of green technologies.

Learners would be expected to have experience within the construction industry and be interested in the application of green technologies within the built environment.

Progression Opportunities

The OCN NI Level 5 Award in Green Technologies will allow learners to progress to the OCN NI Level 5 Certificate and Extended Certificate in Green Technologies. From there learners may progress to higher level qualifications in the area of environmental conservation and green technologies or into employment.

Entry Requirements

Learners must be at least 18 years of age have a level 3 qualification or at least five years' experience in the construction and related industries. Learners must also meet all regulatory and statutory licensing and standards where appropriate in order to perform practical activities governed by the regulations within the qualifications.

Qualification Support

A Qualification Support pack is available for OCN NI centres within the login area of the OCN NI website (https://www.ocnni.org.uk/my-account/), which includes additional support for teachers, eg planning and assessment templates, guides to best practice, etc.

Delivery Languages

These qualifications are available in English only at this time. If you wish to offer these qualifications in Welsh or Irish (Gaeilge) then please contact OCN NI who will review demand and provide as appropriate.

Centre Requirements for Delivering the Qualification

Centre Recognition and Qualification Approval

New and existing OCN NI recognised centres must apply for and be granted approval to deliver the qualification prior to the commencement of delivery.

Equipment Requirements

Centres offering these qualifications must provide learners with access to industry standard equipment and technologies including buildings in order to demonstrate practical elements within each of the units.

Centre Staffing

Centres are required to have the following roles in place as a minimum, although a member of staff may hold more than one role*:

- Centre contact
- Programme Co-ordinator
- Tutor
- Assessor
- Internal Verifier

*Note: A person cannot be an internal verifier for their own assessments.

Tutors

Tutors delivering these qualifications should be qualified to at least one level higher than the qualification and have at least three years' industry experience in the specific green technology area they are teaching.

Assessors

The qualifications are assessed within the centre and is subject to OCN NI's quality assurance processes. Units are achieved through internally set, internally assessed, and internally verified evidence.

Assessors must:

- qualified to at least one level higher than the qualification and have at least three years' industry experience in the specific green technology area they are teaching
- have a relevant assessor qualification
- have direct or related relevant experience in assessment
- assess all assessment tasks and activities

Internal Verification

OCN NI qualifications must be scrutinised through the centre's internal quality assurance processes as part of the recognised centre agreement with OCN NI. The centre must appoint an experienced and trained centre internal verifier whose responsibility is to act as the internal quality monitor for the verification of the delivery and assessment of the qualifications.

The centre must agree a working model for internal verification with OCN NI prior to delivery of the qualifications.

Internal Verifiers must:

- qualified to at least one level higher than the qualification and have at least three years' industry experience in the specific green technology area they are teaching
- attend OCN NI's internal verifier training if not already completed or have relevant internal verification qualifications

Internal verifiers are required to:

- support tutors and assessors
- sample assessments according to the centre's sampling strategy
- ensure tasks are appropriate to the level being assessed
- maintain up-to-date records supporting the verification of assessment and learner achievement

Structure and Content

OCN NI Level 5 Award in Green Technologies
In order to achieve this qualification learners must complete a minimum of 7 credits from any of the optional units.

Total Qualification Time (TQT) for this qualification:	70 hours
Minimum Guided Learning Hours (GLH) for this qualification:	35 hours

OCN NI Level 5 Certificate in Green Technologies
In order to achieve this qualification learners must successfully complete a minimum of 15 credits from any of the optional units.

Total Qualification Time (TQT) for this qualification:	150 hours
Minimum Guided Learning Hours (GLH) for this qualification:	75 hours

OCN NI Level 5 Extended Certificate in Green Technologies
In order to achieve this qualification learners must successfully complete a minimum of 35 credits from any of the optional units.

Total Qualification Time (TQT) for this qualification:	350 hours
Minimum Guided Learning Hours (GLH) for this qualification:	175 hours

Unit Reference Number	OCN NI Unit Code	Unit Title	Credit Value	GLH	Level
Optional units					
Y/650/1554	CBF753	Solar Photovoltaic Systems	9	49	Five
A/650/1555	CBF754	Anaerobic Digestion	10	52	Five
D/650/1556	CBF755	Solar Thermal Decarbonisation of Hot Water Systems	8	40	Five
F/650/1557	CBF756	Electrical Vehicle Charging Systems	10	48	Five
H/650/1558	CBF757	Ground and Air Source Heat Pumps	10	59	Five
J/650/1559	CBF758	Hydrogen Production Systems and Technologies	10	52	Five
M/650/1560	CBF759	Sustainable Alternative Biofuels	7	35	Five
R/650/1561	CBF760	Electrical Energy Storage Systems	9	47	Five

Unit Reference Number	OCN NI Unit Code	Unit Title	Credit Value	GLH	Level
T/650/7648	CBG281	Small-Scale Domestic Off-Grid Electrical Power Generation	7	35	Five
Y/650/7649	CBG282	Wind Power Generation of Electrical Energy	7	35	Five

Unit Details

Title	Solar Photovoltaic Systems
Level	Five
Credit Value	9
Guided Learning Hours (GLH)	49
OCN NI Unit Code	CBF753
Unit Reference No	Y/650/1554
***Unit purpose and aim(s)*:** This unit will enable the learner to understand the processes involved in installing, commissioning and maintaining small scale photovoltaic (PV) systems. The learner will also be able to develop maintenance programmes for and fault find on PV systems.	
Learning Outcomes	**Assessment Criteria**
1. Understand photovoltaic energy generation.	1.1. Evaluate photovoltaic energy generation as an alternative supplementary domestic energy source. 1.2. Evaluate the strengths and weaknesses of photovoltaic energy generation as a green technology, in relation to the current UK energy legislation and strategy. 1.3. Analyse the perspective of utility providers regarding the continual adaptation and extension of the current electrical grid and network a) in relation to the current electrical grid infrastructure and age b) energy produced from alternative power generation 1.4. Calculate the energy requirements of a given number of domestic dwellings and corresponding energy offset due to implementation of a given percentage of photovoltaic systems across these dwellings.
2. Be able to carry out risks assessment on activities and environment associated with installing solar photovoltaic systems.	2.1. Analyse the health and safety issues associated with installing solar photovoltaic systems impacting on all individuals affected by the installation process. 2.2. Carry out risk assessments on activities and environment associated with installing solar photovoltaic systems.
3. Be able to design modular photovoltaic systems.	3.1. Explain the design principles used to determine solar photovoltaic system module array size and position requirements. 3.2. Design a modular PV system to reduce the electrical consumption of a given UK semi-detached dwelling by 25%.
4. Understand solar photovoltaic system protection techniques and components.	4.1. Explain solar photovoltaic system protection techniques and components including: a) anti-islanding protection b) purpose of the inverter

5. Understand the installation, commissioning, and operation of the small-scale photovoltaic system.	5.1. Explain the process of installation, commissioning, and operation of a given small-scale photovoltaic system including: a) system schematics b) component identification c) testing energy performance parameters
6. Be able to design a maintenance programme for a photovoltaic system and fault find to component level.	6.1. Design an annual photovoltaic maintenance regime to ensure optimal system performance of both the solar arrays and electrical components. 6.2. Use meggar test equipment to test electrical breaker switches for AC and DC electrical systems. 6.3. Explain how to identify the correct operation of the Inverter within the photovoltaic system. 6.4. Diagnose faults with an inverter in relation to: a) battery performance and operation b) electrical polarity c) electrical short circuits

Assessment Guidance

The following assessment method/s may be used to ensure all learning outcomes and assessment criteria are fully covered.

Assessment Method	Definition	Possible Content
Portfolio of evidence	A collection of documents containing work undertaken to be assessed as evidence to meet required skills outcomes OR A collection of documents containing work that shows the learner's progression through the course	Learner notes/written work Learner log/diary Peer notes Record of observation Record of discussion
Practical demonstration/assignment	A practical demonstration of a skill/situation selected by the tutor or by learners, to enable learners to practise and apply skills and knowledge	Record of observation Learner notes/written work Learner log
Coursework	Research or projects that count towards a learner's final outcome and demonstrate the skills and/or knowledge gained throughout the course	Record of observation Learner notes/written work Tutor notes/record Learner log/diary
E-assessment	The use of information technology to assess learners' work	Electronic portfolio E-tests

Title	Anaerobic Digestion
Level	Five
Credit Value	10
Guided Learning Hours (GLH)	52
OCN NI Unit Code	CBF754
Unit Reference No	A/650/1555
Unit purpose and aim(s): This unit will enable the learner to understand how to address the challenges of waste management, the detrimental effects of waste landfill from methane and utilising a range of alternative sustainable energy. The learner will evaluate the requirements to produce sustainable Anaerobic Digestion (AD) energy, assist local and national government meet landfill site waste reduction and the best uses of AD.	

Learning Outcomes	**Assessment Criteria**
1. Understand the principles of energy extraction from consumer waste.	1.1. Explain how energy is extracted from consumer waste products. 1.2. Research and calculate reduction in landfill for a given geographical area due to energy extraction from consumer waste products.
2. Understand the principles of using AD as an energy source.	2.1. Analyse the reasons why AD is viewed as a renewable fuel. 2.2. Research and determine the carbon dioxide release as products of combustion from AD consumption against methane release from given landfill waste sites. 2.3. Evaluate the strengths and weaknesses of AD as a renewable source of fuel and waste reduction in relation to the following: a) current energy legislation b) domestic dwelling energy requirements c) calorific values produced d) landfill cost per domestic dwelling 2.4. Analyse the best usage of AD as a fuel and energy source.
3. Be able to determine the AD energy and infrastructure requirements of a town.	3.1. Determine the energy requirements for a given medium sized town and if a given source of AD energy can meet this. 3.2. Determine the infrastructure requirements to supply AD energy to the town identified in AC 3.1.
4. Understand health and safety requirements and standards associated with waste management, and associated risk assessments and safety control development.	4.1. Analyse the health and safety requirements of working in volatile environments in accordance with both EH40 (Environmental Hygiene) and WELs (Workplace Explosive Limits) for all parties impacted by the waste management and gas production. 4.2. Explain the Control of Major Accidents and Hazards Regulations (COMAH) and how they would be implemented in an AD plant.
5. Be able to carry out risk assessments and develop safety controls to support a safe working environment.	5.1. Carry out risk assessments and develop safety controls to support a safe working environment.
6. Understand the six gas states of AD production and associated systems.	6.1. Explain the six gas states of AD production, gas pressures produced, gas controls and equipment used to manage each phase safely. 6.2. Critically compare and contrast gas states produced by AD against fossil fuel gas.

7. Understand an AD site layout and operation.	7.1. Explain layout of an AD processing plant and operation of main components including: a) waste collection b) hydrolysis c) biogas membrane buffer d) digestor e) bio methane buffer f) compressor
8. Be able to safely carry out maintenance on AD plant components.	8.1. Summarise the skills and qualifications required to safely carry out routine maintenance within AD plants. 8.2. Determine the gases an operative will encounter in the main components of an AD plant and the corresponding Personal Protection Equipment (PPE) required by operatives to work on each component. 8.3. Operate and test given gas control regulators. 8.4. Record the test results from gas control regulators identified in AC 8.3 in relation to: a) nominal operating pressure b) under pressure shut off c) over pressure shut off d) limited relief pressure 8.5. Modify pressure performance of different low pressure gas regulators to an appropriate level through use of diaphragm, orifice and spring replacements.

Assessment Guidance

The following assessment method/s may be used to ensure all learning outcomes and assessment criteria are fully covered.

Please be advised that learners undertaking the practical elements of this unit must do so in a controlled environment under supervision. Prior to any practical activity being undertaken learners must have demonstrated an understanding of the health and safety requirements before undertaking practical demonstrations.

Assessment Method	Definition	Possible Content
Portfolio of evidence	A collection of documents containing work undertaken to be assessed as evidence to meet required skills outcomes OR A collection of documents containing work that shows the learner's progression through the course	Learner notes/written work Learner log/diary Peer notes Record of observation Record of discussion
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E-assessment	The use of information technology to assess learners' work	Electronic portfolio E-tests

Title	Solar Thermal Decarbonisation of Hot Water Systems
Level	Five
Credit Value	8
Guided Learning Hours (GLH)	40
OCN NI Unit Code	CBF755
Unit Reference No	D/650/1556
***Unit purpose and aim(s)*:** This unit will enable the learner to understand how to utilise solar gains to decarbonize hot water systems through designing and installing different alternative sustainable energy systems.	
Learning Outcomes	**Assessment Criteria**
1. Understand the health and safety requirements and regulations and safe systems of work associated with solar thermal system installation.	1.1. Analyse the health and safety requirements, regulations and safe ways of working of solar thermal system installation in relation to the following: a) construction design and management regulations (CDM) b) working at heights regulations c) manual handling regulations d) Control of Substances Hazardous to Health (COSHH) 1.2. Explain the issues to be addressed in developing a risk management strategy in regard to solar thermal system installation. 1.3. Summarise the legislative and statutory regulations for individuals carrying out the installation, commissioning, operation and maintenance of solar thermal systems.
2. Understand the physics underpinning solar thermal systems.	2.1. Explain the physical principles underpinning solar thermal systems including: a) installation b) collection of energy c) thermo dynamics 2.2. Research what is meant by the following stages of solar energy a) solar Constant b) direct Irradiance c) reflected Irradiance d) diffusion e) diffuse Irradiance 2.3. Explain the four main energy transfer stages of solar power through reflectance, absorbance, emittance, and aperture of solar collectors. 2.4. Calculate the expansion and thermo dynamics of a given solar thermal system using the formula V = (e X c) / 1 (pi / pr) and determine the fluid and glycol percentage mixture required.
3. Understand the design principles underpinning solar thermal systems.	3.1. Explain the design principles underpinning different solar thermal systems and compare the following: a) flat plate collectors b) evacuated tube collectors c) direct evacuated tubes d) heat pipe evacuated tubes e) unglazed collectors

	3.2. Critically compare and contrast advantages and disadvantages of the following mounting techniques: a) on-roof mount b) in-roof mount c) free standing 3.3. Determine the optimum geographical setting for location and installation of solar thermal collectors within the UK giving reason for choice. 3.4. Determine the daily average solar radiation per month for a given region.
4. Understand function and operation of solar hot water system controls.	4.1. Explain the reason for, function and operation of the following solar hot water system controls: a) fluid expansion b) frost protection c) bacterial growth d) high temperature and steam
5. Be able to design a solar thermal system.	5.1. Design a given small scale solar thermal system in accordance with BS8558 to supply a domestic dwelling including calculation of fossil fuel energy reduction.
6. Understand how to install, commission, and operate a small-scale solar thermal system.	6.1. Explain the health and safety requirements prior to solar thermal system installation. 6.2. Carry out a site external survey (SES) to confirm the following: a) collector orientation b) potential shading c) roof access d) collector size 6.3. Carry out a site internal survey (SIS) to confirm the following: a) hot water consumption and anticipated usage is compliant with regulations b) cold water supplies c) legionella risk controls are in place d) adequate electrical supplies e) position of solar controller and pumps 6.4. Develop a risk management strategy for the solar thermal system installation based on the SES and SIS carried out in ACs 6.2 and 6.3. 6.5. Carry out the installation, commissioning, and operation of a small-scale solar thermal system to manufacturer's instructions including complete carrying out all required checks.
7. Be able to carry out maintenance on solar thermal system components and devices.	7.1. Carry out corrective maintenance of solar thermal systems including: a) diagnosis of irregular operation of differential temperature controller b) diagnosis of the three-control sensor safety triangle

Assessment Guidance		
The following assessment method/s may be used to ensure all learning outcomes and assessment criteria are fully covered. **Please be advised that learners undertaking the practical elements of this unit must do so in a controlled environment under supervision. Prior to any practical activity being undertaken learners must have demonstrated an understanding of the health and safety requirements before undertaking practical demonstrations.**		
Assessment Method	**Definition**	**Possible Content**
Portfolio of evidence	A collection of documents containing work undertaken to be assessed as evidence to meet required skills outcomes OR A collection of documents containing work that shows the learner's progression through the course	Learner notes/written work Learner log/diary Peer notes Record of observation Record of discussion
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E-assessment	The use of information technology to assess learners' work	Electronic portfolio E-tests

Title	Electrical Vehicle Charging Systems
Level	Five
Credit Value	10
Guided Learning Hours (GLH)	48
OCN NI Unit Code	CBF756
Unit Reference No	F/650/1557
***Unit purpose and aim(s)*:** This unit will enable the learner to understand the installation of dedicated conductive charging equipment for the charging of pure electric, plug-in hybrid electric road vehicles (PHEV) and extended range of electric vehicles (E-REV).	
Learning Outcomes	**Assessment Criteria**
1. Understand the key health and safety requirements for installing and working with electric vehicle charging equipment (EVCE).	1.1. Explain the Electrical Regulations at Work Act 1989 in relation to installing EVCE systems. 1.2. Explain what is meant by the electrical safety pyramid. 1.3. Explain qualification and competence in electromechanical works in accordance with BS7671 and how this relates to installing and working on EVCE systems. 1.4. Summarise the legislative and statutory regulations for individuals carrying out the installation, inspection, testing and final commissioning handover of an EVCE system.
2. Understand electric vehicle charging EVC, associated charging modes and Wireless Power Transfer (WPT).	2.1. Critically compare the energy transfer of the four modes of EVC charging. 2.2. Explain what is meant by WPT technology and its operation and application including and inductive and microwave systems.
3. Be able to design a domestic EVCE system including electrical supply, protection and earthing.	3.1. Explain the source of electrical supply to the EVCE from a consumer unit in a dwelling including circuit and metering requirements. 3.2. Compare the over current protection requirements for a consumer unit to the following standards: a) BSEN60289 b) BSEN60898 c) BSEN61009-1 d) BSEN60947-6-2 3.3. Explain the key features and issues to be considered when designing a domestic EVCE system including protection and earthing systems. 3.4. Develop a design for and corresponding schematic drawing of a domestic EVCE system to include the following features: a) 32A Supply b) Single Phase c) Terre-Terre (TT) Earthing arrangement d) Mode 3 Energy Transfer/Charging Unit e) Type 3 Connection
4. Be able to install an EVCE system in a domestic dwelling.	4.1. Explain the procedures to be followed when installing a domestic EVCE system from the customers consumer unit including: a) potential health and safety issues including Electricity at Work Act b) installation standard BS7671 c) cables, switches and EV charging equipment to be used

	d) site preparation e) installation stages 4.2. Carry out the safe installation of an EVCE system in a domestic dwelling in line with design developed in AC 3.4.
5. Be able to carry out safe isolation of an EVCE installation.	5.1. Select, explain and demonstrate the use of appropriate measuring instruments to safely isolate the EVCE system installed in AC 4.2. including testing: a) continuity of protective conductors b) insulation resistance test c) separated extra-low voltage (SELV) and protective extra-low voltage (PELV) extra low voltage testing d) electrical separation e) polarity
6. Be able to complete the inspection, testing and final commissioning handover of an EVCE system.	6.1. Select, explain and demonstrate the use of appropriate measuring instruments to carry out the process of initial verification of the EVCE system installed in AC 4.2. including testing: a) earth electrode resistance b) earth fault loop impedance c) operation of Residual Current Devices (RCDs) d) phase rotation sequence e) voltage drops 6.2. Carry out inspection, testing, final commissioning certificate to BS7671 and handover of the EVCE system installed in AC 4.2 in line with requirements and processes undertaken in AC 6.1.

Assessment Guidance

The following assessment method/s may be used to ensure all learning outcomes and assessment criteria are fully covered.

Please be advised that learners undertaking the practical elements of this unit must do so in a controlled environment under supervision. Prior to any practical activity being undertaken learners must have demonstrated an understanding of the health and safety requirements before undertaking practical demonstrations.

Assessment Method	Definition	Possible Content
Portfolio of evidence	A collection of documents containing work undertaken to be assessed as evidence to meet required skills outcomes OR A collection of documents containing work that shows the learner's progression through the course	Learner notes/written work Learner log/diary Peer notes Record of observation Record of discussion
Practical demonstration/assignment	A practical demonstration of a skill/situation selected by the tutor or by learners, to enable learners to practise and apply skills and knowledge	Record of observation Learner notes/written work Learner log

Coursework	Research or projects that count towards a learner's final outcome and demonstrate the skills and/or knowledge gained throughout the course	Record of observation Learner notes/written work Tutor notes/record Learner log/diary
E-assessment	The use of information technology to assess learners' work	Electronic portfolio E-tests

Title	Ground and Air Source Heat Pumps
Level	Five
Credit Value	10
Guided Learning Hours (GLH)	59
OCN NI Unit Code	CBF757
Unit Reference No	H/650/1558
***Unit purpose and aim(s)*:** This unit will enable the learner to understand the operation, design, and specification of ground and air source heat pumps.	

Learning Outcomes	Assessment Criteria
1. Understand the health and safety requirements and standards associated with heat pump installation.	1.1. Analyse the health and safety requirements of the heat pump system installation in relation to the following: a) construction design and management regulations (CDM) b) Electricity at Work Act (EAW) c) Health and Safety at Work Act 1974 HASAWA 1974 d) manual handling regulations e) Control of Substances Hazardous to Health (COSHH) f) Fluorinated gases regulations (FGAS)
2. Understand how to develop a risk management strategy for a ground source closed loop collector system.	2.1. Develop a risk management strategy to be implemented for a ground source closed loop collector system.
3. Understand the operating principles of different heat pump types.	3.1. Critically compare and contrast energy collection and transfer between the air and ground source heat pumps. 3.2. Critically compare and contrast monovalent and bivalent heat pump systems. 3.3. Select with justification the appropriate monovalent or bivalent heat pump systems for different dwellings.
4. Understand vapour compression and absorption cycles and the function of vapour compression cycle components.	4.1. Critically compare the vapour compression and absorption cycles. 4.2. Explain the functions of each of the following vapour compression cycle components: a) heat exchanger b) expansion valve c) compressor d) condenser e) dryer
5. Be able to research and design heating system elements.	5.1. Research relevant data and information to inform the design of the following: a) an internal pipeline heating system to given specifications for connection to a heat pump b) a heat emitter system with given optimal temperature difference powered by a given heat pump c) heat emitters for a given heat pump system
6. Be able to calculate the thermal expansion and thermo dynamics of an air source heat pump system.	6.1. Calculate the thermal expansion and thermo dynamics of a given air source heat pump system for a specified optimal operating temperature.

Assessment Guidance		
The following assessment method/s may be used to ensure all learning outcomes and assessment criteria are fully covered.		
Assessment Method	**Definition**	**Possible Content**
Portfolio of evidence	A collection of documents containing work undertaken to be assessed as evidence to meet required skills outcomes OR A collection of documents containing work that shows the learner's progression through the course	Learner notes/written work Learner log/diary Peer notes Record of observation Record of discussion
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Coursework	Research or projects that count towards a learner's final outcome and demonstrate the skills and/or knowledge gained throughout the course	Record of observation Learner notes/written work Tutor notes/record Learner log/diary
E-assessment	The use of information technology to assess learners' work	Electronic portfolio E-tests

Title	Hydrogen Production Systems and Technologies
Level	Five
Credit Value	10
Guided Learning Hours (GLH)	52
OCN NI Unit Code	CBF758
Unit Reference No	J/650/1559
Unit purpose and aim(s): This unit will enable the learner to understand the safe use of hydrogen, hydrogen production systems and technologies.	

Learning Outcomes	**Assessment Criteria**
1. Understand the health and safety requirements and standards for hydrogen production systems and technologies.	1.1. Analyse the health and safety requirements of working on premix gas production in volatile environments in accordance with Environmental Hygiene (EH40) and Workplace Explosive Limits (WELs). 1.2. Explain the characteristics of molecular hydrogen (H2) in relation to lower explosive limit (LEL) and upper explosive limits (UEL) and required safety regimes when using H2 as an energy source. 1.3. Summarise the legislative and statutory regulations for individuals carrying out the blending of hydrogen and natural gas and setting, measuring and stabilisation of hydrogen mixes at different pressures.
2. Understand how to carry out risk assessments and develop safety controls when working in gaseous atmospheres.	2.1. Explain how to carry out risk assessments and develop safety controls to support safe working environments in gaseous atmospheres.
3. Be aware of trends, legislative frameworks, environmental impact and fuel security in relation to energy usage.	3.1. Research and present current UK fuel energy usage trends and associated carbon dioxide (CO2) emissions. 3.2. Evaluate the emissions identified in AC 3.1 against H2 CO2 emissions. 3.3. Research and analyse the legislative pathway from current fossil fuel usage to Zero Carbon 2050. 3.4. Critically compare fuel security and environmental impact of the usage of conventional oil and gas in a given region against localised hydrogen production.
4. Understand hydrogen production processes.	4.1. Explain the six hydrogen production processes. 4.2. Critically compare green electrolysis H2 against the other five forms of H2 production.
5. Understand the impact of hydrogen on the gas grid network system.	5.1. Research and explain the effects of Hydrogen Embrittlement (HE), Stress Corrosion Cracking (SCC), and Creep, caused by H2 on the upstream and downstream gas infrastructure.
6. Be able to carry out gas blending for hydrogen and natural gas.	6.1. Explain the process of blending hydrogen and natural gas. 6.2. Carry out gas blending for hydrogen and natural gas to correct ratio for given hybrid appliances using appropriate equipment.

7. Be able to carry out the setting, measuring and stabilisation of hydrogen mixes at different pressures.	7.1. Research fuel gas mixtures and the dynamics of mixing different combustible gases. 7.2. Carry out the setting, measuring and stabilisation of hydrogen mixes at different pressures including: a) high b) two-stage c) low
8. Understand the by-products from combustion of H2 and fossil fuels and implications for system design.	8.1. Compare and contrast the production of nitrogen oxides (NOX) and condensate from combustion of H2 to that from current fossil fuels including implications for system design.

Assessment Guidance

The following assessment method/s may be used to ensure all learning outcomes and assessment criteria are fully covered.

Please be advised that learners undertaking the practical elements of this unit must do so in a controlled environment under supervision. Prior to any practical activity being undertaken learners must have demonstrated an understanding of the health and safety requirements before undertaking practical demonstrations.

Assessment Method	Definition	Possible Content
Portfolio of evidence	A collection of documents containing work undertaken to be assessed as evidence to meet required skills outcomes OR A collection of documents containing work that shows the learner's progression through the course	Learner notes/written work Learner log/diary Peer notes Record of observation Record of discussion
Practical demonstration/assignment	A practical demonstration of a skill/situation selected by the tutor or by learners, to enable learners to practise and apply skills and knowledge	Record of observation Learner notes/written work Learner log
Coursework	Research or projects that count towards a learner's final outcome and demonstrate the skills and/or knowledge gained throughout the course	Record of observation Learner notes/written work Tutor notes/record Learner log/diary
E-assessment	The use of information technology to assess learners' work	Electronic portfolio E-tests

Title	Sustainable Alternative Biofuels
Level	Five
Credit Value	7
Guided Learning Hours (GLH)	35
OCN NI Unit Code	CBF759
Unit Reference No	M/650/1560
Unit purpose and aim(s): This unit will enable the learner to understand the use of sustainable alternative biofuels and their impact.	
Learning Outcomes	**Assessment Criteria**
1. Understand the health and safety requirements and standards associated with liquid biofuel storage.	1.1. Analyse the health and safety requirements and standards associated with liquid biofuel storage including: a) Environmental Hygiene (EH40) b) Fuel Storage Regulations 2010 c) Building Regulations Part L 1.2 Summarise the legislative and statutory regulations for individuals carrying out installation and commissioning of a hydrotreated vegetable oils (HVO) firing appliance.
2. Be able to develop risk assessments and safety controls to support the safe working environment for a liquid biofuel storage facility.	2.1. Develop risk assessments and safety controls to support the safe working environment for a given liquid biofuel storage facility.
3. Understand biofuel production.	3.1. Explain how biofuel and associated energy is extracted from different organic materials. 3.2. Analyse reasons why biofuel is a renewable energy source. 3.3. Critically compare products from the combustion of HVOs and kerosene.
4. Understand how biofuels can impact on the green economy, fuel security and agricultural industry.	4.1. Analyse how manufacturing biofuels can impact on the following in a given region: a) the green economy b) the agricultural industry c) fuel security
5. Understand conversion of appliances to using biofuel.	5.1. Analyse the technical advances within oil burning appliances to facilitate conversion to using biofuels.
6. Be able to install and commission an HVO firing appliance.	6.1. Demonstrate the correct installation and commissioning of a HVO firing appliance including: a) initial system compliance checks against manufacturer's instructions b) pressure testing the HVO fuel line to current standards c) purging the HVO to the appliance d) commencing combustion process e) carrying out a smoke test f) completing an Electronic Flue Gas Analysis (EFGA) g) recording all findings in an industry standard format

Assessment Guidance		
The following assessment method/s may be used to ensure all learning outcomes and assessment criteria are fully covered. **Please be advised that learners undertaking the practical elements of this unit must do so in a controlled environment under supervision. Prior to any practical activity being undertaken learners must have demonstrated an understanding of the health and safety requirements before undertaking practical demonstrations.**		
Assessment Method	**Definition**	**Possible Content**
Portfolio of evidence	A collection of documents containing work undertaken to be assessed as evidence to meet required skills outcomes OR A collection of documents containing work that shows the learner's progression through the course	Learner notes/written work Learner log/diary Peer notes Record of observation Record of discussion
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E-assessment	The use of information technology to assess learners' work	Electronic portfolio E-tests

Title	Electrical Energy Storage Systems
Level	Five
Credit Value	9
Guided Learning Hours (GLH)	47
OCN NI Unit Code	CBF760
Unit Reference No	R/650/1561
***Unit purpose and aim(s)*:** This unit will enable the learner to understand how to install, test and commission electrical energy storage systems (EESS).	

Learning Outcomes	Assessment Criteria
1. Understand the key health and safety requirements for installing and working with EESS.	1.1. Summarise the legislative and statutory regulations for individuals carrying out the installation, inspection, testing, final commissioning handover and operation of an EESS system. 1.2. Explain the Electrical Regulations at Work Act 1989 in relation to installing EESS. 1.3. Explain what is meant by the electrical safety pyramid. 1.4. Explain qualification and competence in electromechanical works in accordance with BS7671 and G98/1 and how these relate to installing and working on EESS systems.
2. Understand EESS subsystem operation.	2.1. Explain the operation of the following subsystem components and processes: a) direct monitoring of AC current b) direct monitoring of DC current c) monitoring of DC current and voltage state 2.2. Explain the following battery check procedures for an EESS system: a) assessing operation of the charger b) assessing battery health status 2.3. Explain what is a subsystem communication system. 2.4. Explain the operation of the set point controller for the inverter charger and Maximum Power Point Tracking (MPPT). 2.5. Explain the use of a photovoltaic (PV) generation export meter. 2.6. Summarise the ventilation requirements for an EESS system.
3. Be able to design a domestic EESS system including electrical supply, protection and earthing.	3.1. Explain the source of electrical supply to the EESS from a consumer unit in a dwelling including circuit and metering requirements. 3.2. Compare the over current protection requirements for a consumer unit to the following standards: a) BSEN60289 b) BSEN60898 c) BSEN61009-1 d) BSEN609047-6-2 3.3. Explain the key features and issues to be considered when designing a domestic EESS system including protection and earthing systems. 3.4. Develop a design for and corresponding schematic drawing of a domestic EESS system to include the following features:

	a) 32A Supply b) Single Phase c) Terre-Terre (TT) Earthing arrangement d) Mode 3 Energy Transfer/Charging Unit e) Type 3 Connection
4. Be able to install an EESS system in a domestic dwelling.	4.1. Explain the procedures to be followed when installing a domestic EESS system from the customers consumer unit including: a) potential health and safety issues including Electricity at Work Act b) installation standard BS7671 c) cables, switches and EV charging equipment to be used d) site preparation e) installation stages 4.2. Carry out the safe installation of an EESS system in a domestic dwelling in line with design developed in AC 3.4.
5. Be able to carry out safe isolation of an EESS installation.	5.1. Select, explain and demonstrate the use of appropriate measuring instruments to safely isolate the EESS system installed in AC 4.2. including testing: a) continuity of protective conductors b) insulation resistance test c) separated extra-low voltage (SELV) and protective extra-low voltage (PELV) extra low voltage testing d) electrical separation e) polarity
6. Be able to complete the inspection, testing and final commissioning handover of an EESS system.	6.1. Select, explain and demonstrate the use of appropriate measuring instruments to carry out the process of initial verification of the EESS system installed in AC 4.2. including testing: a) earth electrode resistance b) earth fault loop impedance c) operation of Residual Current Devices (RCDs) d) phase rotation sequence e) voltage drops 6.2. Carry out inspection, testing, final commissioning certificate to BS7671 and handover of the EESS system installed in AC 4.2 in line with requirements and processes undertaken in AC 6.1.

Assessment Guidance		
The following assessment method/s may be used to ensure all learning outcomes and assessment criteria are fully covered. **Please be advised that learners undertaking the practical elements of this unit must do so in a controlled environment under supervision. Prior to any practical activity being undertaken learners must have demonstrated an understanding of the health and safety requirements before undertaking practical demonstrations.**		
Assessment Method	**Definition**	**Possible Content**
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E-assessment	The use of information technology to assess learners' work	Electronic portfolio E-tests

Title	Small-Scale Domestic Off-Grid Electrical Power Generation
Level	Five
Credit Value	7
Guided Learning Hours (GLH)	35
OCN NI Unit Code	CBG281
Unit Reference No	T/650/7648
Learn Direct Code	TD3
Unit purpose and aim(s): This unit will enable the learner to understand the processes involved in installing, commissioning, and maintaining small-scale domestic off-grid electrical systems. The learner will also be able to develop maintenance programmes for and fault find on the off-grid power system.	

Learning Outcomes	**Assessment Criteria**
1. Understand off-grid energy generation and associated electrical power infrastructure.	1.1. Evaluate small-scale off-grid energy generation as an alternative supplementary domestic energy source. 1.2. Evaluate the strengths and weaknesses of stand-alone energy generation as a green technology in relation to the current UK energy legislation and strategy. 1.3. Analyse the perspectives of electrical utility providers and off-grid consumers regarding the continual adaptation and extension of the current electrical grid and network including: a) current electrical grid infrastructure and age b) energy produced from alternative power generation
2. Be able to calculate the energy off-set of domestic dwellings.	2.1. Calculate the energy off-set of a given domestic UK dwelling.
3. Be able to carry out risk assessments on activities and environment associated with installing small-scale domestic off-grid power generation systems.	3.1. Analyse the health and safety issues associated with the installation of small-scale domestic off-grid systems. 3.2. Carry out risk assessments on activities and environment associated with installing small-scale domestic off-grid power generation systems.
4. Be able to design a small-scale domestic off-grid power generation system.	4.1. Explain the design principles used to determine the size and output of the off-grid system including: a) preferred energy generation type b) potential electrical energy consumption c) energy off-set requirements 4.2. Design a modular small-scale domestic off-grid power generation system.
5. Understand the electrical protection systems required for small-scale domestic off-grid electrical systems.	5.1. Explain with justification the reasons for using and operation of a high voltage protection device including the four levels of protection it provides to the electrical system.
6. Understand the installation, commissioning, and operation of small-scale domestic off-grid power generation systems.	6.1. Explain the process of installation, commissioning, and operation of a given small-scale domestic off-grid power generation system including: a) system schematics b) component identification c) testing of energy performance parameters

7. Be able to design a maintenance programme for a small-scale domestic off-grid power generation system and fault find to component level.	7.1. Design an annual off-grid maintenance regime to ensure optimal system performance of a small-scale domestic off-grid power generation system. 7.2. Explain how to determine if the inverter in a photovoltaic system linked to an off-grid system is operating correctly. 7.3. Diagnose faults in an off-grid inverter system including : a) battery performance and operation b) electrical polarity c) electrical short circuits
Additional assessment guidance: For assessment criteria 2.1 the dwelling should be one where the average is 2,900Kw/hr and off grid energy generated is generated from a 4.4Kw unit. For assessment criteria 4.2 the design should be in relation to UK semi-detached dwelling to reduce energy consumption by 30%. For assessment criteria 7.1 the maintenance regime should refer to the solar arrays, generator, inverter and associated electrical components.	

Assessment Guidance

The following assessment method/s may be used to ensure all learning outcomes and assessment criteria are fully covered.

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E-assessment	The use of information technology to assess learners' work	Electronic portfolio E-tests

Title	Wind Power Generation of Electrical Energy
Level	Five
Credit Value	7
Guided Learning Hours (GLH)	35
OCN NI Unit Code	CBG282
Unit Reference No	Y/650/7649
Learn Direct Code	TD3
Unit purpose and aim(s): This unit will enable the learner to understand the processes involved in installing, commissioning, and maintaining small scale wind powered electrical energy generation systems. The learner will also be able to develop maintenance programmes for and understand how to fault find on wind power systems.	

Learning Outcomes	**Assessment Criteria**
1. Understand factors to be considered when planning the installation of a wind turbine.	1.1. Explain the wind speed and area required for installation of a small-scale wind turbine. 1.2. Explain the factors to be considered when determining the optimum installation location for a wind turbine including: a) energy performance b) noise pollution c) aesthetics d) electrical grid infrastructure, positioning and age
2. Be able to carry out risk assessments on activities and environment associated with the installation of small-scale wind powered electrical generation systems.	2.1. Analyse the health and safety issues associated with the installation of small-scale wind powered electrical generation systems. 2.2. Carry out risk assessments on activities and environment associated with installing small-scale wind powered electrical generation systems.
3. Be able to carry out a cost benefit analysis on the installation of small-scale wind powered electrical generation systems.	3.1. Calculate the seasonal wind power generation for a given small-scale wind turbine in the UK or Ireland. 3.2. Carry out a cost benefit analysis on the installation of a given small-scale wind powered electrical generation system including: a) initial installation costs b) potential electrical energy savings against consumption c) off-set requirements
4. Be able to determine energy usage and carbon off-sets.	4.1. Explain the key aspects of using fossil fuels to produce electrical energy. 4.2. Determine the average electrical Kw/Hrs consumed, in a given UK domestic dwelling, percentage of CO2 produced per dwelling against UK Government CO2 reduction strategies. 4.3. Determine the carbon offset from using wind power electrical production for a given dwelling.
5. Understand site selection, preparation and operation of small-scale wind powered electrical generation systems.	5.1. Explain the factors to be considered during site selection and preparation of small-scale wind powered electrical generation systems. 5.2. Explain the operation of small-scale wind powered electrical generation systems including: a) system schematics; turbine to grid b) nacelle

	c) hub d) blades
6. Be able to design a maintenance programme for a small-scale wind powered generation system.	6.1. Design a maintenance programme for a small-scale wind powered generation system to maintain optimal performance.
7. Understand how to fault find on a small-scale wind powered generation system.	7.1. Explain how to fault find on a small-scale wind powered generation system to maintain optimal performance including the following: a) yaw b) gearbox c) controller d) main shaft bearing

Assessment Guidance

The following assessment method/s may be used to ensure all learning outcomes and assessment criteria are fully covered.

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Quality Assurance of Centre Performance

External Verification

All OCN NI recognised centres are subject to External Verification. External verification visits and monitoring activities will be conducted annually to confirm continued compliance with the conditions of recognition, review the centre's risk rating for the qualifications and to assure OCN NI of the maintenance of the integrity of the qualifications.

The External Verifier will review the delivery and assessment of the qualifications. This will include the review of a sample of assessment evidence and evidence of the internal verification of assessment and assessment decisions. This will form the basis of the EV report and will inform OCN NI's annual assessment of centre compliance and risk. The External Verifier is appointed by OCN NI.

Standardisation

As a process, standardisation is designed to ensure consistency and promote good practice in understanding and application of standards. Standardisation events:

- make qualified statements about the level of consistency in assessment across centres delivering a qualification
- make statements on the standard of evidence that is required to meet the assessment criteria for units in a qualification
- make recommendations on assessment practice
- produce advice and guidance for the assessment of units
- identify good practice in assessment and internal verification

Centres offering units of an OCN NI qualification must attend and contribute assessment materials and learner evidence for standardisation events if requested.

OCN NI will notify centres of the nature of sample evidence required for standardisation events (this will include assessment materials, learner evidence and relevant assessor and internal verifier documentation). OCN NI will make standardisation summary reports available and correspond directly with centres regarding event outcomes.

Administration

Registration

A centre must register learners within 20 working days of commencement of a qualification.

Certification

Certificates will be issued to centres within 20 working days of receipt of correctly completed results marksheets. It is the responsibility of the centre to ensure that certificates received from OCN NI are held securely and distributed to learners promptly and securely.

Charges

OCN NI publishes all up to date qualification fees in its Fees and Invoicing Policy document. Further information can be found on the centre login area of the OCN NI website.

Equality, Fairness and Inclusion

OCN NI has considered the requirements of equalities legislation in developing the specification for these qualifications. For further information and guidance relating to access to fair assessment and the OCN NI Reasonable Adjustments and Special Considerations policies, centres should refer to the OCN NI website.

Retention of Evidence

OCN NI has published guidance for centres on the retention of evidence. Details are provided in the OCN NI Centre Handbook and can be accessed via the OCN NI website.

OCN NI Level 5 Award in Green Technologies
Qualification Number: 610/0594/0

OCN NI Level 5 Certificate in Green Technologies
Qualification Number: 610/0593/9

OCN NI Level 5 Extended Certificate in Green Technologies
Qualification Number: 610/0592/7

Operational start date: 15 March 2022
Operational end date: 28 February 2027
Certification end date: 28 February 2032

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