QUALIFICATION FILE

Technician - Operations and Maintenance Compressed Biogas/Waste to Energy

☒ Short Term Training (STT) ☐ Long Term Training (LTT) ☐ Apprenticeship

☐ Upskilling ☐ Dual/Flexi Qualification ☐ For ToT ☐ For ToA

☒General ☐ Multi-skill (MS) ☐ Cross Sectoral (CS) ☐ Future Skills ☐ OEM

NCrF/NSQF Level: 4

Submitted By:

Skill Council for Green Jobs

Chief Executive Officer
CBIP Building, Malcha Marg,
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Contents

Section 1: Basic Details

1.	**Qualification Name**	**Technician - Operations and Maintenance Compressed Biogas/Waste to Energy**	
2.	**Sector/s**	**Environmental Science**	
3.	**Type of Qualification: ☐ New ☒ Revised ☐ Has Electives/Options**	**NQR Code & version of existing/previous qualification:** 2022/WSSWM/SCGJ/05146 & version 1	**Qualification Name of existing/previous version:** Technician - Operations and Maintenance Compressed Biogas/Waste to Energy
4.	**a. OEM Name** **b. Qualification Name** (Wherever applicable)		
5.	**National Qualification Register (NQR) Code &Version**	**QG-04-ES-01350-2023-V1.1-SCGJ**	**6. NCrF/NSQF Level:** 4
7.	**Award (Certificate/Diploma/Advance Diploma/ Any Other**	Certificate	
8.	**Brief Description of the Qualification**	The individual at work is responsible for supporting effective and efficient operation and maintenance of a compressed biogas (CBG)/waste to energy plant by troubleshooting, repairing and ensuring maximum up-time of the plant.	
9.	**Eligibility Criteria for Entry for Student/Trainee/Learner/Employee**	**a. Entry Qualification & Relevant Experience:**	

S. No.	Academic/Skill Qualification (with Specialization - if applicable)	Required Experience (with Specialization - if applicable)
1.	12th Grade Pass	NA
2.	Completed 2nd year of 3-year diploma (after 10th) and pursuing regular diploma	NA
3.	10th Grade Pass plus 2 year NTC/ 10th Grade Pass plus 1 year NTC plus 1 year NAC	NA
4.	10th Grade Pass	2 years relevant experience. (e.g. in bioenergy, etc)

		b. Age: 19	5.	Completed 3-year diploma after 10th	1-year relevant experience (e.g. in bioenergy)
			6.	12th grade pass	2 years relevant experience. (e.g. in bioenergy, etc)
			7	10th Grade pass	4-year relevant experience. (e.g. in bioenergy, etc)
			7.	Previous relevant Qualification of NSQF Level 4 and with minimum education as 8th Grade pass	3 years of relevant experience (e.g. in bioenergy/ waste to energy sector, etc)

10	**Credits Assigned to this Qualification, Subject to Assessment** (as per National Credit Framework (NCrF))	14	**10. Common Cost Norm Category:** **I**
11	**Any Licensing requirements for Undertaking Training on This Qualification** (wherever applicable)	NA	
12	**Training Duration by Modes of Training Delivery** (Specify **Total Duration** as per selected training delivery modes and as per requirement of the qualification)	☒**Offline** ☐**Online** ☐**Blended**	

Training Delivery Modes	**Theory (Hours)**	**Practical (Hours)**	**OJT Mandatory (Hours)**	**OJT Recommended (Hours)**	**Total (Hours)**
Classroom (offline)	150	150	120	0	420
Online					

(Refer Blended Learning Annexure for details)

13	**Aligned to NCO/ISCO Code/s** (if no code is available mention the same)	NCO-2015/3122.9900 Operation and Maintenance

14	**Progression path after attaining the qualification** (Please show Professional and Academic progression)	Vertical Progression: Supervisor – Operations & Maintenance Compressed Biogas/Waste to Energy (Level 5) Horizontal Progression: NA	
15	**Other Indian languages in which the Qualification & Model Curriculum are being submitted**	**Nil**	
16	**Is similar Qualification(s) available on NQR-if yes, justification for this qualification**	**☐ Yes ☒ No**	
17	**Is the Job Role Amenable to Persons with Disability**	**☒ Yes ☐ No** **If "Yes", specify applicable type of Disability:** **☒ Deaf ☒ Hard of Hearing ☒ Acid Attack Victims ☒ Dwarfism**	
18	**How Participation of Women will be Encouraged**	The programme would be proposed to be incorporated in women ITIs and diploma colleges to train women candidates on the job role. TPs shall be encouraged to onboard at least a certain number of female candidates in each batch	
19	**Are Greening/ Environment Sustainability Aspects Covered** (Specify the NOS/Module which covers it)	**☒ Yes ☐ No**	
20	**Is Qualification Suitable to be Offered in Schools/Colleges**	**Schools ☒ Yes ☐ No Colleges ☒ Yes ☐ No**	
21	**Name and Contact Details of Submitting / Awarding Body SPOC** (In case of CS or MS, provide details of both Lead AB & Supporting ABs)	**Name:** Dr. Praveen Saxena **Email:** ceo@sscgj.in **Contact No.:** 9871119101 **Website: https://sscgj.in/**	
22	**Final Approval Date by NSQC: 27/01/2022**	**23. Validity Duration:** 3 years	**24. Next Review Date: 26/01/2025**

Section 2: Module Summary

S. No	NOS/Module Name	NOS/Module Code & Version *(if applicable)*	Core/ Non-Core	NCrF/NSQF Level	Credits as per NCrF	Training Duration (Hours)					Assessment Marks					
						Th.	Pr.	OJT-Man.	OJT-Recc.	Total	Th.	Pr.	Proj.	Viva	Total	Weightage (%) *(if applicable)*
1.	Operate a CBG plant	SGJ/N0619 Version 2	Core	4	3	45	45			90						
2.	Monitor and Maintain the CBG Plant	SGJ/N0620 Version 3	Core	4	4	30	90			120						
3.	Maintain health, safety and hygiene at Project Site	SGJ/N0106 Version 3	Core	4	1	15	15			30						
4.	Employability Skills(60 hours)	DGT/VSQ/N0102 Version 1	Non Core		2	60				60						
5.	On the Job Training									120						
Duration (in Hours) / Total Marks						150	150	120	0	**420**						

NOS/s of Qualifications

(In exceptional cases these could be described as components)

Mandatory NOS/s:

Specify the training duration and assessment criteria at NOS/ Module level. For further details refer curriculum document.

***Th.**-Theory **Pr.**-Practical **OJT**-On the Job **Man.**-Mandatory Training **Rec.**-Recommended **Proj.**-Project*

Assessment - Minimum Qualifying Percentage

Minimum Pass Percentage – Aggregate at qualification level: 70 % *(Every Trainee should score specified minimum aggregate passing percentage at qualification level to successfully clear the assessment.)*

Section 3: Training Related

1.	**Trainer's Qualification and experience in the relevant sector (in years)** *(as per NCVET guidelines)*	Graduate/Diploma (Technical) with Two years of experience in Bio Energy processes/relevant experience Or Certified under relevant Craft Instructor Training Scheme (CITS) course. * Relevant experience includes Suitable work experience in Bio Energy
2.	**Master Trainer's Qualification and experience in the relevant sector (in years)** *(as per NCVET guidelines)*	Engineering Graduate with 5 years of experience in Bio Energy
3.	**Tools and Equipment Required for Training**	☒Yes ☐No (*If "Yes", details to be provided in Annexure)*
4.	**In Case of Revised Qualification, Details of Any Upskilling Required for Trainer**	Not Applicable

Section 4: Assessment Related

1.	**Assessor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	Graduate/Diploma (Technical) with Three years of experience in Bio Energy Or Certified under relevant Craft Instructor Training Scheme (CITS) course. *** Relevant experience includes Suitable work experience in Bio Energy**
2.	**Proctor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	Engineering Graduate with 6 years of **experience in Bio Energy**
3.	**Lead Assessor's/Proctor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	Engineering Graduate with 10 years of **experience in Bio Energy.**
4.	**Assessment Mode** *(Specify the assessment mode)*	Online and offline both

5.	**Tools and Equipment Required for Assessment**	☒ Same as for training ☒ Yes ☐ No *(details to be provided in Annexure-if it is different for Assessment)*

Section 5: Evidence of the need for the Qualification

Provide Annexure/Supporting documents name.

1.	**Latest Skill Gap Study (not older than 2 years) (Yes/No):** yes. Modern Bioenergy has been identified by Skill Council for Green Jobs as one alternative to contribute in this transition to self-reliance in the energy sector. Biomass as renewable resource for India can play important role to achieve a net-zero carbon emissions economy by 2070. We have a large surplus of biomass (230 million Metric tonne per year) which provides social and environmental benefits apart from clean fuels. Bioenergy applications can also reduce pollution create local jobs and business opportunities. It also overcomes the main problems of use of traditional biomass like inefficient combustion technologies, environmental hazards due to indoor pollution and unsustainable harvesting practices. Government of India has initiated many schemes for increased use of biomass for various end use applications. However it is necessary to ensure biomass resource availability and its demand through a proper supply chain management. Availability of skilled human resources is critical to achieve the goals. The current capacity and skills are not adequate and there is a gap in terms of knowledge and application which are critical to conceptualize, implement, regulate and monitor. It is necessary to create a cadre of local entrepreneurs who not only manage the surplus Agri residue of farm but also developed avenue for livelihood generation in villages. Skilling in this sector will not only organize it but also improve the service quality, its efficiency, livelihood of the farmers/labour's and to create a job opportunity in the existing and as well as upcoming CBG plants. As a part of its objectives for capacity building for green businesses and cutting-edge climate friendly technologies, Skill Council for Green Jobs along with KPMG, India has carried out sector analysis, skill gap studies, occupational mapping and process flow along with identification of job roles for the biomass sector with focus on biomass Supply chain and its utilization. As per the study, a part of agricultural residues generated in the country are consumed in traditional uses such as construction material for rural housing, domestic fuel for cooking etc. The surplus that is generated is burned by farmers in open fields in the absence of affordable disposal alternatives. The crop residue generated in the field has to be made available to the user facilities. The supply chain involves collection, storage and transportation of residue from field to site for end-use. Biomass also needs to be stored to ensure long term biomass availability for implementation of economically viable bio-based energy projects. Biomass can be stored in Biomass storage depot which need to be built and maintained for comprehensive inventories of biomass preferably in States which have high biomass availability per unit area which in turn is linked to the number of jobs in the region. Job related to agri-residue supply chain include jobs related to field collection of agri residues, biomass densification and aggregation in biomass depots. Harvesting Raking Primary Baling Transport Debaling Secondary Baling Storage at Depot

	In order to plan for creating trained manpower for providing a sustained supply of feedstock for the CBG plants, it is necessary to develop a sustainable biomass supply chain and set up storage depots. As per the study conducted by SCGJ, 200 tons of paddy can be handled by each workforce annually and a biomass storage depot could house 10000 tonnes capacity/annum (280 days storage) in a radius of 25-30 km of the plant. Skill Council for Green Jobs (SCGJ) has developed Qualifications Packs of Agri-residue Aggregator, AnimalWaste Manure Aggregator and Biomass Depot Operator and Manager to skill local youth in collection, aggregation and storage of farm waste and also be trained for developing business in supply chain management of agri-residues/cattle manure. Keeping in view the focus of the Government to promote a Bio-CNG for automotive industrial and commercial usages, Skill Council for Green Jobs (SCGJ) in collaboration with Foreign Commonwealth Development Office (FCDO) India, Govt of UK (Formally DFID) has conducted another study with the objective to identify new and emerging Job Roles in the Bio-CNG sector for development of National Occupational Standards. The study has taken in to account global best practices to identify areas of potential growth in future and various government initiatives in the sector. SCGJ has also developed four training modules on the new and emerging job roles in the Bio-CNG/CBG sector for the job roles of Plant Head, Feedstock Manager (Procurement & Composition), Supervisor-CBG/WtE and Technician-CBG/WtE. Recently SCGJ has completed an in-depth study for assessments of biomass demand-supply value chain and entrepreneurship development for pellet production and identification for job roles. Skill council has developed qualification modules for Bioenergy Entrepreneur and Biomass Pellet Manufacturing Junior Technician.
2.	**Latest Market Research Reports or any other source (not older than 2 years) (Yes/No):** yes 1. https://www.ieabioenergy.com/wp-content/uploads/2021/11/CountryReport2021_India_final.pdf 2. https://www.transparencymarketresearch.com/india-biomass-market.html
3.	**Government /Industry initiatives/ requirement (Yes/No):** Yes: This Qualification Pack will be used across industry which is organised. • It would be used by the training institute for new trainings/For employers to conduct RPL and for annual Appraisal • The SSC would submit details of the employment generated (wherever applicable) and realised.
4.	**Number of Industry validation provided:** 5

5.	**Estimated nos. of persons to be trained and employed:** Bioenergy has started to provide promising results in India's decarbonization efforts. It is no more the 'sleeping giant' of renewables in the country and has a significant role to play in India achieving its 2030 Conference of Parties 26 (COP26) target of achieving a cumulative non-fossil fuel-based energy capacity of 500 GW and reduction of total projected carbon emissions by 1 billion tonnes. It can also help to achieve the low-carbon transition pathway by focusing on rational utilisation of national resources as committed by India in COP27. In terms of its socioeconomic impact, bioenergy also bodes well for the Government of India's push for home-grown initiatives – underlined in programmes and campaigns such as Make in India, Aatmanirbhar Bharat Abhiyaan and Swachh Bharat Abhiyan. It also offers opportunities for augmenting farmers' income, easing the pressure on India's exchequer, and generating employment and waste-to-wealth creation. As of August 2022, based on the total installed capacity of bioenergy projects in India, an estimated 0.43 million direct jobs and 0.66 million indirect jobs had been created in the economy. Of these, approximately 0.25 million jobs across the value chain of bioenergy projects are for women.
6.	**Evidence of Concurrence/Consultation with Line Ministry/State Departments:** Concurrence has been requested from the Ministry of New and Renewable Energy

Section 6: Annexure & Supporting Documents Check List

Specify Annexure Name / Supporting document file name

1.	**Annexure:** NCrF/NSQF level justification based on NCrF level/NSQF descriptors *(Mandatory)*	Annexure: Evidence of Level

2.	**Annexure:** List of tools and equipment relevant for qualification *(Mandatory, except in case of online course)*	Annexure: Tools and Equipment (Lab Set-Up)
3.	**Annexure:** Detailed Assessment Criteria *(Mandatory)*	Annexure: Detailed Assessment Criteria (Mandatory)
4.	**Annexure:** Assessment Strategy *(Mandatory)*	Annexure: Assessment Strategy
5.	**Annexure:** Acronym and Glossary *(Optional)*	Annexure: Acronym and Glossary
6.	**Supporting Document:** Model Curriculum *(Mandatory – Public view)*	Attached
7.	**Supporting Document:** Career Progression *(Mandatory - Public view)*	Annexure: Career progression and OM
8.	**Supporting Document:** Occupational Map *(Mandatory)*	Annexure: Career progression and OM
9.	**Supporting Document:** Assessment SOP *(Mandatory)*	Annexure: Assessment Strategy

Annexure: Evidence of Level

Title/Name of qualification/component: Technician - Operations and Maintenance (Compressed Biogas/Waste to Energy)			**Level:4**
NSQF Domain	**Outcomes of the Qualification/Component**	**How the outcomes relate to the NSQF level descriptors**	**NSQF Level**
Professional Theoretical Knowledge/ Process	Factual knowledge of field of knowledge or study. • Organizational policies, procedures, and SOPs regarding CBG production • Types of tools, equipment, and machines in a CBG plant • Procedure to inspect machines for proper functioning • Controls of a CBG plant • Procedure to repair minor faults • Equipment monitoring methods • Proper usage and function of PPE • Processes involved in manufacturing of CBG • Procedure to start and shut down the CBG plant • Equipment monitoring methods • Quality parameters of the raw material • Procedure to operate various machinery and equipment in a CBG plant • Procedure to inspect and pre-process the feedstock • Process to regulate the flow and pressure of the machines as per the requirement • Procedure to calibrate various devices like fuel, chemical and water meters • Procedure to keep the working area clean • Methods to monitor the transportation and storage of hazardous material • How to record operational records, test results and other documentation required in a CBG plant • Waste management procedures • Methods of effective utilization of resources • Inspection procedure of various machinery and equipment in a CBG plant • Functioning of various machines and equipment • Performance parameters of mixers, digestors and compressors	A Technician- Operations and Maintenance Compressed Biogas/Waste to Energy should have knowledge of policies, procedures and SOPs regarding CBG production, inspect machines for proper functioning, etc. Hence Level 4	4

Title/Name of qualification/component: Technician - Operations and Maintenance (Compressed Biogas/Waste to Energy)			**Level:4**
NSQF Domain	**Outcomes of the Qualification/Component**	**How the outcomes relate to the NSQF level descriptors**	**NSQF Level**
	• Analysis parameters of gas, slurry and compost • Biological processes involved in manufacturing of CBG • Basic maintenance procedures of the machinery and equipment • Documentation, recording and reporting procedures at a CBG plant • Procedure to handle major breakdown • Preventive and corrective maintenance procedures • Legislation, standards, policies, and procedures followed in the organization relevant to own employment and performance conditions • Reporting structure, inter-dependent functions, lines and procedures in the work area • Relevant people and their responsibilities within the work area • Escalation matrix and procedures for reporting work and employment related issues • Various categories of people that one is required to communicate and co-ordinate with in the organization • Importance of effective communication in the at project site • Importance of teamwork in organizational and individual success • Various components of effective communication • Key elements of active listening • Value and importance of active listening and assertive communication • Barriers to effective communication • Importance of tone and pitch in effective communication • Importance of avoiding casual expletives and unpleasant terms while communicating professional circles • How poor communication practices can disturb people, environment and cause problems for the employee, the employer and the customer • Key elements and importance of non-verbal communication • Importance of ethics for professional success • Importance of discipline for professional success • What constitutes disciplined behavior for a working professional		

Title/Name of qualification/component: Technician - Operations and Maintenance (Compressed Biogas/Waste to Energy)			**Level:4**
NSQF Domain	**Outcomes of the Qualification/Component**	**How the outcomes relate to the NSQF level descriptors**	**NSQF Level**
	• Common reasons for interpersonal conflict • Importance of developing effective working relationships for professional success • Expressing and addressing grievances appropriately and effectively • Importance and ways of managing interpersonal conflict effectively • Importance of teamwork and collaboration • Importance of gender sensitivity and equality • How to help PWD to overcome the challenges • Gender, disability and cultural biases, stereotypes and impact on others • Gender and its concepts such as gender roles, gender spectrum, gender as an identity • Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013 • Legislations, grievance redressal mechanisms, and penalties against harassment in the workplace • Importance of safety drills • Importance of working in clean and safe environment • Health and safety roles and responsibilities of relevant personnel within and outside the organization • Reporting procedures in case of breaches or hazards for site safety, accidents and emergency situations • Basic ergonomic principle • Key internal and external source of health and safety information • Meaning of hazards, risk and near miss • Importance of Personal Protective Equipment required for specific job • Forms and classification of hazardous substances • Health effect associated with exposure to environmental pollution • Housekeeping activities relevant to task • Symptoms of infection like fever, cough, swelling and inflammation		

Title/Name of qualification/component: Technician - Operations and Maintenance (Compressed Biogas/Waste to Energy)			**Level:4**
NSQF Domain	**Outcomes of the Qualification/Component**	**How the outcomes relate to the NSQF level descriptors**	**NSQF Level**
Professional and Technical Skills/ Expertise/ Professional Knowledge	Recall and demonstrate practical skill, routine and repetitive in narrow range of application, using appropriate rule and tool, using quality concepts. • Write information documents to internal departments/ internal teams • Note the information communicated, observations related to the activity • Read and interpret instructions, procedures, and information at the workplace • Note the information communicated • record the readings of various parameters in the prescribed format • Note down observations related to the activity • Write information documents to internal departments/ internal teams • Read vernacular/English language • Read and understand equipment manuals, health and safety instructions, memos, other company documents • Communicate effectively with supervisor, peers and subordinates • Follow organization rule-based decision-making process • Analyze critical points in day-to-day tasks and identify control measures to solve the issue • Handle issues in case the superior is not available (as per the authority matrix defined by the organisation) • Planning and organization of work to meet dead • Record data on waste disposal at workplace • Complete statutory documents relevant to safety and hygiene • Fll safety formats for near miss, unsafe condition • Identify potential safety risk and report to appropriate authority • Communicate and collaborate with others to incorporate sustainable practices • Interpret general safety guidelines, labels, charts and signage	The jobholder should have practical skills which are routine and repetitive in nature like carrying CBG plant operations. Hence Level 4	4

Title/Name of qualification/component: Technician - Operations and Maintenance (Compressed Biogas/Waste to Energy)			**Level:4**
NSQF Domain	**Outcomes of the Qualification/Component**	**How the outcomes relate to the NSQF level descriptors**	**NSQF Level**
Employment Readiness & Entrepreneurship **Skills & Mind-set/Professional Skill**	Language to communicate written or oral, with required clarity, skill to basic arithmetic and algebraic principles, basic understanding of social political and natural environment. Complete tasks efficiently and accurately within stipulated time Improve and modify own work practices Communicate effectively with supervisor, peers and subordinates Respond appropriately to any queries Read from different sources- books, screens in machines and signage Read internal information documents sent by internal teams Express statements or information clearly so that others can hear and understand Participate in and understand the main points of simple discussions Work constructively and collaboratively with others Support the superiors in scheduling tasks Follow organization code of conduct Manage relationships with customers with intent on satisfying its requirements for service delivery Recognize problems and search for solutions Choose best methods to complete assigned tasks Approach relevant authority when required Apply domain knowledge, observations and data to select course of action to perform tasks Critically evaluate information obtained from customers, supervisor and co-workers to perform day to day activities Ask questions for better understanding Review and reflect on own work performance to facilitate personal development and self confidence Use positive words to encourage participants	Technician - Operations and Maintenance Compressed Biogas/Waste to Energy have good written and oral communication skills to deal with seniors and team members. The person should also be acquainted with natural environment to carry out his duties efficiently. Hence Level 4	4

Title/Name of qualification/component: Technician - Operations and Maintenance (Compressed Biogas/Waste to Energy)			**Level:4**
NSQF Domain	**Outcomes of the Qualification/Component**	**How the outcomes relate to the NSQF level descriptors**	**NSQF Level**
Broad Learning Outcomes/ Core Skill	Work in familiar, predictable, routine, situation of clear choice. Operate a CBG plant Monitor and maintain the CBG plant Work effectively with others Maintain health, safety and hygiene at workplace	A Technician - Operations and Maintenance Compressed Biogas/Waste to Energy is responsible for operating a CBG plant, monitoring and maintaining the CBG plant. The works in the familiar, predictable, routine, situations. Hence Level 4	4
Responsibility	• Responsibility for own work and learning. • Prepare for plant operations • Perform operational activities of a compressed bio-gas plant • Maintain greening practices at workplace • Maintain the CBG Plant • Assist in monitoring the CBG Plant • Assist in handling major breakdowns • Communicate effectively with others • Work in a collaborative manner • Respect diversity • Adopt safe practices at workplace • Follow emergencies, rescue and first aid procedures • Follow good housekeeping practices and infection control guidelines	The jobholder is responsible for performing the operational activities for preparing the plant and carrying out all plant operations, maintenance etc. The person is responsible for his own work. Hence Level 4	4

Annexure: Tools and Equipment (Lab Set-Up)

List of Tools and Equipment

Batch Size: 30

S. No.	Tool / Equipment Name	Specification	Quantity for specified Batch size
1	Relevant Standard Operating Procedures, and Sample reports	Each	1
2	First aid kit	Nos	3
3	Fire extinguisher	Nos	5
4	Warning signs and tapes	Nos	5
5	Safety footwear	Each	1
6	Rubber gloves	Each	1
7	Head protection	Each	1
8	Safety glasses	Each	1
9	Personal Protection Equipment	Each	1
10	Participant Handbook and Related Standard Operating Procedures	Each	1
11	Training kit (Trainer guide, Presentations	Each	1
12	2.1 Laptop External Speakers.	No	1
13	Projector screen	No	1
14	Laptop with charger	Nos	3
15	Projector	No	1
16	Duster	No	1
17	Markers	Nos	5
18	Flip Chart	Nos	3
19	Whiteboard	No	1

Classroom Aids

The aids required to conduct sessions in the classroom are:

Marker, chart and visual aid, Pellet production flowchart, raw material supply chain flow chart, Schematics of Compressed biogas waste to energy plant;

Annexure: Industry Validations Summary

Provide the summary information of all the industry validations in table. This is not required for OEM qualifications.

S. No	Organization Name	Representative Name	Designation	Contact Address	Contact Phone No	E-mail ID	LinkedIn Profile *(if available)*
1	Cyra Engines Pvt. Ltd	Dr. Rajesh C. Iyar	Founder	Surat	7203847496	rajesh_c_iyer@yahoo.com	NA
2	Enprotech Solution	Mr. Sanjay Nandre	Managing Partner	Pune	9890044785	enprotech@gmail.com	NA
3	REVY Environmental Solutions Pvt. Ltd	Dr. Vanita Prasad	CT0	Vadodara, Gujarat	8156006652	vanita.prasad@revy.co.in	NA
4	MSA Bio-Energy Pvt Ltd	Mr Deepak Gadhia	Director	Valsad, Gujarat	9825117353	Deepak.gadhia@greenashram.org	NA
5	United Nations Development Program	Srikrishna Balachandran	Project Manager	Lodhi Estate, New Delhi	7406133000	Srikrishna.balachandran@undp.org	N/A

Annexure: Training & Employment Details

Training and Employment Projections:

Year	Total Candidates		Women		People with Disability	
	Estimated Training #	Estimated Employment Opportunities	Estimated Training #	Estimated Employment Opportunities	Estimated Training #	Estimated Employment Opportunities
2024-25	100	10	30	30	10	10
2025-26	500	50	50	60	20	20
2026-27	300	30	60	60	20	20

Data to be provided year-wise for next 3 years

Training, Assessment, Certification, and Placement Data for previous versions of qualifications:

Qualification Version	Year	Total Candidates				Women				People with Disability			
		Trained	Assessed	Certified	Placed	Trained	Assessed	Certified	Placed	Trained	Assessed	Certified	Placed

1	2022-23	7											

Applicable for revised qualifications only, data to be provided year-wise for past 3 years.

List Schemes in which the previous version of Qualification was implemented:

1. NA

Content availability for previous versions of qualifications:

☐ **Participant Handbook** ☐ **Facilitator Guide** ☐ Digital Content ☐ Qualification Handbook ☐ Any Other:

Languages in which Content is available: Available in English

Annexure: Blended Learning

Blended Learning Estimated Ratio & Recommended Tools:

Refer NCVET "Guidelines for Blended Learning for Vocational Education, Training & Skilling" available on:
https://ncvet.gov.in/sites/default/files/Guidelines%20for%20Blended%20Learning%20for%20Vocational%20Education,%20Training%20&%20Skilling.pdf

S. No.	Select the Components of the Qualification	List Recommended Tools – for all Selected Components	Offline : Online Ratio
1	☒Theory/ Lectures - Imparting theoretical and conceptual knowledge	Not Applicable	NA
2	☒Imparting Soft Skills, Life Skills, and Employability Skills /Mentorship to Learners		
3	☒Showing Practical Demonstrations to the learners		
4	☒Imparting Practical Hands-on Skills/ Lab Work/ workshop/ shop floor training		
5	☒Tutorials/ Assignments/ Drill/ Practice		
6	☒Proctored Monitoring/ Assessment/ Evaluation/ Examinations		
7	☒On the Job Training (OJT)/ Project Work Internship/ Apprenticeship Training		

Annexure: Detailed Assessment Criteria

Detailed assessment criteria for each NOS/Module are as follows:

NOS/Module Name	Assessment Criteria for Performance Criteria/Learning Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
SGJ/N0619: Operate a CBG plant	Introduction to Green Jobs and Technician - O&M CBG/WTE	**4**	**-**	**-**	**-**
	PC1. discuss the objectives and benefits of the Skill	1	-	-	-
	PC2. describe the scope of Green jobs and its sub-sectors	1	-	-	-
	PC3. discuss job role and opportunities for a	1	-	-	-
	PC4. Elaborate the basic terminology used in CBG	1	-	-	-
	Prepare for CBG Plant Operations	**6**	**14**	**-**	**-**
	PC5. discuss the standard policies and procedures regarding CBG production and Apply appropriate procedures to identify and arrange various equipment, machinery and tools used to operate the CBG plant	1	2	-	-
	PC6. List various tools, equipment and machines used in a CBG plant	1	2	-	-

	PC7. describe the procedure to inspect machines, controls and equipment of a CBG plant for proper functioning and demonstrate how to identify major controls of the plant like temperature of reaction, amount of substrate, quantity of gas produced, etc.	1	2	-	-
	PC8. Discuss the procedure to repair minor faults in equipment or machinery of a CBG plant and apply appropriate procedure for ensuring proper operation of the plant components like feeders, pumps, agitators etc. and repair them in case of any damage and escalate the issue to the supervisor, if any	1	2	-	-
	PC9. show how to perform maintenance activities like scheduled replacement of wear parts as filters and seals	-	2	-	-
	PC10. employ appropriate procedures to replace or replenish supplies or consumables like engine oil or water, as required	-	2	-	-

PC11. Apply appropriate practices to identify important safety issues, potential risks and hazards for humans, animals and the environment	1	-	-	-
PC12. explain proper usage and function of PPE and apply proper practices to take precautions to avoid any risks and hazardous situations and wear proper PPE before starting the operations	1	2	-	-
Perform Operational Activities and facilitate in implementing Greening Practices at CBG Plant	**10**	**16**	**-**	**-**
PC13. describe the processes involved in manufacturing of CBG	2	-	-	-
PC14. discuss the operating and monitoring methods for various machinery and equipment used in a CBG plant and demonstrate how to start and shut down the plant equipment				
PC15. describe the methods of effective utilization and optimization of resources as per standard and apply proper techniques to measure, monitor and assess quality of raw biomass feedstock	1	2	-	-
PC16. state the significance of switching off the machinery and equipment when not in use and demonstrate how to control operation of digester/reactor/drier/blender/mixer etc. as per standard procedure and operate valves, pumps engines, or generators to control and adjust production of CBG as per standards	1	2	-	-

PC17. explain quality parameters of the raw material used in CBG production and employ appropriate techniques to calculate, measure, load, or mix biomass feedstock for production of CBG	1	2	-	-
PC18. elaborate the procedure to inspect and pre- process the feedstock, regulate the flow and pressure of the machines as per the requirement and calibrate various devices like fuel, chemical and water meters and demonstrate the operational procedure of a CBG plant from preparing the feedstock, calibrating liquid flow devices or meters and controlling equipment to regulate flow and pressure of gas	1	2	-	-
PC19. discuss the importance and procedure for keeping the working area clean and apply appropriate procedure by monitor transportation and storage of flammable and other potentially dangerous products as per safety guidelines and regulations	1	2	-	-
PC20. discuss the process of recording operational records, test results and other documentation required in a CBG plant and employ proper documentation and compilation procedures for operations records, test results, and gauge readings such as temperatures, pressures, concentrations, and flows	1	2	-	-

	PC21. describe waste management procedures and methods of effective utilization of resources and demonstrate how to segregate recyclable and non-recyclable, and hazardous waste and dispose of the hazardous waste appropriately as per standard procedure	1	2	-	-
NOS Total		**20**	**30**	**-**	**-**

NOS/Module Name	Assessment Criteria for Performance Criteria/Learning Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
SGJ/N0620: Monitor and Maintain the CBG Plant	*Monitor the CBG Plant*	**10**	**1**	**-**	**-**
	PC1. explain the basic maintenance procedures of the machinery and equipment and Show how to remove, dismantle, assemble and install machinery and equipment used in CBG plant	2	1	-	-
	PC2. state the significance for following the maintenance schedule based on the inspection results	2	-	-	-
	PC3. describe the inspection procedure of various machinery and equipment in a CBG plant	2	-	-	-
	PC4. discuss the functioning of various machines and equipment	2	-	-	-

PC5. discuss the importance to take adequate measures to protect the plant from corrosion	2	-	-	-
PC6. demonstrate how to clean and grease the bearings and do required adjustments, as required	-	2	-	-
PC7. demonstrate how to replace wear parts as filters, seals and replace or replenish supplies or consumables like engine oil or water and remove debris from organic matter that falls to the bottom of the tank	-	2	-	-
PC8. perform the steps to arrest the leakage in case of any CBG leakage	-	2	-	-
PC9. Apply appropriate procedure to monitor the mobile/storage cascade as per the standards	-	2	-	-
PC10. employ proper procedure to report the supervisor in case of any performance failure and technical cause of deviated performance of machinery in CBG plant	-	2	-	-
PC11. demonstrate how to prepare different type of maintenance records, namely routine maintenance, breakdown maintenance etc. and update the repair & maintenance records real time to be made available to the respective authority in charge	-	2	-	-
Assist in Monitoring and Handling Major Breakdown in the CBG Plant	**10**	**1**	**-**	**-**

PC12. describe the performance parameters of mixers, digestors and compressors	2	-	-	-
PC13. discuss the analysis parameters of gas, slurry and compost and biological processes involved in manufacturing of CBG	2	-	-	-
PC14. state the significance for performing regular unit checks for all equipment for their properly operation and fill out daily activities log sheet	2	-	-	-
PC15. describe the procedure of documentation, recording and reporting at a CBG plant	2	-	-	-
PC16. explain the procedure of preventive and corrective maintenance and for handling major breakdown of CBG plant	2	-	-	-
PC17. Apply proper inspection techniques for various machinery such as digester/reactor/drier/blender/mixer/weighbridge, connections and equipment functioning, temperature, level and flow gauges on CBG plant	-	2	-	-
PC18. demonstrate how to check chain for any damage and lubricate at the CBG plant.	-	2	-	-
PC19. employ proper procedure for performing operation check of the CBG plant or processing equipment, recording or reporting damage and mechanical problems	-	2	-	-
PC20. show how to diagnose adverse operating conditions and equipment malfunctions	-	2	-	-

	PC21. role play on how to collect and report operational, maintenance, and environmental data for CBG plant	-	3	-	-
	PC22. dramatize a situation on how to initiate call with supervisor for experts/service engineers of equipment supplier in case of planned shutdown/ major breakdown and take necessary action regarding the breakdown to prevent future mishappening	-	4	-	-
	PC23. show how to troubleshoot the issues with the concerned machinery in a safety manner and take prior approval from supervisor in case of necessary withholding of the production process	-	2	-	-
NOS Total		**20**	**3**	**-**	**-**

NOS/Module Name	Assessment Criteria for Performance Criteria/Learning Outcomes	Theory Marks	Practical Marks	Project	Viva Marks
SGJ/N0106: Maintain Personal Health & Safety at project site	*Adopt safe practices at workplace*	**11**	**19**	**-**	**-**
	PC1. identify and report any hazards, risks or breaches in site safety to the appropriate authority	2	3	-	-
	PC2. follow recommended safe practices in handling physical, chemical, electrical and fire hazards and risk	1	2	-	-
	PC3. use appropriate Personal Protective Equipment(PPE) for head, eye, hand, ear, face, body and fall protection specific to work condition	2	4	-	-
	PC4. follow safe practices when working at height and in confined space	1	1	-	-
	PC5. handle all required tools, tackles, materials and equipment safely	1	2	-	-
	PC6. identify expiry dates, wear and tear issues of specified equipment and accordingly inform supervisor and undertake corrective measures	1	2	-	-

	PC7. apply ergonomic principles wherever required	1	2	-	-
	PC8. use safety signs, labels, charts and notices at workplace	1	1	-	-
	PC9. identify work safety procedures and instructions for handling heavy components	1	2	-	-
	Follow emergencies, rescue and first aid procedures	**4**	**4**	**-**	**-**
	PC10. follow emergency and evacuation procedures in case of accidents, fires and natural calamities	1	1	-	-
	PC11. use appropriate fire extinguishers for different types of fire	1	1	-	-
	PC12. administer first aid to victim in case of various medical emergencies including bleeding, burns, choking, electric shock, cardiac arrest, etc.	1	1	-	-
	PC13. use correct method to move injured person during an emergency	1	1	-	-
	Follow good housekeeping practices and infection control guidelines	**4**	**8**	**-**	**-**
	PC14. follow recommended personal hygiene, workplace hygiene and sanitation practices	1	2	-	-
	PC15. clean and disinfect all material, tools and supplies before and after use	1	2	-	-

	PC16. report immediately to concerned authorities regarding sign and symptoms of illness of self and other colleagues	1	2	-	-
	PC17. follow processes specified for disposal of hazardous waste	1	2	-	-
NOS Total		**19**	**31**	**-**	**-**
	PC32. answer questions politely, with clarity and confidence, during recruitment and selection	-	-	-	-
	PC33. identify apprenticeship opportunities and register for it as per guidelines and requirements	-	-	-	-
	NOS Total	**20**	**30**	**-**	**-**

NOS/Module Name	**Assessment Criteria for Performance criteria/Outcomes**	**Theory**	**Practical**	**Project**	**Viva**
DGT/VSQ/N0102.Employability Skills (60 Hours)	*Introduction to Employability Skills*	**1**	**1**	-	-
	PC1. identify employability skills required for jobs in various industries	-	-	-	-
	PC2. identify and explore learning and employability portals	-	-	-	-
	Constitutional values – Citizenship	**1**	**1**	-	-

PC3. recognize the significance of constitutional values, including civic rights and duties, citizenship, responsibility towards society etc. and personal values and ethics such as honesty, integrity, caring and respecting others, etc.	-	-	-	-
PC4. follow environmentally sustainable practices	-	-	-	-
Becoming a Professional in the 21st Century	**2**	**4**	-	-
PC5. recognize the significance of 21st Century	-	-	-	-
PC6. practice the 21st Century Skills such as Self-Awareness, Behaviour Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for continuous learning etc. in personal and professional life	-	-	-	-
Basic English Skills	**2**	**3**	-	-
PC7. use basic English for everyday conversation in different contexts, in person and over the telephone	-	-	-	-
PC8. read and understand routine information, notes, instructions, mails, letters etc. written in English	-	-	-	-
PC9. write short messages, notes, letters, e-mails etc. in English	-	-	-	-

	Career Development & Goal Setting	**1**	**2**	-	-
	PC10. understand the difference between job and career	-	-	-	-
	PC11. prepare a career development plan with short- and long-term goals, based on aptitude	-	-	-	-
	Communication Skills	**2**	**2**	-	-
	PC12. follow verbal and non-verbal communication etiquette and active listening techniques in various settings	-	-	-	-
	PC13. work collaboratively with others in a team	-	-	-	-
	Diversity & Inclusion	**1**	**2**	-	-
	PC14. communicate and behave appropriately with all genders and PwD	-	-	-	-
	PC15. escalate any issues related to sexual harassment at workplace according to POSH Act	-	-	-	-
	Financial and Legal Literacy	**2**	**3**	-	-
	PC16. select financial institutions, products and services as per requirement	-	-	-	-
	PC17. carry out offline and online financial transactions, safely and securely	-	-	-	-
	PC18. identify common components of salary and compute income, expenses, taxes, investments etc	-	-	-	-

	PC19. identify relevant rights and laws and use legal aids to fight against legal exploitation	-	-	-	-
	Essential Digital Skills	**3**	**4**	-	-
	PC20. operate digital devices and carry out basic internet operations securely and safely	-	-	-	-
	PC21. use e- mail and social media platforms and virtual collaboration tools to work effectively	-	-	-	-
	PC22. use basic features of word processor, spreadsheets, and presentations	-	-	-	-
	Entrepreneurship	**2**	**3**	-	-
	PC23. identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research	-	-	-	-
	PC24. develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion	-	-	-	-
	PC25. identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity	-	-	-	-
	Customer Service	**1**	**2**	-	-
	PC26. identify different types of customers				
	PC27. identify and respond to customer requests and needs in a professional manner.	-	-	-	-

	PC28. follow appropriate hygiene and grooming standards	-	-	-	-
	Getting ready for apprenticeship & Jobs	**2**	**3**	-	-
	PC29. create a professional Curriculum vitae(Résumé)				
	PC30. search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively	-	-	-	-
	PC31. apply to identified job openings using offline/online methods as per requirement				
	PC32. answer questions politely, with clarity and confidence, during recruitment and selection	-	-	-	-
	PC33. identify apprenticeship opportunities and register for it as per guidelines and requirements	-	-	-	-
	NOS Total	**20**	**30**	-	-

Annexure: Assessment Strategy

This section includes the processes involved in identifying, gathering, and interpreting information to evaluate the Candidate on the required competencies of the program.

1. Assessment System Overview:

- Batches assigned to the assessment agencies for conducting the assessment on SDSM/SID or email
- Assessment agencies send the assessment confirmation to VTP/TC looping SCGJ
- Assessment agency deploys the ToA certified Assessor for executing the assessment
- SCGJ monitors the assessment process & records

2. Testing Environment:

- Confirm that the centre is available at the same address as mentioned on SDMS or SIP
- Check the duration of the training.
- Check the Assessment Start and End time to be as 10 a.m. and 5 p.m.
- Check that the allotted time to the candidates to complete Theory & Practical Assessment is correct.
- Check the mode of assessment—Online (TAB/Computer) or Offline (OMR/PP).
- Confirm the number of TABs on the ground are correct to execute the Assessment smoothly.
- Check the availability of the Lab Equipment for the particular Job Role.

3. Assessment Quality Assurance levels / Framework:

- Question papers created by the Subject Matter Experts (SME)
- Question papers created by the SME verified by the other subject Matter Experts
- Questions are mapped with NOS and PC
- Question papers are prepared considering that level 1 to 3 are for the unskilled & semi-skilled individuals, and level 4 and above are for the skilled, supervisor & higher management
- Assessor must be ToA certified & trainer must be ToT Certified
- Assessment agency must follow the assessment guidelines to conduct the assessment

4. Types of evidence or evidence-gathering protocol:
    - Time-stamped & geotagged reporting of the assessor from assessment location
    - Center photographs with signboards and scheme specific branding
    - Biometric or manual attendance sheet (stamped by TP) of the trainees during the training period
    - Time-stamped & geotagged assessment (Theory + Viva + Practical) photographs & videos

5. Method of verification or validation:
    - Surprise visit to the assessment location
    - Random audit of the batch
    - Random audit of any candidate

6. Method for assessment documentation, archiving, and access
    - Hard copies of the documents are stored
    - Soft copies of the documents & photographs of the assessment are uploaded / accessed from Cloud Storage
    - Soft copies of the documents & photographs of the assessment are stored in the Hard Drives

On the Job:

OJT Monitoring Report

- As in Green Jobs Sector, reproducing the evidence for assessment is not feasible due to constraints like cost, confidentiality and controlled environment, every
- Apprentice is required to record the evidences performed during the OJT and the same gets authorized by his/her supervisor.
- The evidence recording is done in a structured monitoring report, termed as OJT Monitoring report.
- During the OJT, every trainee is required to fill the OJT monitoring report which is required to be signed by his/her supervisor.
- Towards the end of OJT period these reports are submitted with the HR department of company
- These duly submitted reports are then verified by an Industry nominated assessor for verification of evidence.

Theory, Practical & Viva:

- Scope – Is used to test the knowledge and understanding and skills acquired during the OJT as well as to conform the OJT monitoring report.
- Some personality traits and generic skills (such as – promptness, sharpness, communication skills, depth of knowledge, comprehension, presentation, patience
- etc) can also be tested, which is also required for the QP.

- Tools – The assessment's questions should be aligned with the Qualification Pack, covering the PCs. There will be summative assessment at the end of the OJT.
- Method – Direct questions open and close ended questions, situation-based questions, analytical questions, and decision-making based questions for Viva,
- MCQ for the theory and performing QP related operations for practical. Different questions in theory, practical and viva are included to test relevant PCs from
- the QP
- Analysis – Assessor draws a spectrum of ready answers to be expected from trainee for Viva. This reduces effect of subjectivity of the assessor. Comparative
- Quality of trainees within a batch or different institutes can be gauged. The skill is gauged by observing the practical work.

Execution of OJT Assessment:

- HR department hands over the individual OJT monitoring report with Industry nominated assessor and schedules an assessment meeting for each trainee.
- Industry nominated assessor assesses each trainee based on OJT monitoring report, viva on each PC and also takes into account attendance of each trainee towards the end of the OJT period.
- The OJT marks are compiled for each NOS by the Industry nominated assessor and submitted with HR department of company.
- The OJT assessment results are then sent to SCGJ by HR department of company in a sealed envelope for compiling the assessment results in case of offline assessment.

Annexure: Acronym and Glossary

Acronym

Acronym	Description
AA	Assessment Agency
AB	Awarding Body
ISCO	International Standard Classification of Occupations
NCO	National Classification of Occupations
NCrF	National Credit Framework
NOS	National Occupational Standard(s)

NQR	National Qualification Register
NSQF	National Skills Qualifications Framework
OJT	On the Job Training

Glossary

Term	Description
National Occupational Standards (NOS)	NOS define the measurable performance outcomes required from an individual engaged in a particular task. They list down what an individual performing that task should know and also do.
Qualification	A formal outcome of an assessment and validation process which is obtained when a competent body determines that an individual has achieved learning outcomes to given standards
Qualification File	A Qualification File is a template designed to capture necessary information of a Qualification from the perspective of NSQF compliance. The Qualification File will be normally submitted by the awarding body for the qualification.
Sector	A grouping of professional activities on the basis of their main economic function, product, service or technology.
Long Term Training	Long-term skilling means any vocational training program undertaken for a year and above. https://ncvet.gov.in/sites/default/files/NCVET.pdf

Annexure: Annexure: Career Progression and OM