Approved in 21st NSQC meeting- 03.08.2018

NSQF QUALIFICATION FILE

CONTACT DETAILS OF THE BODY SUBMITTING THE QUALIFICATION FILE

West Bengal State Council of Technical & Vocational Education and Skill Development
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Name: Shri Suparna Kumar Roychowdhury

Position in the organisation: Chairman, Board of Studies and Skilling

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List of documents submitted in support of the Qualifications File

1. Curriculum and Course Content (Annexure I)
2. Letters from Industries/ Employers to establish need of the qualification (Annexure II)
3. Assessment strategy (Annexure III)

Model Curriculum to be added which will include the following:

- Indicative list of tools/equipment to conduct the training
- Trainers qualification
- Lesson Plan
- Distribution of training duration into theory/practical/OJT component
- **SUMMARY**

1	**Qualification Title:**	Bio Gas Plant and Bio Slurry Technician
2	**Qualification Code, if any -**	NA
3	**NCO code and occupation -**	
4	**Nature and purpose of the qualification (Please specify whether qualification is short term or long term)**	Short Term (400 hours)

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5	**Body/bodies which will award the qualification**	West Bengal State Council of Technical & Vocational Education and Skill Development
6	**Body which will accredit providers to offer courses leading to the qualification**	West Bengal State Council of Technical & Vocational Education and Skill Development
7	**Whether accreditation/affiliation norms are already in place or not , if applicable (if yes, attach a copy)**	NA
8	**Occupation(s) to which the qualification gives access**	Bio Gas Plant Construction, Bio Slurry production & Crop production with Bio slurry
9	**Job description of the occupation**	Under "Bio Gas Plant Construction, Maintenance, Bio slurry production & Crop Production with Bio slurry" trade, a candidate is trained on Professional Skill, Professional Knowledge, Entrepreneurship skill and Employability Skill. In these days of Global Warming from industrial agriculture coupled with ever increasing cost of cultivation with dwindling farmer profit and Self-Declared Goal (SDG) of the country to work for clean technologies, Biogas Pant & Bio slurry management in Agriculture & fishery can work as a potential sustainable tool and create sustainable job opportunities at village level for the rural youth in Biogas Plant construction, maintenance as well as sustainable agriculture. To become wage employed/ self-employed with the skill set of Bio Gas Plant construction, maintenance and bio slurry production
10	**Licensing requirements**	NA
11	**Statutory and Regulatory requirement of the relevant sector (documentary evidence to be provided)**	NA
12	**Level of the qualification in the NSQF**	4
13	**Anticipated volume of training/learning required to complete the qualification**	
14	**Indicative list of training tools required to deliver this**	Attached in curriculum

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	qualification	
15	**Entry requirements and/or recommendations and minimum age**	Class VIII pass
16	**Progression from the qualification (Please show Professional and academic progression)**	Pass outs of this course can get both self and waged employment. Various nodal agencies set up in States, Khadi & Village Industries Commission, Voluntary Agencies, State Biogas Directorates employ technicians. There is also quite good scope for self-employment in this sector. Wage Employment – **Bio Gas Plant TechnicianSr. Bio Gas Plant Technician Bio Gas Plant Manager**
17	**Arrangements for the Recognition of Prior learning (RPL)**	RPL arrangement will be for existing uncertified experienced workforce and will consist of four stages 1. Counselling- To inform, advise and guide the candidates regarding RPL 2. Pre-Assessment- To assess the current competencies of the candidates and identifying the gap between the full qualification and current competencies. 3. Orientation &Bridge Training- To train the candidates for bridging the gap. Final assessment & Certification- To assess the candidate for full qualification and certify.
18	**International comparability Where Known (Research Evidence to be provided)**	Not Yet Established
19	**Date of planned review of the qualification.**	April 2021
20	**Formal structure of the qualification**	

The qualification will consist of five mandatory components including Practical (On-site) for 1400 hours as detailed below

Title of component and identification code.	**Mandatory/ Optional**	**Estimated size (learning hours)**	**Level**
Apply safe working Practices	Mandatory	25	4

Identify appropriate site for installing BGP	Mandatory	30	4
To be able to Construct Bio Gas Plant	Mandatory	100	4
Install Cooking Apparatus	Mandatory	50	4
Post BGP construction activities	Mandatory	60	4
Preparation of Bio slurry manure and value addition	Mandatory	30	4
Marketing of organically grown crops	Mandatory	30	4
Understand and practice soft skills	Mandatory	25	4
Demonstrate knowledge of concept and principles of basic arithmetic and financial calculation, and apply knowledge of specific area to perform practical operations.	Mandatory	25	4
Explain time management, entrepreneurship and manage/organize related task in day to day work for personal & social growth.	Mandatory	25	4
Total		**400**	

SECTION 1
ASSESSMENT

21	**Body/Bodies which will carry out assessment:** Board of Examination under West Bengal State Council of Technical & Vocational Education & Skill Development constituted under the ACT XXVI of 2013 under Department of Technical Education, Training & Skill Development, Govt. of West Bengal.
22	**How will RPL assessment be managed and who will carry it out?** RPL arrangement will be for existing uncertified experienced workforce and will consist of four stages 1. Counselling- To inform, advise and guide the candidates regarding RPL 2. Pre-Assessment- To assess the current competencies of the candidates and identifying the gap between the full qualification and current competencies. 3. Orientation &Bridge Training- To train the candidates for bridging the gap. 4. Final assessment & Certification- To assess the candidate for full

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	qualification and certify. RPL assessment will be managed by PBSSD (Paschim Banga Society for Skill Development) under Department of Technical Education, Training & Skill Development, Govt. of West Bengal.
23	**Describe the overall assessment strategy and specific arrangements which have been put in place to ensure that assessment is always valid, reliable and fair and show that these are in line with the requirements of the NSQF.** There will be two types of Assessments viz. Formative and Summative. The Formative Assessment will be carried out continuously during the conduct of course. There will be two sets of Summative assessments, One set each on completion of one year training for all the subjects except Practical (On Site) for which there will be a single summative assessment at the end of 2nd year wherein the trainee has to present/defend his/her project/practical (on site) report before the Board of Examiners. Assessment will be carried out by Board of Examination under West Bengal State Council of Technical & Vocational Education & Skill Development, under Department of Technical Education, Training & Skill Development, Govt. of West Bengal. The Council has all necessary infrastructure and pool of qualified Assessors/ Examiners to carry out such assessments. Presently the Council is conducting all examinations for all courses which include Diploma Courses, Vocational Courses in VIII+ level and X+2 level &other Short term Courses. Council also conducts all State Level Entrance tests like JEXPO for admission to Diploma Courses in Polytechnics, VOCLET for lateral entry to Diploma Courses in Polytechnics and CET (Common Entrance Test) for admission to NCVT courses in ITIs.

Please attach most relevant and recent documents giving further information about assessment and/or RPL.
Give the titles and other relevant details of the document(s) here. Include page references showing where to find the relevant information.

ASSESSMENT EVIDENCE

Complete a grid for each component as listed in "Formal structure of the the qualification" in the Summary.

NOTE: this grid can be replaced by any part of the qualification documentation which shows the same information – ie Learning Outcomes to be assessed, assessment criteria and the means of assessment.

24. Assessment evidences

Title of Component:

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Outcomes to be assessed/NOSs to be assessed	Assessment criteria for the outcome
1 Apply safe working Practices	PC-1 Comply with occupational health and safety requirements relevant to the work, PC-2 Assess possible risk and hazards in the work environment and exercise safety precautions to minimize injury to self and others, PC-3 Comply relevant safety practices as the work deals with inflatable gas, don't give bleaching water, soap, urea etc. in Bio gas Plant PC-4 Confirm that there is no leakage of gas, or don't work with fire around BGP
2 Identify appropriate site for installing BGP	PC 5 Select suitable location based on factors such as avoidance of water inundation/marshy land/tall tree, availability of cow dung in nearby areas, maximum 200 ft. distance from kitchen point and a minimum 40 ft. distance from pond/river/ tube well etc. PC 6 Verify that water is available in the vicinity for making a water solution of dung to be given in the input inlet, PC 7 Confirm the availability of labour for giving daily input PC 8 Mix sufficient water to prepare input and also collect bio slurry output at regular interval, PC 9 Construct plastic/straw shed over bio slurry collection chamber and keep sufficient space to uplift & dry the collected bio slurry,
3 To be able to Construct Bio Gas Plant	PC 10 Fixed Dome Dinabandhu Model family size Bio Gas Plant construction requires construction technology and materials as per soil and climatic condition of the State, PC 11 Proper supervisory technical expert for BGP and trained masonry support is essential, PC 12 Soil test is done to find the type of construction, PC 13 A minimum 150 sqft area is required to construct the BGP, PC 14 The construction materials are required as per technical specification for a particular type of BGP for different agro-climatic condition. PC 15 Construction materials include bricks, sand, stone chips, cement, pipe, iron rod, biogas oven, etc. PC 16 For 2 m^3 BGP with 3# brick structure, 9 man-days are required to complete the

	construction, after construction, 15 days is required for curing and then loading of the chamber is to be done with cow dung mixed with water through inlet under loamy & sandy soil. PC 17 For the same structure specification under Hill region, 10 man-days and a higher cost is involved followed by mandatory curing etc. PC 18 For same 2 m^3 BGP with 5# brick structure, under clayey soil, 12 man-days are required. PC 19 The construction work and installation of gas pipeline needs technical supervision. PC 20 After completion of Plant construction, the constructed structure has to be cured with water for 15 days. Then a mixture of cow dung and water 1 kg each is to be given through inlet pipeline and the pipeline fittings has to be completed. Then the valve is to be closed for seven days and it is to be seen whether watery cow dung is coming out from the outlet pipeline. If it comes out, then 50 kg each of cow dung and water has to be given. PC 21 Checks to be made whether gas is coming out through the burner in the kitchen and if found that the gas in not flaming, the full air to be passed and after closing the valve, checks are to be made on the next day. PC 22 For first time filling, no chicken waste need sto be given, which may hamper full production of methane.
4 Install Cooking Apparatus	PC 23 Gas pipeline installation, regulator, Gas oven etc. Care to be taken to see that no ferrous metal is there in gas line as the Gas contains water vapour and hydrogen sulphide along with methane, which will cause corrosion of the gas line within very short time. PC 24 User must be trained with dos& don'ts of this gas usage, PC 25 Regular maintenance of the gas line and other apparatus for security reasons.
5 Post BGP construction activities	PC 26 Determination of carbon credit development and avoidance of fertilizer subsidy with use of Bio slurry and use of methane as a green substitute of LPG, wood, cattle dung and kerosene etc are to be worked out for each sub zone, using BGP & community participation in doing so.

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		PC 27 Linking dry/liquid Bio slurry of BGP for organic nutrient management of different agricultural and horticultural crops, replacing chemical fertilizers. PC 28 The Plant needs to be refreshed on every 10th year on a regular basis. Firstly remove all the cowdung from the plant and it be washed. After drying for two days, the inner wall of the plant is to be painted with 5 kg cement mixed with water. After drying, the plant is to filled with cowdung following the same rule, as followed for the first filling. The same is also to be done in presence of trained technical expert.
6	Preparation of Bio slurry manure and value addition	PC-29 The bio slurry produced from the biogas plant as a by-product, is to be collected in the Outlet Chamber, PC 30 The liquid bio slurry thus produced, may be mixed with chopped pseudo stem of Banana to increase the potash content of the bio slurry manure. PC-31 The liquid bio slurry can either be collected or placed at an upper elevation to make it dried under sun shine and air or it may be directly used in the field as liquid manure at already worked out doses with such frequencies, identified for different crops. PC 32 The liquid bio slurry can be mixed with vermi compost manure to enrich the quality and reduce the dosage of individual manure, PC 33 Dried Bio slurry manure can be mixed with microbial bio fertilizers and bio pesticides for value addition and enriched manure preparation and organic way of crop cultivation. PC 34 Bio slurry can be used for fishery, as a source of feed. PC 35 The bio slurry produced by one family size BGP will be sufficient to supply the entire nutrient for 1 acre of land for any area with 300% cropping intensity with crops like Paddy, wheat, maize, vegetables, oilseeds, pulses and fodder at already worked-out doses.
7	Marketing of organically grown crops	PC 36 The cost of production will get reduced over conventional production system, accordingly the farmers will get higher profit over

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	conventional system of farming even selling in the same local hut. PC 37 Farmers may get higher price through selling their produce in "Organic huts/markets", PC 38 Farmers may get higher profit through selling their produce directly to the consumers. PC 39 The scope & way of e-commerce in selling the produce to the consumers,
8 Understand and practice soft skills	PC 40 Assessor will rate the trainee on his ability to practice soft skills, including clear and concise communication, in day to day work with team and with higher authority
9 Demonstrate knowledge of concept and principles of basic arithmetic and financial calculation, and apply knowledge of specific area to perform practical operations.	PC 41 Apply basic arithmetic calculations for arriving dimensional parameters as per drawing. PC 42 Apply basic financial calculation to understand cost of materials & labour and basic concepts of profit/loss, PC 43 Engage in basic banking transactions as customer
10 Explain time management, entrepreneurship and manage/organize related task in day to day work for personal & social growth.	PC 44 Ascertain appropriate time for the assigned task. PC 45 Execute the assigned task within time frame. PC 46 Manage own work within specified time. PC 47 Explain importance & factors affect the development of entrepreneurship. PC 48 Identify service providers for developing entrepreneur/business establishment.

Means of assessment 1

There will be two types of Assessments viz. Formative and Summative. The Formative Assessment will be carried out continuously during the conduct of course and Summative Assessment will be carried out at the end of the course. Details are mentioned under means of Assessment-2. Written test, Practical examination/ Skill test, Viva voce & presentation of "On Site Training".

Means of assessment 2

I. Means of Formative Assessment (Total marks allotted- 250)

i) Assignments for each module of Theory component
ii) Assignments for each module of Employability Skills component
iii) Continuous evaluation of each module of Practical component

II. Means of Summative Assessment(Total marks allotted- 1250)

i) Written test for Theory component
ii) Written test for Employability Skills component
iii) Practical Test & Viva voce for Practical Component.
iv) Trainee has to present/defend his/her project/practical (on site) report before the Board of examiners.

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Component wise distribution of marks is given in the Annexure 2
Pass/Fail Passing criteria is based on marks obtained in Formative and Summative Assessment taken together as mentioned in Annexure No-1 i) Minimum Marks to pass Theory component– 40% ii) Minimum Marks to pass Employability Skills component– 40% iii) Minimum Marks to pass practical component– 60% Minimum attendance required to appear in the final examination- 75% **At the end of the course, Final marks for each subjects will be calculated by adding 50% weight to the marks scored in each annual exam while 100% weight will be added to the marks scored in the practical (on site) examination.**

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SECTION 2

25. EVIDENCE OF LEVEL

OPTION A

Title/Name of qualification/component: Bio Gas Plant and Bio Slurry Technician			**Level: 5**
NSQF Domain	**Outcomes of the Qualification/Component**	**How the outcomes relates to the NSQF level descriptors**	**NSQF Level**
Process	• Identify appropriate site for installing BGP • To be able to Construct Bio Gas Plant • Install Cooking Apparatus • Post BGP construction activities • Preparation of Bio slurry manure and value addition • Marketing of organically grown crops	The individual is responsible for selection of suitable site in the farmers holding as per agro climatic and soil situation for all the six agro climatic zones namely **1. Hilly Region, 2. Terai Region, 3. Vinda Alluvial plain, 4. Gangetic Alluvial plain, 5. Red & Lateritic Western zone and 6. Saline Coastal zone** of the state to construct bio gas plant. The individual should also be able to plan the size of BGP as per available input resources and plan for use of bio gas slurry in agri culture, hoti culture and fishery for making climate resilient agriculture activities as a whole.	Level 4
Professional knowledge	• Identify appropriate site for installing BGP • To be able to Construct Bio Gas Plant • Install Cooking Apparatus • Post BGP construction activities • Preparation of Bio slurry manure and value addition • Marketing of organically grown crops	The individual needs to have knowledge of construction dealing with inflammable gases as well as leakage free gas pipeline, its maintenance, training the users regarding does and don'ts as per agro climatic and soil condition of the state. Further the individual needs to know the crop management of different agriculture and horticulture crops with use of modern agricultural technology for growing	Level 4

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Title/Name of qualification/component: Bio Gas Plant and Bio Slurry Technician			**Level: 5**
NSQF Domain	**Outcomes of the Qualification/Component**	**How the outcomes relates to the NSQF level descriptors**	**NSQF Level**
		organic crops and fishery. He should also know different use of Bio Slurry, its right dose etc. to grow different crops to manage fertility of different soils and to combat chemical pollution in agriculture.	
Professional skill	• Identify appropriate site for installing BGP • To be able to Construct Bio Gas Plant • Install Cooking Apparatus • Post BGP construction activities • Preparation of Bio slurry manure and value addition • Marketing of organically grown crops	The individual needs to have practical skills regarding construction of Bio Gas Plants at different soil and agro climatic conditions. He should also have practical skills to work with different Gas Pressure load as well as right mixture of bio gas from the BGPs. Further, he should also have the skill in guiding and demonstrating different crop cultivation with the use of Bio Slurry to increase and improve farmers' profit, productivity and take care of the environment as a whole.	Level 4
Core skill	• Understand and practice soft skills • Demonstrate knowledge of concept and principles of basic arithmetic and financial calculation, and apply knowledge of specific area to perform practical operations. • Explain time management, entrepreneurship and manage/organize related task in day to day work for personal & social growth.	The individual should have a basic skill to draw, design and guide the beneficiaries as well as the workers under him to construct the BGPs. He should also be able to communicate with the beneficiaries as well as the workers working under him for smooth execution of the BGPs as well as conducting demonstration of crops and fisheries with Bio Slurry. Finally he should have some mathematical skills for working out the cost benefit	Level 4

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Title/Name of qualification/component: Bio Gas Plant and Bio Slurry Technician		Level: 5	
NSQF Domain	**Outcomes of the Qualification/Component**	**How the outcomes relates to the NSQF level descriptors**	**NSQF Level**
		ratio of BGPs and future scope of Carbon Credit Business and possible integration of govt. agencies/ corporate houses to utilize the carbon credits generated through development of BGPs.	
Responsibility	• Apply safe working Practices • Identify appropriate site for installing BGP • To be able to Construct Bio Gas Plant • Install Cooking Apparatus • Post BGP construction activities • Preparation of Bio slurry manure and value addition • Marketing of organically grown crops • Understand and practice soft skills • Demonstrate knowledge of concept and principles of basic arithmetic and financial calculation, and apply knowledge of specific area to perform practical operations. • Explain time management, entrepreneurship and manage/organize related task in day to day work for personal & social growth	The individual has to take ownership of the work related to construction of BGPs. There would be couple of workers required for construction work of a Bio Gas Plant and the individual is required to supervise their work. Furthermore, all the decisions regarding design and construction materials depending on soil and agro climatic conditions has to be taken by the individual. Hence the particular qualification should be levelled at level 4.	Level 4

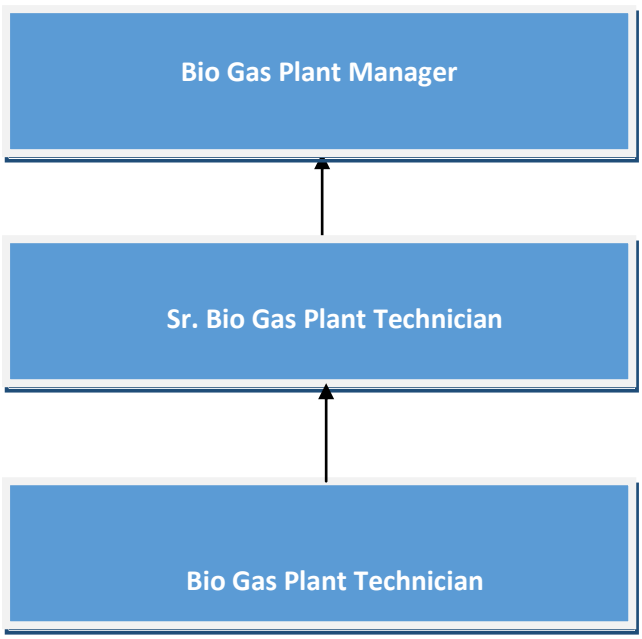
SECTION 3
EVIDENCE OF NEED

26	**Basis of estimate**	**In case of other Awarding Bodies (Institutes under Central Ministries and states departments)**
	Need of the qualification	An On-Farm Project has been undertaken by Agriculture Department, Govt. of West Bengal, where Biogas Plants are constructed in Farmer's holding and crop production done with Bio slurry management along with other advocated technologies to make the farmers self-reliant. Bio gas Plant has been found to be very effective in reducing cost of production as well as cost of cooking.It has been recommended that producing biogas slurry for crop production with waste of cows is found to be highly profitable, economically viable and sustainable method of farming. This model would obviously strengthen profit maximization, soil health and livelihood of small and marginal farmers of the state, and rural economy and environment of the country as a whole. Relevant published documents in this regard are attached (Annexure IV).
	Industry Relevance	To understand the requirement of the qualification and Industry relevance, West Bengal State Council of Technical & Vocational Education and Skill Development through Paschim Banga Society of Skill Development has approached Khadi & Village Industries Commission, West Bengal division to incorporate feedback on the proposed curriculum of "Bio Gas Plant and Bio Slurry Technician". The letter from KVIC, West Bengal is attached at Annexure V as a supporting document. PBSSD also consulted Industry partners to incorporate Industry Feedback. Industry validation is attached in Annexure II.
	Usage of Qualification	West Bengal State Council of Technical & Vocational Education and Skill Development has proposed the course "Bio Gas Plant and Bio Slurry Technician" after receiving multiple feedback from industries and self-employed Bio Gas technicians regarding need of the qualification. The letter (Annexure V) from Khadi and Village Industries Commission, nodal agency for implementing Bio Gas Plant related project on behalf of Ministry of Micro, Small and Medium Enterprises, Government of India has also vetted the course content. There is no such similar approved course

		available in NQR. Hence, Council has proposed this course.
	Estimated uptake	As per census report, West Bengal is having approximately 72 lakh farm families, of whom more than 96% are small and marginal in nature. Moreover, the state is dominated by fertile soil with availability of good water resource in general. Hence the Qualification will be able to develop clean technology and job directly at rural level and help farmers in general to make sustainable business and profit.
27	**Recommendation from the concerned Line Ministry of the Government/ Regulatory Body. To be supported by documentary evidences** Khadi & Village Industries Commission, Ministry of Micro, Small and Medium Enterprises, Government of India is the nodal agency to construct Bio Gas Plant in various states. Voluntary Agencies, State Biogas Directorates employ technicians. West Bengal State Council of Technical & Vocational Education and Skill Development through Paschim Banga Society of Skill Development has approached Khadi & Village Industries Commission, West Bengal division to incorporate feedback on the proposed curriculum of "Bio Gas Plant and Bio Slurry Technician". The letter from KVIC, West Bengal is attached at Annexure V as a supporting document.	
28	**What steps were taken to ensure that the qualification(s) does (do) not duplicate already existing or planned qualifications in the NSQF? Give justification for presenting a duplicate qualification** This qualification will be conducted under the West Bengal State Council of Technical & Vocational Education & Skill Development under Department of Technical Education, Training and Skill Development. In the state of West Bengal the Council is affiliating and awarding body for this qualification. Thus there is no other existing or planned qualification (Short term courses) in the state aligned with NSQF.	
29	**What arrangements are in place to monitor and review the qualification(s)? What data will be used and at what point will the qualification(s) be revised or updated? Specify the review process here** The council has three well defined sub-committees namely Board of Studies and Skilling, Board of Examination and Recognition Committee. These committees monitor and review the progress of all qualifications under its purview on a regular basis. This qualification will be reviewed and revised at an interval of three years on the basis of the outcome of the trainees, placement and self-employment data and feedback from concerned industries/employers.	

Please attach most relevant and recent documents giving further information about any of the topics above.
Give the titles and other relevant details of the document(s) here. Include page references showing where to find the relevant information.

SECTION 4
EVIDENCE OF PROGRESSION

30	**What steps have been taken in the design of this or other qualifications to ensure that there is a clear path to other qualifications in this sector?** ***Show the career map here to reflect the clear progression*** Pass outs of this course can get both self and waged employment. Various nodal agencies set up in States, Khadi & Village Industries Commission, Voluntary Agencies, State Biogas Directorates employ technicians. There is also quite good scope for self-employment in this sector. The trainee on completion of the course will qualify to work as Bio Gas Plant Construction and Maintenance Technician. On gaining experience the trainee will become eligible to work as a Sr. Bio Gas Plant Technician and further positions as indicated below. 

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Give the titles and other relevant details of the document(s) here. Include page references showing where to find the relevant information.