

## ANNEXES

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ANNEX 1-1 ACHIEVEMENT OF THE PROJECT

Project Title: Project for Strengthening of Quality of Vocational Education and Training Delivery in Bhutan

Narrative Summary	Objectively Verifiable Indicators	Results																
<p>&lt;Overall Goal &gt; Electrical courses of VTIs produce human resources who have necessary knowledge and skills based on industrial needs</p>	<p>1. 80% of employers find graduates of electrical course of VTIs can perform their jobs they are trained in</p>	<p>1. It is premature to assess overall goal since pilot courses have only been implemented for about a year so there is no graduates from the pilot training working long enough to be assessed by their employers.</p>																
<p>&lt;Project Purpose&gt; Management System of VET at MoLHR and KVTI is strengthened and KVTI becomes an institution which can offer quality training on electrical.</p>	<p>1. Developed/revised manuals/workflow such as curriculum and materials development system is approved by MoLHR. 2. Satisfaction of industry to electrical course of KVTI is increased. 3. XX% of ex-students are satisfied the programs offered by electrical course of KVTI 4. Number of MoLHR staff are trained.</p>	<p>1. Guideline for training management including curriculum and material review, but not manual of curriculum and material development, which is under development, is expected to be approved. 2. It is premature to assess satisfaction of industry since pilot courses have only been implemented for about a year so there is no graduates from the pilot training working long enough to be assessed by their employers. 3. Since pilot course at NC2 level has been just completed, questionnaire survey to assess satisfactory level of trainees is yet to be conducted. Methodology of the survey of each NC level course is now under preparation by the Project. 4. The following trainings have been conducted under the Project.</p> <table border="1"> <thead> <tr> <th>Theme</th> <th>Duration</th> <th>Participants</th> <th>Location</th> </tr> </thead> <tbody> <tr> <td>Vocational Training Administration</td> <td>Oct. 2009</td> <td>2 (MoLHR)</td> <td>Japan</td> </tr> <tr> <td>Vocational Training Management</td> <td>Oct. 2009</td> <td>2 (MoLHR) 1 (KIEE)</td> <td>Japan</td> </tr> <tr> <td>Observation CBT System in Philippines</td> <td>5 – 11 June 2011</td> <td>7 (MoLHR) 3 (TTI)</td> <td>Philippines</td> </tr> </tbody> </table>	Theme	Duration	Participants	Location	Vocational Training Administration	Oct. 2009	2 (MoLHR)	Japan	Vocational Training Management	Oct. 2009	2 (MoLHR) 1 (KIEE)	Japan	Observation CBT System in Philippines	5 – 11 June 2011	7 (MoLHR) 3 (TTI)	Philippines
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<p>&lt;Output 1&gt; Planning and implementation system of DOS and DHR and KVTI is established and strengthened.</p>	<p>1.1 Manuals/Workflow of curriculum and material development is developed / revised. 1.2 Equipment is procured and subjects of practical work in the curriculum increased. 1.3 Equipment management plan is made and equipment</p>	<p>1.1 MoLHR officially adopted CBT after the Project design. Since manuals for curriculum and material development should be in line with all the other training programmes as a whole in view of the introduction of CBT, it is now not appropriate for the Project to develop its own manuals only for electrical engineering courses. Training material for pilot training courses are prepared but not yet a manual. Discussion has been held with C/P regarding development of guideline for training management including curriculum and material review rather than development of manual for Curriculum and material development. Therefore, this indicator may be reviewed after consideration by parties concerned.</p>																

	<p>is managed properly based on the plan.</p>	<p>1.2 Necessary equipment is procured for practical works at KIEE. Proportion of practical works written in curriculum was 80% (previous curriculum for the Programme "General Electrician") and 71% (NC2 level as in pilot training at KIEE). However, it is obvious that they could not implement practical works indicated in previous curriculum before due to lack of training equipment. On the other hand, it is confirmed from the hearing session with instructors and trainees that actual time spent on practical works has been increased after the provision of the equipment.</p> <p>1.3 Equipment management manual is planned to be developed at KIEE. Preparation of database of equipment has been underway at KIEE.</p>												
<p>&lt;Output 2&gt; Pilot training course on electrical is implemented.</p>	<p>2.1 Training conducted based on the training plan 2.2 Result of the examinations of trainees</p>	<p>2.1 Training plan of pilot training course was prepared and the Pilot training at NC2 level was conducted from August 2010 to June 2011. New batch at NC2 level also just started in August 2011. 2.2 The result of the extermination is not yet available since assessment of pilot training course at NC2 level is soon to be conducted.</p>												
<p>&lt;Output 3&gt; Monitoring and evaluation system for DHR and KVTI is developed.</p>	<p>3.1 Guideline for monitoring and evaluation developed. 3.2 Monitoring and evaluation conducted based on the guideline 3.3 Actions for identified problems</p>	<p>3.1 Guideline for monitoring and evaluation is now under preparation. 3.2 Monitoring and evaluation of training delivery at KIEE is conducted using monitoring sheet in which training hours as well as problems encountered through the delivery of the training were recorded. 3.3 Systematic feedback to training implementation from monitoring is not yet done. It is expected to be incorporated into the guideline for monitoring and evaluation that is under preparation. Training Promotion Committee has been formed in order to address the issue as well.</p>												
<p>&lt;Output 4&gt; Instructors Development System of VTI is strengthened.</p>	<p>4.1 Master trainers have ability to develop and deliver training program for instructors 4.2 Technical knowledge and skill of master trainers is improved.  4.3 Technical knowledge and skill of other instructors is improved.</p>	<p>4.1 Three master trainers who have been trained by the Project have developed delivered trainings of instructors. But the master trainers still require further training on various topics. 4.2 Technical knowledge and skills of the three master trainers are improved through master trainer training as well as instructions given by JICA experts. The following table shows comparison of instructors' capacity before and after inputs from the Project (average score of 3 to 5 modules for specializations of each) assessed by JICA expert.</p> <table border="1"> <thead> <tr> <th></th> <th>Instructor A</th> <th>Instructor B</th> <th>Instructor C</th> </tr> </thead> <tbody> <tr> <td>Before</td> <td>64.0</td> <td>67.5</td> <td>70.7</td> </tr> <tr> <td>After</td> <td>81.1</td> <td>81.7</td> <td>83.5</td> </tr> </tbody> </table> <p>All of three are still expected for further improvement to gain full capacity of for master trainers. 4.3 Technical knowledge and skills of instructors are improved through TOT held by master trainers. The following table shows comparison of instructors' capacity before and after TOT (average score of 6 to 9 questions by 2 to 5 participants with '5' as full</p>		Instructor A	Instructor B	Instructor C	Before	64.0	67.5	70.7	After	81.1	81.7	83.5
	Instructor A	Instructor B	Instructor C											
Before	64.0	67.5	70.7											
After	81.1	81.7	83.5											

	<p>4.4 Number of trainings held by master trainers</p> <p>4.5 Satisfaction of participants of the training by the instructors of RVTI and SVTI</p>	<p>mark) assessed by themselves.</p> <table border="1"> <thead> <tr> <th></th> <th>Industrial Wiring</th> <th>Motor Maintenance</th> <th>PLC</th> <th>Industrial Wiring</th> </tr> </thead> <tbody> <tr> <td>Before</td> <td>4.1</td> <td>1.0</td> <td>1.0</td> <td>3.1</td> </tr> <tr> <td>After</td> <td>4.7</td> <td>4.5</td> <td>5.0</td> <td>4.6</td> </tr> </tbody> </table> <p>4.4 Four sessions of trainings have been held so far.</p> <p>4.5 In one of TOT on basic control system conducted in July 2011, satisfactory level of three participants in 'training design and contents' and 'training method and material' are rated as '4.6' and '4.2' respectively on an average in average with '5' as full mark.</p>		Industrial Wiring	Motor Maintenance	PLC	Industrial Wiring	Before	4.1	1.0	1.0	3.1	After	4.7	4.5	5.0	4.6
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ANNEX 1-2. List of Activities

Planned Activities	Results
<p>1-1. Formulate a working group for promoting collaboration between VTI and industry.</p> <p>1-2. Conduct training needs assessment</p> <p>1-3. Review curriculum/material development system and revise/develop curriculum and materials for pilot course.</p> <p>1-4. Revise/Develop manual on curriculum/material development</p> <p>1-5. Install necessary equipment for electrical course</p> <p>1-6. Advocacy and promotion of electrical course in KVTI</p> <p>1-7. Hold workshops/seminars to promote the activities/outputs of the project</p>	<p>1-1 No working group or such body has been formed under the Project framework. There are already IMB (Institutional Management Board) in each TTI and its function may be efficiently utilized in the purpose of promotion of collaboration with industry. The Project has also proposed to establish sector specific group to address issues related to their interests.</p> <p>1-2 TNA was conducted in October 2009 sampling 26 employers, 66 graduates, 17 electricians and four industry organizations. There have been two industry visits organized for the purpose of TNA, first in February 2011 sampling six companies in the field of PLC and second in June 2011 sampling 5 companies in the field of transformer maintenance.</p> <p>1-3 MoLHR officially adopted CBT after the Project design. Since manuals for curriculum and material development should be in line with all the other training programmes in view of the introduction of CBT, it is now not appropriate for the Project to develop its own manuals only for electrical engineering courses. Instead, the Project has contributed to the curriculum development under CBC process in technical aspects such as development of module of Electrical Fundamental. Therefore, this activity may be reviewed after due consideration by parties concerned.</p> <p>1-4 Discussion has been held with C/P regarding development of guideline for training management including curriculum and material review as well as FAQ on CBT rather than development of manual for Curriculum and material development.</p> <p>1-5 Necessary equipment for pilot courses have been procured and installed.</p> <p>1-6 Website of KIEE has been developed and maintained.</p> <p>1-7 The following workshops/meetings were organized; 1) Two day workshop held in October 2009 to share TNA results; 2) VET conference held in January 2011 (approx. 40 participants) where the Project made some suggestions to improve quality of training; 3) TTI Management workshop held by TPSD where the Project progress was shared (approx. 20 participants); 4) Preliminary meeting of VET Conference held in March 2011 at CICE and KIEE where the development of monitoring and evaluation under the Project was explained.</p>
<p>2-1. Conduct pilot course in electrical at KVTI</p>	<p>2-1 Pilot course at NC2 level has commenced in August 2010 and completed in June 2011. 66 trainees completed training course at NC2 level. The pilot course at NC3 level following NC2 level will commence soon.</p>

<p>3-1. Develop monitoring and evaluation system  3-2. Conduct monitoring and evaluation of the training  3-3. Develop manual on monitoring and evaluation</p>	<p>3-1 Monitoring system is not yet established but developed trial basis in pilot course.  3-2 Monitoring of the pilot course at NC2 level is conducted as trial.  3-3 Guideline on monitoring and evaluation of training implementation has been under development. In addition, monitoring of employment status of graduates has been conducted twice so far targeting 118 graduates from electrical programme at KIEE in 2010 using SMS of mobile phone; in December 2010, 95 graduates were contacted and 79 replied; in May 2011, 96 were contacted and 92 responded.</p>																								
<p>4-1. Train master trainers in electrical course   4-2. Master trainers implement training to instructors of other VTI in electrical course   4-3. Develop manual on training of instructors</p>	<p>4-1 The following tables shows master trainer training conducted so far.</p> <table border="1"> <thead> <tr> <th>Subject</th> <th>Duration</th> <th>Participants</th> </tr> </thead> <tbody> <tr> <td>PLC</td> <td>16 days (11-19 Feb., 25 Feb.–5 Mar. 2011)</td> <td>1 (RIEE)</td> </tr> <tr> <td>Industry Wiring</td> <td>9 days (24 Feb.–5 Mar. 2011)</td> <td>1 (CICE)</td> </tr> </tbody> </table> <p>4-2 The above-mentioned master trainers conducted the following training.</p> <table border="1"> <thead> <tr> <th>Module</th> <th>Duration</th> <th>Participants</th> </tr> </thead> <tbody> <tr> <td>PLC</td> <td>17 days (11-19 Feb., 7–16 Mar. 2011)</td> <td>3 instructors</td> </tr> <tr> <td>Industry Wiring</td> <td>18 days (24 Feb.–5 Mar., 7–16 Mar. 2011)</td> <td>3 instructors</td> </tr> <tr> <td></td> <td>10 days (21 –30 Jul. 2011)</td> <td>6 instructors</td> </tr> <tr> <td>Motor Maintenance</td> <td>6 days (25 –30 Jul. 2011)</td> <td>3 instructors</td> </tr> </tbody> </table> <p>4-3 Guideline on instructors development has been drafted by TPSD with assistance from JICA expert based on experience in the development of electrical instructors. It is now under further verification by other courses.</p>	Subject	Duration	Participants	PLC	16 days (11-19 Feb., 25 Feb.–5 Mar. 2011)	1 (RIEE)	Industry Wiring	9 days (24 Feb.–5 Mar. 2011)	1 (CICE)	Module	Duration	Participants	PLC	17 days (11-19 Feb., 7–16 Mar. 2011)	3 instructors	Industry Wiring	18 days (24 Feb.–5 Mar., 7–16 Mar. 2011)	3 instructors		10 days (21 –30 Jul. 2011)	6 instructors	Motor Maintenance	6 days (25 –30 Jul. 2011)	3 instructors
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ANNEX 1-3 Evaluation by Five Criteria

Criteria	Evaluation Items	Confirmation Items	Source of Information	Results
Relevance	Accordance of social and community development needs in Bhutan	- Degree of priority of measures to address unemployed youth	-Interview to MoLHR -Mid-term review of Tenth Five Year Plan	Issue of employment of youth is still high priority considering 46.4% of unemployed are youth according to Eleventh Round Table Meeting, September 2011.
	Consistency with development policy/strategy of Bhutan	- Possible major revision of Tenth Five Year Plan	-Interview to MoLHR -Mid-term review of Tenth Five Year Plan	The Project is fully in line with RGoB development strategy, e.g. recently conducted study by a international consultant also stresses need of urgent development of VET with highest priority.
	Consistency with Japan's ODA policy and strategy to Bhutan	-Japan's ODA policy to Bhutan	-Review of the related documents in JICA -Interview to JICA Bhutan Office	One of the two JICA's assistance strategy for Bhutan is Social Infrastructure Improvement to Attain Sustainable Development. Under the strategy, Programme for Improvement of Social Services with focus on Investments in Human Resources Developments is implemented, to which the Project contributes.
	Relevance of Strategy/Approach of the Project	Relevance of project strategy to improve youth unemployment issue	-Interview to MoLHR -Mid-term review of Tenth Five Year Plan	Strengthening VET should be one of areas where career development for youth is urgently required considering 31,000 youth will enter labour market from 2011 to 2013 without marketable skills according to Eleventh Round Table Meeting, September 2011. However, absorption of graduates from VET needs to be addressed urgently as well since industry specially in private sector is still under developed.E6
	Relevance of the selection of the target group	Relevance of selection of pilot training programme of electrical engineering	-Interview to DHR, JICA Experts, BPC, DGPC	Rural electrification project has been implemented as planned so that on-grid electrification is scheduled to be completed in 2013. Considering that, development of technicians in electrical works is priority for the country.
	Relevance of influence to those other than target group	- Influence to other training programmes than electrical engineering	-Interview to DHR, JICA Experts	Some of management tools such as guideline for monitoring and evaluation are applicable in other training programme according to DHR staff.
	Relevance in terms of superiority of Japan's technology and	- Application of Japan's expertise and experience in TVET or ODA	-Interview to DHR, JICA Experts	Japan has developed through engineering industry so experience of Japan is highly relevant in VET development for developing countries.

Criteria	Evaluation Items	Confirmation Items	Source of Information	Results
	Changes of environment surrounding project implementation	Consistency with DANIDA's assistances through Social Sector Programme Support	-Interview to DHR, DANIDA and JICA Experts	DANIDA finances directly MoLHR budget that include costs for technical assistance by consultants especially in overall CBT framework development such as OSS, CBC, CBLM, QMS. etc. It is confirmed with that DANIDA assistance and JICA assistance should complement each other considering that JICA's approach is to assist actual training implementation delivered by training institutes through pilot activity in selected pilot institute and selected training programme, i.e. electrical engineering programme at KIEE.
		Consistency with ADB assistances such as Rural Skills Development	-Interview to DHR and JICA Experts	ADB assistance in skills development focuses on village level technical persons who could help simple and easy works for villagers and there is no duplications of technicians demand with TTIs that focuses on technicians in industry level.
		Consistency with any other donors' assistances	-Interview to DHR and JICA Experts	There has been no other major activities assisted by other donors identified.
		Consistency with CBC development policy	-Interview to DHR and JICA Experts	Project has made some inputs to CBC of electrical engineering and use it in pilot courses so that there is no consistency.
		Consistency with CBT introduction policy	-Interview to DHR and JICA Experts	The Project follows CBT policy and also provide feedback from pilot activity in terms of issues in actual implementation from the experience in pilot training delivery so that there is no consistency.
Effectiveness	Achievement of the project outputs	Comparison of Current status and the outputs' indicators		See ANNEX 1-1
	Achievement of the project purpose	Comparison of Current status and indicators of the project purpose		Ditto
	Hindering factors to achieve project purpose effectively			Number of instructors, specially senior instructors with experiences, are insufficient to assure quality of training. Urgent measure to address the issue must be taken.
	Effectiveness of outputs to achieve project purpose	Is effectiveness assured in the proposed revision of PDM		There is no inconsistency identified in the proposed PDM ver. 1.
	Status of important assumption to achieve	Are project purpose affected by personnel staffing	-Interview to DHR, KIEE and JICA Experts	It seems there is a room for personnel staffing taking quality of training delivery as priority.



Criteria	Evaluation Items	Confirmation Items	Source of Information	Results
	project purpose through outputs	Are project purpose affected by activities by other donors	-Interview to DHR, DANIDA and JICA Experts	DANIDA assistance is major one in VET area and so far complementing relation each other has been observed.
Efficiency	Achievement of outputs	Inputs of the project		See ANNEX 1-1
	Hindering factors to achieve outputs		-Interview to DHR, KIEE, BCCI and JICA Experts	Considering current status of industry, it may be difficult to establish effective collaborative relations.
	Efficiency of activities to achieve outputs	Contribution of each activity to emergence of outputs		See ANNEX 1-1
	Efficiency of inputs to achieve outputs	Contribution of each input to emergence of outputs	-Interview to DHR and JICA Experts	JICA Expert in charge of chief advisor is efficiently coordinating project activities specially considering VET is now undergoing rapid changes due to introduction of CBT. JICA Experts in charge of electrical engineering have been efficiently contributing to upgrade instructors.
		Sufficiency of trainers involved	-Interview to DHR, KIEE and JICA Experts	The number of instructors in electrical engineering is obviously short and this situation should be rectified as soon as possible since it directly affects quality of training.
	Status of important assumption to achieve outputs through activities	Number of trainers in terms of efficient implementation	-Interview to DHR, KIEE and JICA Experts	Number of instructors is obviously not sufficient so that efficiency of training activities are sacrificed. For instance, it is very difficult to organize TOT since instructors are fully tied up with classes.
		Equipment procurement process in terms of efficient implementation	-Interview to DHR, KIEE and JICA Experts	Equipment is procured so that pilot course in NC2 could be implemented as planned.
	timeliness of the inputs and activities in order to implement the Project properly	Timeliness of inputs and activities by Project in terms of quality and quantity	-Interview to DHR, KIEE and JICA Experts	There is no major delay or inefficient inputs in terms of quality and quantity
		Timeliness of inputs and activities by MoLHR in terms of quality, quantity	-Interview to DHR, KIEE and JICA Experts	Number of instructors is not sufficient so that timely participation to activities such as TOT is very difficult to coordinate.
	Impact on overall goal achievement by activities and input so far	Impact on human resources development in electricians	-Interview to DHR and JICA Experts	Impact on electrician development is yet to be identified since pilot training has only implemented for about one year.
Degree of private sector development that should absorb graduates		-Interview to DHR, BPC, DGPC and JICA Experts	There are demand for electricians from hydro power projects, construction works and rural electrifications although accurate number of demand is difficult to estimate from the information available.	

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Criteria	Evaluation Items	Confirmation Items	Source of Information	Results
Impact	Impact on development issues by overall goal	Status of Tenth Five Year Plan	-Interview to DHR and JICA Experts	Impact on youth employment is yet to be identified since pilot training has only implemented for about one year.
	Hindering factors to achieve overall goals	Status of rural electrification and expansion of actual usage of electricity	-Interview to DHR and JICA Experts	Rural electrification seems to be in time so that by 2013 most of villages will be electrified.
			-Interview to DHR and JICA Experts	Assignment of training programmes to TTI is now uncertain since major reshuffling is underway to maximize training capacity. It may affect overall TTI operation negatively.
	Status of important assumption to achieve overall goal after achieving project purpose	Changes of skills demand in local industry	-Interview to DHR and JICA Experts	There is no reason to expect decrease of skills demand in electrical works although accurate demand is not available due to lack of valid information.
	Other impacts other than overall goal	Possibility of impacts on other training programmes than electrical engineering	-Interview to DHR and JICA Experts	Some of general activities such as development of guideline for evaluation and monitoring or instructor development strategy are applicable to expand to other training courses.
	Differences of degrees of impact due to social factors such as gender or ethnics	Fairness of trainee selection process	-Interview to DHR, KIEE and JICA Experts	Selection of trainees is strictly based on their marks at the end of their secondary education so that it should be fair. However, there seems to be not enough explanations on training courses at interview by the MoLHR before the enrolment so that trainees find details of training only after enrolled in the programme. It may lead to some kind of disappointment.
	Other negative impacts	Possibility of negative impact to currently practising electricians		There is no sign that the Project would lead to negative impact in any way.
sustainability in terms of relevant policies	Consistency of VET policy in next five year plan	-Interview to DHR and JICA Experts	Recommendation made by international consultant firm stresses importance of vocational training development. Considering this, it is confirmed that the Project is consistent with the highest development policy.	
sustainability in terms of legal system	Qualifications of instructor, graduates and technicians in industry	-Interview to DHR and JICA Experts	There is no system of qualifications for instructors or graduates in place except for NC2 and NC3 issued by MoLHR that is not official requirement for any license in the market.	

Criteria	Evaluation Items	Confirmation Items	Source of Information	Results
Sustainability	sustainability in terms of extension of achievements	Possibility of sustainable expansion to other TTI	-Interview to DHR and JICA Experts	It is observed that some of outputs of the Project is well applicable to other TTI. Guideline of monitoring and evaluation is one of them and actually introduced to other TTI than KIEE.
	sustainability in terms of institutional capacity	Personnel staffing in MoLHR and KIEE	-Interview to DHR and JICA Experts	There is an urgent need to recruit instructors to meet the standard ratio between instructors and trainees indicated by DOS, i.e. 1:12. Instructors and TTI managers are transferred to MoLHR in some cases that could affect training delivery more difficult due to lack of capacity of remaining staff of their previous TTI.
	sustainability in terms of ownership	Motivation and ownership of the Project by C/P	-Interview to DHR and JICA Experts	Motivation of instructors is reasonably high in TOT since they receive direct benefit of knowledge and skills. However, it is also observed that instructors are heavily loaded with classes due to shortage of instructors, CBT related activity such as CBLM development and some activities under the Project so that there is a risk that instructors may become fed up with the other activities under the Project.
	sustainability in terms of budgeting	Budgeting under MoLHR	-Interview to DANIDA and JICA Experts	After budget support from DANIDA ends in 2013, sustainability of financing MoLHR may face difficulties.
	sustainability in terms of technology transferred	Sustainable relation with Thailand resources	-Interview to JICA Experts	Coordination capacity may be required to sustain relation with those resources utilized in the Project.
	sustainability in terms of equipment management	Actual status of equipment management	-Interview to KIEE and JICA Experts	KIEE should gain equipment management capacity through equipment management related activity under the Project while other TTIs may have difficulties to apply the achievement of the Project with current poor status of equipment.
	sustainability in terms of extension of achievements within Project	Possible extension to other TTI	-Interview to DHR, KIEE and JICA Experts	Extension of achievement of the Project to other TTIs does depend on recruitment of instructors and procurement of equipment.
	sustainability in terms of social issues	Possible issues regarding social groups (gender, ethnicity, etc.)	-Interview to DHR, KIEE and JICA Experts	No issues related to different social groups have been identified.
	sustainability in terms of environmental issues	Consideration of environmental issues in technology development especially in EE	-Interview to DHR, KIEE and JICA Experts	No issues related to environment have been identified.

ANEX 2: Project Design Matrix (PDM) Version1 on 31st August, 2011

- Project Name: Strengthening of Quality of Vocational Education and Training Delivery
- Period: 4years
- Beneficiaries:

(direct) Department of Human Resources (DHR), Khuruthang Institute of Electrical Engineering (KIEE) and other TTIs (Electrical)

(indirect) Department of Occupational Standard (DOS), other TTIs (Except Electrical), students, industries

Narrative Summary	Objectively Verifiable Indicators	Means of Verifications	Important Assumptions
(Overall Goal) Electrical courses of TTIs produce human resources who have necessary knowledge and skills based on industrial needs.	1. 80% of employers find graduates of electrical course of TTIs can perform their jobs they are trained in. 2. More than 70% of jobseekers among graduates of electrical course of TTIs are employed half year after their graduation.	1. Questionnaire and interview to industry 2. Follow-up survey to graduates by SMS	No major changes occur in the national policy and priority area of the Bhutan government on economic and social development.
(Project Purpose) Electrical course of KIEE produces human resources who have necessary knowledge and skills based on industrial needs, and know-how which can be applied in the other TTIs is accumulated.	1. Average evaluation rate of employers to graduates of electrical course of KIEE exceeds average rate of expectation. 2. More than 70% of jobseekers among graduates of electrical course of KIEE are employed half year after their graduation. 3. Satisfaction of participants of workshops to promote the activities / outputs of the project exceeds 4 in five-grade evaluation.	1. Questionnaire and interview to industry 2. Follow-up survey to graduates by SMS 3. Questionnaire and interview to participants of workshop	Trained staffs, especially TOT trainers remain working for DHR and KIEE.  No major changes occur in the national policy and priority area of the Bhutan government on human resource development.
(Outputs) 1. Planning, implementation, monitoring and evaluation system of DHR to deliver effective training is strengthened.	1-1. Revision of training curriculum/material is considered by reference to the actual situation of TTIs. 1-2. Guideline and workflow of training management which can be commonly used in TTIs are developed. 1-3. Monitoring and Evaluation system for training delivery is developed. 1-4. M&E implemented and action plans for identified problems are developed. 1-5. Exchange of views with industries is conducted regularly. 1-6. Mid-term plan of training of instructors is developed.	1-1. Progress of consideration of recommendation from the Project 1-2. Number of developed, guideline and workflow. 1-3. Presence or absence of developed M&E system 1-4. Number of developed action plans. 1-5. Record of exchange of views with industries. 1-6. Presence or absence of mid-term plan.	Instructors of TTI are employed as planned.
2. Capabilities of electrical course of KIEE to provide training program is strengthened.	2-1. KIEE meets its student quota continuously. 2-2. Over 80% of graduates of electrical course of KIEE are satisfied with 80% of training contents of KIEE. 2-3. Pass rate of students of electrical course of KIEE exceeds 80% in NC-2, and exceeds 70% in NC-3. 2-4. Lesson plan to provide effective training is developed.	2-1. Number of enrolled students of KIEE 2-2. Questionnaire and interview to graduates 2-3. Pass rate of certificate in specified years of training. 2-4. Number of developed lesson plans.	
3. Capabilities of electrical instructors of TTIs are enhanced	3-1. TOT trainers have ability to develop and deliver training program for instructors. 3-2. Technical knowledge and skill of instructors is improved.	3-1. Training program prepared and implemented by TOT trainers. 3-2-1. Result of self evaluation by questionnaire. 3-2-2. Result of objective test to instructors.	

ANNEX 2: Project Design Matrix (PDM) Version1 on 31st August, 2011

<p>Activities</p> <p>1-1. Formulate a working group for promoting collaboration between TTI and industry.</p> <p>1-2. Conduct training needs assessment.</p> <p>1-3. Provide recommendations on curriculum/material development system based on the actual situation of TTIs.</p> <p>1-4. Review existing training management practices, compile and develop guideline and workflow of training management.</p> <p>1-5. Develop monitoring and evaluation guideline.</p> <p>1-6. Conduct monitoring and evaluation based on the guideline.</p> <p>1-7. Develop action plans for identified problems.</p> <p>1-8. Hold workshop to promote the activities/outputs of the project.</p> <p>1-9. Develop mid-term plan of training of instructors.</p>	<p>(Inputs)</p> <p>Input from GoJ:</p> <ol style="list-style-type: none"> <li>JICA long term experts including; <ul style="list-style-type: none"> <li>Chief Advisor / Vocational Training Management</li> <li>Electrical</li> </ul> </li> <li>JICA short term experts in necessary fields</li> <li>Necessary equipment and machinery</li> <li>Counterpart training in Japan and / or third country for: <ul style="list-style-type: none"> <li>Staff of DHR, DOS, and Counterparts/ teaching staff of TTI (electrical)</li> </ul> </li> </ol> <p>Input from RGoB:</p> <p>Counterparts including;</p> <ul style="list-style-type: none"> <li>Secretary, MoLHR</li> <li>Director, DHR</li> <li>Director, DOS</li> </ul>	
<p>2-1. Develop lesson plans to provide effective training.</p> <p>2-2. Advocacy and promotion of electrical course of KIEE.</p> <p>2-3. Conduct pilot course in electrical at KIEE.</p> <p>2-4. Conduct monitoring and evaluation and feedback the results to the related organizations.</p> <p>2-5. Develop Resource (materials &amp; equipment) management system</p>	<ul style="list-style-type: none"> <li>Chief Planning Officer, PPD</li> <li>Chief Programme Officer, Vocational Education &amp; Training Division, DHR</li> <li>Chief Programme Officer, Technical &amp; Professional Services Division, DHR</li> <li>Principal of KIEE</li> <li>TOT trainer in electrical engineering</li> <li>Other related personnel of MoLHR and KIEE</li> </ul> <p>Administrative staff including;</p> <ul style="list-style-type: none"> <li>Secretaries, Drivers and necessary support personnel</li> </ul> <p>Necessary infrastructure for the project including;</p> <ul style="list-style-type: none"> <li>Office facility equipped with office furniture, electricity supply, and direct telephone line, for the Project team</li> </ul> <p>Budget for the project such as;</p> <ul style="list-style-type: none"> <li>Cost for maintenance, consumables and spare parts of equipment provided for project activities</li> <li>Expenses for electricity, water, gas fuel and other contingencies</li> <li>Salaries and other allowances for project related MoLHR and TTI employees (including travel expenses, daily allowance, accommodation costs, communication when the necessity arises)</li> <li>Expenses for hosting instructor training including honorarium, accommodation fee, and travel expenses for the participants.</li> <li>Expenses for driver and fuel for transportation of the JICA Project Team</li> <li>Expenses for regular meetings and the working group activities based on the regulation of MoLHR</li> <li>Expenses for printing and binding of curriculum, textbooks and other teaching and learning materials</li> </ul>	<p>(Pre-condition)</p> <p>Counterparts of the Project are assigned at MoLHR and KIEE as planned.</p>
<p>3-1. Train TOT trainers in electrical course.</p> <p>3-2. Conduct cascade training by TOT trainers.</p> <p>3-3. Develop guideline on training of instructors.</p> <p>3-4. Evaluate the training conducted by the TOT trainers.</p>		

Remarks: The super goal of this project is to strengthen quality of Vocational Education and Training Delivery through experience in electrical courses.

### ANNEX 3: Inputs to the Project

#### 3-1. Placement Record of Japanese Experts

##### • Long Term Expert

Name	Title	Duration
Mr.Yoshimi NARETA	Electrical	24 May 2011 ~ 23 May 2013

##### • Short Term Expert

Name	Title	Duration
Mr.Takeshi MIYAGI	Electrical	9 Sep 2009 ~ 14 Feb 2010
Mr.Takeshi MIYAGI	Electrical	1 Jul 2010 ~ 30 Nov 2010
Mr.Yoshimi NARETA	Electrical	17 Jul 2010 ~ 11 Aug 2010

##### • Contract Based Expert

Name	Title	Contract Period
Mr.Fumio MIZUNO	Chief Advisor	27 May 2009 ~ 31 Mar 2010
Mr.Fumio MIZUNO	Chief Advisor	17 May 2010 ~ 31 Mar 2012

### 3-2. List of Participants of Counterpart Training in Japan and third countries

	Training Title	Duration	Country	Name	Position / Organization
1	Step up the Technical Basis for South-South Cooperation and Spreading Know-How Through The Domestic	6 Sep 2009 ~ 18 Sep 2009	Japan	Mr.Yeshey Dorji	Instructor, KVTI
2	Vocational Training Administration	26 Oct 2009 ~ 31 Oct 2009	Japan	Dasho (Dr.) Sonam Tenzin	Secretary, MoLHR
				Mr.Sonam Rinchen	Director, DHR
3	Vocational Training Management	11 Nov 2009 ~ 21 Nov 2009	Japan	Mr.Sangay Dorji	CPO, DHR
				Mr.Karma Dorji	CPO, DHR
				Mr.Yeshey Wangdi	Principal, KVTI
4	TOT in Industrial Wiring	27 Nov 2010 ~ 10 Dec 2010	Thailand	Mr.Damber Thapha	Instructor, KIEE
				Mr.Sangay Jamphel	Instructor, RIEE
				Mr.Tshering Wangdi	Instructor, CICE
				Mr.Samten Dorji	Instructor, KIEE
				Mr.Karma Chophel	Instructor, SICE
5	TOT in PLC	19 July 2010 ~ 30 July 2010	Thailand	Ms,Sonam Tshomo	Instructor, KIEE
				Ms.Sangay Choden	Instructor, KIEE
				Mr.Rinchen Dorji	Instructor, RIEE
				Mr.Bharat Gurung	Instructor, RIEE
				Mr.Shatu	Instructor, RIEE
				Mr,Chophel	Instructor, RIEE
				Ms.Tshering Dolkar	Instructor, RIEE
				Mr. Jamtsho	Instructor, RIEE
				Mr. Choki Thinley	Instructor, SICE
Mr. Tashi Chejay	Instructor, CICE				
6	Institutional Visit to Philippines	5 Jun 2011 ~ 11 Jun 2011	Philippines	Mr.Jamyang Galay (Self finance)	Director, DOE
				Mr.Karma Loday (Self finance)	Chief OSS development, Department of Occupational Standard (DOS)

				Mr.Karma	Chief, Training and Professional Service Division, Department of Human Resources (DHR)
				Ms.Norbu Dema	Sr.Program Officer, Training Professional Service Division, DHR
				Mr.Sangay Dorji	Chief, Vocational Education and Training Division (VETD), DHR
				Mr.Prasad Giri	Deputy Chief Program Officer
				Mr.Mere	Instructor, Construction Service Center, DHR
				Mr.Yeshey Wangdi	Principal, RIEE
				Mr.Kinley Penjor	Principal of KIEE
				Mr.Ugyen Dorji	Instructor, Samthang Institute of Automobile Engineering
7	TOT in Power Transformer Testing and Maintenance	15 Aug 2011 ~ 28 Aug 2011	Thailand	Mr.Damber Thapa	Instructor, KIEE
				Mr.Sonam Tshewang	Instructor, KIEE
				Mr.Sangay Jamphel	Instructor, RIEE
				Mr.Tashi Chejay	Instructor, CICE



### 3-3: List of Equipment

Item	Specification	KIEE	other TTIs	Total	Unit cost (Nu)	Total cost (Nu)
Vehicle				2		3,400,000
D spanner set	(6 x 7 to 30 x 32 mm set) Taparia/JK	5	0	5	6,500	32,500
Ring spanner set	6 x 7 to 30 x 32mmset Taparia/JK	5	0	5	5,500	27,500
Socket spanner set	Model S-14m 6 x 7 to 30 x 32 mm set Taparia/JK	5	0	5	6,500	32,500
Soldering iron	50W/230V	15	0	15	1,250	18,750
De-soldering pump	Tip SRT-12)	15	0	15	2,500	37,500
Philips screw driver Heavy duty.	Taparia/JK	15	0	15	1,250	18,750
Centre punch	Product number 1985	15	0	15	200	3,000
Crow bar	Standard	5	0	5	725	3,625
Spade	Standard	5	0	5	790	3,950
Shovel	Standard	5	0	5	990	4,950
Pickaxe	Standard	5	0	5	1,150	5,750
Aluminium ladder	8 ft ext to 14ft	3	3	6	17,900	107,400
Aluminium ladder	18 ft ext to 32 ft	3	3	6	32,500	195,000
Safety helmet	standard	20	0	20	950	19,000
Safety belt	Pure lather	10	0	10	2,650	26,500
Safety hand gloves	For low voltage	20	0	20	950	19,000
Rubber hand gloves	For low voltage	20	0	20	625	12,500
Sledge hammers (10 kg.)	standard	2	0	2	1,650	3,300
Allen key (set)	Hex 1.5mm to 10mm set	2	0	2	550	1,100
Pulley single way	standard	4	6	10	4,500	45,000

Pulley double way	standard	4	6	10	8,200	82,000
0.5kv Megger hand driven	HTC/equivalent	5	6	11	7,500	82,500
1 kv Megger (digital)	HTC/equivalent	5	6	11	11,500	126,500
Analog multimeter	Standard	15	30	45	2,850	128,250
Digital multimeter	Model 801-L/ equivalent	15	30	45	4,500	202,500
Phase sequence meter	HTC	3	3	6	3,850	23,100
Clamp meter (tongue tester)	standard	5	3	8	4,250	34,000
Analog ammeter	AE 0-10A	15	30	45	3,500	157,500
Analog volt meter	AE 0-500V	15	30	45	2,890	130,050
Analog power factor meter	5A/440VAE/equivalent	15	0	15	7,500	112,500
Digital tachometer	HTC/equivalent 5A/440V 400-4000rpm	3	3	6	5,850	35,100
CRO (two channel) with CRO probes)	5 in test LAB model 3744	5	6	11	69,990	769,890
PCB board (bread board)	SD 24N/ equivalent	20	0	20	3,500	70,000
Electro-pneumatic trainer	Basic level with PLC training Kit	1	0	1	750,000	750,000
Blow lamp	1500W/240V	4	0	4	7,500	30,000
Crimping tool	4sqmm - 400sqmm	2	0	2	18,500	37,000
Auto transformer	3 phase 6.2KVA	3	3	6	48,900	293,400
Auto transformer	1 phase 2KVA	3	3	6	25,000	150,000
Max puller	5 tons capacity	2	3	5	49,500	247,500
Come along clamp	standard	4	3	7	4,000	28,000
First aids kit (box)	Standard with necessary items	3	0	3	7,500	22,500

Portable power hand drilling machine	GSB 13 RE-13mm BOSCH/ Equivalent	6	3	9	16,500	148,500
Portable Grinding machine	GWS 24-180 BOSCH/equivalent	3	0	3	14,500	43,500
Pipe wrench	JK with canvas bag	3	0	3	2,500	7,500
Sliding wrench	Taparia/JK 10"	4	0	4	1,250	5,000
Hand drilling machine (heavy duty)	GBM 32-4 Bosch/equivalent	3	0	3	28,500	85,500
Hand drilling machine (medium duty)	GSB 16 RE-16mm Bosch/equivalent	3	3	6	19,000	114,000
Transformer oil test kit	100KVA Motorized	2	3	5	98,500	492,500
Earth tester (digital)	H,S,ES,E,(3 pole,H,S,E,(2 poleH,E), RE-0.05-1999ohms	2	3	5	69,999	349,995
Barrel pump	(1 HP, 5M head)	1	0	1	38,500	38,500
Extension cable drum	3φ 4 W and 1φ 2W dual	5	3	8	55,000	440,000
Power transformer	(50KVA)outdoor type, ONAN cooling, DYN 11,DYN 11, 3phase)	1	0	1	165,000	165,000
Lightening arrester	11KV/33KV LA set pole top mounted type	3	0	3	22,500	67,500
Potential transformer	ratio 150:1 and 44:1	1	0	1	25,800	25,800
Current transformer	ratio 150:1 and 50:1	1	3	4	24,500	98,000
DC power supply	Input 230V output 0 -30V/0-12A	5	3	8	29,500	236,000
DC dual power supply	0 -30V/5A	5	3	8	49,000	392,000
Portable kerosene generator	2500watts,AVR for stable power Honda/ Equivalent	1	0	1	125,000	125,000

GO switch	LBS (vertical LBS, 11KV/33KV with operating handle including)	1	0	1	19,500	19,500
Energy Meter	Three phase / Anchor	5	3	8	14,500	116,000
Energy Meter	Single phase /Anchor	5	3	8	4,500	36,000
Burglar alarm	Standard	5	0	5	8,200	41,000
Smoke detector	sensing type analogue addressable	5	0	5	16,500	82,500
Stabilizer	1KVA	5	3	8	3,500	28,000
Bus bar	200Amps	2	3	5	9,500	47,500
Solar battery	standard	2	0	2	12,500	25,000
Controller for solar system	For 50WP	3	0	3	15,500	46,500
Soft hammer	Taparia/JK	5	0	5	1,250	6,250
Inverter	12VDC-230VAC	3	0	3	28,500	85,500
Slip ring Induction	motor (3 phase) 2H.P	3	0	3	39,500	118,500
Hydrometer	standard	3	0	3	1,500	4,500
Fire Extinguisher	GEO/Deflame	6	0	6	7,500	45,000
A.C volt meter	0-300V AE/ Equivalent	10	6	16	4,500	72,000
A.C volt meter	0-100V AE/Equivalent	10	6	16	5,500	88,000
A.C Ammeter	0-2A AE/Equivalent	10	6	16	3,900	62,400
A.C Ammeter(0-5A)	0-5A/ AE/Equivalent	10	6	16	3,200	51,200
A.C Ammeter(0-1A)	0-1A AE/Equivalent	10	6	16	3,500	56,000
Rheostat	0-1500ohm	6	3	9	9,500	85,500
Horse shoe magnet	L42 W38 T7 mm	5	0	5	8,500	42,500
Watt meter	1 $\phi$ ,0-500W, 2A/240V AE/Equivalent	5	3	8	8,500	68,000
Watt meter	3 $\phi$ , 0-1500W, 5A/600V	5	6	11	7,500	82,500

Digital watt meter	0-3KW, 10A/600V AE/equivalent	3	0	3	12,500	37,500
VAR meter	0-1500VAR AE/Equivalent	3	0	3	13,500	40,500
Drawing board with all accessories	A4 size	50	0	50	16,500	825,000
Transistor (each 100 pieces)	NPN-2SC1815(60V,150mA), 2SC4793(230V,1A) PNP-2SA1015(50V,150mA), 2SA1837(230V, 1A	2set	0	2set	45,000	90,000
IC (each 100 pieces)	LMC555 (cmos IC), $\mu$ A741(UA741)	2set	0	2set	10,000	20,000
Transistor trainer kid	Transistor characteristics (SL100-NPN/ SK100-PNP) trainer board kit	20	5	25	7,500	187,500
IC trainer kid	IC-555 characteristics trainer board kit	20	5	25	7,500	187,500
IC trainer kid	IC-741 Op-amplifier characteristics trainer board kit	20	5	25	8,500	212,500
Small transformer	1KVA, 230V/30,12,9V	15	6	21	25,500	535,500
PLC	CSET-05, PLC with CSET-01, Mitsubishi FX3U-32MR/ES	1	0	1	750,000	750,000
RCL meter	digital RCL Fluke/equivalent	3	0	3	79,550	238,650
Wire guage	Standard, 1swg-30swg, Heyco/ equivalent	3	0	3	3,500	10,500
Screw driver magnetic bit set	power drive 500w/230V	1	0	1	3,500	3,500
Vernier Caliper	0-6 inch Schlieper/ equivalent	6	6	12	8,500	102,000
Micrometer	0-25MM KERN/ equivalent	6	0	6	28,500	171,000
Winding machine set	Table set type	3	0	3	49,500	148,500
Former	Equal span( set)	3	0	3	5,500	16,500
Former	Unequal span( set)	3	0	3	5,500	16,500

Electric oven (For motor-wire braking)	Medium size	1	0	1	78,500	78,500
Thermometer ( 0-800 degree)	Digital	2	0	2	8,000	16,000
Insulation check master	0-15KV	2	0	2	150,000	300,000
Armature testing Growler	For DC machine	1	0	1	36,500	36,500
Enamel copper wire rolling stand	Standard	3	0	3	28,000	84,000
Project Screen	6'x8'	2	6	8	22,500	180,000
Projector	4000-4500 lumens	1	0	1	290,000	290,000
Projector	2000-3000 lumens	2	6	8	79,500	636,000
Tool cabinet	standard	6	6	12	15,000	180,000
Steel Cabinet	standard	10	6	16	20,000	320,000
Tool box	Pliers, tester, knife, screw driver set, D-spanner, files, hammer Hexo frame, cold chisel, wooden chisel	20	0	20	13,500	270,000
Desktop computer	HD 320, CPU 3GH	3	7	10	51,000	510,000
Server		0	1	1	190,000	190,000
Printer		1	0	1	45,000	45,000

Total: Nu18,403,160

3-4-1 Local Cost from Japanese Side (Nu)

Item	JFY2009	JFY2010	JFY2011	Total
Salary of Project Assistant and Drivers	334,900	621,290	63,080	1,019,270
Construction	0	0	0	0
Maintenance of Equipment	16,140	168,372	14,461	198,973
Equipment	2,780,728	2,857,786	174,270	5,812,784
Consumables	150,678	217,543	37,718	405,939
Travel Expenses	562,678	885,348	512,935	1,960,961
Communication	1,800	6,270	1,250	9,320
Printing	0	49,228	0	49,228
Lease	65,438	1,500	6,000	72,938
Light Fuel & Water	0	0	0	0
Meeting	190,711	109,160	6,916	306,787
HRD	0	4,000	0	4,000
Miscellaneous	12,584	0	550	13,134
Others	0	0	0	0
Total	4,115,657	4,920,497	817,180	9,853,334

3-4-2 Local Cost from Japanese Side (USD)

Item	JFY2009	JFY2010	JFY2011	Total
Salary of Project Assistant and Drivers	0	0	1,509	1509
Equipment	0	614	0	614
Consumables	0	0	56.68	56.68
Travel Expenses	1,981.47	32,904	7,081.00	41966.47
Lease	59.80	156	122	337.8
Miscellaneous	0	2	11	13
Total	2041.27	33676	8779.68	44496.95



## 2. PDM 比較表

	Version 0	Version 1
Beneficiaries (direct)	Department of Human Resources (DHR), Khuruthang Vocational Training Institute (KVTI) and other VTIs (electrical),	Department of Human Resources (DHR), Khuruthang Institute of Electrical Engineering (KIEE) and other TTIs (Electrical)
Beneficiaries (indirect)	Department of Occupational Standard (DOS), students, industries	Department of Occupational Standard (DOS), other TTIs (Except Electrical), students, industries
Overall Goal	Electrical courses of VTIs produce human resources who have necessary knowledge and skills based on industrial needs	Electrical courses of TTIs produce human resources who have necessary knowledge and skills based on industrial needs.
Indicator of Overall Goal	1. 80% of employers find graduates of electrical course of VTIs can perform their jobs they are trained in	1. 80% of employers find graduates of electrical course of TTIs can perform their jobs they are trained in. 2. Employment rate (Number of Employed / Number of Jobseekers) of graduates of electrical course of TTIs exceeds 70% half year after their graduation.
Project Purpose	Management System of VET at MoLHR and KVTI is strengthened and KVTI becomes an institution which can offer quality training on electrical.	Electrical course of KIEE produces human resources who have necessary knowledge and skills based on industrial needs and know-how which can be applied in the other TTIs is accumulated.
Indicator of Project Purpose	1. Developed/revised manuals/workflow such as curriculum and materials development system is approved by MoLHR. 2. Satisfaction of industry to electrical course of KVTI is increased. 3. XX% of ex-students are satisfied the programs offered by electrical course of KVTI 4. Number of MoLHR staff are trained.	1. Average evaluation rate of employers to graduates of electrical course of KIEE exceeds average rate of expectation. 2. Employment rate (Number of Employed / Number of Jobseekers) of graduates of electrical course of KIEE exceeds 70% half year after their graduation. 3. Satisfaction of participants of workshops to promote the activities / outputs of the project exceeds 4 in five-grade evaluation.
Output 1	Planning and implementation system of DOS and DHR and KVTI is established and strengthened.	1. Planning, implementation, monitoring and evaluation system of DHR to deliver effective training is strengthened.
Indicator of Output 1	1-1. Manuals/Workflow of curriculum and material development is developed / revised. 1-2. Equipment is procured and subjects of practical work in the curriculum increased. 1-3. Equipment management plan is made and equipment is managed properly based on the plan.	1-1. Revision of training curriculum/material is considered by reference to the actual situation of TTIs. 1-2. Guideline and workflow of training management which can be commonly used in TTIs are developed. 1-3. Monitoring and Evaluation system for training delivery is developed. 1-4. M&E implemented and action plans for identified problems are developed. 1-5. Exchange of views with industries is conducted regularly. 1-6. Mid-term plan of training of instructors is developed.
Output 2	Pilot training course on electrical is implemented.	2. Capabilities of electrical course of KIEE to provide training program is strengthened.
Indicator of Output 2	2-1. Training conducted based on the training plan 2-2. Result of the examinations of trainees	2-1. KIEE meets its student quota continuously. 2-2. Over 80% of graduates of electrical course of KIEE are satisfied with 80% of training contents.KIEE 2-3. Pass rate of students of electrical course of KIEE exceeds 80% in NC-2, and exceeds 70% in NC-3. 2-4. Lesson plan to provide effective training is developed.
Output 3	Monitoring and evaluation system for DHR and KVTI is developed.	
Indicator of Output 3	3-1. Guideline for monitoring and evaluation developed. 3-2. Monitoring and evaluation conducted based on the guideline 3-3. Actions for identified problems	

Output 4	Instructors Development System of VTI is strengthened.	Capabilities of electrical instructors of TTIs are enhanced
Indicator of Output 4	4-1. Master trainers have ability to develop and deliver training program for instructors 4-2. Technical knowledge and skill of master trainers is improved. 4-3. Technical knowledge and skill of other instructors is improved. 4-4. Number of trainings held by master trainers 4-5. Satisfaction of participants of the training by the instructors of RVTI and SVTI	3-1. TOT trainers have ability to develop and deliver training program for instructors. 3-2. Technical knowledge and skill of instructors is improved.
Activities	1-1. Formulate a working group for promoting collaboration between VTI and industry.	1-1. Formulate a working group for promoting collaboration between TTI and industry.
	1-2. Conduct training needs assessment	1-2. Conduct training needs assessment.
	1-3. Review curriculum/material development system and revise/develop curriculum and materials for pilot course.	1-3. Provide recommendations on curriculum/material development system based on the actual situation of TTIs.
	1-4. Revise/Develop manual on curriculum/material development	1-4. Review existing training management practices, compile and develop guideline and workflow of training management.
	1-5. Install necessary equipment for electrical course	1-5. Develop monitoring and evaluation guideline.
	1-6. Advocacy and promotion of electrical course in KVTI	1-6. Conduct monitoring and evaluation based on the guideline.
	1-7. Hold workshops/seminars to promote the activities/outputs of the project	1-7. Develop action plans for identified problems.
		1-8. Hold workshop to promote the activities/outputs of the project.
		1-9. Develop mid-term plan of training of
	2-1. Conduct pilot course in electrical at KVTI	2-1. Develop lesson plans to provide effective
		2-2. Advocacy and promotion of electrical course of KIEE.
		2-3. Conduct pilot course in electrical at KIEE.
		2-4. Conduct monitoring and evaluation and feedback the results to the related organizations.
		2-5. Develop Resource (materials & equipment) management system
	3-1. Develop monitoring and evaluation system	
	3-2. Conduct monitoring and evaluation of the	
	3-3. Develop manual on monitoring and evaluation	
	4-1. Train master trainers in electrical course	3-1. Train TOT trainers in electrical course.
	4-2. Master trainers implement training to instructors of other VTI in electrical course	3-2. Conduct cascade training by TOT trainers.
	4-3. Develop manual on training of instructors	3-3. Develop guideline on training of instructors.
	3-4. Evaluate the training conducted by the TOT trainers.	
Assumption for Overall goal	No major changes occur in the national policy and priority area of the Bhutan government on economic and social development.	No major changes occur in the national policy and priority area of the Bhutan government on economic and social development.
Assumption for Project Purpose	No major changes occur in the national policy and priority area of the Bhutan government on human resource development.	Trained staffs, especially TOT trainers remain working for DHR and KIEE.  No major changes occur in the national policy and priority area of the Bhutan government on human resource development.
Assumption for Outputs	· Trained staffs, especially master trainers remain working for DHR and KVTI. · Instructors of VTI are employed as planned. · Equipment are purchased, delivered, and installed as planned.	Instructors of TTI are employed as planned.

Pre-condition	Counterparts of the Project are assigned at MoLHR and KVTI.	Counterparts of the Project are assigned at MoLHR and KIEE as planned.
Others		Remarks: The super goal of this project is to strengthen quality of Vocational Education and Training Delivery through experience in electrical courses.

### 3. 調査国による技術コメント

#### 1. 実習における安全管理

実習における、安全作業が十分でない。習熟度別訓練システム（CBT）のカリキュラムの中に安全の項目があるものの、指導員自身、実習課題では電源の取り方が不安全といわざるを得ない方法で作業をしている。訓練における安全管理を徹底する必要がある。

#### 2. 求められる技術レベル

日本の場合、家庭配線（一般用電気工作物）としては、第2種電気工事士の資格が必要になり、他方、高圧関係、工場配線及び制御を含んだもの（自家用電気工作物）は、第1種電気工事士の資格が対応する。ブータン国では、資格制度がないが、生徒は卒業時にNC-3を試験に合格すれば取得できるので、第1種電気工事士に相当するものと考えられる。当然指導員は、知識・技能がそのレベルに達していなければならない。

日本の第3種電気主任技術者レベルをブータン国の職業訓練校でめざすことは、生徒たちの現状の数学力では難しい。しかし、マスタートレーナーは、各専門分野で深く知識・技能を修得していなければならない。

#### 3. CBT 制度の課題

2010年8月からKIEEの電気科ではNC-2訓練が実施されたが、9月に入っても、その評価ができていないまま、NC-3が始まった。

電気分野の職能基準ができ、各NCにおけるカリキュラムもKIEEやランジュン電気工学校(RIEE)の指導員数名が参加して整備され、1カ月間指導員を集めて勉強会が開かれた。しかし、指導員から、生徒1人1人の評価に時間がかかる、また評価に多くの教材が必要であるなどの意見が出ている。こうした問題は、ブータン国が他国のCBTをほとんどそのまま取り入れていることに起因している。生徒にNC-2・NC-3の修了証が発行されるのは良いことであるが、資格に見合う内容が伴う必要があり、ブータン式にアレンジしていかなければならない。しかし、そのために必要な訓練の質・量の改善が、1人の指導員で多くの生徒を抱え、技能向上の時間を確保できない現状では容易ではない。現状では、授業後の時間、休暇時期を指導員の技術向上のために当てているが、他の研修が入ることもあり、こういった対策は十分機能しているとはいえない。根本的な問題解決のためには、指導員対生徒比1:12を実現するための増員が不可欠と思料する。

#### 4. 指導員の質

訓練では、各課題のテキストはなく、参考図書はインド製のテキストを生徒4名に1冊貸し出して対応している。授業中は指導員がプロジェクターに内容を提示し、生徒がそれを書き写す、実習中は数人が実習を行い、残りの生徒は順番を待っている、というのが訓練の現状である。このように訓練に必要な資料、機材に限られた状況では指導員の創意工夫が求められるが、経験の浅い指導員には対応が困難である。

このような指導員間の指導力格差を解消するために、年配の指導員やマスタートレーナーによる指導員研修（TOT）を通じての技術伝承をプロジェクト終了後も続けられる体制を構築する事が重要であり、プロジェクト期間中に多くのTOTを実施する必要がある。

#### 5. 就職先の確保

これまでは、公務員や公社での就職が比較的容易であったが、若年層の増加、公的機関の雇用削減方針から、今後は民間企業における就職機会を拡大する必要がある。各地で多くの建築工事が見られるので、職種としては、電気工事・工場配線施工・工場制御・高圧受電設備等が考えられる。しかし、低賃金のインド人電気技士、ブータン人のブルーカラー職種敬遠の問題があり、雇用拡大の弊害となっている。

こうした状況を踏まえて、ブータン国では初等教育での職業訓練の紹介を始めており、ブルーカラーに対する国民の意識を変える取り組みを始めている。今後職業訓練校は、質の高い訓練を実施することで就職意欲を高めると同時に、就職を希望する訓練生への進路指導として、商工会議所等を活用するなどして企業とのつながりを強め、雇用機会の拡大に努める必要がある。

#### 6. 指導員育成体制の構築

近年、ブータン国政府は指導員の採用にディプロマ卒という条件を付けた。また、現在の指導員は、研修でディプロマの資格を取得させ、訓練の質を向上させると言っている。しかし、ディプロマコースを実施している学校がブータン国には1校しかなく、その卒業生は産業界でのニーズが高いことから、指導員への応募が少ないのが現状である。将来的に、高度な技能を持ったディプロマ卒の学生のニーズがますます高くなることや、訓練の質向上・維持という観点からも、技能を持った指導員を継続的に育成できる体制が必要である。

