



Capacity development and strengthening for energy policy formulation
and implementation of sustainable energy projects in Indonesia

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CASINDO

DELIVERABLE NO. 11:

Report on the in-house trainings by TEDC, Part II

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Preface

This report is deliverable no.11 of the project ‘Capacity development and strengthening for energy policy formulation and implementation of Sustainable energy projects in INDOnesia (CASINDO)’. The CASINDO project aims to establish a self-sustaining and self-developing structure at both the national and regional level to build and strengthen human capacity to enable the provinces of North Sumatra, Yogyakarta, Central Java, West Nusa Tenggara and Papua to formulate sound energy policies and to develop and implement renewable energy and energy efficiency projects. Information on upcoming events, the presentations and meeting minutes of project team meetings and completed project reports can be found on the CASINDO website: www.casindo.info

The CASINDO project is funded by NL Agency and implemented by a consortium coordinated jointly by the Indonesian Ministry of Energy and Mineral Resources and the Energy research Centre of the Netherlands (ECN), comprising the following organisations:

- Indonesian Ministry of Energy and Mineral Resources, Jakarta.
- Muhammadiyah University of Yogyakarta, Yogyakarta.
- Diponegoro University, Semarang.
- University of Sumatra Utara, Medan.
- University of Mataram, Mataram.
- University of Cenderawasih, Jayapura.
- Institute of Technology of Bandung (ITB), Bandung.
- Technical Education Development Centre (TEDC), Bandung.
- Eindhoven University of Technology, Eindhoven.
- ETC-Nederland, Leusden.
- Energy research Centre of the Netherlands ECN, Petten.

In the course of the preparation of this progress report the authors consulted extensively with the technical teams in North Sumatra, Yogyakarta, Central Java, West Nusa Tenggara and Papua and with the Ministry of Energy and Mineral Resources. The contributions provided by these organisations are greatly appreciated.

The sole responsibility for the content of this report lies with the authors. It does not represent the opinion of NL Agency and NL Agency is not responsible for any use that may be made of the information contained herein.

Abstract

This report (Report on the in-house trainings by TEDC, Part II, D11) describes the in-house trainings given by TEDC to 7 SMK that are currently involved in CASINDO regarding the background of, the approach to and the steps taken for the development of operational curricula at SMK level. The report also explains also the results of the in-house trainings; these trainings followed the first 4 SMK, on which was reported in the previous D10 report.

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List of abbreviations and organisations

BG	Biogas
BM	Biomass
BSNP	Board for National Standards in Education
DGEEU	Directorate General of Electricity and Energy Utilization
EE	Energy efficiency
ETCERE	Education and Training Agency of the MEMR
ETCENEREC	Education and Training Centre for Electricity, New Energy, Renewable and Energy Conservation of the MEMR (former ETCERE)
EWG	Indonesia–Netherlands Energy Working Group
HYCOM	ASEAN Hydropower Competence Centre
IDBP	Indonesian Domestic Biogas Programme (BIRU)
IEP	Industrial Employment Practices
KBK	Competency Based Curriculum (Kurikulum Berbasis Kompetensi)
KD	Basic competence (Kompetensi Dasar)
KTSP	School Level Curriculum (Kurikulum Tingkat Satuan Pendidikan)
MEMR	Ministry of Energy and Mineral Resources
MHP	Micro Hydro Power
RE	Renewable Energy
REP	Renewable Energy Program
RET/TET	Renewable Energy Technology (Teknologi Energi Terbarukan)
RPP	School level learning implementation plan (Rencana Pelaksanaan Pembelajaran)
SMK	Vocational and Technical School (Sekolah Menengah Kejuruan)
STTPP	Graduate Certificate of Education and Training (Surat Tanda Tamat Pendidikan dan Pelatihan)
PV	Photovoltaic
SK	Competency standards (Standar Kompetensi)
TEDC	Technical Education Development Centre
WP	Work Package
WE	Wind Energy

1. Introduction

This report on Delivery 11 describes the in-house trainings delivered by TEDC in 7 CASINDO SMK, that were following the training experiences of the most advanced 4 SMK with respect to the integration RET in their educational practice. The approach to concentrate firstly on 4 SMK instead of the full 11, proved to be good. The learning experiences gathered in the first 4 in-house trainings were leading in the carrying out of the in-school trainings for the remaining 7 SMK.

This report does not only provide information on the results the in-house trainings yielded, but also gives a more detailed background of this kind of trainings and what educational approach to curriculum development at school level can be chosen. In the report will be attended aspects on which was not elaborated in the D 10 report. These aspects concern:

1. Industry Employment Practices (IEP) as part of the the context for school level curriculum development
2. The school level syllabus as a concretisation of the general educational SMK objectives and the specific vision & objectives of each SMK
3. The support by TEDC to SMK to elaborate and handle the school level syllabus
4. The application of lesson modules in school practice
5. The putting up of school level Implementation Learning Plans related to the school level syllabus and lesson modules.

After the selection of the 11 SMK as pilot schools for the CASINDO project (see report D7), it was decided in consultation with these SMK by TEDC, to change the strategy for years 2010 and 2011 and to redefine the content of D8, D9, D10, and D11 accordingly. Firstly SMK Teachers had to be trained in the MHP, PV, WE, BM, BG and EE for upgrading their knowledge required for proper RET integration in the schools (D8, D9). Secondly in 2011 at SMK level operational curriculum development and development of related modules for narrow linkage between theory and practice will take place (D10, D11).

This change in strategy did change the intended content of D11, as envisaged in the CASINDO project document. The new deadline for the submission of the D11 report was fixed on February 2012, as TEDC's in-house training reports for the 7 SMK had to be ready, before putting up this report.

2. School curriculum: Industry employment, design, training, application

2.1 Introduction

The information given in this report is a reflection of accumulated experiences gathered in the course of the implementation of WP3 and the changes in strategy already mentioned in the previous chapter. In this respect the position of TEDC and the roles of the CASINDO SMK, the regional educational offices (Dinas Pendidikan), and the central Ministry of National Education, and ETC/TTP will be highlighted.

This information is based on discussions with/between different stakeholders working under WP3 and the observations made in the monitoring visits carried out by TEDC and ETC/TTP joint meetings with

the 11 CASINDO SMK in the course of the CASINDO programme¹. Also the detailed dossiers put up and maintained by TEDC per each in-house training workshop to the SMK were a source for clarifying the content and the results of these workshops. These dossiers contain the following elements: approach and content of the training, reporting by each SMK participating in the training on learning experiences (theoretical and practical), TEDC's reporting on the training, including the recording of the knowledge and skills acquired by the trainees. Based on the level of acquired knowledge and skills certificates were issued to the participants in the trainings.

2.2 Industry Employment Practices

In addition to what has been described in the D10 report (regarding the development competency based learning at national level), the place of industry employment practices is an integral part in the school level curriculum is here highlighted. These practices do have general elements, but also depend very much each school's direct environment. Industry Employment Practices (IEP) are generally an integral part of the learning activities in productive program subjects² of the school curriculum.

IEP activities are to be designed and implemented considering the following matters:

1. The IEP activities aim at providing real work experience for students, especially for the formation of attitudes (ethos) required in the student's future professional practice.
2. The IEP activities are part of the learning activities and thus a part of the assessment of learning outcomes (competencies) of the students.
3. The availability of facilities and infrastructure / resources in the school to support IEP activities for the acquisition of professional competencies in accordance with the established competency standards. The implementation of IEP should take place in stages or in units, tailored to the needs and characteristics of each skill competency.
4. The share of the IEP activities allocated within the available time consists of four hours of practice in the industry as equivalent of one hour of structured face to face teaching at school.

A special department for labor market relations is part of the organisational set-up of the Negeri (governmental) SMK. This department serves as the intermediate between the educational practices in the SMK and the requirements for skilled people in the labor market. The departments are actively involved in providing inputs for IEP activities within the schools. Potential employers come to the school to present themselves, to inform the SMK about their labor needs and to interview students for possible future labor assignments. Through these contacts the SMK can respond to the needs of their direct environments; through the need for RET trained people became increasingly apparent. In the in-school trainings of the 7 SMK this aspect got attention; questions was how to organise IEP activities in line with the local needs for skills in specific RET relevant in the school's environment.

¹ Initial visits and subsequent monitoring visits have been carried out in respectively June 2009, July 2010, and May 2011. Aside these visits meetings with the 11 CASINDO SMK have taken place in October 2009, October 2010, and October 2011.

² Aside productive subjects (technical education subject i.e. plumbing, electrical engineering, mechanical engineering, -26% of lesson hours) that concern the subjects related to the technology discipline for graduation, normative subjects (Religious education, Citizenship Education, Indonesian language, Physical Education Sport and Health, and Art and Culture -19% of lesson hours) and adaptive subjects (English, Mathematics, Natural Sciences, Physics, Chemical Science, Social sciences, Communication, and Entrepreneurship -46% of lesson hours) are taught in the SMK. Local content, as well as extracurricular Personal development (9% of the lesson hours). See Report D13, November 2012, p. 7.

2.3 Design of the school level syllabus

According to BSNP documents the Competency Based Curriculum should be understood as a guide for teachers. At school level teachers have to develop the syllabus, which is a summary of each school subject with the competencies linked to it. Syllabus development includes the following elements:

1. Review standards of competence and basic competences, as listed in the Standard of Competence Graduates / SKL (Decree No. 23 of 2006).
2. Formulate indicators as markers of achievement of basic competencies in terms of behavioral changes that can be measured and observed, including attitudes, knowledge, and skills. The indicators are developed according to the characteristics of students and subjects, educational units, and the principles of Bloom's taxonomy (see D13 Report p.p. 6-7).
3. Determine a balanced set of assessments in close relation with the basic competencies and linked indicators (i.e. written or oral tests, performance observation, measurement of attitudes, assessment of the work assignments, the use of portfolios, and self-assessment).
4. Identify instructional material that supports the acquisition of basic competences in accordance with standards linked to these competencies.
5. Design of learning activities to provide learning experiences involving interaction between students, students with teachers, the school's environment, and other learning resources in the acquisition of basic competencies.

Schools syllabi are generic and not directly relevant to the local context of the school. The national curriculum offers the school free space for the Local Content curriculum for vocational competencies and local culture of local art (2 – 6 hours per week out of a total 38 hours a week).

In all 7 in-school trainings the development of syllabi, following these 5 elements were central.

2.4 TEDC's trainings on the elaboration of school level syllabus

TEDC's support to the elaboration of school related level syllabus was carried out in 7 remaining CASINDO SMK. For each school the support has taken place as follows³:

No	Subject	Time
1	General Context	
	Ministry of National Education Policy and Education Office of the City	2
2	Workshop Program	
	2.1 Platform for Development Program RET	2
	2.2 Curriculum Design RET	2
	3.3 Learning Management RET	2
	2.4 Standards and Competency Basic Competency RET	2
	2.5 Model Operational curriculum RET	35
	2.6 Preparation of the RET Syllabus	4
3	Program Support	
	Preparation of Application for Opening of RET Skill Competency	1
	Number	50

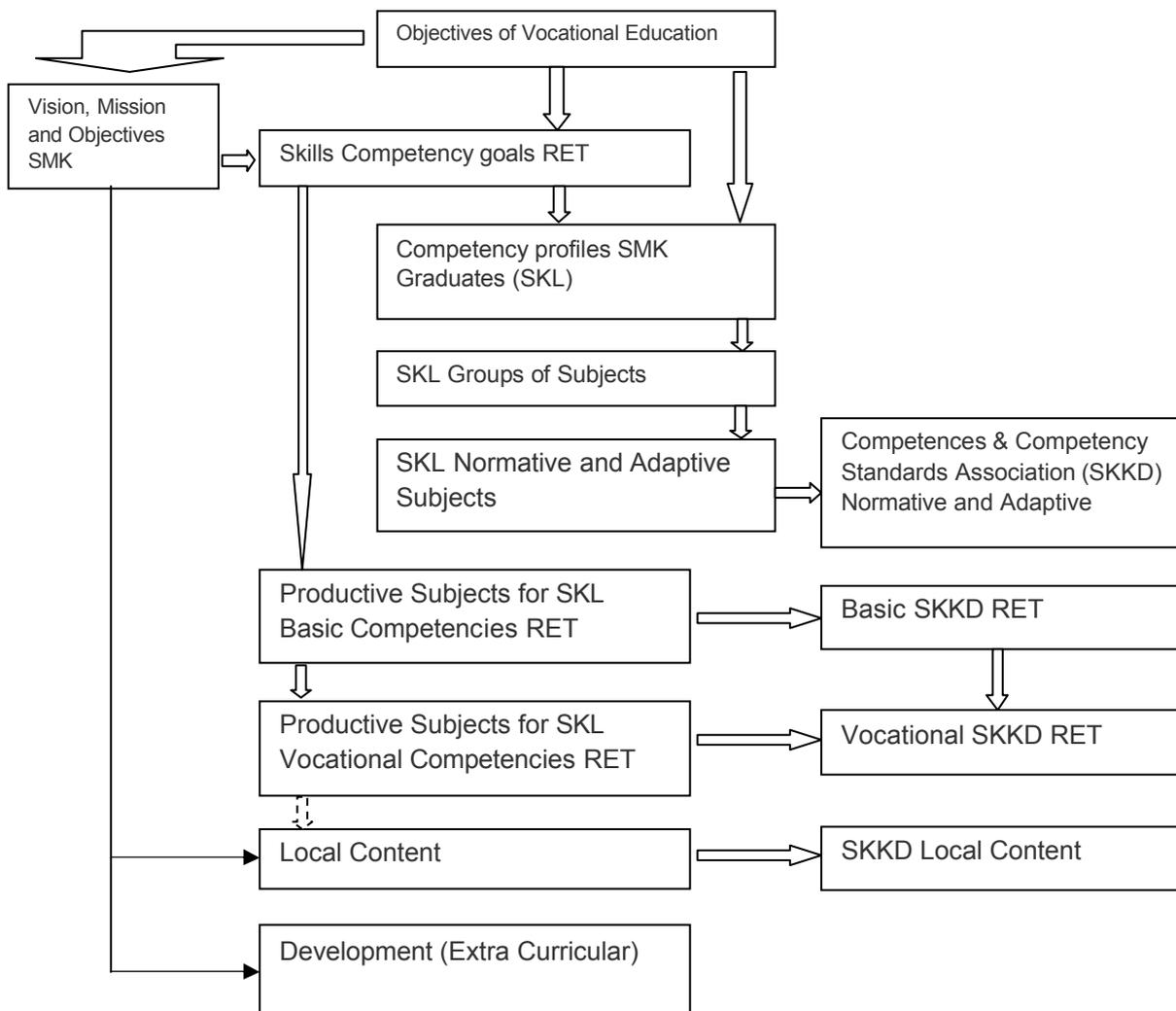
³ Per each training/workshop report have been issued by TEDC. The report have been drawn up by the TEDC moderators of each training/workshop. Time relates to 45 minutes per unit; preparation for Application for Opening of RET Skill Competency was done in SMKN 1 Magelang, but not in other in-house trainings.

The dates, number of participants and TEDC lecturers/instructors are given in the next table.

School	General training/ Workshop		TEDC Lecturer/instructor
	Dates	Number participants	
SMK Negeri 2 Kulonprogo	13 – 17 December 2011	16	Juhari, S.Pd
SMKN 2 Kuripan	13 – 17 December 2011	15	Niamul Huda, ST., MPd
SMKN 1 Blora	13 – 17 December 2011	11	Drs. Iman Permana
SMKN 2 Rantau Utara	13 – 17 December 2011	15	Drs. Tatang Sukendar, MT
SMK Panca Bhakti Banjarnegara	19 - 23 December 2011	13	Auhari, S.PD
SMK 1 Magelang	21 – 24 December 2011	8	Drs. Iman Permana
SMKN 2 Yogyakarta	3 – 7 January 2012	20	Niamul Huda, ST., MPD

In the in-school trainings the relation between the national Objectives of Vocational Education, the Vision/ Mission of each SMK, the graduate competency profile (SLK) and the basic competencies and related competency standard (SKKD) were discussed for each specific SMK.

The following flow diagram gives an overview.



The national level objectives for vocational education jointly with the vision/mission of each SMK determine what technical competencies goals for technical subjects have to be fulfilled. The national level objectives are leading herein; in the vision/mission of each SMK the specific situation of this school is reflected. When is talked about RET integration in SMK teaching, this concerns the RET skills competency goals. The RET skills competency goals influence directly the choice for RET productive subjects relevant for the acquisition of basic vocational competencies and thereafter the productive subjects for vocational RET competencies. At the other hand the competency profiles contain groups of normative and adaptive subjects. For these subjects standards of competence and basic competences, as listed in the Standard of Competence Graduates (Decree No. 23 of 2006) by the Competences and Competency Standards Association.

For the productive RET subjects also basic and vocational competencies and related competency standards are determined, resulting in basic and vocational SKKD for RET, but thus far this is not done at national level. The vision/mission of the SMK is articulated in the definition of Local Content and in the Extra Curricular school activities. Especially the relation between the national level objectives for vocational education and the vision/mission of each SMK was a central issue in the workshops.

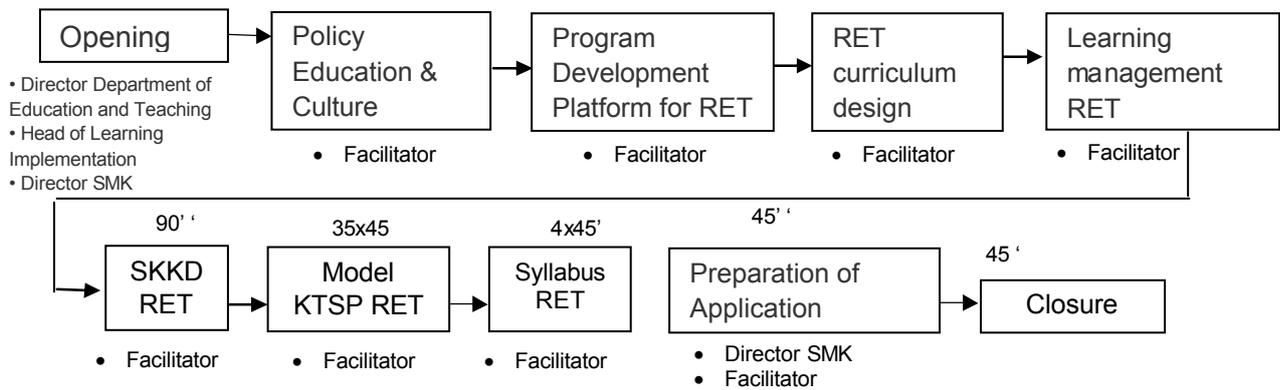
TEDC has agreed with each SMK on the approach and content of the in-school trainings. For this purpose Terms of Reference these trainings/workshops were formulated. Based on this agreement between TEDC and the school a contract was signed that fell within the general agreement between each SMK and CASINDO. After the completion of all trainings certificates were issued to the participants, based on the results of a final test on knowledge and participation.

Subject matter RET teachers as well as the school management (school director and the head curriculum development mostly). participated in the General Trainings/Workshops. In the Enrichment Trainings/Workshops the same pattern of participation was followed. All trainings to the 7 SMK have been executed in the time span of December 2011 – January 2012. This made intensive exchanges on experiences in the different workshops/trainings possible. All lecturers/instructors were part of the TEDC core group for RET development in SMK.; this core group fell under the general guidance and coordination of drs. Iman Permana.

The goals of the In-house Trainings/Workshops were for all schools the same:

1. Transfer of knowledge on the design and the characteristics of curriculum and the learning process in vocational Renewable Energy Technologies
2. Development of school level curriculum (KTSP) in accordance with the two concentration of RET chosen by each school
3. Development of the syllabus for addressing the defined competency standards.
4. Understanding of the RET curriculum as proposed in draft by TEDC to the Directorate of Vocational Education of the Ministry of Education
5. Use of the RET curriculum as a guide in conducting the development and implementation of RET in the specific SMK.

Each General Training/Workshop had the following sequence of activities (time is indicated in minutes):



TEDC followed in the workshop/training to the 7 SMK the following principles for syllabus development:

- (1) Scientific
- (2) Relevant
- (3) Systematic
- (4) Consistent
- (5) Adequate
- (6) Actual and Contextual
- (7) Flexible
- (8) Comprehensive

The syllabus is the place to elaborate the standards of competence in the learning subjects and the ways of assessing the achievement of the competencies by the student. In the training/workshop the RET related competencies were specially highlighted, as they were completely new to the actual school practice. Thus far RET got attention in the schools in relation to the existing curricula and syllabi for the existing subject under Technology and Engineering. TEDC provided the syllabi for the RET MHP, PV, WE, BG and BM, which were developed in the previous years. These syllabi served as examples for further fine-tuning in accordance with the specific requirements of each school.

TEDC also provided the modules per each RET, after a general introduction on the main characteristics of modules. In the learning modules the leaning contents are described in detail (for example: the different components of a micro hydro power plant i.e.: penstock, turbines, powerhouse, electrical connections, etc., and their operation). This description goes hand in hand with the indication how the student can learn (for acquisition of knowledge, motivation and skills), and what learning tools can be mobilised (texts, demonstration equipment, practical exercises, outside visits). So each module gives an indication of learning contents, learning strategies, and learning means.

2.5 The use of lesson modules in the schools

As was the case with the previous 4 SMK, also all 7 SMK produced a document with the definition of the specific RET standard competencies (KD) as part of the general competency standards (SK), and the syllabi on MHP, PV, WE, BG, and BM. This was mainly done in the Trainings/Workshops at the end. The RET modules, as firstly developed by TEDC, were used as basic source material. Each SMK

focused on the two concentration RET each school has chosen. The next table gives an overview of these concentration RET per SMK (see Report D7, p. 9).

Province	Name Candidate SMK	Offered Concentration
Papua	SMKN 3 kota Jayapura	1.MHP, 2. PV
	SMKN 3 kabupaten Merauke	1. PV, 2.WE
North Sumatra	SMKN 2 Doloksanggul, kab. Humbang Hasundutan	1.MHP,2. PV
	SMKN 1 Balige, kabupaten Toba Samosir	1.MHP, 2.Biomass
	SMKN 2 Rantau Utara, kabupaten Labuhan Batu	2.Biomass, 2.PV
NTB	SMKN 2 Kuripan, kab. Lombok Barat	1.MHP, 2.Biomass
Yogyakarta	SMKN 2 kota Yogyakarta	1.PV, 2.WE
	SMKN 2 Pengasih, kab. Kulonprogo	1.MHP, 2.Biomass
Central Java	SMKN 1 kabupaten Blora	1.Biomass, 2.PV
	SMKN 1 kota Magelang	1.MHP, 2.Biomass
	SMK Swasta Panca Bhakti, kab. Banjarnegara	1.MHP, 2.Biomass

Based on concrete experiences with carrying out RET learning activities (theory and practice lessons), the schools made suggestions for short-term adaptations in the RET learning strategies needed. For the concentration RET good indications could be given what should be adapted after the first year of learning practices with the existing TEDC produced RET modules. The options for adaptation of lesson modules to regional needs were also discussed in procedural terms. Reference was made to Article 1 of Government Regulation No. 19 of 2005. To what extent adaptations in the procedures would be needed, could not clearly indicated as yet. In the trainings/workshops was no time/space to look into each module separately in this respect.

As was also the case with 1 SMK out of the first 4, those SMK out of the 7 SMK with BM as concentration RET, insisted on the development of BM modules, in order to be capable to implement the integration of BM in the educational practice of the schools. On the choice for the type of BM application only SMKN 1 Magelang was clear, as they run since year a display and demonstration site on carbonisation of agricultural waist (pyrolysis) and briquetting afterwards. The school itself has developed lesson materials for these applications. TEDC will facilitate the spreading of the experience and knowledge in SMKN 1 Magelang to other SMK with BM as a concentration RET. These SMK were less knowledgeable with the different BM applications.

In the trainings/workshops for the 7 SMK Energy Efficiency (EE) was approached as an overarching issue that should get a place within all RET applications. Attention to EE was given in a non-technical way: the focus lied mainly on giving attention to changing behavioural patterns that result in energy saving (new mentality to energy use).

2.6 Conclusions

The trainings/workshop to the 7 SMK did have the same multi-purpose character as the first ones 4 SMK trained before. In the first place the schools have been thoroughly informed about the formal rules that guide curriculum and syllabus development. In the second place was strongly focused on the integration of the concentration RET in the learning processes of these schools. The joint study and assessment of the relevant RET lesson modules recently produced by TEDC, were important to get a concrete idea what is needed to integrate RET in the school learning practices and where the existing modules needed to be adapted. The RET teachers with their acquired RET knowledge in TEDC's teachers trainings were stimulated to put their acquired knowledge in practice in their teaching. Regarding the adaptation of the content of the modules to regional needs can be concluded that this concerns only the concentration RET at school level. Each school should plan an experimentation cycle in which the modules are used, evaluated and then adapted.

3. Implementation Learning Plans

3.1 Introduction

In the last part of the trainings/workshops to the 7 SMK attention was given to the school-level implementation learning plans (RPP-School level learning implementation plan (Rencana Pelaksanaan Pembelajaran) regarding RET education. All schools have put together such kind of plans, but the level of detailing varied per school considerably. The schools need to spend more time to finalise these plans to have clarity about the RET learning activities in the next future.

3.2 RPP's functions and orientation 7 SMK to RPP

The syllabus is the basis for the RPP and has to guide the learning activities of the students in their school practice, in order that they can achieve meeting the Competency Standards (KD) linked to the basic competencies (SK) within the planned period. The RET RPP's are a further description and concretization of the syllabus. It contains a description of the sequence of learning activities, the identification of learning materials/tools, and the allocation of time. In general the learning activities that are designed in the RPP, are expected to facilitate interactive learning, and should be inspiring, exciting, challenging, and motivating students to actively participate in the learning process. And also should the RPP provide enough space for innovation, creativity, and independence in accordance with the talents, interests, and physical and psychological development of participant learners. This ambition is applicable to RPP's of all school subjects, thus not only to RET related learning.

Each of the 7 SMK followed its own preference lead by the chosen concentration RET. For each RET a separate RPP was developed for every RET in accordance with the RET specific Basic Competencies to be achieved related, or a cluster of RET. For every RET the teacher had to prepare a complete and systematic lesson plan and to apply this in their learning activities for the specific RET chosen. The process of RPP development has taken a different shape in the different trainings/workshops. This depended very much on the knowledge and focused orientation each school has shown. The elaboration of RPP's was done differently per school, depending on the ability to create

space for RET education. In all trainings/workshops was very much looked forward to the materialisation of the integration of RET education in the National Curriculum under SPEKTRUM.

At the end of all trainings/workshops an evaluation was done of the knowledge acquired by the participants, the character of participation, the discipline/attitude displayed. When a participant passed a Graduate Certificate of Education and Training (STTPP - Surat Tanda Tamat Pendidikan dan Pelatihan) was issued; all participants did get a certificate. The participants reiterated that further teacher trainings by TEDC would be necessary (especially in BM and BG, as well as schools that had only one teacher trained in a certain RET), as also coaching for guiding the opening of a special RET study discipline as soon as SPEKTRUM provides space for this.

3.3 RET syllabus and RPP in the next future

The trainings/workshops resulted in establishing special groups of teachers (sometimes called development committees) that will, in cooperation with mostly the Vice Director Curriculum, take on contacts with the private sector in the school's environment as part of the RPP. Furthermore regular internal meetings are to be organised to discuss experiences with RET in the various learning activities amongst the members of the development committee, and also with students. Based on all this feedback the development groups are able to adapt specific RPP for the school years 2011/2012 and 2012/2013, as well as the use and the content of the RET lesson modules in use. In contrast with the expectation for the first 4 SMK, it is expected that this process will take more time than only the school year 2011/2012. The progress in the whole process very much depends on how fast the RET curriculum is integrated in SPEKTRUM.

4. Final remarks

From the content of this report on Deliverable 11 can be learned that activities geared to the integration of RET in SMK at the same time served the broader objective of renewing educational practices that were started from 2004 onwards. This has also been shown in the workshops/trainings for the first 4 SMK. The 7 SMK involved in RET integration had to attend to these interlinked processes at the same time. These 7 SMK appeared partially to be able to face this double challenge. In this respect the experiences gathered in the first 4 SMK were in the workshops not optimally used in their in-school trainings curriculum, syllabus, and module development.

TEDC has succeeded in meeting the double challenge in its facilitation the trainings/workshops also for the 7 SMK. Again the different moderators (for each school another moderator) were able to cater the different character and environment of the SMK involved. From their reports can also be learned that the process of handling the syllabus, modules, and the RPP is a huge challenge for every school. This made it difficult for these schools to be intensively involved in the external promotion of RET integration to other schools in their provinces. The report on D12 elaborates more on this issue.