



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

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CASINDO

DELIVERABLE NO. 12:

Report on the approach to roll-out to other SMK

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NL Agency
Ministry of Foreign Affairs

**Bilateral energy cooperation between
Indonesia and the Netherlands BECIN**

November 2011

Preface

This report is deliverable no.12 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 co-ordinated 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 describes the different strategic options for rolling-out the integration of the renewable energy technologies to other SMK than those that are currently involved in CASINDO. The report also contains the justification for one strategic option and of the first actions taken to make this strategy work.

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List of abbreviations and organisations

BM	Biomass
BG	Biogas
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)
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)
SMK	Vocational and Technical School (Sekolah Menengah Kejuruan)
PPP	Public-Private Partnership
PV	Photovoltaic
TEDC	Technical Education Development Centre
WP	Work Package
WE	Wind Energy

1. Introduction

This report on Delivery 12 describes the different options that came up in the course of the implementation of WP3 from the 2nd years onwards. Regarding possible roll-out strategies the following questions came up:

1. Who should be the main agent(s) in the implementation of the roll-out under WP3?
2. Should the roll-out be limited to the five provinces that are currently addressed under WP3 of CASINDO?
3. What are the stimulating and the inhibiting factors that may influence the roll-out?
4. Should the roll-out cover the whole range of Renewable Energy Technologies (RET) that are attended to under WP3?
5. At what competency level should the roll-out focus?

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 not change the intended content of D12, as envisaged in the CASINDO project document. Only the deadline for the submission of the D12 report was changed from January 2012 to November 2011.

2. Alternative roll-out options

2.1 Introduction

The information given in this report is a reflection of accumulated experiences gathered in the course of the implementation of WP3. In the project CASINDO document no clear assumption is formulated who should give the principal guidance in the roll-out to other SMK than the actual SMK working under WP3 of CASINDO. In this respect the roles of the CASINDO SMK, the regional educational offices (Dinas Pendidikan), the central Ministry of National Education, the Universities working under WP4 of CASONDO, TEDC, 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. Also the detailed dossiers put up and maintained by TEDC per each delivered training to the SMK teachers, were a source for considering the different roll-out options. These dossiers contain the following elements: training brochure containing the target group, approach and content of the training, reporting by each SMK participating in the training on learning experiences (theoretical and practical), personal appreciation of each trainee of the training followed, and TEDC's reporting on the training, including the learning materials used and the reports from the external assessors on the knowledge and skills acquired by the trainees.

2.2 Roll-out to other SMK driven by CASINDO SMK

In the CASINDO project document it was clearly indicated by whom the roll-out should be driven: the SMK operating in the CASINDO target provinces should express their interest in the integration of RET in their educational practices. During the implementation of WP3 since the start of CASINDO, the 11 SMK were considered as important agents for the promotion of RET integration in SMK educational practices. During the first two years of the CASINDO project, this RET promotion did not get focused attention at school level, as all CASINDO schools were much more concentrated on integrating RET in their own school practice within the possibilities of the conditions the existing national curriculum framework offered and the demands coming from local stakeholders (i.e. local authorities, private sector, and candidate students). In the following an overview is given on the current views the 11 SMK do have with respect to their role in the roll-out of RET to other schools in the provinces they operate.¹

SMKN 1 Blora (PV, biomass)

A change in the school's directorate of the school has caused during the last year misunderstandings; the transfer of information about RET integration was not clear. The school seeks to insert RET in the discipline of electrics. Biomass gets attention in extra-curricular activities; about 10 students are engaged in these activities. RET education will be a program under local content. The school eagerly waits for the RET integration in the SPEKTRUM program. Extra efforts are made to improve the further dissemination of RET teaching within the school, but to a lesser extend outside the school. The school concentrates on improving its RET educational activities with an emphasis on general RET competencies, and does not have time to make major efforts in the promotion of RET integration at school level to other SMK.

SMKN 1 Magelang (MHP, biomass)

The school has already ample experience with biomass (carbonization, briquetting). This is the reason that, apart from this concentration RET, is opted for highlighting solar PV. A US sponsored PV business specialist promoted actively PV at another RET within the school. The school has now a new director: the original plan to install a MHP demonstration set-up has now been left aside. RET integration is mainly done through local content. Under the former director the school was actively networking regarding RET integration with neighbouring schools; the actual situation appears to be less clear. The school does have an own roll-out strategy for RET integration.

SMK Swasta Panca Bhakti (MHP, biomass)

In the vision of the school is now currently operated with an adapted SMA curriculum. It was stressed that the school needed an own RET curriculum; for this the Directorate General for SMK would be directly approached to get 30% free space in the curriculum. Within this space RET can be approached properly. With the respect to the two concentration RET, no clearly articulated actions have been undertaken. The school needs to collect more in depth knowledge about the concentration RET, in addition to the teachers trainings TEDC has offered. The school indicated that the first priority for RET integration was to be put in the own teaching practices and not to promoting RET integration to other schools.

¹ This information was recently gathered in the meeting with the 11 SMK (TWG VII) that has taken place on 26 October 2011

SMKN 2 Yogyakarta (PV, wind energy)

The school is waiting for the RET program to be accepted by SPEKTRUM. In the meantime the school is looking for possibilities of inserting RET within the discipline of electrics. The school committee expressed interest in the biogas technology; the committee made a proposal for funding to the Mayor of Yogyakarta for funding for the introduction of this technology at the school. With the biogas technology the school aims at reaching poorer communities, from which a part of the students originate. The school continues RET education as a local content program. This also includes cooperation with a local traffic light production company that constructs solar PV fuelled traffic lights. The school is not much involved in the promotion of RET education to other (neighbouring) SMK; such activity did not have clear priority. Reaching out to poor communities was more important in that respect.

SMKN 2 Pengasih (MHP, biomass)

The school has now 12 teachers trained in RET. Most attention is given to MHP and biomass as concentration areas, but also at solar PV. As long as RET is not integrated in the national SPEKTRUM programme the school opts for running a crash programme through insertion in other school disciplines. The main focus was on establishing educational practices for general RET competencies. Discussions within the school committee revealed acceptance for RET integration, due to the possibility that RET competencies can be also applied in non-RET work places. Four teachers of the school are now engaged in a survey how the best this can take place. The school is engaged in RET promotion activities, but these concern mostly the direct environment of the school itself. The RET promotion is mostly oriented on the concentration RET of the school i.e. MHP and biogas, but also PV has gotten more attention from the school's environment. Engaging other SMK in RET education for RET roll-out did not have priority in the school.

SMKN 3 Jayapura (MHP, PV)

The school started last year a complete new RET competency program and wants to follow this up ambitiously. The school considers its RET programme as a valuable pilot for RET integration in the national curriculum and calls the other SMK to look at their RET programmes the same way. Contacts were established with a private PV company that will employ students from the school. Not only is RET associated with electrics and civil engineering, but also with the discipline of plumbing. The school stresses the need for proper facilities in spite of the termination of CASINDO. Therefore direct contact is sought with the Director General of the SMK Directorate for getting funding for facilities. The school also cooperates directly with the educational bureau (Dinas Pendidikan) on RET integration and has facilitated the participation of 3 students from the SMKN Wamena (Papua Province) in RET teachers training by TEDC through the school. The school did not develop an own roll-out strategy for Papua Province.

SMKN 3 Merauke (PV, wind energy)

The first in-school training provided by TEDC has taken place in this school. The training workshop was opened by Merauke's bupati in May 2011. The bupati promised to actively promote RET in his Kabupaten. Especially the bupati was stressing integrating the biogas technology; for this the school needs teachers to be trained in biogas. For this reason interest was expressed in biogas as a RET to be integrated in the curriculum, apart from the 2 the school's concentration RET. RET integration has taken place through local content. The school appears to have gradually lost its interest in wind energy. The teachers have carried out mainly internal socialisation / presentation on RET, and are now looking at progress of the SPEKTRUM curriculum proposal. The school has already purchased a water pump that is related to the application of the solar PV. It appeared that the bupati's promotion of

biogas was very much concentrated on this school and not aimed at implying other schools in the promotion of RET integration in general. The school is inclined to promote roll-out, but not on its own.

SMKN 2 Doloksanggul (MHP, PV)

The school has opened last year a separate RET competency programme, but this year all students were switched to the regular discipline of electricians. Integration of RET in the SPEKTRUM program is very much needed. One cannot go on with temporary solution for RET integration. This puts a too heavy pressure on the ongoing school activities. Unless the current RET (PV) linkage to electricity the school wants to give attention to MHP. The school also stresses the importance of proper RET facilities, apart from what CASINDO temporarily can offer. The school has cooperation with SMKN 1 Balige on coordinated action regarding RET integration (joint in-school training workshop with TEDC), but does not give priority to extend RET integration to other SMK. The geographical position of the school and its own needed efforts in RET integration are the main causes for this orientation.

SMKN1 Balige (MHP, biomass)

The school got a new director in the last year. He stresses much more the importance of RET integration in the SPEKTRUM programme. For this reason the school is pursuing a follow-up of the RET programme that was opened last year within the existing national curriculum framework. The school was not pro-active regarding the use of the current possibilities for RET integration, and was not inclined to give much priority to the external promotion of RET integration in the school curriculum.

SMKN 2 Rantau Utara (PV, biomass)

The school is eagerly waiting the moment that the SPEKTRUM curriculum is in place. The school has for the time being chosen for given attention to solar PV (PLTS) in local content. Insertion of RET is also sought in electricians and in civil engineering. Promotion of RET has taken on in 3 new kabupaten, as these new administrative units were recently established in an administrative reform. In this promotion a few other SMK are involved, but this has not lead to a possible roll-out of the integration of RET in their curricula. The school prefers to concentrate on its own RET integration.

SMKN 2 Kuripan (MHP, biomass)

The school cooperates with the local government in the area of biogas and intends to come in touch with local communities that are interested in the use of domestic biogas facilities. The 25 students that expressed interest in Micro-Hydro could have specific training by insertion in electricians and civil engineering. The school management is not yet prepared to put the right RET operational curriculum and a listing of needed competences in place. The school indicated that still many efforts should be made regarding RET integration and is therefore not able to work on the external promotion of RET integration i.e. to other SMK in the province it operates.

Conclusion

In general the 11 selected SMK for CASINDO were not suited to play an important role in the roll-out of RET integration to other SMK in their provinces. The efforts each of these schools should make for materialising their own RET integration in their school practices was taking much time and effort. The circumstance that the national SMK curriculum framework allowed only possibilities for RET integration through insertion of contents in existing disciplines, thorough the use of local curriculum space and through extracurricular activities was important in that respect. The exception to this

conclusion regarded SMKN 3 Jayapura. This school showed apparently more ambition to be active in externally promoting RET integration in other schools.

The main reason for not giving priority to the RET roll-out was the fact that all schools were involved in teachers trainings provided by TEDC in 2010 and 2011. In the reports D8 and D9 is described in detail what training courses have been provided and for how long. Roughly 90 SMK teachers from the 11 SMK have followed these training in the course of 2011, which means an average of more than 9 teachers per school. This has put a considerable burden on each school. And another fact also counts very much: only after the teachers trainings in 2011 the schools possessed the basic knowledge about the different RET, which is needed to make the promotion for a successful roll-out possible.

2.3 Roll-out induced by general stakeholders and universities CASINDO

The CASINDO programme assumed that at the level of its provinces, coordinating mechanisms starting with concerted energy planning, could also support and stimulate the cooperation between provincial energy, educational authorities and universities and SMK. Within that framework the CASINDO programme envisaged the further strengthening of the energy fora in the provinces. Those bodies already have been established and were operating in the provinces of Yogyakarta, Central Java, and Nusa Tenggara Barat; the establishment of such bodies is still in process in the provinces of North Sumatra, and Papua.

During CASINDO's Midterm Evaluation on 18 October 2010 in Makassar², it was clearly stated that individual SMK should not be part of an energy forum of a province. To represent all SMK in a certain province, the provincial educational bureau (Dinas Pendidikan) should take that place. The argument brought forward during the Midterm Evaluation was certainly correct from the procedural point of view, but appeared to neglect the fact the SMKs have been overlooked for a very long time. By involving them they would become more visible which would be good for promotional purposes. As it looks now, the significance of the provincial energy fora did not yet yield results in rolling out RET integration to new SMK in the CASINDO provinces.

Worthwhile mentioning in this report is the good cooperation between Cenderawasih University Jayapura and the SMK in Papua Province and Diponegoro University Semarang with the CASINDO SMK in the Province of Central Java. In both provinces SMK invited directors and teachers to participate in trainings given by the universities; in all cases these invitations were followed up. The mentioned universities did not invite only CASINDO SMK, but also others for certain trainings (energy planning). These universities offered also a shared use of the demonstration equipment that the CASINDO programme facilitated for all universities that are part of the programme. All these cooperation initiatives were fruitful for the implied SMK, but did serve the roll-out of RET integration to new SMK to a lesser extent.

The cooperation between Education and Training Centre for Electricity, New Energy, Renewable and Energy Conservation of the MEMR –ETCENEREC- (former ETCTERE) took place at the level of the

² CASINDO Mid-Term Evaluation Meeting, Meeting Minutes, Makassar, 18th October 2010

level of the coordination of CASINDO activities in Indonesia. The institute offered trainings in RET applications to the personnel of the Ministry; before the CASINDO programme ETCERE participated also in RET trainings TEDC organised for its own staff. The cooperation between ETCENEREC and TEDC within CASINDO was not instrumental for the roll-out of RET education to new SMK. The question is whether that was possible, given ETCENEREC's coordination tasks of all Indonesian stakeholders of CASINDO.

2.4 Roll-out through TEDC

In the course of 2010 and 2011 trainings have been given to teachers of the 11 CASINDO SMK. The reports D8 and D9³ give a detailed record of all trainings delivered by TEDC for this purpose. In these reports also the mason trainings for BIRU Biogas, MHP Teacher training for E9 countries, and the establishment of HYCOM all have been highlighted as substantial training activities that TEDC has carried out. As a consequence of these activities 21 new SMK have been trained in Micro Hydro Power (MHP) at 4 different levels, and in Biogas (BG) and Wind Energy (WE) at basic level. In the following table an overview is given of the provinces in which these new SMK are established in combination with the disciplines taught. The table shows also that 11 of the new SMK were involved in the training 2 disciplines. It concerns combinations of MHP-1 with MHP-2/4 and BG-1, but also with biogas and MHP-1 or MHP-2/4 with WE-1. This explains why the totals of new SMK are lower than the totals of all trainings executed.

Table 1: Overview MHP-1, MHP-2/4, BG-1, WE-1

CASINDO provinces	New SMK	MHP-1	MHP- 2/4	BG-1	WE-1
Jawa Tengah (Central Java)	3	2		3	
Special Region Yogyakarta	1	1			
Nusa Tenggara Barat (West Nusa Tenggara)	1	1		1	
Sub Total	5	4	0	4	0
Non CASINDO provinces					
Jawa Timur (East Java)	3	2		1	3
Jawa Barat (West Java)	7	3	2	4	1
Sumatera Barat (West Sumatra)	1			1	
Sumatera Selatan (South Sumatra)	1	1		1	
Sulawesi Utara (North Sulawesi)	1	1			
Sulawesi Selatan (South Sulawesi)	2	1	2		1
Bangka Belitung	1				2
Sub Total	16	8	4	7	7
Total general	21	12	4	11	7

The table shows as well that mainly SMK were reached by the RET trainings in other than the provinces, where CASINDO was operating. In total 16 new SMK outside the CASINDO provinces participated in the teacher trainings and only 5 new SMK within these provinces. TEDC's policy was

³ Deliverable No. 8: Report on general competency trainings (basic level) by TEDC and SMK teachers from the five CASINDO regions

Deliverable No. 9: Report on specific competency trainings (basic level) by TEDC for SMK teachers from the five CASINDO regions

to follow the demand expressed by the SMK without a specific focus on the CASINDO provinces. This was generated by the institute's promotion for RET trainings during its activities for E-9 and its cooperation with BIRU (see Report on D9).

The reason for the approach not to pursue a roll-out within only the CASINDO provinces (on the average 4 per province), as was envisaged in D12 of the CASINDO project document, stemmed from the understanding of and based on working 3 years with the 11 CASINDO SMK, that these schools had much more to do with the RET integration in their own schools than to go out and try to awake the interest of at least for other SMK in the provinces they were working. This would have required much time, but also funds for a coordinated effort within each CASINDO province, in case more than one CASINDO SMK was operating in that province. In the case where just one CASINDO SMK was operating in a province (Nusa Tenggara Barat), the burden for promoting and expanding consistently RET integration in other SMK was too heavy.

Also should be noted that, because of the demand driven character of TEC's training activities, the roll-out to new SMK was not covering the entire range of RET trainings that TEDC could offer. D12 of the CASINDO project document suggests a strategy in which from the outset the whole range of RET would be taken up in the roll-out to other SMK. TEDC has made a more pragmatic choice by using its newly acquired reputation in supporting SMK in the integration of RET in their educational practices. By doing so TEDC succeeded to already imply actively 21 SMK in concrete activities related to RET integration, whereas D12 of the CASINDO project document only required *the formulation of the approach* for a roll-out that would be materialised *beyond* the CASINDO project period. TEDC's chosen step by step and demand driven approach (SMK demand through SMK teacher trainings, one RET at a time, all provinces open for roll-out) proved to be successful.

This successful implication of the mentioned 21 SMK in RET training activities induced TEDC to further promote its offer of RET training opportunities to the SMK field. In this promotion most of the 21 reached SMK and some new ones were implied. In the promotion for RET training by TEDC mention is made of the experiences gathered in the CASINDO programme, as well as in the preceding Energy Working Group projects. Herein is brought forward that the 11 SMK working under CASINDO are in the position to open a broad RET program at basic level; they have been prepared to open a RET competency skills programme in 2012. Table 2 gives the concerned SMK and the provinces within which they operate.

Table 2: MHP-1, WE-1, PV-1, BM-1, BG-1

CASINDO provinces	RET program at basic level	Total SMK
Jawa Tengah (Central Java)	SMKN 1 Blora SMKN Magelang SMK Swasta Panca Bhakti	3
Special Region Yogyakarta	SMKN 2 Yogyakarta SMKN 2 Pegasih	2
Papua	SMKN 3 Jayapura SMKN 3 Merauke	2
Sumatera Utara (North Sumatra)	SMKN 2 Doloksanggul SMKN 1 Balige	3
Nusa Tenggara Barat (East Nusa Tenggara)	SMKN 2 Kuripan	1

On top of that 20 SMK have opened their doors for the delivery of RET teaching to SMK students. TEDC is actively promoting these new opportunities per October 2011⁴. In Table 3 an overview is given of these SMK; herein is also indicated which schools already offer RET teaching at basic competency level takes place within local content (i.e. free space within the school curriculum that can be filled at the schools discretion based on student demand and specific requirements from the environment of the school). Table 3 shows that already 11 SMK have been practicing RET teaching within local content, 2 SMK through other mechanisms (insertion in other disciplines, extracurricular activities), whereas 6 SMK are actively pursuing the upgrading of their teaching in MHP and WE.

In TEDC's promotion also is emphasised that a RET expertise programme with clearly defined competencies at national level will become part of the SPEKTRUM of Vocational Secondary Education programme of the Ministry of National Education in 2012. This will make it much easier for individual SMK to offer RET teaching in their schools. These schools have then the opportunity to open a specific fully fledged RET programme with also the possibility to acquire the needed equipment/facilities for such programme at the cost of the Ministry. This is important for the further roll-out to other SMK with TEDC's mediation. The 11 CASINDO SMK have acquired demonstration equipment on the budget of the CASINDO programme; the experiences with the acquisition and the use of this equipment can certainly of use for the new SMK.

Table 3: New SMK in RET education

CASINDO provinces	RET teaching within local content	Teaching MHP & WE	ToT MHP	ToT WE
Jawa Tengah (Central Java)	SMKN 1 Klego, Kab. Boyolali SMKN 2 Kab. Klaten SMKN 7 Kota Semarang			
Nusa Tenggara Barat (West Nusa Tenggara)	SMKN 3 Kota Mataram			
Non CASINDO provinces				
Jawa Timur (East Java)	SMKN 1 Kota Kediri			SMKN 2 Kota Probolinggo
Jawa Barat (West Java)	SMKN 5 Pangalengan, Kab. Bandung SMKN 1 Kota Sukabumi SMKN 6 Kota Bandung SMKN 3 Kab. Kuningan	SMKN 2 Kab. Garut	SMKN 6 Kota Bandung	
Sumatera Barat (West Sumatra)	SMKN 1 Lintau Buo, Kab. Tanah Datar			SMKN 2 Subang
Sumatera Selatan (South Sumatra)			SMKN 2 Kota Palopo	
Lampung	SMKN 2 Bandar Lampung			SMK Muhammadiyah Kota Metro
Sulawesi Utara (North Sulawesi)				SMKN 2 Bitung
Sulawesi Tenggara (South East Sulawesi)		SMKN 2 Kota Kendari		
Riau				SMKN 2 Kota Pangkal Pinang

⁴ For that purpose the brochure 'Pendidikan Dan Pelatihan Teknik Energi Terbarukan di 31 Sekolah Menengah Kejuruan dan PPPPTK BMTI/TEDC Cimahi' was published in October 2011 by TEDC

2.5 Conclusions

The roll-out model that was tentatively formulated in the CASINDO document (concentration of 4 new SMK in project provinces, covering the whole spectrum of RET), has been amended by TEDC's pragmatic approach. The offer of all RET training that TEDC could make was a direct result of the EWG projects preceding CASINDO and the CASINDO programme itself. This approach, in which the demand by new SMK for RET teaching in their schools is lead by TEDC's RET trainings, have proven to be very effective. At the same time the cooperation between TEDC, the universities and other stakeholders (ETCENEREC, energy fora) within CASINDO made a good start.

3. Roll-out options to be pursued

3.1 Introduction

In Chapter 2 is clearly shown that TEDC has played a central role in the roll-out of RET education to new SMK. In the following paragraphs will be shortly described whether this should stay the same and what other stakeholders should play a role.

3.2 Conditions to be fulfilled

As earlier mentioned TEDC's role was pioneering one, and its importance in the roll-out certainly should remain. For a successful fulfilment of its role the following conditions have to be met.

1. Align TEDC's teaching capacity (in quality and quantity) with the expected increased demands from new SMK that wish to start RET education activities.
2. Upgrade TEDC's knowledge on RET, in order to be able to offer higher level teacher competency trainings to SMK teachers
3. Get the integration of RET in the SPEKTRUM of the national Secondary Vocational Education programme of the Ministry of National Education
4. Strengthen SMK already involved in RET education and new SMK that are interested to do so in actively cooperating with each other by promoting exchanges of RET teachers and developed RET school curricula
5. Strengthen the cooperation between TEDC and SMK with CASINDO stakeholders (universities, ETCENEREC, provincial educational bureaus, already operating energy fora)

In all 5 conditions TEDC remains playing a central role. In the first 2 conditions this is very clear, and in the 3rd conditions TEDC has a central role in submitting the final version of the national RET competency programme. These roles cannot be fulfilled by (an)other institution(s) thus far.

This does not count for the last 2 conditions: here other actors than TEDC should play an increasingly important role. The question here is who takes the lead in the realisation of these conditions: it is simply too much for TEDC to take care of all.

3.3 Roll-out in the next future

In the previous paragraphs it became clear that thus far the roll-out of RET education to new SMK was driven by TEDC i.e. TEDC-centred. A more SMK-centred approach, as assumed in the CASINDO programme document, proved to be difficult. The main reason for this was the circumstance that each SMK had to struggle with the existing national curriculum framework for SMK, which not only limited opportunities to open a full RET discipline, but also the opportunities to get financial means additional to their current allocated budgets. With the concrete perspective that a RET national curriculum will be integrated in SPEKTRUM in the course of 2012, SMK and also TEDC do get many more opportunities to integrate RET education in the learning practices at school level.

This new circumstance has to be anticipated. TEDC is then in the position to more actively involve SMK in the roll-out of RET education. The question now is whether TEDC should continue playing the role of leading institution, or that level a core group at national level should be established, in which the Ministry of National Education, the Ministry of Energy and Mineral Resources, TEDC, and 2 or 3 pioneering SMK are represented. This group should have the task to put up a plan with milestones for the roll-out; the recent initiative by TEDC to involve already 19 new SMK in RET education and the opening of RET disciplines in the 11 CASINDO SMK, should be the point of departure for the core group. The group should get a mandate that gives room liaison with the provincial authorities (education and energy), new SMK, and the private sector. The establishment of the group should take place in the 2nd half of 2012, when the integration of RET in SPEKTRUM is materialised.

Only with the establishment of the core group the cooperation between the provincial educational bureaus and the SMK pursuing RET education at provincial level can be strengthened. This process is foreseen to take place from the outset of 2013. In the meantime actual existing practices of cooperation with the universities, ETCENEREC and energy fora should continue and be strengthened.

4. Final remarks

The idea of roll-out, as originally envisaged in the project document, proved to be a first attempt to give an indication for a possible strategy. Practice has learned that implementation questions on the roll-out come along with the process of RET integration in the 11 CASINDO SMK and 20 additional SMK. With TEDC's vast experiences gained in its roll-out of RET and the to be expected integration of RET in the national programme SPEKTRUM, the conditions for a further roll-out appear to be much more favourable in comparison with the situation at the start of CASINDO.