



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

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

## CASINDO

### DELIVERABLE NO. 4: INCEPTION REPORT

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## Preface

This inception report is deliverable No. 4 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 sustainable energy projects.

The CASINDO project is funded by SenterNovem 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 Cendrawasih, Jayapura.
- Institute of Technology of Bandung (ITB), Bandung.
- Technical Education Development Centre (TEDC), Bandung.
- Technical University Eindhoven, Eindhoven.
- ETC-Nederland, Leusden.
- Energy research Centre of the Netherlands ECN, Petten.
- Biomass Technology Group BTG, Enschede.
- AdvancedConsulting, Bennekom.
- Technical University Delft, Delft.

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

The CASINDO project is registered under ECN project number 50276.

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

## Abstract

The inception phase of the CASINDO project lasted from June to September 2009 and was meant to discuss the proposed approach among the project partners and to assess the need for training both at the national level and in the five target provinces. The inception report presents the proposed training programmes for addressing the identified training needs, the proposed changes to the monitoring framework and other relevant issues discussed during the inception phase.

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## 1. Introduction

In June 2009, SenterNovem and the Energy research Centre of the Netherlands (ECN) signed a contract relating to the implementation of the project ‘Capacity development and strengthening for energy policy formulation and implementation of sustainable energy projects in Indonesia (CASINDO)’. The CASINDO project will be carried out within the framework of the renewable energy programme that the Dutch embassy is currently implementing in Indonesia.

The CASINDO project has officially commenced on 8 June 2009 and will run until 31 December 2011. The project will be coordinated jointly by the Energy research Centre of the Netherlands and the Education and Training Centre for Electricity and Renewable Energy of the Indonesian Ministry of Energy and Mineral Resources. CASINDO will be implemented both at the national level and in the provinces of North Sumatra, Yogyakarta, Central Java, West Nusa Tenggara and Papua by a consortium comprising six Dutch and eight Indonesian research and government organisations.

The inception phase ran from June to September 2009. The overall goal of this phase was to discuss the proposed approach and work plan among the project partners and to identify the needs for training both at the national level and in the five target provinces. More specific objectives of this phase were to:

- Assess in detail the training needs of:
  - DNREEC, DICEMR and ETA-ETCERE of the MEMR,
  - the technical teams established in the five target provinces,
  - the energy fora in the five target provinces,
  - the selected kabupaten and kota in the five target provinces,
  - the partner universities in the five target provinces,
  - the selected SMKs in the five target regions.
- Develop a training programme that addresses the above identified needs, which will be implemented throughout the duration of the project and will support the implementation of the other activities foreseen in CASINDO.
- Determine the demand in the five target provinces for technical school and university graduates in the fields of sustainable energy and energy efficiency.
- Review the indicators that will be used to monitor the ‘output’ and ‘outcome’ of the CASINDO activities and to assess the baseline values for these indicators.
- Discuss the activities foreseen in CASINDO and to revise the approach and work plan presented in the project proposal, if necessary.

Unfortunately, the consortium was unable to visit Papua during most of the inception phase due to the security situation. This obviously significantly affected the launch of CASINDO in this province, which has not yet been involved in the Energy Working Group activities. Initially, an opening seminar was planned to be held in Papua in July 2009 to introduce the CASINDO project to the main stakeholders. To this end, MEMR and ITB visited Papua in June 2009 to prepare the seminar and to meet with the Cendrawasih University, the proposed partner University in Papua. Moreover, ETC Nederland and TEDC undertook a mission to Papua in June 2009 to identify suitable SMKs that could be included in the CASINDO programme. However, towards the end of June the security situation deteriorated and in early July the MEMR decided that it was not safe enough to go there and therefore the opening seminar was cancelled until further notice. A meeting of MEMR and the head of the regional energy office in Papua was held in Jakarta instead.

Several missions have been undertaken to the target provinces and to MEMR during the inception phase:

- On 23-24 April 2009, ECN conducted meetings with DICEMR, ETCERE and DNREEC of MEMR to identify the specific training needs of MEMR staff and to prepare a first draft training programme.
- In June 2009, ITB and MEMR visited Papua to introduce CASINDO to the local government and the local university and to start preparing the opening seminar.
- In June 2009, ETC Nederland, together with TEDC, visited Papua (before the security situation deteriorated) and North Sumatra and TEDC visited the other regions in July with the purpose to identify suitable SMKs that could be included in the CASINDO programme and to assess the demand for skilled labour in the field of renewable energy technologies in the target provinces.
- In July 2009, the Technical University Eindhoven visited all provinces except Papua with the aim to assess the training needs of the partner universities, to determine the demand for university graduates in the regions and to discuss the proposed approach for establishing an education and research programme at the partner university.
- On 30 July 2009, ECN conducted a one-day meeting in Mataram attended by all regional technical teams except Papua to discuss the CASINDO work plan, in particular the activities related to work package 5 of the CASINDO proposal.
- In August 2009, ECN conducted a second round of meetings in Jakarta with DICEMR, ETCERE and NDREEC of MEMR to discuss the draft training programme and proposed detailed curriculum for the training courses.
- During the period end August – early September 2009 ECN visited the teams in North Sumatra, Central Java, Yogyakarta and West Nusa Tenggara to discuss and finalise the training needs assessment conducted by the teams and other issues relevant for the inception report.

In the CASINDO project proposal the activities are structured according to eight work packages. This inception report presents the main issues discussed during the inception phase for each of these work packages.

Chapter 2 presents the main issues regarding the general project management. In Chapter 3, the institutional structure to be set up or strengthened in the target provinces is presented and discussed. Chapter 4 covers the needs analysis for the technical schools(SMK) and Chapter 5 contains a similar analysis for the partner universities. In Chapter 6 the identified training needs of the stakeholders in the five target provinces is presented and in Chapter 7 contains the agreed training programme the MEMR-ETCERE will be given in the target provinces. The training programme developed for the MEMR is discussed in Chapter 8 and Chapter 9 addresses the main issues related to the dissemination of the project results. In Chapter 10 the need for engaging organisations outside the CASINDO consortium for the implementation of the training programme is assessed and, finally, in Chapter 11 the organisational structure for CASINDO is presented and discussed.

## 2. Major issues for Work Package 1: General management

The major issues related to WP 1 discussed during the inception phase were: contractual arrangements, establishing procedures to ensure efficient and effective implementation of CASINDO, kick-off meeting, collaboration with other relevant ongoing projects in Indonesia and the Project Advisory Committee (PAC).

### *Contractual arrangements*

Soon after the main contract for CASINDO between SenterNovem and ECN was signed, sub-contracts were drawn up for the CASINDO partners and these subcontracts were signed during the second half of the inception period, except for Papua for reasons explained in the previous section.

A subcontract has also been signed with MVV Decon, a German consultancy firm specialised in energy efficiency. MVV Decon will be responsible for the implementation of the energy efficiency training courses and will co-ordinate the development of the regional energy efficiency master plans. The signing of subcontracts with BTG and AdvanceConsulting is foreseen for early October when the inception phase is completed and the inception report has been approved by SenterNovem.

### *Procedures to ensure efficient and effective implementation of CASINDO*

CASINDO is a large project (programme) comprising numerous activities and involving many team members. A clear working structure therefore needs to be put in place to safeguard a smooth and efficient implementation of the project. To this end, a number of Technical Working Groups (TWG) have been established, each of which will work on the achievement of the objectives of one or more particular activities. In addition, frequent interactions with the regional and national government are foreseen to ensure that these activities are embedded in the national/regional policy framework. A more detailed description of this structure is presented in Chapter 11.

In addition to the above structure, good communication channels have been put in place/strengthened among the project partners. Firstly, communication to facilitate the necessary interactions among the TWGs to create synergy and avoid duplication of work is coordinated by ECN (Nico van der Linden). Secondly, communication among the Indonesian partners is coordinated by MEMR-ETCERE and ECN (Nico van der Linden) and, finally, communication among the European partners is overseen by ECN (Koen Smekens). E-mail is the most common mode of communication, but regular teleconferences will be organised as well. Most intensive communication, however, will take place during the many team meetings foreseen in the project.

### *Kick-off meeting*

Although the CASINDO project officially commenced on 8 June and a number of activities have already started it was decided to postpone the official kick-off until 30 November 2009 in order to be able to combine it with the Energy Working Group meeting and the signing of a Memorandum of Understanding for the Energy Programme of the Dutch Embassy by the (new) Minister of Mineral Resources and Energy and the Dutch Ambassador. These activities will take place in the period 30 November to 3 December 2009 in Jakarta and are expected to attract much attention from the local and national media. From a public relations point of view this period would therefore be a perfect time to also launch the CASINDO project.

### *Collaboration with other ongoing activities*

Collaboration with other relevant ongoing activities will be sought throughout the implementation of CASINDO, in particular with the other BECIN activities geothermal, micro-hydro and biogas. Good working relationships have already been established with GTZ (micro-hydro), Ton de Wilde (geothermal), HIVOS (biogas) and the Dutch embassy. Regular communication among these activities will be maintained to exchange experience, knowledge and information and to identify areas for potential cooperation.

### *Project Advisory Committee*

A Project Advisory Committee will be set up for the CASINDO project, which will provide guidance to the programme on its strategic implementation and review its progress. The composition of the PAC will include representatives of the national government as well as representatives of the regional government in the five target provinces. The PAC will have an Executive Committee, comprising DGEEU and ETCERE of MEMR and the Deputy head of Mission of the Government of the Netherlands, tasked to resolve any problems that may emerge and that could hamper a smooth implementation of CASINDO. The establishment of the PAC is coordinated by SenterNovem.

## 2.1 Monitoring framework for WP 1

The discussions held among the partners and with SenterNovem during the inception phase resulted in a number of changes regarding the monitoring framework for WP 1. The revised monitoring framework, including the baseline values, is presented in the table below.

Table 2.1 *Monitoring framework for WP 1: General Management Monitoring Framework*

	<i>Criteria</i>	<i>Indicators</i>	<i>Baseline value</i>
<i>Output</i>	<ul style="list-style-type: none"><li>• Quality of management and good performance of the Consortium</li></ul>	<ul style="list-style-type: none"><li>• Good communication with the Project Advisory Committee measured through frequency and quality of communication.</li><li>• Good communication and coordination within the consortium, measured by the frequency, means and quality of the communication, the clarity of roles and the complementarity of activities of the partners.</li><li>• Timely and appropriate reporting, measured against the schedule of deliverables and their approval by SenterNovem.</li><li>• Efficient organisation and implementation of project team meetings, measured against the minutes of the meetings.</li></ul>	<p>PAC not yet established.</p> <p>Communication structure to some extent already established in EWG activities.</p> <p>D37 submitted and approved by SN provided that some revisions will be made.</p> <p>No CASINDO project teams meetings held yet.</p>
<i>Outcome</i>	<ul style="list-style-type: none"><li>• Smooth implementation and timely completion of all work packages, deliverables and progress reports</li></ul>	<ul style="list-style-type: none"><li>• Programme progresses on time and within the budget, as measured through progress reports and cost statements.</li></ul>	<p>No progress reports/cost statements submitted yet</p>

### 3. Major issues for Work Package 2: Strengthening of the institutional structure

The key bodies of the institutional structure for energy policy formulation set up in the provinces are the regional energy forum and the regional technical team. The technical team conducts the analysis that is needed to enable the regional energy forum to formulate sound energy policies that can be submitted to the regional government for final approval. In the CAREPI project this structure was successfully set up in the provinces Yogyakarta, Central Java and West Nusa Tenggara.

In North Sumatra, however, the energy forum has not yet been formally established, despite the efforts undertaken by the CAREPI team, in particular by MEMR, to convince the provincial government of the importance of this body. This lack of formal support from the local government hampers a smooth implementation of the project and also weakens the rationale for inclusion of this province in CASINDO. Therefore, in the coming months further discussions on this matter will take place with MEMR, Dinas Energi, and SenterNovem with the aim to ensure the North Sumatra government's commitment to and active participation in the CASINDO project. If, however, these renewed efforts again turn out to be unsuccessful the position of North Sumatra in the CASINDO project needs to be reconsidered.

In CASINDO the established institutional structures will be strengthened and expanded to include the provincial education office (Dinas Pendidikan) and, if not yet included, the regional private sector and regional NGOs. The institutional focus of CASINDO will shift from the regional technical team and the regional energy forum to the regional energy office (Dinas Energi), which will become the focal point for CASINDO in each target province. This new approach is already applied for Papua where discussions have been initiated about the CASINDO project between MEMR and Dinas Energi Papua. The essential difference between the CAREPI and the CASINDO approach is that in the latter the Dinas Energi will be first involved in and committed to the project before the regional team, including the local University, is set up jointly by the CASINDO team and the regional energy office. This ensures ownership of CASINDO by the regional government at an early stage and therefore will likely avoid the problems encountered in North Sumatra, where the technical team was established first and, subsequently, the Dinas Energi was invited to become involved in the activities<sup>1</sup>.

#### 3.1 The institutional structure for the CASINDO project

The slightly revised institutional set up for CASINDO is depicted in figure 3.1 below.

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<sup>1</sup> The CAREPI approach, however, did work satisfactorily in Yogyakarta, Central Java and West Nusa Tenggara where good working relationships have been established with local government by the technical teams.

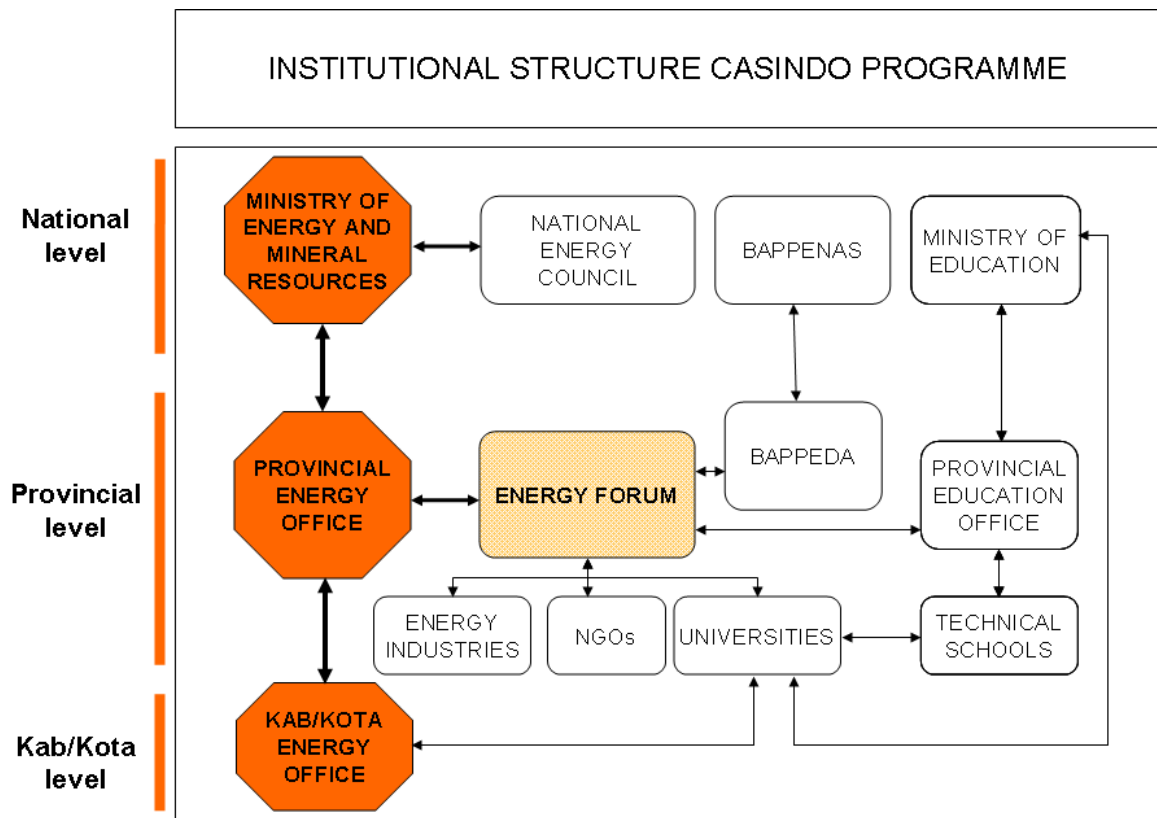


Figure 3.1 Institutional structure for CASINDO programme

The Ministry of Energy and Mineral Resources at the national level and the regional energy office in the province will be the focal points for CASINDO, but also a (limited) number of kabupaten/kota will be involved in the project and will receive training on energy policy formulation and implementation issues.

The regional energy forum, including the regional technical team, is the main body in the region for discussing and formulating regional energy policies. These policies are submitted to the regional energy office for final approval.

The partner universities, local energy industries and NGOs are working together in the technical team to support the energy forum members and increasingly also the kabupaten/kota policy makers. The universities will develop and implement renewable energy and energy efficiency research and education programmes. To ensure that the curriculum developed for the education programme is in line with national regulations and to facilitate replication of this approach in other regions, close cooperation with the Ministry of Education will be sought.

The introduction of renewable energy and energy efficiency training modules at selected technical schools (SMK) will be done in close cooperation with the provincial education office and the Ministry of Education to facilitate a roll-out of the approach to other SMKs. The curriculum for the training modules will also be developed in line with the demand for specific skilled labour required to implement the energy policies formulated by the energy forum.

The Bappenas at the national level and the Bappeda in the province will play an important role in CASINDO with regard to the financing of bankable renewable energy and energy efficiency projects developed by the CASINDO team.

Finally, although the national energy council is not yet fully operational, it is expected that the NEC will provide important guidance as to national and regional energy policy priorities.

### 3.2 Monitoring framework for WP 2

The discussions held during the inception phase with the MEMR and regional governments as well as the comments received from SenterNovem have resulted in a revision of the monitoring framework for WP2. The set-up of the institutional structure and the composition of the energy forum and the technical team are extremely important for the sustainability of CASINDO in the longer term. However, it should be realised that this is the prime responsibility of the regional government and it is therefore to a large extent beyond the control of the CASINDO team. It was thus deemed better to express the indicators in more qualitative terms.

Table 3.1 *Monitoring framework for WP2: Strengthening institutional structure Monitoring Framework*

	<i>Criteria</i>	<i>Indicators</i>	<i>Baseline value</i>
<i>Output</i>	<ul style="list-style-type: none"> <li>• Institutional structure and framework for regional energy forum and technical team established in North Sumatra and Papua</li> <li>• Institutional structure strengthened in WNT, Central Java and Yogyakarta.</li> </ul>	<ul style="list-style-type: none"> <li>• Official approval of the energy forum and technical team by local government and inclusion in annual government planning and budget cycle, measured by official documents showing the composition of EF and technical team.</li> <li>• Composition of the forum broadened by representatives of regional education bureau and, if necessary, representatives from bappeda, private sector and NGOs.</li> <li>• Increasing regional budget provisions for regional energy fora activities.</li> </ul>	<p>Structure not yet established in Papua and; in North Sumatra technical team established but not yet formally supported by local government.</p> <p>Composition energy forum basically consists of government and energy sub-sectors.</p> <p>No financial support from regional government in Central Java, and only limited support in Yogya and WNT.</p>
<i>Outcome</i>	Energy policies discussed and energy strategies formulated and submitted to the regional government.	Frequency of forum meetings and agreed energy policies submitted to the regional government.	Discussions take place but no policies submitted yet

#### 4. Major issues for Work Package 3&6: Training needs assessment for SMKs

The inception phase, including the meetings with the visited SMKs, has led to clarification and adaptation of the aims of WP 3. The major issues discussed in this phase were the assessment of demand for SMK graduates in RE&EE, the selection of SMKs for inclusion in CASINDO, identification of necessary demonstration equipment to be purchased for the target SMKs, the institutional embedding and the monitoring framework.

##### 4.1 Assessment of demand for SMK graduates in RE&EE technologies

Assessment of demand for SMK graduates in RE&EE technologies was done in 3 ways:

1. Regional/local authorities: indication of main energy sources in their regions.
2. Visited SMKs: positions of their alumnae; their perception of the local labour market (data from the respective SMKs).
3. Questionnaire of TU/e: data from interviews with about 10 energy supplying companies per province; their perception of the demand for specific RET related skills.

###### *Ad 1: Regional/local authorities*

Below a summary is given of the expected main trends in the field of renewable energy in general and for the 5 target provinces. These trends are an indication for specific demands for RET related professional training.

Table 4.1 illustrates the potential of renewable energy in Indonesia according to the Blueprint of National Energy Management 2005-2010 (2005), in as far this regards the sources that are covered in WP3.

Table 4.1 *National renewable energy potential*

Energy Non Fossil	Resources [MW]	Equivalent	Utilisation	Installed Capacity [MW]
Mini/Micro hydro	458,75	458,75 MW	-	84,00
Biomass	-	49,81 GW	-	302,40
Solar PV	-	4,80 kWh/m <sup>2</sup> /hari	-	8,00
Wind Energy	-	9,29 GW	-	0,50

Source: Blueprint of National Energy Management 2005-2025 (2005)

[http://www.energiterbarukan.net/filedownload/blueprint\\_PEN.pdf](http://www.energiterbarukan.net/filedownload/blueprint_PEN.pdf)

Table 4.2 shows the main features of the potential for RET in the five project provinces.

Table 4.2 *Renewable energy development program 2005-2009: 5 target provinces*

No	Provinces	Micro Hydro Power [kW] <sup>1)</sup>	Solar Photo Voltaic [kW] <sup>2)</sup>	Potential Wind Energy [kW]	Biomass/Biogas [kJ]
1	Papua	Potential: 79,133.4 kW In 2009 will install 32.3 MW	5.720 Wh/ m <sup>2</sup> In 2009 MEMR will install 33.000 unit SHS. Papua will get 2,999 unit SHS 50 Wp	Potential of Merauke: coast area 5m/sec, hinterland 2m/sec during the year <sup>3)</sup> In 2010 gov. will build 8 x 2.5 MW	-
2	North Sumatra	134,888 In 2009 PT PLN builds some MHP with 60 MW including MHP of 7,5 MW each in Humbang Hasundutan.	No data	No data	Paddy chaff 201,069 to/ year, Shell 3,649 ton/ year Oil pum shell 640.8 Life stock : 480,000 cows; 52,473 buffalos; 784,420 pigs; 139,511 goats Peat 1,528.526 kj <sup>5)</sup>
3	West Nusa Tenggara	Hydro power potential: 291,609.36 kW Micro hydro potential 50,609.36 kW	Radiation intensity: 5.747 Wh/ m <sup>2</sup> at 9 <sup>0</sup> 37' TS; 120 <sup>0</sup> 16' LE during 1991-1995 In 2009 West Nusa Tenggara will get 2,100 units SHS 50Wp	Wind speed 3,5-7 m/sec In 2009 20 units WE will be built with total capacity of 100 kW	In 2009 500,000 cows can generate 480 MW <sup>9)</sup>
4	Special Region of Yogyakarta	This province has 484,800 kW from micro hydro. About 100 kW will be installed in 2009	Until 2007 114 PLTSs have been installed	Installed potential 200 MW in Purworejo, 50 Km from Yogyakarta <sup>4)</sup>	No data
5	Central Java	384,800 kW In 2009 Indonesia Power targets 11 MHP à 1,2 MW in Banjarnegara <sup>7)</sup>  In the future Indonesia Power will build 25 location à 2MW	In 2009 Kabupaten Banjarnegar (Sub-province Blora) will get 50 Solar PV <sup>8)</sup>	-	In 2009-2011 Cooperation between DGEEU with SNV and HIVOS will install 12,000 unit biogas for houses in Indonesia <sup>6)</sup>

Source:

1): <http://re.djlpe.esdm.go.id/modules/potential/mikrohidro.php?prop>

2): [http://www.ptpjb.com/iframe\\_news\\_content.php?n=1066](http://www.ptpjb.com/iframe_news_content.php?n=1066)

3): [http://kab.merauke.go.id/index.php?option=com\\_content&task=category&sectionid=3&id=35&Itemid=55](http://kab.merauke.go.id/index.php?option=com_content&task=category&sectionid=3&id=35&Itemid=55)

4): <http://indonesiaenergywatch.com/fokus/purworejo-layak-pembangkit-listrik-tenaga-bayu.html>

5): <http://re.djlpe.esdm.go.id/modules/potential/biomass.php?prop=SUMATERA+UTARA&txtsrc=>

6): [http://www.energiiterbarukan.net/index.php?option=com\\_content&task=view&id=178&Itemid=81](http://www.energiiterbarukan.net/index.php?option=com_content&task=view&id=178&Itemid=81)

7): <http://www.kompas.com/read/xml/2008/08/07/19322397/indonesia.power.targetkan.11.pltmh.di.jateng>

8): <http://diskominfo-blora.blogspot.com/2009/07/radar-bojonegoro-ipitek-olah-raga.html>

9): <http://www.sasak.org/univ-ks/78-energi/806-biogas-listrik-teknologi-tepat-guna-untuk-implementasi-program-desa-mandiri-energi-di-nusa-tenggara-barat.html>

## *Ad 2: Visited SMKs*

For getting data about SMK alumnae, SMK headmasters and teacher perceptions regarding the demand for RET skills training, additional data collection was carried out as a complement to the data collection during the visits made in June 2009 to the SMK in the 5 project provinces. The survey was carried out in September 2009 by the TEDC team; a questionnaire with 6 open questions was used in interviews by phone. In total 11 principals and 33 teachers of mechanical, civil, electrical from the 12 selected SMK in project 5 provinces have been interviewed<sup>2</sup>. The narration of the interview outcomes will be given per province.

### a. Papua

Headmasters and teachers stated, that though Papua has many renewable energy sources, that the electrification ratio only reaches to about 32%. In the North of Papua many water sources give a large power potential. South Papua has opportunities for wind energy generation.

Headmasters and teachers stated that Renewable Energy Technology (RET) is very important to be studied in SMK, in order to give students have the needed competencies for fulfilling the electricity needs in the province. By having RET related competencies alumnae can empower themselves for the electrification of rural societies in Papua.

RET technicians must be immediately prepared, because in 2009 the central government and the province government are developing large hydro power facilities. In this year the government is also distributing 2,999 units of PV 50 Wp that will be allotted to all Papua sub provinces. Related systems must be handled, managed, maintained and repaired by local technicians that are to be educated also in the field of renewable energy: RET alumnae will have opportunities to develop themselves as professional techno entrepreneur.

Headmasters and teachers target RET alumnae to the following specific RET related job opportunities:

- 1) Projects from the government, PLN and the private sector for the development of small scale power plants
- 2) Project from the government and the private sector for electricity that have not yet jointed the electricity supply by PLN
- 3) Other development activities that require electricity

There were contacts between the Association Kontraktor Listrik and Mekanikal Indonesia (AKLI) Papua, the Jayapura city government, and the Merauka sub-province government with SMK regarding RET trainings; the government of the province supported this. For this reason school year the SMKN 3 Jayapura and SMKN 3 Merauke intend to open in the school year 2010/ 2011 new RET programs. In the first year will be started with one class.

The headmasters and teachers stated that alumnae's marketing is to be conducted by:

- 1) RET training promotion to private sector, industry, government, association, and NGOs by exhibitions, brochure, and the organization of competitions on RET student competencies.
- 2) Providing RET services to Desa Binaan Daerah regarding the maintenance and repair for small scale power plants, making components for small scale power plants and to build small scale power plant units.
- 3) Create a self-supporting school RET production unit. Schools should seek cooperation with industry that manufactures the components of small scale power plants regarding their installation, maintenance, and reparation, but also regarding diagnosing system failures.

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<sup>2</sup> A list of interviewees and interviewers is given in Appendix A.

## b. Northern Sumatra

Interviewed headmasters and teachers stated that though Northern Sumatra has many renewable energy sources for the production of electricity, but that these were underutilized. Until now biomass technology for power generation has not yet become a good business opportunity. The same counts for biogas, because potential for biogas (availability of ox livestock, pig and goat) is present.

The experience of the headmasters and teachers also indicates that much MHP and PV equipment has a short live cycle, because of the weakness of the capacity for operating, managing, maintaining and repairing MHP and PV systems. The development and management of small scale power MHP and PV systems must be supported by technicians that are educated and trained in renewable energy technology. Important something is also that electricity consumers use electricity more efficiently.

Headmasters and teachers stated that a large part of energy related investments are for the benefit of the central government, the national private sector the international investors, and PLN. For MHP investments are limited. Nevertheless they already see opportunities for interesting new careers for RET alumnae in the future:

- 1) Alumnae of RET can contribute to develop pico-hydro and micro hydro power in cooperation with the local government.
- 2) MHP & PV maintenance and repair training can be developed in cooperation between manufacturers from West Java and with the guidance of SMK in the province.
- 3) RET alumnae can work as an operator or technician at small scale, middle and large power plants that already exist, or under construction. The alumnae also can work in developing communities around the plantations for biomass applications (briquettes) and to contribute to the application biogas for cooking.
- 4) RET alumnae can continue their education to higher education of sustainable energy technology that now has started or other study programs like electrical engineering, technical engineering, or civil engineering.

For absorption of RET alumnae in the labour market, a marketing strategy should be developed:

- 1) Promotion to students of Junior secondary schools about work opportunity of RET
- 2) Using teaching methodology geared to project work in collaboration with industry
- 3) Participation in applied technology/educational fairs at national, (sub) province levels
- 4) Organizing on the job training in renewable energy power facilities
- 5) Promoting alumnae to renewable energy industries/power plants
- 6) Empowering the alumnae in SMK RET oriented business units

The Headmasters and teachers are motivated to open new a study program on Renewable Energy Technology (RET) in school year 2010/2011. They intend in collaboration with TEDC to propose a new study program for RET education to Dinas Pendidikan and Direktorat Pembinaan SMK. Headmasters and teachers intend to make RET a state of the art program, with teaching learning activities, on the job training (OJT) in different industries. In line North Sumatra's potential MHP (PLTMH) and Biomass should get first attention, whereas PV and Wind Turbine will have second priority. In first instance each SMK will open one class of RET with student amount only 24 people.

## c. West Nusa Tenggara

Only with one SMK interviews have been conducted. The other, SMK Negeri 3 Mataram, appeared not to be ready to execute a RET as new study program. After the visit of June 2009, the school management and teachers remained undecided about participating in RET related activities. This in spite of the fact that the educational office was stressing the importance of such ac-

tivities; the office was prepared to facilitate a start up workshop. It was decided to exclude the school from participation in the project.

The headmaster and the three electricity teachers of SMKN 2 Kuripan Lombok Barat stated that very important teaching RET within SMK, because WTB has a big renewable energy potential. Mid-term labour market prospects for RET alumnae are big enough in WTB. Also the potential solar PV and wind energy potencies are large. In 2006 the development of bio fuels has been started in NTB. Therefore the headmaster and teachers think that 70% of the RET alumnae can be absorbed in the labour market for RET, and 30% in the non formal labour market of RET; in this 30% are also included those who continue with (RET) higher education.

SMK should supply multi-skilled RET technicians for better power generation, but also to support developing power plants and Villages with Self Supplied Energy (Desa Mandiri Energi). The following points are important mentioning:

- 1) SMKN 2 Kuripans has broad and longstanding cooperation with the local government, private sector, and society of renewable energy practitioners in WTB, Bandung, Padang and East Java. There was also cooperation with IMIDAP, MHPP, IBEKA, Micro hydro Network, and the Technical System Magister of Gajah Mada University.
- 2) SMKN 2 Kuripans already conducts promotion of renewable energy utilization. SMK teachers, private sector, local government take part in the Focus Group Discussion with Asosiasi Hidro Lombok.
- 3) SMKN 2 Kuripans has conducted brief courses at micro hydro operation.
- 4) In their community oriented college, SMKN 2 Kuripans gives a brief course in renewable energy to village youngsters with a limited study future.

From the school year 2010/2011 SMKN 2 Kuripans will open one class of RET every year with concentration MHP and biomass/biogas. Each class will consist of 32 students. SMKN 2 Kuripan developed a special curriculum. The headmaster has prepared six teachers, of which 3 are MHP alumnae from Gajah Mada University and 3 MHP alumnae from teacher training in TEDC. Through cooperation with industries RET alumnae will get On the Job Training (OJT). The headmaster aims at taking a number of RET related measures:

- 1) Further develop RET program by RET developers / teachers
- 2) Exhibit RET products made by students for events, and RET in-school projects
- 3) Facilitate linkages with three school programs in mechanical, electrics and civil
- 4) Improve teachers competencies by their participation in RET master programs
- 5) Extend collaboration with local government, industry and business world

#### d. Special Region of Yogyakarta (Daerah Istimewa Yogyakarta -DIY-)

Headmasters and teachers stated that it is important teaching RET to SMK students. The need for specific RET competencies will increase, when the importance of renewable energy in the country is better acknowledged. They expect that this acknowledgement will come given the dependence on fossil energy generation. They think that the (local) government should be able to empower private sector to develop renewable energy.

A RET program can also stimulate the entrepreneurship of the alumnae by producing and servicing small power plant components. RET Alumnae should be able to work in the company or the private sector, either on RET related planning, installation, operation and or repair. Headmasters and teachers stated that the development of new RET human resource takes time, and requires a visionary, creative and prospective attitude. The local government should therefore support and guide RET integration in the national curriculum setup 'Spectrum'. With this integration teacher development, facilities, laboratory, curriculum development and learning materials, partnership development with government institutions and private sector can be better pursued. Cooperation should be sought with UGM or the Centre of Energy Studies.

The job market perspectives for RET alumnae in DIY are unclear; there is a lack of statistical data. Plans of the local government and the private sector in the field of renewable energy don't give sufficient information. The orientation to RET development in DIY is still not well articulated.

In 2010/2011 SMKNs 2 Pengasih and SMKN 2 Yogyakarta will each open one class RET; in the next years further classes will depend on the demand of labour market. In consequence, RET socialization will be conducted continually. Both SMKs will become education institutions for supporting the implementation Agenda of National Research and Government Act No 5 in 2006 about renewable energy. Before RET becomes new study program in within Spectrum of Vocational Education, the RET instruction will be conducted as extracurricular activities for one special class of 15 students, of which five people come from electricians, five from mechanical and five from civil. They will study RET 12 hours per week. The school intend to develop RET a broad based (interdisciplinary) curriculum.

Headmasters and teachers indicate that more RET related socialization should be carried out (school website, direct promotion, exhibitions, RET workshops, in which industries and societal organizations are invited). Cooperation with projects like for example PNPM Mandiri in areas without electricians, but with RET potential, have to be pursued. Even the establishment of a school-based small business can be considered.

#### e. Central Java

Headmasters and teachers of SMKN 1 Magelang, SMKN 1 Blora, and SMK Panca Bhakti Banjarnegara state that the labour market for RET alumnae is growing in industry, agriculture (plantation), and fishery. Power plants in Central Java and local investors that develop MHP projects need qualified personnel. RET is very important to be taught in SMK, because the dependence on fossil fuel energy becomes problematic; SMK must therefore actively participate in spreading RET technology. They think that multi skilled human resources are needed for supporting the government and private sector programs in the field of renewable energy. For this will they engage themselves in various promotion activities for RET education, which are similar to what is intended in the other project provinces.

SMKN 1 Magelang will open study program RET in teaching year 2010/2011 for one class (36 students). SMKN 1 Magelang selected MHP as first choice and Biomass/ biogas as second choice. The demand for SMK services (about 1,800 requests) is higher than its admissions (540 students). There is no other SMK that has opened a RET program. The headmaster and teachers emphasise the need for promotion RET education, as the province has a large RET potential. They see a promotion opportunity in the construction of a MHP plant in the touristic area Kyai Lenggeng Garden, which visited by a large number of people (1,250,000) a year.

The new MHP plant will serve as a plant as a RET lab for SMKN 1 Magelang. The Educational office of the Government of Magelang has committed itself to provide land and to fund a part of the construction of the MHP laboratory. SMKN 1 Magelang wishes to concentrate on Biomass/ biogas, because the school has experience and a laboratory for charcoal briquetting as a cooperation result with PPPTEK Jakarta.

SMKN 1 Blora selected biomass and biogas as first choice and solar PV as second choice. Biomass was selected because Blora has much ox livestock, which offers a good potential to develop biogas for the rural society. Biomass was selected because Blora because in the forest and wastelands plants that can be cultivated for bio fuel. Photo voltaic was selected, because PV has become a program of the local government in providing electricity in the rural areas. Support will be given by the Blora government and to SMKN 1 Blora regarding RET.

SMK Panca Bhakti Banjarnegara is a private school (there is no public SMK that has a technology and industry stream), which will do a feasibility study before opening RET program. The school will check the student's demand for RET education, the prospects in the job market, and RET program future on longer term. If feasibility study result shows RET as new study program, then the SMK in 2010/2011 private Panca Bhakti will open one RET class. Before the finishing of the feasibility study the school will open one class in its Career Centre. The local government supports RET implementation at the SMK strongly.

#### f. Final observations

- 1) Interviewed SMKs attach much importance to RET education in their schools. They have taken previously initiatives to put RET education on the agenda. The SMKs and TEDC lobby for RET program to Direktorat Pembinaan SMK.
- 2) 10 of 11 SMK stated that they will propose RET as a new study program in SMK in the school year 2010/2011; the 11<sup>th</sup> SMK wishes firstly to do a further feasibility study.
- 3) All schools do have a RET relevant network (educational offices, companies, knowledge institutions), from which they are informed about the need for RET education, but they couldn't show sound statistics.
- 4) All schools put emphasis on promotion RET education and alumnae marketing (RET Products Fair, school exhibition/open house, sub-province/ city, province and national fairs, publication by website and print media).
- 5) All schools intend to involve RET students in development, management, maintenance and repair of small scale power plants for obtaining working practice, and doing on the job training.
- 6) Before formal integration of RET in the school curriculums through the national curriculum setup 'Spectrum', the schools will open one special extracurricular class in the form of a Community College/Career Centre or Skill Training Centre.
- 7) Within the framework of regional energy planning a closer relationship between this planning and the professional schools has to be established for better identification of RET educational needs as a reflection of labour market needs.

#### *Ad 3: Questionnaire TU/e*

From the TU/e interview data in each province the number of people could be derived that are employed by a total of 10 companies that have followed SMK training and subsequently the specific number of persons that have followed RET related programmes in these SMKs.

Table 4.3 covers the project provinces Central Java, North Sumatra, Yogyakarta and West Nusa Tenggara (WNT), because TU/e was not allowed to visit the Papua province during its mission in July 2009. About Yogyakarta only the total number of employees was available; no specific data on the number of SMK trainees and the number of energy related SMK related could be collected.

Table 4.3 *Data Questionnaire TU/e in 4 provinces*

Province	Central Java	North Sumatra	WNT	Total
Nr of employees	9,944	29,371	983	40,298 (incl. Yogyakarta 40,516)
Nr. SMK trainees	2,138	338	3,783	6,359
Nr. Energy related SMK trainees	64	413	64	480

The table also shows large inter-provincial differences that cannot be directly attributed to certain factors (differences in population size, or patterns of economic development). Such would require a larger survey sample and more in-depth surveying questions. The table does indicate clearly that in 3 provinces companies are distinctly incorporating SMK trainees in their workforce, but that relatively small numbers were recruited with a specific renewable energy or energy efficiency background.

SMKs in these provinces did not structurally offer learning packages on renewable energy or energy efficiency. Had this been the case, the demand for energy related SMK trainees would articulate itself much clearer, according to the visited SMK (see Ad 2).

## 4.2 Selection of SMKs

Besides demand assessment a selection was done of SMKs that will participate in the project. A ranking instrument was used, in which the elements of understanding and commitment of local authorities, specific geographical circumstances and soundness of SMK (management, equipment, premises, learning teaching materials and teacher quality) were all included (see Appendix B).

A first selection of SMKs was made based on data obtained from the Ministry of Education per province regarding the aspects of the interest of SMKs in integration RET, governmental ranking in relevant theoretical streams (A, B, C, of which A is the highest rank), possession of ISO 9001:2000 certification or engaged in the procedure to acquire certification. This selection resulted in a short list, which served as a point of departure for the visits to the provinces.

ETC and TEDC have visited all provinces CASINDO is covering. First the most unknown provinces were visited; Papua and Sumatera Utara. In these two provinces a total of eight SMKs have been visited (two SMKs in Papua and six SMKs in Sumatera Utara). Out of these eight SMKs a total of five SMKs were selected.

After this first visit, TEDC's team visited the provinces of Yogyakarta, Central Java and West Nusa Tenggara. In these provinces a total of ten schools were visited (including two pilot SMKs); out of these ten SMKs seven were selected. With two SMKs working relations had already been established regarding the introduction of RET; this concerned SMKN 2 Pengasih, kabupaten. Kulonprogo, and SMKN 2 Kuripan, kabupaten Lombok Barat. In accordance with the CASINDO project document these schools were selected in order to take advantage of their experiences with integrating RET in their programmes.

In total 11 SMKs have been selected for participation in CASINDO. This selection was first made per province. The following elements were taken into consideration in the selection process:

1. Recommendations made in all SMK visit reports.
2. Description and appendices of data (supply and demand, the size of the area, geographical opportunities etc).
3. Spreading of the different RET.

#### 4. Possibility of facilities procurement.

The SMKs indicated clearly to opt for a broad introduction in a range of Renewable Energy Technologies (RET) to be done in the SMK's first two years of the four-year educational trajectory; in the last two years maximally two RET will be focussed upon. In these two final years, in-depth training is provided with sound practical components. The following table summarises the selection proposal for incorporating Renewable Energy Programmes (REP) in the SMKs.

Table 4.4 11 SMKs – REP Proposed for selection

Province	Name Candidate SMK Terpilih	Offered Concentration	Remarks
1. Papua	1) SMKN 3 kota Jayapura	1.MHP, 2. PV	
	2) SMKN 3 kabupaten Merauke	1. PV, 2.WE	
2. North Sumatra	3) SMKN 2 Doloksanggul, kab. Humbang Hasundutan	1.MHP,2. PV	
	4) SMKN 1 Balige, kabupaten Toba Samosir	1.MHP, 2.Biomass	
	5) SMKN 2 Rantau Utara, kabupaten Labuhan Batu	2.Biomass, 2.PV	
3. WNT	6) SMKN 2 Kuripan, kab. Lombok Barat	1.MHP, 2.Biomass	REP Pilot SMK
4. Yogyakarta	7) SMKN 2 kota Yogyakarta	1.PV, 2.WE	
	8) SMKN 2 Pengasih, kab. Kulonprogo	1.MHP, 2.Biomass	REP Pilot SMK
5. Central Java	9) SMKN 1 kabupaten Blora	1.Biomass, 2.PV	
	10) SMKN 1 kota Magelang	1.MHP, 2.Biomass	
	11) SMK Swasta Panca Bhakti, kab. Banjarnegara	1.MHP, 2.Biomass	

The table shows that there are:

- seven SMKs to conduct MHP,
- six SMKs to conduct PV,
- two SMKs to conduct WE,
- seven SMKs to conduct Biomass.

This also means that:

- For every province there is one SMK focussing on MHP, except in North Sumatra and Central Java with two SMKs.
- Each province has SMKs conducting PV, except in West Nusa Tenggara .
- Each province has a SMK conducting Biomass, except Jayapura.
- WE will be only conducted in two provinces, i.e. Papua and Yogyakarta.
- These 11 SMKs consist of one private SMK and ten public SMKs.

#### 4.3 Identification of required demonstration equipment at target SMKs

An inventory was made in each of the selected schools to have demonstration equipment procured and installed.

For MHP and PV equipment the project document mentions a maximum budget of € 45,000 and also provides amounts per equipment unit (MHP: € 6,000 and PV € 800 per equipment unit). These amounts are tentative indications. In case WE and biogas demonstration equipment is

needed in SMKs attending to these RET, maximum budget amounts will have to be calculated and agreed upon with the project Steering Group.

ETC/TEDC will make a consolidated list of equipment specified per SMK based on the proposals coming from each province. Procurement of the demonstration equipment will be done by limited tender and clear technical specifications; the tender procedure will be managed by ETC/TEDC.

The inventory had the following outcome:

Table 4.5 *Inventory demonstration equipment for selected 11 SMKs*<sup>3</sup>

SMK	MHP [€]	PV [€]	WE	Biomass
1) SMKN 3 kota Jayapura	1,000	100		
2) SMKN 3 kabupaten Merauke		100	v	
3) SMKN 2 Doloksanggul, kab. Humbang Hasundutan	1,000	100		
4) SMKN 1 Balige, kabupaten Toba Samosir	1,000			v
5) SMKN 2 Rantau Utara, kabupaten Labuhan Batu		100		v
6) SMKN 2 Kuripan, kab. Lombok Barat	1,000			v
7) SMKN 2 kota Yogyakarta		100	v	
8) SMKN 2 Pengasih, kab. Kulonprogo	1,000			v
9) SMKN 1 kabupaten Blora		100		v
10) SMKN 1 kota Magelang	1,000			v
11) SMK Swasta Panca Bhakti, kab. Banjarnegara	1,000			v

#### 4.4 Identification of the potential for co-operation between SMK and local university

The visits to SMKs revealed that no institutionalised contacts existed between provincial universities and SMKs. The same was the case for the local educational offices (Dinas Pendidikan) and the administration at the lower local levels (Kabupaten/Kota levels). Especially for province-based teacher RET trainings cooperation between universities and SMK can be useful. Such cooperation can also be useful for establishing contacts with governmental bodies geared to the local labour markets, and the local business communities.

While in discussion with TEDC during the visits to the project provinces, the institute considered a possible cooperation between local universities and SMKs to be pursued, provided that trajectories for the renewal of educational practices in SMKs driven by the Ministry of Education and executed by TEDC are not hampered by such cooperation. Especially in the area of competency-oriented education (training of professional skills) TEDC is implied in different development trajectories in professional education; local universities are not geared to such a competency-oriented approach, because their mandates are different.

<sup>3</sup> Estimated Price:

##### Micro Hydro

- 1) Open plum 650 Watt : € 600
- 2) Open plum 100 Watt : € 200
- 3) Crossflow 2 kW : € 1,250

##### PV

- 1) SHS: Solar power unit 10 Wp with LED, Including :10 Wp solar panel, battery 7 Ah, 3 unit LED lamps, cables, and accessories, price : € 200; the price is cash and carry.

There are six SMKs with PV, but the budget amounts to only 50% of the minimum cost. This means that when 6 SMKs have one SHS, the total budget for PV should be € 1,600.

In contacts between ETC and TU/e, after their respective mission to the project provinces, the need for concerted actions for institutionalising cooperation between SMK and local universities was highlighted in the field of introducing RET in education. For these actions a plan will be elaborated with the following elements:

- Liaison with provincial educational authorities for stressing the importance and getting their consent regarding cooperation between universities and SMKs in the area of RET.
- Liaison with the provincial business communities for mobilising their involvement and inputs in a cooperation between SMK and local universities regarding RET.
- Establishment of linkages between the provincial energy forums, local universities (one per province), and all SMKs that are involved in CASINDO for highlighting the importance of RET in future provincial energy scenarios.

#### 4.5 Institutional embedding

Through liaison of the Ministry of Education Jakarta with the educational bureaus of CASINDO's provinces and sub provinces/ cities and CASINDO's SMKs, province specific REP curricula should be worked out. This has to be done within the framework of the national Technical Vocational Education and Training (TVET) legal curriculum framework "Spectrum". Province specific curricula are then to be realised within the existing free space in this national framework.

Active involvement in and support by provincial and sub-provinces/ cities educational bureaus in the RET introduction in CASINDO's selected SMKs should be pursued. Here TEDC, in close cooperation with CASINDO's management, should take the lead.

With the active support of these offices the establishment of an interprovincial working group SMK REP covering CASINDO's provinces must be realised. In this working group the educational bureaus, the selected SMKs and provincial MEMRs should take part, as well as members of the provincial energy forums, where such a body was established. The main task of this working group is to have interprovincial exchanges on RET within SMK and to assess the provincial relevance of RET curricula and modules designed for SMK. The working group will be moderated and monitored by ETC/TEDC.

Another interprovincial educational/didactic working group should be created with special attention to WP6. This group may consist of some SMK teachers, students in their final year, TEDC/ETC staff and the provincial educational office. Its task is to guide and monitor the province's relevant reformulation of curricula and modules, and related teacher and students' trainings. For this regular small-scale progress, surveys should be organised, in which the appreciation of the trainees is measured and suggestions for improvements are requested. The working group also serves as a reference group for the reformulation of the province relevant curricula and modules for teachers and students trainings.

Finally, it should be emphasised that the organisations responsible for WP3 (TEDC and ETC) should enter in regular consultations with those responsible for WP4 (especially regarding the cooperation between provincial universities and SMKs and the valorisation of knowledge regarding RET with the private sector).

Moreover, a firm link should be established with the organisations responsible for WP7 in order to take advantage of content wise parallel activities and to avoid overlaps. The established management structure of CASINDO should cater for these needs (i.e. project coordinator (ECN, ETCERE), WP coordinators, technical team coordinators and technical working group coordinators, and coordination within the province by ECN/ETCERE).

## 4.6 Activity time table and schedule international experts

Table 4.6 Activity time table and schedule for international experts

Year/ Month	Activity	Provinces	International Experts (Y/N) & who	Deadlines/periods reports/activities
<i>2009</i>				
June	-Visits/surveys to 14 SMKs CASINDO provinces	All	Y: Eric Kamphuis TEDC team	30/06/2009
July	- Working out survey data - Recommendation selection 11 SMKs	All	Y: Eric Kamphuis TEDC team	14/08/2009
Aug	- Preparation Inception report WP3 and Monitoring framework	All	Y: Eric Kamphuis TEDC team	
Sept	- Completion Inception Report	All	Y: Eric Kamphuis TEDC team	<b>D37:</b> 30/09/2009
Oct	- Contacting SMK - Working out agreements resulting from inception phase (i.e. approval SMK selection) - Planning further ETC-TEDC cooperation	All	Y: Eric Kamphuis, Willem van Burgsteden TEDC team	<b>D7:</b> 31/10/2009
Nov	- Provincial workshops with SMKs - Start-meeting CASINDO - TWGVII meeting - Knowledge valorisation (cooperation with WP4)	North Sumatra All All	Y: Eric Kamphuis, Willem van Burgsteden Y:Eric K.Willem vanB. N:TEDC team	30/11/2009
Dec	- Curriculum/ modules MHP/PV - Trainings teachers/students	Yogyakarta, NTB	N: TEDC team	
<i>2010</i>				
Jan	- Curriculum/ modules MHP/PV - Trainings teachers/students - Teaching equipment	Yogyakarta, NTB	N: TEDC team	
Feb	- Educational/didactic working group (WP6) - Training TEDC staff on EE  - Contribution to 1 <sup>st</sup> progress report		Y: Eric Kamphuis  Y: External expertise (MVV Decon) Y: Eric Kamphuis, Willem van Burgsteden TEDC team TEDC team	<b>D1:</b> 28/02/2009
Mar	- Curriculum/ modules introduction BM/BG/WE/EE - Trainings teachers/students - Curriculum/ modules MHP/PV - Curriculum/ modules introduction BM/BG/WE/EE	Central Java, North Sumatra, Papua Yogyakarta, NTB Central Java, North Sumatra, Papua NTB Central Java	N: TEDC team N: TEDC team	
April	- Training TEDC staff on BM - Knowledge valorisation (cooperation with WP4) - Visits to SMK - Training Energy & Development MENR junior staff in Netherlands	NTB	Y: BTG inputs N: TEDC team Y: Eric Kamphuis, Willem van Burgsteden, Frank van der Vleuten	14 – 20 April 2010
May	- Curriculum/ modules MHP/PV - Curriculum/ modules introduction BM/BG/WE/EE - Completion Curriculum/ modules introduction BM/BG/WE/EE	Yogyakarta, NTB Central Java, North Sumatra, Papua Central Java, North Sumatra	N: TEDC team N: TEDC team N: TEDC	<b>D9:</b> 16/05/2010
June	- Curriculum/ modules MHP/PV - Knowledge valorisation	Yogyakarta, NTB North Sumatra,	N: TEDC team Y: Eric Kamphuis	

<i>Year/ Month</i>	<i>Activity</i>	<i>Provinces</i>	<i>International Experts (Y/N) &amp; who</i>	<i>Deadlines/periods reports/activities</i>
	(cooperation with WP4)	Central Java, Papua		
	<b>- Workshop ETC-TEDC</b>		Y: Eric Kamphuis, Willem van Burgsteden	
July	- Completion Curriculum/ modules MHP/PV & Trainings teachers/students	Yogyakarta, NTB	Y: Eric Kamphuis TEDC team	<b>D8:</b> 16/07/2010
Aug	- Pilot trainings teachers/students MHP/PV/BM/BG/WE/EE	Papua Yogyakarta, NTB	N: TEDC	<b>D10:</b> 31/05/2010
Sept	- Knowledge valorisation (cooperation with WP4)			
Oct	- SMK integrated students/teachers training MHP/PV/BM/BG/WE/EE	North Sumatra, Central Java, Papua		
Nov	<b>- Completion SMK integrated students/teachers training MHP/PV/BM/BG/WE/EE</b>	North Sumatra, Central Java, Papua	Y: Eric Kamphuis, Willem van Burgsteden	<b>D11:</b> 14/11/2010
	<b>- EWG/TWGVII meetings</b>			
	- Approach to roll-out teacher/student training programs MHP/PV/BM/BG/WE/EE	All: 4 SMKs per province	Y: Eric Kamphuis, Willem van Burgsteden TEDC team	<b>D12:</b> 30/11/2010
Dec	- Contribution to 2 <sup>nd</sup> Progress Report		Y: Eric Kamphuis, Willem van Burgsteden TEDC team	<b>D2:</b> 21/12/2010
2011				
Jan	- Roll-out teacher/student training programs MHP/PV/BM/BG/WE/EE	All: 4 SMKs per province	N: TEDC	
Feb	- Roll-out teacher/student training programs MHP/PV/BM/BG/WE/EE	All: 4 SMKs per province	N:TEDC team	
Mar	- Roll-out teacher/student training programs MHP/PV/BM/BG/WE/EE	All: 4 SMKs per province	N: TEDC team	
	- Knowledge valorisation (cooperation with WP4)		N: TEDC team	
April	- Roll-out teacher/student training programs MHP/PV/BM/BG/WE/EE	All: 4 SMKs per province	N: TEDC team	
May	- Roll-out teacher/student training programs MHP/PV/BM/BG/WE/EE	All: 4 SMKs per province	N: TEDC team	
	- Contribution to dissemination & communication ( WP8)	All	Y: Eric Kamphuis TEDC team	<b>D13:</b> 16/05/2011
June	- Knowledge valorisation (cooperation with WP4)	North Sumatra, Central Java, Yogyakarta	N: TEDC team	
July	<b>- Mission on results roll-out</b>	All: 4 SMKs per province	Y: Eric Kamphuis, Willem van Burgsteden TEDC team	
	- Educational/didactic working group (WP6)		Y: Eric Kamphuis, TEDC team	
Aug	- Contribution to report on knowledge valorisation		Y: Eric Kamphuis TDEC team	<b>D19:</b> 15/08/2011
Sept	- Contribution to 3 <sup>rd</sup> progress report		Y: Eric Kamphuis, Willem van Burgsteden TEDC team	<b>D3:</b> 12/09/2011
Oct	- Visits to rolled-out SMK	All: 4 SMKs per province	Y: Eric Kamphuis, Willem van Burgsteden TEDC Team	
Nov	- Report on results roll-out 4 SMKs per province	All	Y: Eric Kamphuis, Willem van Burgsteden TEDC Team	14/11/2011
	<b>- EWG/TWGVII meetings</b>		Y: Eric Kamphuis, Willem van Burgsteden	

<i>Year/ Month</i>	<i>Activity</i>	<i>Provinces</i>	<i>International Experts (Y/N) &amp; who</i>	<i>Deadlines/periods reports/activities</i>
<i>Dec</i>	<i>- Contribution to final report</i>	<i>All</i>	<i>Y: Eric Kamphuis, Willem van Burgsteden TEDC team</i>	
<i>2012</i>				
<i>Jan</i>	<i>- Contribution to final report</i>	<i>All</i>	<i>Y: Eric Kamphuis, Willem van Burgsteden TEDC team</i>	
<i>Feb</i>	<i>- Contribution to final report</i>	<i>All</i>	<i>Y: Eric Kamphuis, Willem van Burgsteden TEDC team</i>	
<i>Mar</i>	<i>- Completion final report</i>			<i>D5:14/03/2012</i>

Note:

- Red blocked texts refer to possible missions.
- If *N* is put under International experts, only Indonesian partners (mostly TEDC) will take care of the concerned activity.
- If *Y* is put under International experts, the names of persons/companies are mentioned and the local partner with whom is cooperated (also: mostly TEDC).
- In some cases the technical project document contains a List of deliverables that does not correspond with the Activity Time Schedule in the same document. In this planning the Activity Time Schedule was used as the benchmark.
- Apart from the deadlines for the deliverables deadlines are also mentioned for other activities; these last deadlines are indicative and should be established with the project management.

#### 4.7 Monitoring framework for WP 3

The monitoring framework for WP3 presented in the CASINDO project proposal has been slightly changed as a result of the discussions held. In **Error! Reference source not found.** the revised table is presented, entailing a SMART indication of the situation before the initiation of WP3. The table also contains relevant target values and an indication of when/how the target values are measured.

Table 4.7 *Monitoring framework for WP 3: Development of skilled manpower for RE&EE*

Results chain	Criteria	Indicators	Baseline value
<i>Output</i>	<ul style="list-style-type: none"> <li>• Selection of pilot SMKs for CASINDO by public tender.</li> </ul>	<ul style="list-style-type: none"> <li>• Selection procedure completed with selection of ten new SMKs. In total 11 SMKs have been selected measured by production of deliverable no. D7.</li> </ul>	Two SMKs selected
	<ul style="list-style-type: none"> <li>• Needs for RE/EE training assessed in 5 provinces.</li> </ul>	<ul style="list-style-type: none"> <li>• Needs assessment prepared and included in inception report.</li> </ul>	Needs assessment; not yet conducted
	<ul style="list-style-type: none"> <li>• RE&amp;EE training material developed and SMK teachers trained.</li> </ul>	<ul style="list-style-type: none"> <li>• Training material on RE&amp;EE developed measured by production of deliverable D8&amp;D9.</li> </ul>	Training material has been developed for other regions, but needs to be made province-specific.
	<ul style="list-style-type: none"> <li>• Interaction between SMKs / universities and business community on RE&amp;EE.</li> </ul>	<ul style="list-style-type: none"> <li>• At least 11 SMK teachers trained by TEDC measured by production of deliverable no. D10.</li> <li>• At least 30 participants attending the yearly seminars with provincial universities and pilot SMKs for validation of developed educational materials.</li> </ul>	No teachers trained (teachers from two SMKs trained?) No seminars organised.
<i>Outcome</i>	<ul style="list-style-type: none"> <li>• Integration RE&amp;EE in SMK curricula.</li> </ul>	<ul style="list-style-type: none"> <li>• RE&amp;EE curricula and training material incorporated in selected SMKs measured by production of deliverable D11.</li> </ul>	RE&EE training modules not included in SMK curriculum.
	<ul style="list-style-type: none"> <li>• Students at SMKs trained in RE&amp;EE.</li> </ul>	<ul style="list-style-type: none"> <li>• At least 150 students followed the SMK RE&amp;EE courses; at least 100 received a certificate (passed exam).</li> </ul>	No specific SMK RE&EE certificate awarded.

## 5. Major issues for Work Package 4: Training needs assessment for the partner universities

As stated in the CASINDO project proposal, the activities in Work Package 4 are aimed at developing and implementing an education and research programme at the partner universities in the target provinces. In the inception phase a detailed training needs assessment for the partner universities has been conducted and a training programme has been developed that addresses the identified needs. Other issues discussed during the inception phase include an assessment of the demand for university graduates in SE&EE, necessary research and demonstration equipment to be purchased and the planning of the various activities in WP 4.

### 5.1 Assessment of demand for university graduates in SE&EE

As a further legitimization of the activities in WP4, in the inception phase an assessment has been made of the extent to which there is a need for trained graduates of the university in sustainable energy and related energy efficiency issues. The assessment was done by interviewing a number of relevant stakeholders by each of the following Indonesian partner universities:

- Muhammadiyah University of Yogyakarta (UMY),
- Diponegoro University (UNDIP),
- University of Sumatera Utara (USU),
- University of Mataram (UNRAM).

The interviews by the University of Cendrawasih (UNCEN) had to be postponed because of some unrest in Papua at the time of the inception mission.

In total 42 interviews were conducted based on a questionnaire (see Appendix A). The background of the respondents is given in the figure below:

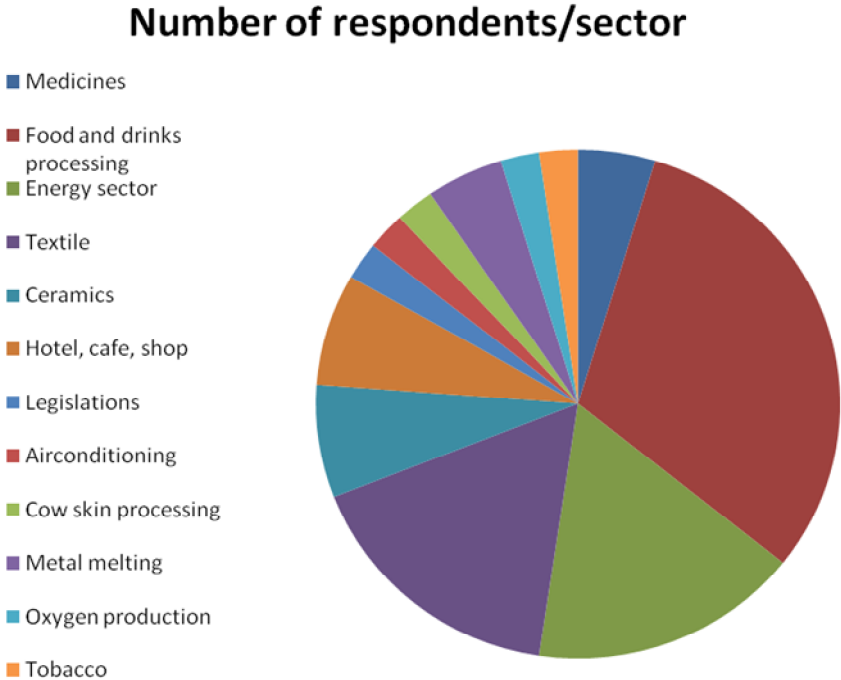


Figure 5.1 Sectors of respondents

The survey included 12 organisations from the food & drinks processing sector, 6 organisations from the energy sector, 6 organisations from the textile industry and 18 companies from other sectors; hence the results are not dominated by one particular sector.

When dividing the companies into small- (1-10 employees), medium- (11-200 employees) and large (>200 employees) scale companies, each scale constitutes around one-third of the respondents.

Table 5.1 presents the total number of employees working in the surveyed organisations, as well as the number of employees graduated from SMK or university. The table shows that the surveyed companies have only a small number of employees that graduated from SMK or university with a specialisation in energy.

Table 5.1 *Graduates SMK's and University with energy specialisation as employees*

	Total
Total number of employees	40516
No. employees graduated from SMK	6359
No. employees graduated from SMK with energy specialisation	480
No. employees graduated from university	3103
No. employees graduated from university with energy specialisation	71

As demonstrated in table 5.2 the most important energy source used by the organisations is electricity.

Table 5.2 *Most used Energy sources*

Energy source	No. of organisations using energy source
Electricity	32
Diesel oil	9
Coal	6
Gasoline	9
Wood	8
LPG	7
Kerosene	11

Most of the respondents experience problems with their electricity supply. Only 6 out of the 42 respondents claim they have never experienced any problems in their electricity supply. The number of times that these problems occur has not been asked. The problems can be arranged as follows: (the respondents were allowed more than one answer)

Table 5.3 *Problems in energy supply*

Problems in energy supply	No of organisations experiencing this problem
No stable supply	16
Expensive	8
Low efficiency	6
Genset failure	4
Pressure drop gas	2
Mixed biodiesel with diesel	1
Shortage coal supply	1

Furthermore, about 97% of the respondents answered that energy costs are an important part of the business costs.

A large proportion of the respondents is interested in using sustainable energy technologies and/or using energy more efficiently.

Table 5.4 Interest for use of SE/EE

	Interested in use SE	Interested in use EE
Yes	37	39
No	5	3

This figure demonstrates in which specific energy resources the respondents are interested:

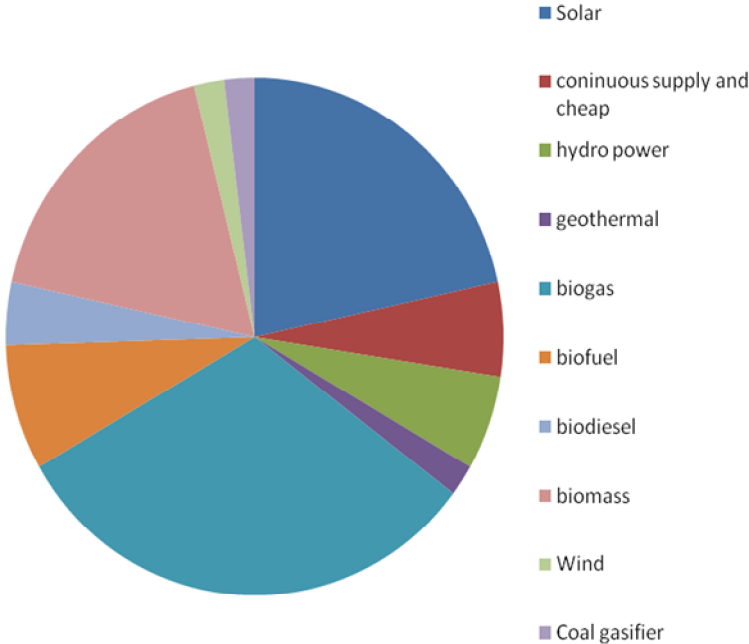


Figure 5.2 Interest for sustainable energy sources

Solar energy and use of biomass (used in different manners) are the largest energy resources in which the organisations are interested.

Some measures to improve energy efficiency, in which the organisations showed interest, are the following:

- Efficient lighting.
- Insulation.
- Use of waste stream.
- Reduction of heat losses.

To one of the most important questions posed, namely whether their organisation would be interested in employing more people with a specialisation in sustainable energy or energy efficiency, 35 out of 42 answered positively. The education of graduates with a specialisation in this field would therefore be welcomed.

Moreover, some questions were posed on whether they estimate that other organisations in their region would be interested in use of SE/EE and also whether they think that there exist organisations that would like to hire people with a specialisation in SE/EE.

Out of these 22 respondents (only slightly more than half of the respondents answered these questions), 18 estimated that there are organisations in their regions interested in SE/EE and that they would like to hire people with specialisation in this field.

### *Conclusions based on questionnaires*

The surveyed organisations experience problems in their current energy supply and most of them realise that their energy costs constitute a large part of their business costs. It is therefore not surprising that 80-90% of the respondents shows interest in use of either sustainable energy resources and/or application of energy efficiency measures within their business process. One reason for organisations to expect a cost reduction is that they would like to use resources such as biomass, dung and/or other kinds of waste for energy production.

The interest expressed by the respondents combined with the fact that only few organisations have people employed with a specialisation in SE/EE leads to 83% of the respondents thinking it would be useful to have (more) people working in their organisation with a specialisation in SE/EE.

Next to the interests of their own organisation, about half of the respondents also estimated whether organisations within their region would have an interest for SE/EE and engineers specialised in this field. 18 out of 22 of the respondents think that there are organisations in their region that would be interested in applying sustainable energy technologies and/or measures to enhance energy efficiency. And the same number of respondents estimates that there is a regional interest for engineers of SMK or university with specialisation in this field.

The most important conclusion of this survey for the CASINDO project is that a need for employees with a specialisation in the SE/EE field has been demonstrated.

## **5.2 Fast tracks for UNDIP and UNCEN**

UNDIP and UNCEN have not been involved in the activities that were part of the EWG-programme during 2007-2009. These activities included:

- Developing an overall plan to shape the education programme and research on SE and EE technologies.
- Developing a pilot practical course in SE.
- Exploring the best practices on how to stimulate the linkages for collaboration with industry and how to stimulate spin-offs and entrepreneurship from the university.

In order to establish whether it would be possible to have the same activities for all five universities and to have the same outcome at the end of the CASINDO project period, the inception phase was dedicated to investigating to what extent a fast track programme would be necessary and/or useful to get these two universities at the same starting point as the other three.

UNDIP is an outstanding university with an A-level accreditation for most of the programmes. In the Mechanical Engineering master programme there is an energy track where different technical courses, including in SE&EE, are in place. UNDIP has many contacts with industry, although specific projects on SE&EE can be further stimulated. For the fast track there is a need for UNDIP and TU/e staff to get to know each other and there is a need for exploring the possibilities for a programme in Energy and Management, specifically where the less technical courses are concerned and there is a need for further discussion with industry on their needs for applied research in SE&EE. After discussions were held with UNDIP it was concluded that two workshops will be organised in the fast track at UNDIP:

- Workshop 1: on sustainable energy; development, empowerment and management. Target audience: University staff with participation of two staff members of TU/e.

- Workshop 2: Discussing SE & EE, requirements of industry. Target group: industry, government and university staff. With participation of two TU/e staff members.

The fast track for UNCEN will be defined at a later moment in time. Reports from ITB-staff that made a preliminary visit to UNCEN give the impression that UNCEN would be better served with a tailor-made approach. This will be checked and worked out in a visit at the earliest possible term.

### 5.3 Assessment of training needs of the university lecturers

All partners feel that for the institutional embedding of the activities in WP4 (see also 4.6) it is crucial to aim at establishing a relevant distinguished curriculum in SE&EE. Based on the needs and wishes of individual universities this can for instance be a certificate or a degree programme. Such a new programme will combine existing and new courses. The demand for training of university lecturers who will be involved in this programme follows logically from the new courses to be developed.

UMY and UNRAM have decided to start a certificate program in the bachelor program. UNDIP is studying on starting a new master programme in Energy and Planning. Some more time will be needed to make such a new programme possible administratively. Therefore, the compulsory courses for this MSC programme will be developed first and offered as part of a certificate programme for MSc students in Mechanical and Chemical Engineering.

USU will develop an interdisciplinary Master program in SE and EE. As UNCEN was not yet visited, it remains unclear what their wishes are in relation to the development of an educational program.

Table 5.5 *Course for the programmes at each of the universities*

UMY	UNDIP	USU	UNRAM
Technology and sustainability	Energy Conversion and Renewable Energy	Green house science	Introductory course in SE
Energy Conservation	Energy Efficiency and Demand Management	Solar Cells	Biomass course
Renewable Energy Resources	Sustainable Energy	Design of sustainable Energy Systems for the Built Environment	Micro Hydro course
Energy from biomass	Clean Development Mechanism	Energy from Biomass	Solar energy
Wind Energy	Project and Research Methodology	Energy and Economy	Energy conversion
Solar Energy	Project Engineering	Energy Efficiency	Energy management
Energy Economics	Energy Planning and Policy	Energy Policy	Energy economics
Energy and Consumer (Hydrogen technology)	Feasibility studies	Electrical Power Engineering and System Integration Energy Conversion Technology for Sustainable Development Renewable Energy Sources Physical Transport Phenomena	

For the courses to be developed staff members will be trained for two weeks in the Netherlands where they will also get acquainted with research and education of TU/e or other Dutch university staff. Three missions of two TU/e staff members to the Indonesian partner universities will be conducted for further transfer of knowledge on the courses (combined with visits of research support). Preferably these TU/e staff members will be involved in teaching a short block course. The Indonesian staff members to be trained in the Netherlands are listed in Table 5.6 and the Dutch staff members who will visit Indonesia are given in Table 5.7. These are tentative because the definite choice on staff to go to Indonesia will be based on the experiences in the training sessions in the Netherlands.

Table 5.6 *Indonesian staff to be trained in the Netherlands*

Name staff member	University	Faculty	Subjects training
Mrs. Lilis	UMY	Economics	Energy Economics
Mr. Najib	UMY	Engineering	Wind Energy
Mr. Novi Caroko	UMY	Engineering	Solar Energy
Mr. Ikhsan	UMY	Engineering	Energy and Consumers
Mr. Sri Atmaja Putra	UMY	Engineering	Energy Conservation
Mr. Tony K. Hariadi	UMY	Engineering	Renewable Energy Resources
Mr. Bambang Puwanggono	UNDIP	Industrial Engineering	Feasibility Studies
Mr. Joko Windarto	UNDIP	Electrical Engineering	Energy Conversion and Renewable Energy
Mr. Hermawan	UNDIP	Electrical Engineering	Energy Planning and Policy
Mr. Nazarudin	UNDIP	Mechanical Engineering	Wind Energy Design and Energy Efficiency for Transportation
Mr. M. Zaini	UNDIP	Chemical Engineering	Bio-fuel processing
Mr. Sri Eko	UNDIP	Civil/Electrical Engineering	Project and Research Methodology
Wahyuni/Soedjadi			
Mr. Irvan	USU	Chemical Engineering	Physical Transport Phenomena
Mrs. Nurzainah	USU	Agriculture and Animal Husbandry	Energy from Biomass
Mr. Taslim	USU	Chemical Engineering	Energy from Biomass (bio fuels)
Mr. Syahrul	USU	Physics	Solar Cells
Mr. Usman Baafai	USU	Electrical Engineering	Energy Efficiency
Mrs. Yeni Absah	USU	Economics	Economy and Energy
Mr. Arif Mulyanto	UNRAM	Mechanical Engineering	Solar energy
Mr. Yesung Allo Padang	UNRAM	Mechanical Engineering	Biomass
Mr. L Wlrahman	UNRAM	Civil Engineering	Micro Hydro and environmental engineering
Mr. Prayitno Basuki	UNRAM	Economics	Integration of energy economics, food & health for community development
Mr. I.B. Ferry Citarsa	UNRAM	Electrical Engineering	Energy Conversion
Mrs. Rosmaliati Muchar	UNRAM	Electrical Engineering	Energy Management

Table 5.7 *Dutch staff visiting Indonesian universities*

Name staff member	University	Subjects training
Dr.ir.Han van Kasteren	TU/e	Biomass and Waste Management
Ir. Patrick van Schijndel	TU/e	Energy efficiency and Energy audits
Dr. Gerard van Bussel	TUD	Wind Energy
Dr.ir. Rick de Lange	TU/e	Energy Conversion
Dr. Henny Romijn	TU/e	Feasibility studies & Community development
Ir. Arjan Kirkels	TU/e	Biomass, Sustainable Energy
Ir. Elco van de Burg	TU/e	Entrepreneurship and Innovation
Prof.dr.ir. Richard van der Sanden	TU/e	Solar cells
Dr. Ir. Annelies Balkema	TU/e	Feasibility studies

The first time the course is given is seen as the pilot phase, whereby feedback from the students will be used to improve the courses. The project requires an audit of the quality of the educational programmes by a TU/e professor. This audit can provide the basis for jointly signed certificates.

#### 5.4 Identification of required demonstration and research equipment

The partner universities in Indonesia have expressed their need for the development of a research program that on one side will support the teaching activities and on the other side supports local industries (knowledge valorisation). An additional aim of the research is to make staff, students, industry and the communities aware of the possibilities and potential for sustainable energy. The need for equipment necessary for research and the need for demonstration equipment for knowledge valorisation and awareness raising will be cleverly combined. Based on the needs of industry at least three pilot research projects with a duration of less than one year will be developed and implemented using the chosen demonstration and research equipment. The research will be supported by means of visits by TU/e staff members (combined with visits for support of the education program) and remote support through e-mail and telephone. The aim is to set up a structural way for industries and universities to work together on the introduction of sustainable energy units in society. The exchange between universities and industry will be organised through workshops. The research projects defined by the universities can be found in Table 5.8. The demonstration equipment needed is listed in Table 5.9 and the additional necessary research equipment is listed in Table 5.10

Table 5.8 *Research projects defined by the different universities*

UMY	UNDIP*	USU	UNRAM	UNCEN
Economic valuation of renewable energy potential, Yogyakarta as a case	Biogas processing and implementation for households	Solar-Desiccant Assisted Drying	Efficient biomass for drying of tobacco	
Mapping renewable energy potential in Yogyakarta	Solar cell equipment for implementation in communities	Problems solving at cacao plantation by Methanisation process	Use of solar power and heat storage for drying of tobacco	
Solar water heating & heat storage (industry related)	Energy Efficiency measurement for transport (industrial)	Biodiesel production in oscillatory baffled reactor by two-step transesterification	Biogas for frying of jackfruit (replacing LPG)	
Vertical and slow rotating wind mill for instance for a mosque (industry related)			Redesign oven for tobacco drying (energy efficiency)	
Energy conservation for Build Environment (industry related)			Energy self-sufficiency of communities (economic analysis; integrated with other research projects)	
Energy potential scanning (DINAS)			Power control system device for integrating generation units	
Social-economic study on Energy, including evaluation of micro-hydro systems				
Energy Information System (DINAS)				
Energy utility Management				

\* With UNDIP the agreement was made to define the research project more detailed after the first workshop combined with industry in December.

It is the ambition of the universities to carry out all of these research projects. Some of the projects do not require (financial) assistance from CASINDO, though. The equipment necessary to carry out at least three projects of each of the universities are listed below.

Table 5.9 *Demonstration equipment for the different universities*

UMY	UNDIP*	USU	UNRAM
Vertical, slow rotating windmills (80cm, 100cm, 150cm diameter), Shaft, wiring system	Equipment for Biogas processing and implementation for households	Demonstration unit of Electricity Generation of liquid waste fermentation	Bio-digester
Solar collector, water pump, heat exchanger	Solar Cell Equipment for use in integrated communal system	Biodiesel mini-plant in using oscillatory baffled reactor as transesterification reactor	Drying stove
Computer system and network (for energy information system)	Measurement equipment for energy efficiency of transport	Transparent, fibreglass material Biogas prototype unit	Drying rooms (redesigned)
Demonstration energy conservation building (lab-scale)			Solar collectors
Logical accessories to complete experimental setup			Heat storage equipment
			PV-panels
			Logical accessories to complete experimental setup

\* With UNDIP the agreement was made to define the research project more detailed after the first workshop combined with industry in December.

Table 5.10 *Research equipment for the different universities*

UMY	UNDIP*	USU	UNRAM
Measuring equipment for wind energy such as: anemometer, digital tachometer, torque meter, wind speed data logger, digital multi tester		Humidity sensor	Pyranometer and accessories
Measuring equipment for solar water heating such as: Pyrometer, Flow meters (capacity 0,5-5 GMP, 5-50 GMP), Four channel Temperature Data Logger, 8 Channel thermo couples		Analog Input Module with 4 terminal	Thermocouples
Measuring equipment for lab-scale energy building such as energy data logger		Adaptor with 24 VDC and 3 A	Analog/digital display of temperatures for different thermocouples
		Chemical analysis of fresh and dried cocoa bean	Gas chromatograph
		Thermometer	Power quality meter
		pH meter	
		RBD-Stearin	
		Methanol	
		Sodium hydroxide	
		Water bath	
		Hot water pump	

\* With UNDIP the agreement was made to define the research project more detailed after the first workshop combined with industry in December.

The following procedure for purchasing equipment is proposed:

1. Short tendering procedure in which each of the universities invites companies to present their best offer.
2. Selection of these best offers by a Dutch organisation, based on their cost-quality ratio.
3. After approval of the Dutch organisation and agreement between TU/e and partner-university, equipment will be purchased.

## 5.5 Institutional embedding

As mentioned under 5.3 all partners are convinced that for the intuitional embedding of the activities in WP4 it is crucial to establish a relevant distinguished curriculum in SE&EE. How this can be done depends significantly on the needs and wishes of individual universities. However, the institutional embedding is also influenced by national regulations set by the Ministry of Education. For further institutional embedding it is therefore necessary to regularly inform the

Ministry of Education on the achievements in these pilot projects and to discuss possibilities of repeating these efforts at other universities as well as measures that could ease the introduction of SE&EE in academic curricula with the ministry. Therefore, a technical working group will be established with members from the local universities, staff from the Ministry of Education, staff from the MEMR and staff from TU/e. This working group will meet once a year (adjacent to other meetings) to present the results and discuss what can be done to improve the introduction of SE&EE in curricula and the valorisation of academic knowledge in the areas of SE&EE( see Chapter 10 for more detailed explanation).

## 5.6 Activity time table and schedule international experts

Table 5.11 *Activity time table and schedule for international experts*

Month	Activity	University	International Experts (Y/N) & who	Deadline reports
<i>Aug 2009</i>	First workshop knowledge valorisation	UMY	N	
<i>Sept</i>	Start pilot program and courses	UMY, UNDIP	N	
<i>Oct</i>	Fast-track workshop on Energy Management	UNDIP	Y: Mr. Patrick van Schijndel and Mr. Rick de Lange	
<i>Nov</i>	<ul style="list-style-type: none"> <li>• First workshop Knowledge valorisation</li> <li>• Start-meeting CASINDO</li> <li>• TWG VI meeting</li> <li>• First visit to UNCEN</li> </ul>	<ul style="list-style-type: none"> <li>USU</li> <li>All</li> <li>All</li> <li>UNCEN</li> </ul>	<ul style="list-style-type: none"> <li>N</li> <li>Mr. Lex Lemmens</li> <li>Mr. Lex Lemmens</li> <li>Mr Lex Lemmens</li> </ul>	
<i>Dec</i>	Fast-track workshop on Knowledge Valorisation	UNDIP	Y: unknown yet	
<i>Jan 2010</i>	Education and R& D development visit	All	2 TU/e experts; yet unknown,ITB	
<i>Feb</i>	First knowledge valorisation workshop	UNRAM	N	D1:Progress Report
<i>Mar</i>	First knowledge valorisation workshop	UNDIP	N	
<i>April</i>	Period; March-June; training of at least 24 lecturers	UNRAM, UMY, UNDIP, USU	Y: all TU/e lecturers mentioned, but in NL,ITB	
<i>May</i>				D14:Fast-track Development
<i>June</i>				D15:R&D agendas
<i>July</i>	Education and R& D development visit	USU, UNDIP, UNRAM	Y: 2 TU/e experts; yet unknown	
<i>Aug</i>				D20:Demonstration Units
<i>Sept</i>	<ul style="list-style-type: none"> <li>• Second knowledge valorisation workshop</li> <li>• Start MSc. Courses</li> </ul>	<ul style="list-style-type: none"> <li>UNRAM, USU, UNDIP, UMY</li> <li>USU</li> </ul>	<ul style="list-style-type: none"> <li>Y: Mr. Han van Kasteren/Mr. Patrick van Schijndel</li> <li>N</li> <li>N</li> </ul>	D17:Education programmes

Month	Activity	University	International Experts (Y/N) & who	Deadline reports
	<ul style="list-style-type: none"> <li>• Start BSc. Courses / Certificate</li> <li>• Education and R&amp;D development visit combined with knowledge valorisation workshop</li> </ul>	UNRAM	Y: Mr. van Kasteren/Mr. Patrick van Schijndel,ITB	
<i>Oct</i>				
<i>Nov</i>	TWG VI meeting	All	Y:Mr Lex Lemmens	D18:Training material
<i>Dec</i>				D2:Progress Report
<i>Jan 2011</i>	Education and R& D development visit	All	Y: 2 TU/e experts; yet unknown	
<i>Feb</i>				
<i>Mar</i>	Third knowledge valorisation workshop	UNRAM	N	
<i>April</i>				
<i>May</i>				
<i>June</i>	Third knowledge valorisation workshop	USU, UNDIP, UMY	N	D15:Development D16:R& D agendas
<i>July</i>	Audit of education programmes	All	Y: to define	Pilot Projects
<i>Aug</i>				D19:Knowledge Valorisation
<i>Sept</i>				D3:Progress Report
<i>Oct</i>				
<i>Nov</i>	TWG VI meeting	All	Y: Mr Lex Lemmens	
<i>Dec</i>				
<i>Jan 2012</i>	Contribution to final report			
<i>Feb</i>	Contribution to final report			
<i>Mar</i>	Contribution to final report		Lex Lemmens, Mara Wijnkers	D5:Final report

\* Except for the first visit, which is not arranged yet, no planning is made for activities at/with UNCEN. Planning is to make arrangements for future activities at the first meeting.

## 5.7 Monitoring framework for WP 4

Based on the discussions held during the inception phase with the project partners and SenterNovem a number of changes to the monitoring framework presented in the project proposal were deemed necessary. Table 5.12 presents the revised monitoring framework for WP 4.

Table 5.12 *Monitoring framework for WP 4: Development of Lead Universities for SE&EE*

	Criteria	Indicators	Baseline value
<i>Output</i>	Need for RE&EE university graduates assessed.	<ul style="list-style-type: none"> <li>Report on needs assessment prepared and included in inception report.</li> </ul>	No questionnaires received back yet.
	Need for and type of education programme on sustainable energy at partner University assessed	<ul style="list-style-type: none"> <li>Report on training needs and type of education programme prepared and included in inception report</li> </ul>	Report not yet available.
	Education programme developed and implemented	<ul style="list-style-type: none"> <li>Curriculum &amp; training material for identified courses for educational programmes developed for five partner universities measured by deliverable no D18 produced on time</li> <li>Lecturers of partner universities trained in the Netherlands and Indonesia measured by deliverable D17 produced on time.</li> <li>Education programme implemented at five partner universities measured by deliverable D17 &amp; D14 produced on time.</li> <li>Number of subjects taught in SE/EE; target is 21(UMY), 15(UNDIP), 14(USU), 6(UNRAM).</li> <li>Number of practical courses in SE/EE ; target is 2(UMY), 5(UNDIP), 2(USU), 0 (UNRAM).</li> </ul>	<ul style="list-style-type: none"> <li>No education programme developed yet.</li> <li>-Lecturers, except from Papua, have received some training in EWG.</li> <li>No education programme yet at UMY, USU, UNRAM, UNCEN.</li> <li>Existing subjects 15(UMY), 9(UNDIP), 8(USU), 3(UNRAM).</li> <li>Existing courses 0(UMY), 5(UNDIP), 2(USU), 0 (UNRAM).</li> </ul>
Research programme developed and implemented	<ul style="list-style-type: none"> <li>Number of research projects in SE/EE: target 9(UMY), 20(UNDIP), 6(USU), 7 (UNRAM).</li> <li>Number of research projects in SE/EE related to industry: target 5(UMY), 12(UNDIP), 6(USU), 2(UNRAM).</li> <li>Deliverables no D15 &amp; D16 produced on time.</li> </ul>	<ul style="list-style-type: none"> <li>Existing projects 4(UMY), 17(UNDIP), 3(USU), 3 (UNRAM).</li> <li>Existing projects 2(UMY), 11(UNDIP), 3(USU), 0 (UNRAM).</li> </ul>	

	Criteria	Indicators	Baseline value
	Demonstration units installed	<ul style="list-style-type: none"> <li>• Timely installation of appropriate demonstration unit, measured by installation date and type of installation: target 5(UMY), 14(UNDIP),6(USU), 3 (UNRAM)</li> <li>• Deliverable no D20 produced on time</li> </ul>	Existing units 2(UMY), 11(UNIP),3(USU), 1 (UNRAM)
<i>Outcome</i>	Students at partner university trained in SE&EE subjects	<ul style="list-style-type: none"> <li>• At least 75 students attended the SE&amp;EE education programme successfully (passed the exam)</li> </ul>	Currently students can not attend this programme.
	Valorisation of existing knowledge at partner universities materialised	<ul style="list-style-type: none"> <li>• At least 10 valorisation workshops held in the regions measured against number of participants.</li> <li>• Deliverable no D19 produced on time.</li> </ul>	1 knowledge valorisation workshop per university organised before in EWG.
	Structure for contacts with industry specifically in SE/EE	Structure strengthened to medium/strong measured through new request from private sector for research projects.	Existing structure weak for UMY, USU and UNRAM and medium for UNDIP.

## 6. Major Issues for Work Package 5 & 6: Training needs assessment for the technical teams and regional authorities in the target provinces

During the CAREPI project technical teams were established in Yogyakarta, Central Java and West Nusa Tenggara. The establishment of an approved team in North Sumatra is still pending, although within USU the nucleus of a possible team is active in CAREPI. These teams have received formal training and on-the-job training in the fields of energy planning and modelling and micro hydro technology and project feasibility studies. In CASINDO the technical teams will be further expanded in size and in capacity and the knowledge level of the existing team members will be broadened. Furthermore, in each of the five target provinces a limited number of regencies and cities will also be involved in CASINDO. This section presents the results of the training needs assessment of the regional technical teams and the regencies and cities.

### 6.1 Assessment of training needs of the regional technical teams

The identification of the specific training needs of the technical teams to be addressed in CASINDO revealed the following four fields of training needs:

1. Basic LEAP training: 3-day training course on integrated energy planning and the LEAP model. This course was given to all teams in the first year of CAREPI. However, over the past 2 years new staff has been recruited by the teams who also need to be trained on this subject.
2. Advanced LEAP training: meant for team members who are actually working with LEAP and have already gained significant experience with the model. The 2-day course involves in-depth training on particular subjects suggested by the teams.
3. Energy efficiency: this 3-day course is meant to improve knowledge of the team members on energy efficiency, a subject not covered in the CAREPI project.
4. Feasibility analysis: this 3-day training course involves an explanation of cash flow analysis, feasibility analysis and development of a bankable project, with a focus on non hydro projects.

For Papua a tentative training programme is included in the Table below based on the CAREPI experiences and on discussions held by ITB with the Cendrawasih University. As Papua is a new region, a similar capacity building path as the other teams received in CAREPI is envisaged. A more elaborated programme will be developed as soon as the security situation has normalised and the project team is able to visit this province. The identified training needs of the technical teams in the five provinces are summarised in Table 6.1:

Table 6.1 *Overview of identified training needs of the regional technical team*

Province	Basic LEAP training	Advanced LEAP	Energy efficiency	Feasibility analysis
<i>North Sumatra</i>	4 new team members will attend	Transformation costs, cost/benefit analysis, environmental analysis, investment plan; 2 team members will attend	2 team members will attend	4 team members will attend
<i>Central Java</i>	4 new team members plus 3 students will attend	8 team members will attend		2 team members will attend
<i>Yogyakarta</i>		Drivers for energy demand, energy balances, energy scenarios 8 team members will attend		Cash flow analysis plus workshop; 10 team members will attend
<i>West Nusa Tenggara</i>	4 new team members plus potentially 2 students	1 team member will attend; data management		2 team members will attend
<i>Papua</i>	The whole team will attend			The whole team will attend

## 6.2 Assessment of training needs of regional energy forums and Kabupaten/Kota

The regional energy forum is the key body for discussing provincial energy policies. Kabupaten/Kota are lower administration levels within the province that currently also have a large degree of autonomy with regard to their energy sector development. The CASINDO project will therefore also aim at strengthening the energy policy formulation capacity in a limited number of Kabupaten/Kota. Table 6.2 below presents an overview of the combined training needs of the regional energy forum and the selected Kabupaten/Kota in each target province.

Table 6.2 Overview of identified training needs of energy forum and kabupaten

Province	Basic LEAP training	Feasibility Analysis/business planning/financing schemes
<i>North Sumatra</i> <i>-Deli Serdang</i> <i>-Langkat</i> <i>-Medan</i>	4 participants from each of the selected Kabupaten and possibly also participants from REF.	4 participants from each of the selected Kabupaten and possibly also participants from REF.
<i>Central Java</i> <i>-Cilacap</i> <i>-Banjarnegara</i> <i>-Pekalongan</i> <i>-Wonogiri</i> <i>-Rembang</i> <i>-Pubalingga</i> <i>-Banyumas</i>	In total 10 participants from Dinas Energi and Kabupaten	In total 10 participants from Dinas Energi and Kabupaten/Kota
<i>Yogyakarta</i> <i>-Bantul</i> <i>-Gunungkidul</i> <i>-Yogyakarta</i>	In total 20 participants from REF and Kabupaten will attend	In total 15 participants from Kabupaten will attend
<i>West Nusa Tenggara</i> <i>-East Lombok</i> <i>-Central ombok</i>	In total 8 participants from REF and kabupaten	In total 4 participants from Kabupaten and REF
<i>Papua</i>	In total 10 participants from Dinas Energi	

### 6.3 Training programme to address identified training needs

A training programme developed to address the above mentioned identified training needs of the technical teams, energy fora and Kabupaten/Kota comprises the following main components:

- Basic 3-day integrated energy planning and LEAP training for technical teams in North Sumatra, West Nusa Tenggara and Papua that will be given by ITB.
- Advanced 2-day LEAP training will be given by ITB/ECN in Central Java and Yogyakarta on particular subjects proposed by the teams.
- Energy efficiency training for technical will be given by MVV Decon, ECN and TU/e as part of the Technical Working Group on Energy Efficiency.
- Training on financial analysis/business planning for the technical teams will be given by ECN at a central location.
- Basic LEAP training for REF, Dinas Energi and Kabupaten/Kota will be given in each target province by MEMR-ETCERE together with the regional technical team.

## 6.4 Activity time table and schedule of international experts

Table 6.3 Activity time table and schedule for international experts for WP 5

Month	Activity	University	International Experts (Y/N) & who	Deadline reports
Aug 2009	Briefing on needs assessment technical teams and kota/kabupaten levels	UMY,UNDIP, USU, UNRAM	Y: Koen Smekens; Nico van der Linden	
Sept	Perform needs assessment	UMY,UNDIP, USU, UNRAM	N	D4: Inception report
Oct	TWG I meeting	UMY,UNDIP, USU, UNRAM,UNCEN	Y: Koen Smekens,;ITB Nico vd Linden	
Nov	TWG II meeting, TWG III meeting, TWG IV meeting, TWG V meeting	UMY, UNDIP, USU, UNRAM, UNCEN	Y : Tjasa Bole, Raouf Saidi, Rainer Behnke, Nico van der Linden, ITB	
	Develop kota/kabupaten training programme	UMY,UNDIP, USU, UNRAM	Y : ECN,others	
Jan 2010	Develop renewable energy action plan & EE masterplan	UMY,UNDIP, USU, UNRAM, UNCEN	Y : ECN, MVV Decon, ITB	
	Select non hydro project	UMY,UNDIP,USU,UNRAM, UNCEN	N	
Feb	Select and conduct energy needs assessment poor community/ies	UMY,UNDIP, USU, UNRAM,UNCEN	Y: Tjasa Bole, Nico van der Linden	D1: progress report
Mar	Energy balance 2006/7	UMY,UNDIP, USU, UNRAM,	Y : Koen Smekens	D21
	Update LEAP model with energy balance 2006/7 data	UMY,UNDIP, USU, UNRAM	Y : Koen Smekens, ITB	
	TWG I meeting	UMY,UNDIP, USU, UNRAM UNCEN	Y : Koen Smekens	
April	TWG II, III, meeting	UMY,UNDIP, USU, UNRAM,UNCEN	Y : ECN, MVV Decon, ITB	
	Develop regional energy policy scenarios	UNCEN	Y : ECN, others, ITB	
May	TWG IV,V meeting	UMY, UNDIP,USU,UNRAM,UNCEN	Y: Tjasa Bole, Nico vd Linden	
June	Energy balance 2005/6/7	UNCEN	Y: Koen Smekens, ITB	D21bis
	TWG I meeting	UMY,UNDIP, USU, UNRAM, UNCEN	Y : Koen Smekens	
July	Identify measures, development of pro-poor strategies	UMY,UNDIP, USU, UNRAM, UNCEN	Y : Nico van der Linden, others	

Month	Activity	University	International Experts (Y/N) & who	Deadline reports
<i>Sept</i>	Collect energy investment plans	UMY,UNDIP, USU, UNRAM	Y : ECN, others, ITB	
	Model regional energy policy scenarios in LEAP	UNCEN	Y : ECN, others, ITB	
<i>Oct</i>	Develop draft renewable action plan and draft EE master plan	UMY,UNDIP, USU, UNRAM, (UNCEN)	Y : ECN, others, ITB	D24
	TWG I meeting	UMY,UNDIP, USU, UNRAM, UNCEN	Y : ECN, others, ITB	
<i>Nov</i>	EWG	all	Y	
	Start evaluation energy investment plans	UMY,UNDIP, USU, UNRAM	Y : ECN, others, ITB	
	TWG II,III meeting	UMY,UNDIP, USU, UNRAM, UNCEN	Y : ECN, others	
<i>Dec</i>	TWG IV,V meeting	UMY,UNDIP, USU, UNRAM, UNCEN	Y : ECN, others	D2: progress report
<i>Jan 2011</i>	Energy balance 2007/8	UMY,UNDIP, USU, UNRAM	Y : Koen Smekens	D22
	Update LEAP model with energy balance 2007/8 data	UMY, UNDIP, USU, UNRAM	Y : Koen Smekens, ITB	
	Discuss and formulate regional energy scenarios	UMY,UNDIP, USU, UNRAM	Y : Koen Smekens, ITB	
	Discuss and update regional energy policy scenarios	UNCEN	Y : ECN, others, ITB	
	Discuss draft renewable energy action plan & EE masterplan with stakeholders	UMY,UNDIP, USU, UNRAM	Y : ITB, others	
	<i>Feb</i>	Discuss draft pro poor strategy & RE business plan with stakeholders	UNCEN	Y: ECN, ITB
Energy balance 2006/7/8		UNCEN	Y: Koen Smekens, ITB	D22bis
Include updated regional energy scenarios in LEAP		UMY, UNDIP, USU, UNRAM	Y : Koen Smekens, ITB	
<i>Mar</i>	Discuss draft regional energy scenarios outcomes with FGD/fora	UMY, UNDIP, USU, UNRAM	Y : Koen Smekens, Nico, van der Linden, ITB	
	TWG I meeting	UMY, UNDIP, USU, UNRAM, UNCEN	Y : ECN, others, ITB	
<i>April</i>	TWG II, III meeting	UMY, UNDIP, USU, UNRAM, UNCEN		

Month	Activity	University	International Experts (Y/N) & who	Deadline reports
<i>May</i>	Evaluate kota/kabup training programme	UMY,UNDIP, USU, UNRAM	Y : ECN, others	
	TWG IV,V meeting	UNY, UNDIP, USU, UNRAM, UNCEN	Y : ECN, others	
<i>Sept</i>	Final Report on renewable energy action plan, EE masterplan, pro poor strategies ,non hydro business plan	UMY, UNDIP, USU, UNRAM	Y : Koen Smekens, ITB, others	D3: progress report D24,D25,D27
<i>Oct</i>	Energy balance 2008/9	UMY, UNDIP, USU, UNRAM	Y : Koen Smekens	D23
	Update LEAP model with energy balance 2008/9 data	UMY, UNDIP, USU, UNRAM	Y : Koen Smekens, ITB	
	TWG I meeting	UMY, UNDIP, USU, UNRAM, UNCEN	Y : ECN, others, ITB	
<i>Nov</i>	EWG	all		
<i>Dec</i>	Energy balance 2007/8/9	UNCEN	Y: Koen Smekens, ITB	D23bis
	Report on regional energy scenarios	UMY,UNDIP, USU, UNRAM	Y: Koen Smekens, ITB	D28
	Report on regional energy scenarios in outlook	UNCEN	Y: Koen Smekens, ITB	D28bis
	Report on evaluation of energy invest plans	UMY, UNDIP, USU, UNRAM	Y : ECN, others	D28
<i>Jan 2012</i>	Contribution to final report			
<i>Feb</i>	Contribution to final report			
<i>Mar</i>	Contribution to final report		Y : Koen Smekens, others	D5:Final report

## 6.5 Monitoring framework for WP 5

Table 6.4 *Monitoring framework WP: 5 Regional energy policy formulation & implementation*

	Criteria	Indicators	Baseline value
<i>Output</i>	<ul style="list-style-type: none"> <li>Members of regional technical team trained in RE/EE policy analysis</li> </ul>	<ul style="list-style-type: none"> <li>Well-established team, measured by the number and composition of staff members; enhanced knowledge</li> <li>Level and quality of formal and informal( on the job) training received measured by training courses organised and technical meetings held.</li> </ul>	<p>Teams established in all regions except Papua; number of staff amounts to 3(NS), 7(Yogya), 3(CJ), 5(WNT).</p> <p>One formal training course and 2 technical meetings per year</p>
	<ul style="list-style-type: none"> <li>Members of regional energy forum trained in RE/EE policy formulation.</li> </ul>	<ul style="list-style-type: none"> <li>Enhanced capacity and knowledge about regional energy planning, strategies and policy making, including pro-poor energy strategies, measured by type and number of training activities and number of forum members trained.</li> </ul>	<p>Forum members have not yet received any formal or informal training.</p>
	<ul style="list-style-type: none"> <li>Representatives at lower administration levels (kabupaten/kota) trained in RE&amp;EE policy formulation.</li> </ul>	<ul style="list-style-type: none"> <li>Training programme developed based on needs assessment for at least 2 kabupaten/kota in each region. At least 2 representatives from each kabupaten trained.</li> <li>Deliverable no 26 produced on time.</li> </ul>	<p>Kabupaten/Kota not yet involved in EWG activities.</p>
<i>Outcome</i>	<ul style="list-style-type: none"> <li>Regional energy policy analysis duly carried out</li> </ul>	<ul style="list-style-type: none"> <li>Deliverables no 21, 22, 23, 24, 25, 27 and 28 produced on time.</li> </ul>	<p>Energy balance 2005 and energy outlook 2009 prepared for all regions except Papua (no energy balance nor outlook).</p>
	<ul style="list-style-type: none"> <li>Sound regional energy policies formulated by energy forum</li> </ul>	<ul style="list-style-type: none"> <li>Policies prepared and submitted to regional Dinas Energi.</li> </ul>	<p>No policies submitted yet.</p>
	<ul style="list-style-type: none"> <li>Energy policies formulated for selected Kabupaten/Kota</li> </ul>	<ul style="list-style-type: none"> <li>Policies developed and approved by at kabupaten level.</li> </ul>	<p>No policies developed yet.</p>

## 7. Major issues for Work Package 6: Developing and strengthening human capacity in the regions

Work package 6 includes all the activities aimed at capacity building, skills development and knowledge transfer in the five target provinces. In the CASINDO project proposal four types of training activities are mentioned:

1. The development and execution of a training programme on renewable energy and energy efficiency by the MEMR-ETCERE
2. SMK teacher and student training programme in renewable energy technologies and energy efficiency by TEDC
3. Basic and advanced training in integrated energy planning and modelling for the technical teams by ITB
4. Training programme for the energy forums implemented by MEMR-ETCERE and the regional technical teams

The issues discussed during the inception phase related to 2, and 3 & 4 are for consistency reasons discussed in Chapter 4 and 6, respectively. This chapter covers the training programme no.1, the training that will be given by MEMR-ETCERE in the target provinces.

In the CASINDO project proposal it is proposed that MEMR-ETCERE in the course of the project will implement the following six courses in the five target provinces.

1. Course on regional energy planning, including basic explanation of LEAP model
2. Course on energy and water conservation for building
3. Course on energy conservation for industries
4. Course on installation and Maintenance of photovoltaic systems
5. Course on design/utilisation of biomass/gas
6. Course on resources mapping and feasibility study of wind power

During the inception phase, MEMR-ETCERE pointed out that the first course to a large degree has already been developed and is ready for implementation. However, some assistance was requested from the international experts in reviewing the curriculum and training material. It was agreed that this course will be given by MEMR-ETCERE in the five target provinces but because of other commitments, MEMR-ETCERE can start with the implementation only after 5 December 2009. It was indicated that MEMR-ETCERE staff need to be further trained before a more advanced LEAP training could be included in the programme.

Regarding the energy efficiency, it was agreed that MEMR ETCERE first would receive ToT from international experts which will take place in November, 2009, in Jakarta. Next, curriculum and training material can be developed and the training given in the five target provinces. Energy efficiency training courses in regions are scheduled for mid 2010.

The training courses on renewable energy technologies also first require ToT which is planned in January-February 2010. The development of these courses will be done in the course of 2010 and it is expected that these courses can be included in the work plan for 2011.

## 7.1 Activity time table and schedule international experts

Table 7.1 *Activity time table and schedule for international experts for WP 6*

Month	Activity	MEMR/University	International Experts (Y/N) & who	Deadline reports
<i>July 2009</i>	Assessment training needs of MEMR	ETCERE, DICEMR, DNREEC	Y: Nico van der Linden	
<i>August</i>	Assessment training needs of technical teams, energy fora, Kabupaten	UMY, UNDIP, USU, UNRAM	Y: TU/e, Nico vd Linden, ITB	
<i>Sept</i>	Develop training programme for for a/kabupaten	UMY, UNDIP, USU, UNRAM	Y: ITB Nico vd Linden	D4: Inception report
<i>Dec</i>	Develop curriculum, training material LEAP training	MEMR-ETCERE	Y :ITB, ECN, SEI-B	D29
	Basin LEAP training tech team Papua	ITB	N	
<i>Jan-June 2010</i>	Basic LEAP training for Dinas Energi in five target provinces	MEMR-ETCERE	N	
	Basic LEAP training for technical team North Sumatra, Central Java, Yogya, WNT	ITB	N	
<i>July-Dec 2010</i>	Develop curriculum, training material EE training	MEMR-ETCERE	Y: MVV Decon	
	EE training for Dinas Energi in five target provinces	MEMR-ETCERE	N	
<i>Jan-June 2010</i>	Develop curriculum, training material PV; training	MEMR-ETCERE	Y: ETC Nederland	
	PV training in five target provinces	MEMR-ETCERE	N	
<i>July- Dec 2010</i>	Develop curriculum, training material for biogas; training	MEMR-ETCERE	Y: BTG, TU/e	
	Biomass training in five target provinces		N	
<i>Jan –June 2011</i>	Evaluation of training	MEMR-ETCERE	N	

## 7.2 Monitoring framework for WP 6

The monitoring framework for WP 6 is presented in Table 7.2.

Table 7.2 *Monitoring framework for WP 6: Developing an strengthening human capacity in the regions*

	<i>Criteria</i>	<i>Indicators</i>	<i>Baseline value</i>
<i>Output</i>	<ul style="list-style-type: none"> <li>training of ETCERE trainers conducted</li> </ul>	<ul style="list-style-type: none"> <li>ToT training modules developed for EE, Advanced LEAP and solar energy</li> <li>ToT training conducted and attended by at least 4 ETCERE staff for each training</li> <li>Report on the evaluation of the courses prepared</li> </ul>	<ul style="list-style-type: none"> <li>No training material available</li> <li>No ToT conducted</li> <li>No evaluation report available</li> </ul>
<i>Outcome</i>	<ul style="list-style-type: none"> <li>Energy professionals in the five target regions trained by ETCERE</li> </ul>	<ul style="list-style-type: none"> <li>At least 50 energy professionals from Dinas Energi trained on energy planning/LEAP, energy efficiency and solar energy</li> <li>At least 30 energy professionals from Kabupaten/Kota trained on energy planning/LEAP and energy efficiency.</li> <li>Evaluation of training courses completed and report prepared</li> </ul>	<ul style="list-style-type: none"> <li>No professionals trained in five CASINDO focus provinces</li> <li>No Kabupaten staff trained</li> <li>No evaluation report available</li> </ul>

## 8. Major issues for Work Package 7: Training needs assessment for the MEMR

During the preparation of the CASINDO proposal it was clearly indicated that to ensure good communication on energy matters between the national and regional levels of administration in Indonesia a training programme is also necessary at the national level. The high staff turnover experienced over the past years at the MEMR necessitates the training of new inexperienced staff and the knowledge of the current staff needs to be broadened.

In the CASINDO work plan, Work Package 7 aims to address the training needs at the national level. To develop and strengthen the human capacity at the NDREEC, DICEMR and ETCERE of the MEMR a training programme is proposed comprising the following components:

- A series of specific in-depth training courses implemented in Jakarta that aim to provide in-depth knowledge on a particular subject to deepen the knowledge of the participants and to train the trainers (ToT) of MEMR-ETCERE in order to enable them to give these training courses to policy makers in the CASINDO target provinces.
- 6-week training programme implemented in the Netherlands for young and new MEMR staff who have limited experience and do not yet qualify for the MSc programme.
- Long term education in the Netherlands with the aim to acquire an MSc degree in sustainable energy

Two meetings and several more informal discussions have taken place with MEMR management to develop the programme for the above training components. The first series of meetings between ECN and MEMR was conducted on 23-24 April 2009, based on which a first draft programme was prepared. On 11-13 August 2009 the draft programme was further discussed with MEMR, which resulted in an agreement about the curriculum for the various training courses and about the date and the location where the course will be given.

### 8.1 In-depth training programme implemented in Jakarta

During the meetings with MEMR held in April and August it was concluded that the following training courses will be implemented for MEMR staff in the second half of 2009 and early 2010:

1. Introductory/refresher course on integrated energy planning and the LEAP model.
2. Advanced training course on integrated energy planning and LEAP model plus Training of Trainers (ToT) of MEMR-ETCERE.
3. In-depth training course on renewable energy technologies plus ToT for MEMR –ETCERE staff.
4. In-depth training course on energy efficiency plus ToT for MEMR-ETCERE staff..

The duration of each course is one week (except course no. 3, which will last 2 weeks) and courses no. 2, 3 and 4 are followed by 2-day trainings of the trainers of MEMR-ETCERE. This ToT will involve in-depth discussion/explanation of particular subjects suggested by ETCERE and review of the curriculum and training material developed by ETCERE. The aim is to enable the trainers of the MEMR-ETCERE to give a similar course in the five CASINDO target provinces.

At the end of each training course the participants are asked to complete a questionnaire with the aim to assess the amount of knowledge the participant has gained through the course.

The intention is also to evaluate each course together with the participants with the aim to receive comments from the participants regarding the course and to identify the potential need for follow up training.

A brief overview of the subjects that will be covered in the course, the course date and location are presented below for each course. The detailed curriculum can be found in Appendix C.

*I. Introductory/Refresher course on integrated energy planning and LEAP model*

Implementation period: 5-9 October 2009

Target group: some 15 junior MEMR staff / 2 Central Java/Yogyakarta Dinas staff

Duration: 5 days

Location: ETCERE

Organizing institute: ETCERE

Implementing institute: ETCERE, BPPT

*Topics:*

- National energy regulation.
- Integrated energy planning.
- Energy demand /demand side management.
- Energy supply.
- Scenario development.
- LEAP model.
- Brief explanation other energy models such as MARKAL

*II. Advanced training course on integrated energy planning and LEAP model*

Implementation period: 11-15 January 2010

Target group: some 20 senior MEMR staff

Duration: 5 days plus 2 days ToT

Location: ETCERE

Organizing institute: ECN

Implementing institute: ECN, SEI-Boston.

*Topics:*

- Load curve calculation.
- Synthetic fuel calculation.
- Cost and technology analysis.
- Environmental analysis.
- Useful energy analysis.
- Methods to estimate missing data/information.
- The latest version of LEAP's software and how to apply.

*III. Training course on renewable energy technologies*

Implementation period: Part I: 18-22 January 2010; Part II: 8-13 February 2010

Target group: some 20 MEMR staff

Duration: 10 days plus 2 days ToT

Location: ETCERE

Organizing institute: ECN

Implementing institute: ECN, BTG, ETC, TU/e, ITB, MITI

*Topics:*

- Solar energy: technology, potential and costs.
- Wind energy: potential, technology and costs.
- Biomass: potential, technology and costs.
- Micro hydro: potential, technology and costs.

- Geothermal: potential, technology and costs.
- Why renewable energy?
- Why targets for renewable energy?
- How to develop RE targets?
- Experiences with RE targets.
- Existing barriers to wide scale introduction of RE technologies.
- How can the uptake of renewable energy technologies be stimulated?
- Experiences with renewable energy support mechanisms and suitability for the Indonesian situation.

#### IV. Training course on energy efficiency

Implementation period: 3-7 November 2009

Target group: some 15 senior MEMR/5 TEDC staff

Duration: 5 days plus 2 days ToT

Location: ETCERE

Organizing institute: ECN

Implementing institute: MVV Decon, ECN

#### *Topics:*

- Introduction and basics.
- Development of energy efficiency strategies.
- Energy management in buildings.
- Energy management in industry.
- Measuring, auditing, energy management.
- Methods of project development.
- Financing of energy efficiency.

## 8.2 6-week training programme in the Netherlands

The 6-week training programme in the Netherlands is specifically intended for junior MEMR staff and is scheduled for the period 29 March to 8 May 2010. The aim of the programme is to provide the participants with a sufficient level of knowledge on various energy subjects relevant for their tasks and responsibilities at the MEMR.

It is expected that some 15 MEMR staff will participate in this training programme. The selection of candidates will be based on criteria such as minimum level of English (less stringent compared to TOEFF test), position, responsibilities and expected professional career at MEMR.

The training programme will be developed and implemented by ECN, ETC, TU/e, BTG, AdvancedConsulting and MVV Decon. It is proposed that the first three weeks the courses will be given at ECN in Petten; next the participants will move to Leusden and will stay there for one week to attend the Energy for development course and, finally, the participants will move to Eindhoven and stay in the vicinity of the University for the last 2 weeks.

The training courses will be very interactive. Participants are encouraged to present and discuss their views and to translate the course material presented by the lecturers to the Indonesian context. Each course will also include a one-day field trip to a relevant project/organisations in the Netherlands/Germany.

At the end of each course the participants are expected to complete a questionnaire to assess the gain in knowledge achieved through the course. If the sum of the scores awarded for the individual courses exceeds a certain minimum, the participant will receive a certificate at the end of the training programme.

An overview of the proposed 6-week training programme, which will be further elaborated in the course of this year, is presented below:

### I. Integrated energy planning

Proposed period: 29 March 2010 – 6 April 2010

Target group: some 15 junior MEMR staff

Duration: 6 days

Location: ECN, Petten, The Netherlands

Organizing institute: ECN

Implementing institute: ECN

#### *Topics:*

- General framework for integrated energy planning.
- Demand forecast.
- Supply analysis.
- Energy modeling (technology input, environmental externalities, technology cost).
- Scenario development and evaluation.
- Energy strategy formulation.
- Demand side management.
- LEAP model.
- Evaluation of the course /questionnaire.

### II. Global Climate Change

Proposed period: 7-8 April 2010

Target group: some 15 junior MEMR staff

Duration: 2 days

Location: ECN, Petten, The Netherlands

Organizing institute: ECN

Implementing institute: ECN

#### *Topics*

- Kyoto protocol.
- Copenhagen protocol.
- Mitigation and adaptation policies (ETC).
- CDM, National Appropriate Mitigation Actions(NAMA), Low-Carbon Development Strategies (LCDS).
- Evaluation of the course /questionnaire.

### III. Financial & Economic analysis

Proposed period: 12-13 April 2010

Target group: some 15 junior MEMR staff

Duration: 2 days

Location: ECN, Petten, The Netherlands

Organizing institute: ECN

Implementing institute: ECN, AdvanceConsulting

#### *Topics*

- Cash flow analysis.
- NPV, IRR.
- Feasibility study.
- Business plan.
- Financing mechanisms.
- Report writing by participants.

#### IV. Energy and development

Proposed period: 14-20 April 2010

Target group: some 15 junior MEMR staff

Duration: 4 days

Location: ETC, Leusden, The Netherlands

Organizing institute: ETC

Implementing institute: ETC

##### *Topics:*

- Millennium Development Goals.
- Energy needs of poor communities without access to modern energy.
- Availability, accessibility, affordability.
- Financing mechanisms.
- Gender issues.
- Evaluation of the course /questionnaire.

#### V. Renewable Energy

Proposed period: 21- 30 April 2010

Target group: some 15 junior MEMR staff

Duration: 5 days

Location: TU/e, Eindhoven, The Netherlands

Organizing institute: TU/e

Implementing institute: TU/e, TU-Delft

##### *Topics*

- Basic explanation of the technology (solar, wind, biomass).
- Policies to promote the uptake of renewable energy technologies (feed in, RPS, investment subsidies); what can be learned from experiences in Europe.
- Evaluation of the course /questionnaire.

#### VI. Energy Efficiency

Proposed period: 3-7 May 2010

Target group: some 15 junior MEMR staff

Duration: 5 days

Location: TU/e, Eindhoven, The Netherlands

Organizing institute: MVV Decon

Implementing institute: MVV Decon, ECN

##### *Topics*

- Development of energy strategies and plans.
- Energy management in buildings, industry.
- Energy audits.
- Financing of energy efficiency.
- Evaluation of the course /questionnaire.

### 8.3 Long term education to acquire a Master degree

The third component of the overall training programme for MEMR involves long term education at a University in the Netherlands with the aim to acquire a Master degree in sustainable energy. As already indicated in the CASINDO project proposal, the programme can not provide the funds for this long term education but can assist the CASINDO partners in applying for scholarships.

Last April, the CASINDO consortium, co-ordinated by the Muhammadiyah University in Yogyakarta, prepared an Expression of Interest for a group application for 15 participants that was submitted to the NufficNeso Scholarship Programme in Jakarta. The evaluation process took several months but at the end of July Muhammadiyah University received the evaluation report. NufficNeso indicated that the EoI fits into their focus areas but that it was too late to include the proposed group application in this year's programme and it was therefore proposed to allocate the CASINDO group application to the 2010 programme. The NufficNeso evaluation report is included in Appendix D.

## 8.4 Activity time table

In table 8.1 the timetable for the various MEMR training courses is presented.

Table 8.1 *Activity time table for MEMR training*

Training / Month	2009			2010				
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
<i>In Jakarta</i>								
1. Basic LEAP training								
2. Advanced LEAP train.								
3. In-depth RE training								
4. In-depth EE training								
<i>In Netherlands</i>								
1. Integrated energy planning								
2. Global Climate Change								
3. Finan. & economic analysis								
4. Energy and development								
5. Renewable energy								
6. Energy efficiency								

## 8.5 Monitoring framework for WP 7

In the CASINDO proposal a number of criteria and associated indicators are presented under WP 7 to measure the output and outcome of the MEMR training programme. The training needs assessment conducted for MEMR concluded that these indicators need to be revised for the following reasons:

- The existing capacity at the ETCERE, DNREEC and DICEMR appeared to be considerably less than anticipated during the preparation of the proposal. Therefore, the number of course participants from these departments will also be less than initially envisaged.
- It became clear during the inception phase that the cooperation between ETCERE and TEDC in the fields of renewable energy and energy efficiency should be strengthened and broadened to the largest possible extent. It was therefore decided to also invite TEDC staff for the training courses
- Some of the indicators presented in WP 7 must be more quantitative in nature to enable better monitoring.

Based on the above considerations the revised criteria and associated indicators are presented in the table below:

Table 8.2 *Monitoring framework for WP 7: Strengthening human capacity at the national level*

	Criteria	Indicators	Baseline value
<i>Output</i>	<ul style="list-style-type: none"> <li>Assessment of training needs at MEMR conducted.</li> </ul>	<ul style="list-style-type: none"> <li>Report on needs assessment prepared and included in inception report.</li> </ul>	Report not yet available.
	<ul style="list-style-type: none"> <li>Courses in relevant subjects are developed.</li> </ul>	<ul style="list-style-type: none"> <li>Curriculum and training material developed and posted on CASINDO website.</li> </ul>	<ul style="list-style-type: none"> <li>LEAP training module developed.</li> <li>EE modules partly developed.</li> <li>Other training models not yet developed.</li> </ul>
	<ul style="list-style-type: none"> <li>ETCERE staff is trained as trainer in RE&amp;EE.</li> </ul>	<ul style="list-style-type: none"> <li>At least 3 ETCERE staff participated successfully in RE&amp;EE. training and ToT training.</li> <li>Test score is at least 70%.</li> </ul>	Basic knowledge on RE&EE, no ToT received.
	<ul style="list-style-type: none"> <li>DNREEC staff is trained in formulating national RE&amp;EE policies.</li> </ul>	<ul style="list-style-type: none"> <li>At least 3 DNREEC staff participated in the training.</li> <li>Test score is at least 70%.</li> </ul>	Basic knowledge on RE & EE.
	<ul style="list-style-type: none"> <li>DICEMR staff is trained in energy policy and energy modelling subjects.</li> </ul>	<ul style="list-style-type: none"> <li>At least 4 DICEMR staff involved in the training.</li> <li>Test score is at least 70%.</li> </ul>	Basic knowledge on Energy planning.
<i>Outcome</i>	<ul style="list-style-type: none"> <li>Energy professionals in the regions trained by ETCERE.</li> </ul>	<ul style="list-style-type: none"> <li>At least 200 energy professionals in the regions trained by ETCERE staff.</li> <li>At least 140 certificates awarded.</li> </ul>	Energy professionals have general knowledge level; no certificates awarded.
	<ul style="list-style-type: none"> <li>Good communication channels between MEMR and the provinces established.</li> </ul>	<ul style="list-style-type: none"> <li>Participation MEMR in energy forum/Dinas meetings measured by frequency of attendance.</li> <li>Participation MEMR in Technical. Working Groups measured by frequency of attendance.</li> </ul>	<p>On average 1-2 meetings a year.</p> <p>No TWG meetings held.</p>

## 9. Major issues for Work Package 8: Dissemination of results

Work Package 8 addresses the essential need for dissemination of results throughout the duration of the programme. No major changes were made to this work package in the inception phase.

One key deliverable of this work package is the development of a CASINDO website. This website was launched on 21 August 2009. It contains a brief description of the CASINDO programme, description of the partners, an overview of upcoming events/meetings and a link to relevant resources. The web address is <http://www.casindo.info/>.

Two national seminars will be held in Jakarta in the course of the project duration. The first seminar is scheduled for mid-February 2010. During the seminar the first results of CASINDO will be presented and the regional teams will present and discuss the final regional energy outlook produced in the CAREPI project.

During the inception phase a first version of the CASINDO leaflet has been developed. The leaflet will comprise four pages and will contain the key project information. A professional designer of ITB has been asked to develop an attractive design for the leaflet. It is proposed to print 1,000 copies of the Bahasa Indonesian version and 500 copies of the English version.

A logo for the CASINDO programme has been agreed upon and this logo will be put on the front page of all CASINDO documents.

### 9.1 Monitoring framework for WP 8

The monitoring framework for WP 8 is presented in Table 9.1.

Table 9.1 *Monitoring framework for WP 8: Dissemination of results*

	<i>Criteria</i>	<i>Indicators</i>	<i>Baseline value</i>
<i>Output</i>	Communication and dissemination at the national, the regional level and at the international level	<ul style="list-style-type: none"> <li>• CASINDO results presented at the national seminar measured against the number of participants</li> <li>• CASINDO results presented in the five focus provinces measured through number of workshops and number of participants</li> <li>• Results presented in the media (print, radio, TV) and posted on the website</li> <li>• CASINDO leaflet produced and distributed measured against number of leaflets produced and distributed</li> </ul>	<p>120 participants at 2009 seminar</p> <p>No workshops conducted yet in the regions</p> <p>No results presented yet</p> <p>Leaflet not yet available</p> <p>CASINDO methodology and</p>

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		results presented and discussed at relevant international workshop/seminar in South East Asia region measured against number of international seminars attended by CASINDO team	
<i>Outcome</i>	Raised awareness of the CASINDO activities and results in Indonesia and abroad	<ul style="list-style-type: none"> <li>• Number of visits to the website</li> <li>• Interest from regions not included in CASINDO in the project measured against number of request for assistance</li> <li>• Extent of cooperation with other ongoing project/programmes in Indonesia</li> </ul>	<p>Website only recently launched</p> <p>Two regions already expressed their interest in CASINDO</p> <p>Close cooperation with MHPP programme of GTZ</p>

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## 10. Need for subcontracting external expertise

The developed training programme, which is based on training needs identified in the various work packages can to a large degree (97%) be implemented by the CASINDO consortium partners, including BTG, AdvanceConsulting and TU Delft. However, the assessment also revealed demand for some specific expertise that cannot be provided by the consortium and therefore it is proposed to sub contract the following organisations:

- Specific expertise on technical and policy aspects of improving energy efficiency is not sufficiently available in the consortium and is required for the MEMR training, the training in the Netherlands, the activities in the target provinces and the SMK related activities. To fill this gap MVV Decon from Germany has been contracted.
- Detailed knowledge on the LEAP software and on specific LEAP related subjects turned out to be extremely important for MEMR-DICEMR, MEMR-ETCERE as well as some of the technical teams in the provinces. It is therefore proposed to ask Mr Charlie Heaps of Stockholm Institute –Boston, the developer of the LEAP model, to provide an advanced LEAP training both for MEMR and for the technical teams. Furthermore, MEMR-ETCERE requested Mr Heaps's assistance in developing the curriculum for the energy planning LEAP course that ETCERE is going to give in the target provinces.
- External expertise might become necessary from the University of Wageningen or Ingenia (engineering) with regard to agriculture related topics including biomass digestion.
- Some experience has already been gained in Indonesia with the RETScreen model, but further training on this model might be necessary, especially for the members of the technical working group on renewable energy project development.

## 11. Organisational structure for CASINDO

CASINDO is a large project comprising many activities and involving some 140 team members. To ensure that these activities are implemented in an efficient and effective manner and that the deliverables are produced on time a clear working structure needs to be in place that addresses both the technical aspects of the work as well as the institutional embedding of the activities into the national and regional energy policy formulation process. To this end, an organisational structure has been set up for CASINDO, which consists of two major components:

1. Technical Working Group (TWG): seven TWGs have been established with the aim to conduct the technical activities presented in the CASINDO proposal under the various work packages and to produce the agreed deliverables.
2. Institutional Structure comprising national and regional government organisations: regular interactions with the Ministry of Energy and Mineral Resources, the Ministry of Education, regional energy office, regional energy forum and regional education office to solicit feedback on the work carried out in the TWGs and to ensure that the CASINDO activities become an integrated part of the national and regional energy policy formulation process.

Both components are described in more details in the sections below.

### 11.1 Technical Working Groups

The following Technical Working Groups (TWG) are established:

- I. Energy policy analysis.
- II. Renewable energy action plan.
- III. Energy efficiency master plan.
- IV. Renewable energy project development.
- V. Pro-poor energy strategy.
- VI. University education & research programme.
- VII. SMK RE & EE training modules.

The thematic scope of a TWG is a particular activity or set of activities. A TWG is tasked to achieve the objectives presented in the CASINDO proposal for that particular activity. The TWG meets at least twice a year (except maybe for TWG VI, VII) to discuss the approach and work plan, to assist the team members in solving any problems they may have encountered, to ensure that the deliverables are produced on time and to exchange experience and knowledge among the team members.

The composition of each TWG consists of representatives from the regional technical teams, MEMR, MoA, ITB, TEDC and the European partners. The meeting dates will be fixed by the TWG co-ordinator in consultation with the regional /MEMR TWG contact person. Agenda and relevant documents for the TWG meeting will be distributed at least one week in advance.

The main objectives and composition of each TWG are presented below:

#### *TWG I: Energy Policy Analysis*

##### *Aims:*

- To develop energy balances for 2006, 2007 and 2008.
- To prepare updated regional energy outlook by October 2011.
- To interact regularly with energy council and other stakeholders in the region.
- To evaluate and monitor investment plans.

- To identify and address the needs for assistance at kabupaten / kota level.

*Composition (contact persons):*

- MEMR Pusdatin, TWG co-ordinator
- MEMR DNREEC,ETCERE
- Nico van der Linden ECN
- Oetomo ITB
- Koen Smekens ECN
- Joko Windarto: Central Java
- Rahmat A.AIHasibi: Yogyakarta
- Hedbien North Sumatra
- Agung West Nusa Tenggara
- To be identified Papua

*TWG II: Renewable energy action plan*

*Aims:*

- To identify potential and costs for RE in the region.
- To determine RE targets for the region in line with national targets.
- To develop and evaluate policies to achieve the set RE target.
- To develop RE action plan for the region in line with national RE policy.

*Composition (contact persons):*

- Oetomo ITB, TWG co-ordinator
- MEMR DNREEC, Pusdatin, ETCERE
- Hermawan Central Java
- Lilies S/SriAtmaja Yogyakarta
- Syahrawardi North Sumatra
- A. Natsir West Nusa Tenggara
- To be identified Papua
- Nico van der Linden ECN

*TWG III: Energy efficiency master plan*

*Aims:*

- To identify potential and costs for EE in the region.
- To determine EE targets for the region in line with national targets.
- To develop and evaluate policies to achieve the set EE target.
- To develop Energy efficiency master plan for the region in line with national EE policy.

*Composition (contact persons):*

- Reiner Behnke MVV Decon, TWG co-ordinator
- MEMR DNREEC, Pusdatin, ETCERE
- Hermawan Central Java
- Lilies S/Tony Yogyakarta
- Naeh/Usman North Sumatra
- Yesung West Nusa Tenggara
- To be identified Papua
- Raouf Saidi ECN
- Nico van der Linden ECN

#### *TWG IV: Renewable Energy project development*

##### *Aims:*

- To identify suitable non-hydro RE projects that can be developed in the province.
- To conduct needs assessment.
- To develop business plan.
- To identify potential investors.
- To construct the project.

##### *Composition (contact persons):*

- Nico van der Linden ECN, TWG co-ordinator
- Tjasa Bole ECN
- MEMR DNTEEC, Pusdatin, ETCERE
- Karnoto Central Java
- Surya Budi Lesmana Yogyakarta
- Soeharwinto North Sumatra
- Arif West Nusa Tenggara
- To be identified Papua

#### *TWG V: Pro-poor energy strategy*

##### *Aims:*

- To review current pro-poor policies in Indonesia.
- To select suitable target community.
- To conduct needs assessment.
- To identify options that address identified needs.
- To formulate pro-poor strategy.

##### *Composition (contact person):*

- MEMR-Pusdatin TWG co-ordinator
- MEMR DNREEC, ETCERE
- Rizal Central Java
- Sri Atmaja Putra Yogyakarta
- Soeharwinto North Sumatra
- Rosmaliati West Nusa Tenggara
- To be identified Papua
- Nico van der Linden ECN
- Tjasa Bole ECN

#### *TWG VI: University Education and Research programme*

##### *Aims:*

- To develop curriculum for education programme on sustainable energy.
- To develop training materials.
- To train the lecturers.
- To implement the education programme.
- To develop and implement a number of research projects with the private sector.

*Composition (contact persons):*

- Lex Lemmens Technical University Eindhoven (co-ordinator)
- Mara Wijnker Technical University Eindhoven
- To be identified Ministry of Education
- To be identified MEMR-ETCERE
- Bambang/Nazarudirt Central Java
- Indira Prabasari Yogyakarta
- Usman North Sumatra
- Rosmaliati West Nusa Tenggara
- Augustinus Papua

*TWG VII: SMK Renewable energy and Energy efficiency training modules*

*Aims:*

- To identify suitable target SMKs in each region.
- To develop curriculum for RE&EE training modules.
- To develop training modules.
- To train the SMK teachers.
- To implement and evaluate RE training modules.

*Composition (contact persons):*

- Iman Permana TEDC(co-ordinator)
- Eric Kamphuis ETC Nederland (co-ordinator)
- To be identified Ministry of education
- To be identified MEMR-ETCERE
- To be identified Central Java
- To be identified Yogyakarta
- To be identified North Sumatra
- To be identified West Nusa Tenggara
- To be identified Papua

## 11.2 Institutional embedding of CASINDO activities

As explained in the previous section, the TWG's main aim is to work on achieving the set objectives for a particular activity. This involves, among others, a technical analysis of the energy (sub)sector and an evaluation of existing energy data and legislation. However, to make the technical analysis relevant for energy policy formulation purposes, the priorities and views of the national/regional authorities must be duly taken into account. Therefore, the work done by the TWG needs to be presented and discussed regularly both with the national and the regional government. In CASINDO this will be achieved as follows:

- Interaction with the national government takes place through the participation of MEMR and MoE in the various TWGs.
- Interaction with regional government is realised through regular meetings with the regional energy office/energy forum and with the regional bureau of education. In addition, the annual national seminar on regional energy planning offers another opportunity to present and discuss the CASINDO activities with regional authorities.

The embedding of the CASINDO activities into the national/regional policy framework is schematically illustrated in Figure 11.1 below.

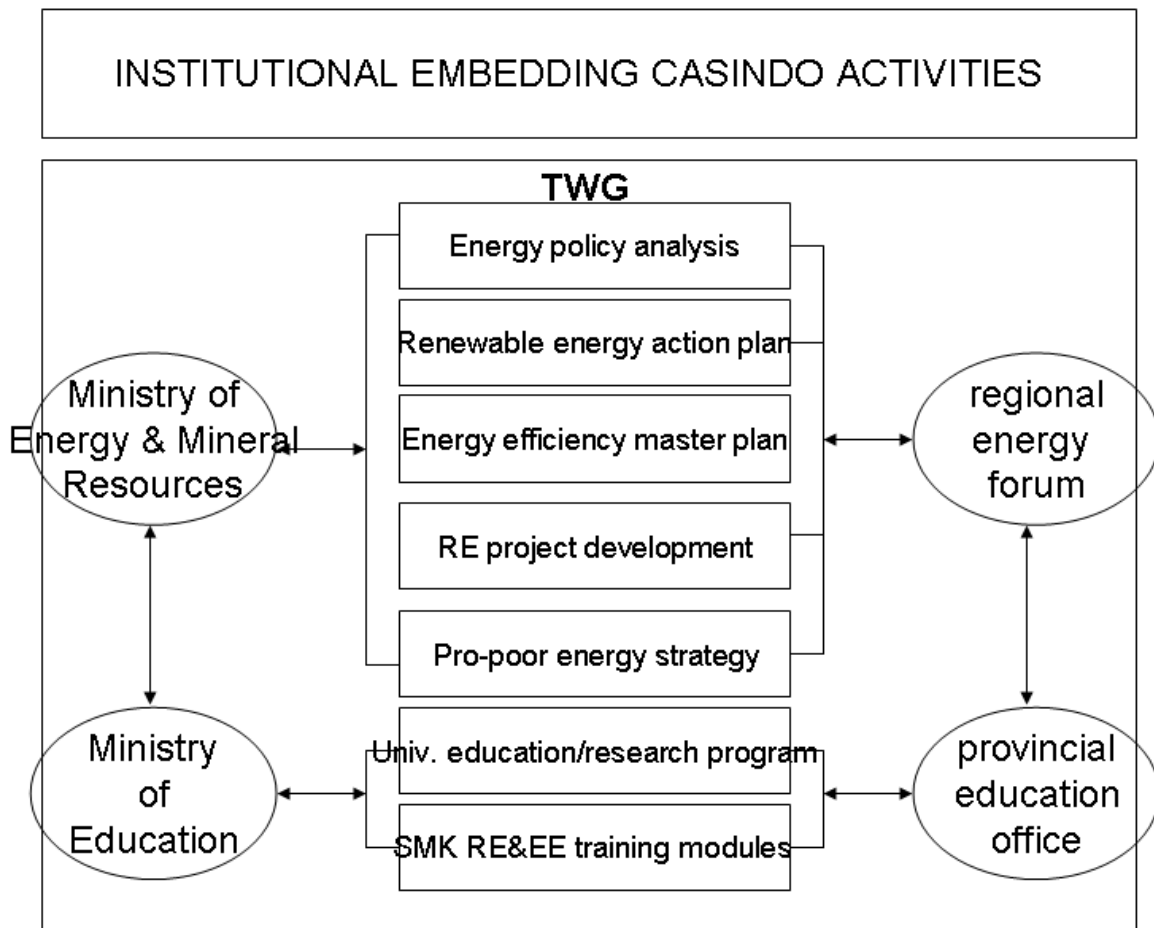


Figure 11.1 *Institutional embedding CASINDO activities*

## List of abbreviations and organisations

BAPPENAS	National Developing Planning Agency
BECIN	Bilateral Energy Cooperation Indonesia Netherlands
CAREPI	Contributing to poverty Alleviation through Regional Energy Planning in Indonesia
DGEEU	Directorate General of Electricity and Energy Utilisation
DINAS	Regional energy office
DICEMR	Data and Information Centre of the MEMR
DNREEC	Directorate for New Renewable Energy and Energy Conservation
EE	Energy efficiency
ETA	Education and Training Agency of the MEMR
ETCERE	Education and Training Centre for Electricity and Renewable Energy of the ETA
EWG	Indonesia–Netherlands Energy Working Group (predecessor of BECIN)
FS	Feasibility Study
ITB	Institute Technology Bandung
MEMR	Ministry of Energy and Mineral Resources
NEC	National Energy Council
PAC	Project Advisory Committee
PSC	Programme Steering Committee
RE	Renewable energy
RET	Renewable energy technology
SE	Sustainable energy
SMK	Medium technical school
TEDC	Technical Education Centre Bandung

## Appendix A List of interviewees and interviewers

Schedule	: 8, 9, 10, 14 Sept '09 for collecting data
	: 15 Sept '09 for processing data
	: 16 Sept '09 for reporting
Method	: interview by phone, five interviewers, one interviewer for one province
Informants	: 11 principals and 33 teachers of mechanical, civil, electrical from 12 selected SMK in 5 provinces (Papua, West Nusa Tenggara, Special region of Yogyakarta, Central Java, North Sumatera)

	SMK	Name of Headmaster	Name of Teachers	Name of Interviewer
6. Papua	12) SMKN 3 kota Jayapura	Pipin Marpaung	- Lahuseni, ST (Civil) - Maaruf, S.Pd. (Mechanical) - Habel D. Saribu (Electrical)	Yayat Sudaryat
	13) SMKN 3 kab. Merauke	Marthen Rumar, S.Pd.	- Sutadi, S.Pd., M.T (Electric) - Permenas Taidi, S.Pd. (Mech) - Febri P. Romba (Civil)	
7. North Sumatra	14) SMKN 2 Doloksanggul, kab. Humbahas	Drs. Silaban	- Tambunan (Mechanical) - Mafulai (Electrical) - B. Sisisli (Civil)	Iman Permana
	15) SMKN 1 Balige, kab. Tobasa	Drs. Lalahartono Simanjuntak	- Juangda Sibarani (Survey) - Andreas Hadehaan (Mech.) - Rudolf W Siregar (Electric)	
	16) SMKN 2 Rantau Utara, Kab. Labuhan Batu	Drs. Syahbudin Parinduri	- Anatariksawan, S.Pd. (Mech.) - Drs. Muhyizar (Electrical) - Ilzam Syafei, ST (Civil)	
8. WNT	17) SMKN 3 kota Mataram	We could not contact the headmaster to interview. So we analyzed again the selection data when we visited this SMK. Finally we decided to remove this SMK from Casindo Project.		Christian M
	18) SMKN 2 Kuripan, kab. Lombok Barat	Dadang Suyatna, SP, M.Pd	Idrsi Hamzah, ST (Electric) Irvan Santoso, S.Pd. (Civil) Bachtinur, S.Pd. (Mechanical)	
9. DIY	19) SMKN 2 kota Yogyakarta	Drs. Marwata	- Mulyono - Nursai Darwis - Mardiana	Juhari,
	20) SMKN 2 Pengasih, kab. Kulonprogo	Drs. Sakiman	- Sumarno (Mechanical) - Heru Widodo (Electrical) - Yulianto (Civil)	
10. Central Java	21) SMKN 1 kabupaten Blora	Pudji Suhardjo	- Kustomo	Bambang Erawan
	22) SMKN 1 kota Magelang	DN. Ngajid, SH	- Kurniawan Basuki, S.Pd., MT - Bambang, SH	
	23) SMK Swasta Panca Bhakti, Kab. Banjarnegara	Agus Supartono, SH, ST, MM	- Agus Saputra - Arif Sugianto - M. Pujo - Sarastiana	

## Appendix B Ranking instrument for selection of target SMKs

### DATA REGARDING SELECTION SMK FOR THE EXECUTION RENEWABLE ENERGY PROGRAMME

Name of SMK :  
Address :  
Date of visit :

#### Data appendixes should be provided by school

1. Identity of School (include area and structure of organization)
2. Data of Administration Facilities
3. Data of Study Programmes and Facilities
4. Data of Students (include social and economy of their parents)
5. Data of Alumna (include unemployed, employee, and continue study)
6. Data of Headmaster
7. Data of Teachers (General Studies and Vocational Studies)
8. Data of School Committee
9. Data of Industrial Cooperation
10. Data of School Achievements
11. Data of mayor/ head of EB address

#### Accreditation ratings per stream:

- |                                    |               |
|------------------------------------|---------------|
| 1. Plumbing and Sanitation         | A, B, C, or n |
| 2. Wood Construction and Finishing | A, B, C, or n |
| 3. Surveying and Mapping           | A, B, C, or n |
| 4. Simple Building Construction    | A, B, C, or n |
| 5. Masonry and concrete            | A, B, C, or n |
| 6. Bulding Drawing                 | A, B, C, or n |
| 7. Electrical Utility              | A, B, C, or n |
| 8. ELectrical Distribution         | A, B, C, or n |
| 9. Industrial Electric             | A, B, C, or n |
| 10. Power Generation               | A, B, C, or n |
| 11. Machining                      | A, B, C, or n |
| 12. Welding                        | A, B, C, or n |
| 13. Machining-tools                | A, B, C, or n |

ISO 9001:2000 (Not) Certified

n : exist, but has not been accredited

- : not existing

A, B, C are levels of accreditation, of which A is the best

**Rating: 1 – weak 2 – sufficient 3 – good 4 - excellent**

## A. BUREAUCRACY SUPPORT

No	Aspect of Potential	Assessment Scale				Remark
		1	2	3	4	
1	Performance of Provincial Educational Bureau					
	- Hospitality					
	- Leadership					
	- Commitment					
	- Management					
2	Understanding and Commitment to Renewable Energy Program					
	- Head of Province EB					
	- Deputy of EB for SMK					
	- Staff of EB for SMK					
3	Province Policy Support to Implement REP at SMK					
	- Strategic Plan of Province Government					
	- Strategic Plan of Province Edu. Bureau					
	- Commitment support through new policy					
4	Performance of Kota/ Kabupaten Educational Bureau					
	- Hospitality					
	- Leadership					
	- Commitment					
	- Management					
5	Understanding and Commitment to REP					
	- Head of City/ Sub Province EB					
	- Deputy of EB for SMK					
	- Staff of EB for SMK					
6	City/ Kab Policy Support to Implement REP at SMK					
	- Strategic Plan of City/ Kab. Government					
	- Strategic Plan of City/ Kab. Edu. Bureau					
	- Commitment support through new policy					
	CONCLUSION (min – max 20 - 80 points)					

## B. POTENTIAL OF SMK

No	Aspect of Potential	Assessment Scale				Remark
		1	2	3	4	
1	Appearance of school physical					
	- Building					
	- Environment					
	- Facilities					
	- Land					
	- Information					
2	Performance of School Management					
	- Hospitality					
	- Leadership					
	- Administration/ management					
	- Discipline					
	- Quality Assurance					
3	Performance of Electrical Study Programme					
	- Readiness of Facility					
	- Teaching learning Materials					
	- Practical Materials					
	- Teaching Learning Process					
	- Teachers Performance					
	- Students Performance					
4	Performance of Mechanical Study Programme					
	- Readiness of Facility					
	- Teaching learning Materials					
	- Practical Materials					
	- Teaching Learning Process					
	- Teachers Performance					
	- Students Performance					
5	Performance of Civil Study Programme					
	- Readiness of Facility					
	- Teaching learning Materials					
	- Practical Materials					
	- Teaching Learning Process					
	- Teachers Performance					
	- Students Performance					
6	Performance of Study Programme					
	- Readiness of Facility					
	- Teaching learning Materials					
	- Practical Materials					
	- Teaching Learning Process					

No	Aspect of Potential	Assessment Scale				Remark
		1	2	3	4	
	- Teachers Performance					
	- Students Performance					
7	Understanding and Enthusiasm to Renewable Energy Technology					
	- School Management					
	- Teachers					
	- Students					
	- School Committee					
	CONCLUSION (min – max 38 - 152 points)					

**C. POTENTIAL OF NATURE RESOURCES AND SOCIETY NEED**

No	Aspect of Potential	Assessment Scale				Remark
		1	2	3	4	
1	Potential of Micro Hydro Power					
	- Sources of water					
	- Debit and Head					
	- Geography Conditions					
	- Demography					
2	Potential of Photo Voltaic Power					
	- Solar Radiation					
	- Geography Conditions					
	- Demography					
3	Potential of Wind Energy					
	- Potential of Wind Energy					
	- Geography Conditions					
	- Demography					
4	Potential of Biomass					
	- Potential of Biomass/ Biogas					
	- Geography Conditions					
	- Demography					
5	Society Needs of Electricity					
	- Electrification					
	- Electricity Needs					
	- Demography					
	- Social Economic					
	- Profession of People					
	- Manufacture Industry Support					
	CONCLUSION (min – max 19 - 76 points)					

#### D. SCHOOL READINESS FOR IMPLEMENTING REP

No	Aspect of Potential	Assessment Scale				Remark
		1	2	3	4	
1	School Management Policy					
	- Develop new policy to implement REP as new study program/ or and kompetensi kealian with new approach					
	- Propose REP as new study program/ or and kompetensi kealian					
2	Sharing Cost					
	- Practical material delivery					
	- Copying teaching learning materials					
	- Extra salary of teachers during development					
	- Cooperation in Forum Energi Daerah					
	- Participation in REP development					
3	Implement of REP					
	- in Local Content					
	- in Extra Curricula					
	- Inserted to KTSP of Mechanical, Electrical and Civil					
	- Propose REP as new study program/ vocational competency					
	- Using Multi Discipline Team Teaching					
	- Using Multi Discipline Moving Class					
	- Implement broad based Curriculum of REP					
3	REP Teacher Training					
	- Provide two candidates of REP teachers of each Mechanical, Electrical and Civil study programme to be trained					
	- No change participants during training phases					
	- Employing and facilitating REP teachers to develop and implement REP at SMK					
	CONCLUSION (max - min 17 – 68 points)					

**CONCLUSION: Min – max 94 – 376 points**

**xxx points**

**Ranking place**

**SEQUENCE: PRIORITY OF THIS SMK TO BE SELECTED IS 1<sup>ST</sup> - 2<sup>ND</sup> - 3<sup>RD</sup> - 4<sup>TH</sup>  
- 5<sup>TH</sup> - 6<sup>TH</sup> - 7<sup>th</sup> - 8<sup>th</sup> - 9<sup>th</sup> - 10<sup>th</sup> - 11<sup>th</sup> - 12<sup>th</sup>**

Date, Year

Aessor 1  
Eric Kamphuis

Assessor 2  
Iman Permana

Appendix C Questionnaire used for conducting the interviews with relevant stakeholders in the target provinces

**Interview: Renewable Energy Experts Need Assessment**

**A. General questions about your organization**

- 1. What is the name of the organization?  
.....  
.....
- 2. What does your organization do?  
.....  
.....  
.....
- 3. Where is your organization located?  
.....  
.....
- 4. Where does your organization do business? Close by, city/district, wider region?  
.....  
.....

**B. Division of work/functions in your organization**

- 5. How many people work in your organization?  
.....  
.....
- 6. How many people work in production?  
.....
- 7. How many people work in management?  
.....
- 8. How many people work in between?  
*For example: sales officers, engineers, accountants.*  
.....
- 9. How many people graduated from an SMK are now working in your organization?  
.....  
.....
- 10. How many people graduated from an SMK, specialized in renewable energy technologies/energy efficiency, are now working in your organization?

.....  
.....

11. How many people graduated from university and are now working in your organization?

.....  
.....

12. How many people graduated from university, specialized in renewable energy technologies/energy efficiency, are now working in your organization?

.....  
.....

**C. Renewable energy in your organization**

13. What kind of energy is used and how much on an annual basis?  
*For example: electricity, heat, gas.*

.....  
.....

14. Is use of energy an important part of your business costs?

.....  
.....

15. Are there ever any problems related to use of energy?  
*For example: shortages in generation/supply, no stable supply, low efficiency*

.....  
.....

16. a).Is your organization interested in use of renewable energy resources?  
*For example: digestion of organic material to produce biogas, solar power for electricity generation or water heating, wind energy for electricity generation or pumping up water etc.*

.....  
.....

b).If yes; what kind of renewable energy use?

.....  
.....

17. a).Is your organization interested in improving its energy efficiency?  
*For example: waste streams for heat and power generation, efficient lighting, isolation for preservation of heat etc.*

.....  
.....

b).If yes; what kind of improvement?

.....  
.....

18. a). Are there people in your organization that have tasks related to renewable energy technologies and/or producing more energy efficient?

.....  
.....

b). If yes, what are they doing?

*For example; maintenance and/or installation of machinery, regulation and measurement, process engineering, administration, purchasing, supply of resources, logistics, electricity generation or conversion, energy efficiency etc.*

.....  
.....

c). If no, why not?

.....  
.....

19. Do you think it would be useful to have (more) people in your organization that are specialized in renewable energy technologies/ energy efficient production?

.....  
.....

#### **D. Renewable energy in the region**

20. Do you think there are organizations in the region that would like to make use of renewable energy technologies and/or produce more energy efficient?

.....  
.....

21. If yes, please specify?

.....  
.....

22. Do you think there exist organizations in the region that need people specialized in renewable energy technologies and/or energy efficiency?

.....  
.....

## Appendix D Curriculum for training courses in Jakarta

Curriculum for one-week introductory course on integrated energy planning and LEAP model

<u>Day</u>	<u>Module</u>	<u>Sessions/ Presentations</u>	<u>Duration (minutes)</u>
<b>Day 1</b>			
<b>1</b>	<b>1: Introduction and basics</b>		
		Introduction CASINDO project and training approach	15
		National energy regulation	45
		National energy outlook	45
		Introduction to Integrated energy planning	35
	<b>2: Development of energy database</b>		
		Introduction to the energy-economy database	90
		Development of database	90
		LEAP economy-energy database	60
<b>Day 2</b>			
	<b>3: Energy demand analysis</b>		
		Introduction to energy demand analysis	30
		Energy demand: Households	60
		Energy demand: Commerce & Industry	60
		Energy demand: Transportation	60
	<b>3a: LEAP energy demand module</b>		
		General introduction to LEAP model	30
		Introduction to LEAP demand module	30
		Practical exercise: development of LEAP demand data base: households	120
<b>Day 3</b>			
	<b>3a: LEAP energy demand module(continued)</b>		
		Practical exercise: development of LEAP demand database -- Commerce & Industry	195
		Practical exercise: development of LEAP demand database: Transportation	195
<b>Day 4</b>			
	<b>4: Energy supply analysis</b>		
		Introduction to supply analysis	30
		Energy supply: power sector	30
		Energy supply : refineries	30
		Energy supply: other sectors	30
	<b>4a: LEAP transformation module</b>		
		Introduction to LEAP transformation module	30
		Practical exercise: development of LEAP transformation module: power sector	80
		Practical exercise: development of LEAP transformation sample database: refinery sector	80
		Practical exercise: development of LEAP transformation module: other sectors	80

<u>Day</u>	<u>Module</u>	<u>Sessions/ Presentations</u>	<u>Duration (minutes)</u>
<b>Day 5</b>			
	<b>5: Development of energy scenarios and strategy</b>		
		General introduction to scenario development	30
		Reference & alternative scenarios	30
		Impact analysis	60
		Practical exercise: development of scenario using LEAP	240
	<b>6: Evaluation of the training course</b>		
		Feedback from participants on course content and suggestions for possible follow up training	30

Curriculum for one-week advanced training course on integrated energy planning and LEAP model

<u>Day</u>	<u>Module</u>	<u>Sessions/ Presentations</u>	<u>Duration (minutes)</u>
<b>Day 1</b>			
<b>1</b>	<b>1: Useful energy analysis</b>		
		Introduction to useful analysis	30
		How to determine useful energy demand	60
		How to use useful energy in LEAP	30
		Practical exercise	60
	<b>2: Analysis of energy technology cost</b>		
		Introduction	30
		Components of technology costs	60
		LEAP cost module	30
		Practical case study	90
<b>Day 2</b>			
	<b>3: Environmental analysis</b>		
		Introduction to environmental analysis	30
		Emission factors	30
		LEAP environmental module	60
		Practical exercise	60
	<b>4: Development of load duration curve</b>		
		Introduction	30
		How to develop a load duration curve	60
		How to use load duration curve in LEAP	60
		Practical exercise	60
<b>Day 3</b>			
	<b>5: Synthetic fuel calculation</b>		
		Introduction	30
		How to calculate synthetic fuel	60
		How to use it in LEAP	60
		Practical exercise	60
	<b>6: How to fill the gaps of missing data</b>		
		Introduction	30

<b>Day</b>	<b>Module</b>	<b>Sessions/ Presentations</b>	<b>Duration (minutes)</b>
		Proxy for missing data	60
		How to use it in LEAP	30
		Practical exercise	60
<b>Day 4</b>			
	<b>7: Latest version LEAP model and how to apply</b>		
		Overview new features most recent LEAP version	90
		Expected future developments regarding LEAP	30
		Questions & answers LEAP model	60
		Practical exercise newest LEAP model	210
<b>Day 5</b>			
	<b>8: Other energy models</b>		
		Introduction to IIEEM model	120
		Introduction to MARKAL model	120
	<b>9: Evaluation of the training course</b>		
		Feedback from participants on course content and suggestions for possible follow up training	30

Curriculum for one-week in-depth training course on energy efficiency

<b>Day</b>	<b>Module</b>	<b>Sessions/ Presentations</b>	<b>Duration/(minutes)</b>
<b>Day 1</b>			
<b>1</b>	<b>1: Introduction and basics</b>		
		Introduction CASINDO project and training approach	30
		Statement on EE policy and targets in Indonesia	30
		Energy management	60
		Energy saving in the political context	30
		Sustainable Development aspects	60
	<b>2: Development of energy efficiency strategies</b>		
		Development of Energy management Strategy	60
		Databases and needs assessment (results of regional energy outlooks)	60
		National energy efficiency policy development, basic principles and best practice	60
<b>Day 2</b>			
	<b>Cont' 2: Development of energy efficiency strategies</b>		
		Energy efficiency and master planning	30
		Development of energy saving programmes and action plans	30
		Development of Energy Saving Agencies	30
		Stimulating factors	30
		Tariff development principles	30
		The role of energy managers: education, certification principles and best practice	30
	<b>3: Energy management in buildings</b>		
		Methodology and general considerations in the regional context	30
		Heating Ventilation and Air Conditioning Systems	30

<u>Day</u>	<u>Module</u>	<u>Sessions/ Presentations</u>	<u>Duration/(minutes)</u>
		Building envelop	30
		Office Equipment	30
		Lighting	30
		Energy management in public buildings (schools, hospitals, admin buildings)	30
		Energy Management in Buildings	30
		Integration of renewable energies in building sector	30
<b>Day 3</b>			
	<b>4: Energy management in industry</b>		
		Methodologies and general considerations Motive Power	30
		Power control systems	30
		Cogeneration systems/ tri-generation	30
		Cost saving opportunities in Fans	30
		Cost saving opportunities in Pumps	30
		Cost saving opportunities in industry	30
		Compressors	30
		Lighting	30
		Integration of renewable energies in industry sector	30
	<b>5: Measuring, auditing, energy management</b>		
		Energy audit basics	30
		Programmes for the rationalization of consumption	30
		Equipment	15
		Energy audits available, what's next?	15
<b>Day 4</b>			
	<b>6: Methods of project development</b>		
		Public Private Partnership	60
		Project selection	60
		Development of an investment plan out of the master plan	60
		Project Cycle Management	60
		Energy performance/ saving Contracting	60
		Monitoring of results and adjustment of plan/ strategy	60
<b>Day 5</b>			
	<b>7:Financing of energy efficiency</b>		
		Project finance vs. corporate lending	30
		Project appraisal	60
		Cash flow forecast and viability parameters	60
		Risk analysis	30
		Financing options (PPP, ESCO, loan programmes)	60
		Project assessment report	30
		Implementation and monitoring	30
		Fund raising strategies	30
	<b>8: Evaluation of the training course</b>		
		Feedback from participants on course content and suggestions for possible follow up training	30

Curriculum for two-week training course on renewable energy technologies

<u>Day</u>	<u>Module</u>	<u>Sessions/ Presentations</u>	<u>Duration (minutes)</u>
<b>Day 1</b>			
<b>1</b>	<b>1: Solar energy technology</b>		

<u>Day</u>	<u>Module</u>	<u>Sessions/ Presentations</u>	<u>Duration (minutes)</u>
		Introduction	30
		How does it work: explanation of technology	150
		Latest technological developments	60
		Potential and costs in Indonesia	30
		Potential and costs globally	60
		Expected future developments	60
<b>Day 2</b>			
	<b>1: Solar energy technology(continued)</b>		
		Solar Home Systems: general introduction	45
		Delivery models for solar home systems	45
		Practical exercise solar energy	105
	<b>2: Wind energy technology</b>		
		Introduction	45
		How does it work: explanation of technology	150
<b>Day 3</b>			
	<b>2: Wind energy technology (continued)</b>		
		Latest technological developments	60
		Potential and costs in Indonesia	30
		Potential and costs globally	60
		Expected future developments	60
		Practical exercise	180
<b>Day 4</b>			
	<b>3: Biomass</b>		
		Introduction	30
		Technologies and processes (the biomass-to-energy chain)	
		Bioenergy resources	180
		-Biomass classification and characteristics	
		-Competing uses of biomass	180
		Bioenergy technologies	
		-Technologies to convert biomass into electricity & heat, solid biofuels, liquid biofuels;	
<b>Day 5</b>			
	<b>3: Biomass(continued)</b>		
		Bioenergy end uses and applications	195
		-Products: charcoal, liquid/oil, fuelgas, heat, electricity	
		-Small scale urban and rural enterprises using biomass	
		-Medium and large scale industries using biomass	
		Building a bioenergy project or business	195
		-Tools and criteria to assess and screen biomass technologies	
		-How entrepreneurs can get involved in the biomass business	

<u>Day</u>	<u>Module</u>	<u>Sessions/ Presentations</u>	<u>Duration (minutes)</u>
<b>Day 6</b>			
	<b>3. Biomass (continued)</b>		
		Policy and sustainability issues	15

<b>Day</b>	<b>Module</b>	<b>Sessions/ Presentations</b>	<b>Duration (minutes)</b>
		Objectives of bioenergy policy	15
		Policy challenges, opportunities & barriers	30
		The need for biomass energy strategies	30
		Developemnt of a national biomass energy strategy	100
		Institutions and key elements for implementation & replication of bioenergy projects	100
		Support instruments	100
<b>Day 7</b>			
	<b>4. Micro hydro technology</b>		
		Introduction	30
		How does it work: explanation of technology	210
		Latest technological developments	30
		Potential and costs in Indonesia	30
		Expected future developments	30
		Practical exercise	60
<b>Day 8</b>			
	<b>4. Geothermal energy</b>		
		Introduction	30
		How does it work: explanation of technology	210
		Latest technological developments	30
		Potential and costs in Indonesia	30
		Expected future developments	30
		Practical exercise	60
<b>Day 9</b>			
	<b>5. Renewable energy policy</b>		
		Introduction	30
		Why renewable energy ?	60
		Why renewable energy targets ?	60
		How to develop RE targets	90
		RE policy in Indonesia	60
		RE support mechanisms	90
<b>Day 10</b>			
	<b>5: Renewable energy policy (continued)</b>		
		Experience with RE support mechanism in Europe	120
		Suitability for Indonesian situation	60
		RE project development	120
	<b>6: Evaluation of the training course</b>		
		Feedback from participants on course content and suggestions for possible follow up training	30

