
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 energy projects in INDOnesia

# CASINDO

## TECHNICAL PROPOSAL

8 MAY 2009

## List of abbreviations and organisations

| | |
|---|---|
| BAPPENAS | National Developing Planning Agency |
| BOE | Barrel of Oil Equivalent |
| CAREPI | Contributing to poverty Alleviation through Regional Energy Planning in Indonesia |
| DGEEU | Directorate General of Electricity and Energy Utilization |
| 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 |
| EWG | Indonesia–Netherlands Energy Working Group |
| FS | Feasibility Study |
| ITB | Institute Technology Bandung |
| MEMR | Ministry of Energy and Mineral Resources |
| NEC | National Energy Council |
| PSC | Programme Steering Committee |
| RE | Renewable energy |
| RET | Renewable energy technology |
| SE | Sustainable energy |
| SMK | Medium technical school |
| WP | Work Package |

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# 1. Introduction

## 1.1 Background

During the period 1987-1997 Indonesia experienced high economic growth rates of on average almost 7 per cent per annum. However, the East Asian economic and financial crises that started at the end of 1997 severely affected Indonesia and resulted in a drop of the value of the rupiah by some 80 per cent and a decrease of Indonesian's GDP by more than 13 per cent in 1998. The steeply rising prices for food triggered a mass popular uprising in Jakarta and other regions in Indonesia that eventually led to the resignation of President Suharto in mid 1998. Since then Indonesia has embarked on a process of social, political and economic reforms that are still ongoing and that are meant to bring about economic growth and a transition to democracy. During the early 2000s the Indonesian economy started to slowly recover from the recession: GDP grew by, on average, 4.8 per cent per annum during the period 2000-2006.

A key component of the political reforms is the decentralisation and regional autonomy that were implemented in 2001 based on the new Law no.22, which was amended in 2004: Law no.32. This law has devolved almost all powers and responsibilities from the central government to the local government (except for sectors such as defence, foreign policies, justice and monetary policy), including responsibilities for energy sector development. This means that regional governments are now responsible for formulating their energy policy and, consequently, must reform their institutional structure and strengthen their human capacity to be able to carry out this new responsibility.

The new energy-related responsibilities for the regional government are also clearly expressed in the new Energy Law (Law no. 30/2007) that came into effect in August 2007. The new law stipulates that the local government will formulate their regional energy master plan, based on the national energy master plan, and develop regional regulation for the implementation of the plan. The new Energy Law also stipulates the establishment of the National Energy Council, which will be responsible for the development of the national energy master plan, involving the participation of regional and local governments.

The decentralisation process, however, appears to be a difficult and time-consuming process. The regional political institutions are weak and poorly organised because they have been left out of the political decision-making process for the last three decades. Many regions also lack sufficient technical and analytical capacity to conduct energy policy analysis and develop energy supply projects. This is seriously hampering the regional energy sector development and is further compounded by the current energy crises in Indonesia caused by the high world crude oil prices, insufficient investments in expansion of supply capacity over the past 10 years and regulated energy prices. As a result, regions are now experiencing power interruptions and load shedding and find it increasingly difficult to meet the growing energy demand.

Regions are very well aware of the importance of a sufficient and reliable energy supply for regional economic development in general and the alleviation of poverty in particular. Therefore, regions have requested the central government for assistance in formulating and implementing their energy policies. The proposed ***CApacity development and strengthening for energy policy formulation and implementation of Sustainable energy projects in INDOnesia (CASINDO)*** programme aims to provide this assistance through developing institutional and human capacity that will enable the regions to develop sound energy policies and implement sustainable energy projects.

## 1.2 Institutional structure of the CASINDO programme

The focus of the proposed CASINDO programme will be on five target provinces and on the Ministry of Energy and Mineral Resources (MEMR). The involvement of government agencies at both the national and the provincial level is imperative to ensure that the programme's activities become embedded in the existing provincial planning and budgeting cycles and can therefore continue also after the project has ended.

The MEMR has developed a framework for the institutional set-up for regional energy policy formulation and implementation which is presented in figure 1.1 below.

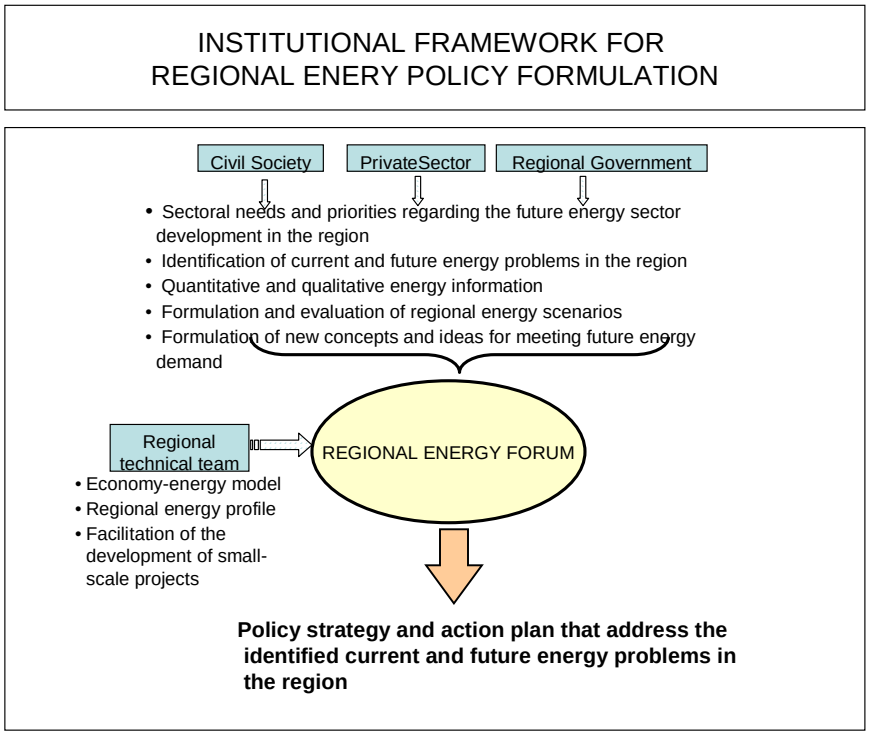


Figure 1.1: *Schematic overview institutional framework for regional energy policy formulation*

The key body of the institutional set-up in the regions is the regional energy forum which comprises of representatives from the regional government, from the private sector and from society and/or social groups. The main task of the regional energy forum is to assist the regional government in formulating and implementing regional energy policies. The forum members are assisted by a regional technical team responsible for providing quantitative and qualitative energy information to enable the forum to formulate sound energy policies. The technical team is led by the local university but could include also representatives from energy industries, NGOs and other local research institutes.

Figure 1.2 shows the relevant national and regional government departments that will be involved in the project, either directly as partners or indirectly as key stakeholders.

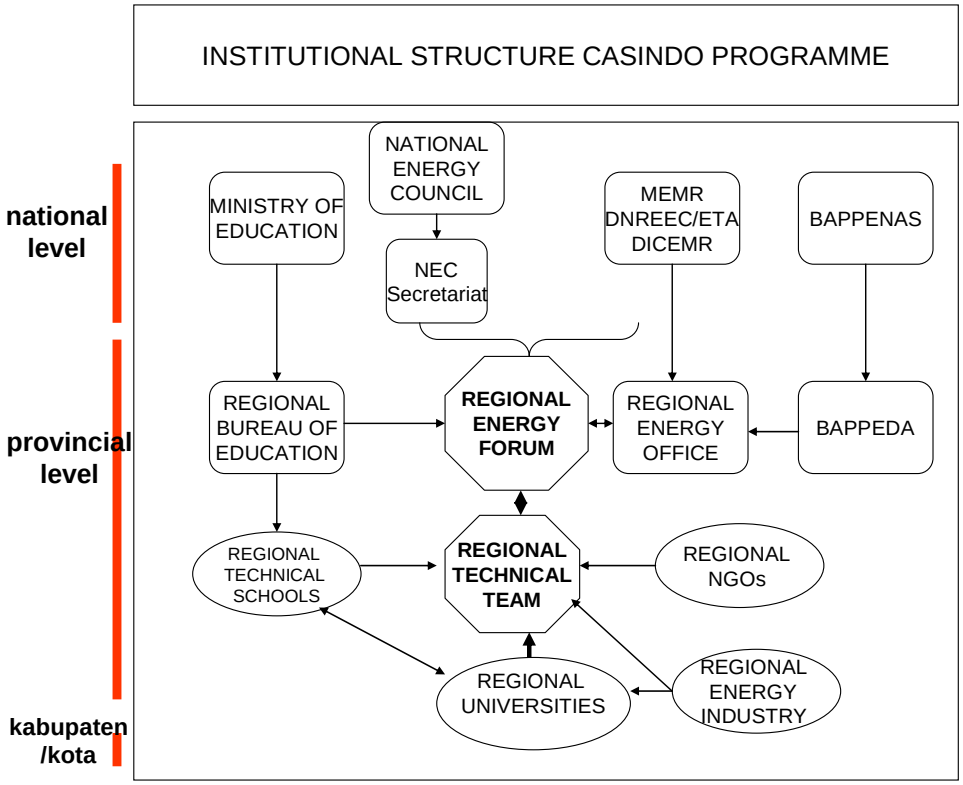

Figure 1.2: S*chematic overview institutional structure CASINDO*

*National level*

The key government organisations for CASINDO at the national level are the DNREEC of the Directorate General of Electricity and Energy Utilisation (DGEEU), the Centre for Data and Information Centre (DICEMR) and the Education and Training Agency (ETA) of the Ministry of Energy and Mineral Resources.

DGEEU is responsible for policy in the electricity sector and co-chairs the EWG. The DICEMR is responsible for developing and implementing the institutional model for regional energy policy formulation and for facilitating the establishment and strengthening of the regional energy forums. The ETA provides training to national and regional government organisations.

The National Energy Council (NEC) is currently being established and will be responsible for the formulation and implementation of the national energy master plan, which will provide the general boundaries within which the provinces need to develop their regional energy master plans. As such the NEC Secretariat will act as a "technical team" at the national level. In carrying out this task, the NEC will coordinate with the regional governments as well as with all stakeholders, including energy consumers, the private sector, research organisations, and environmental organisations and staff.

The Ministry of Education is an important stakeholder for synchronising and the nationwide introduction of the curricula and training modules on renewable energy technologies developed for medium technical schools (SMKs) and universities.

The National Development Planning Agency (BAPPENAS) is responsible for the national development plan and for setting the national targets for the various sectors and allocating the available resources to achieve these targets.

*Provincial level*

The key body for energy policy formulation at the regional level is the regional energy forum. The regional forum is chaired by the governor and comprises representatives of the regional government (incl. representatives of the oil & gas and electricity sector, such as Pertamina and PLN), the private sector and NGOs/community groups. The forum is responsible for formulating energy policies that are then submitted to the regional parliament and government for formal approval. The energy forum is supported by the regional technical team, which is usually led by a local university but also comprises representatives from regional authorities, NGOs and the private sector. The main task of the technical team is to provide the forum with quantitative information on the energy sector in the region and to analyse the consequences of alternative energy scenarios for meeting future energy demand.

The regional energy office (DINAS) is the organisation responsible for formulating regional energy policies. DINAS is a key member of the regional energy forum and therefore an important stakeholder for CASINDO.

The Regional Development Planning Board (Bappeda) is responsible for formulating regional development plans and allocating the regional budget. Bappeda can play an important role in CASINDO, especially with regard to allocating resources for the implementation of the regional plans. Experiences in regions such as South Sumatra show that a lack of funding for concrete energy projects seriously hampers the effectiveness of the energy forum. The involvement of Bappeda at an early stage may reduce or even remove this barrier.

The regional bureau of education is an important stakeholder for capacity building activities targeted at the local universities and technical schools (SMKs). This office can assist in developing curricula and training programme and will be responsible for rolling out the introduction of renewable energy programmes to all schools and universities in the region.

*Kabupaten/Kota level*

There are thirty-three provinces in Indonesia, of which four (Nanggroe Aceh Darussalam, Yogyakarta Special Region, Jakarta Special Capital region and Papua) have greater legislative privileges and a higher degree of autonomy from the central government than the others. Each province has its own political legislature and governor. The provinces are further divided into districts/regencies (kabupaten) and cities (kota), which are further divided into sub-districts. Finally, each sub-district is divided into administrative villages (kelurahan). The 349 regencies or cities have become the principal administrative units, and are responsible for providing most government services. CASINDO will extend its activities to districts/municipalities (kabupaten/kota) within the province because they are the principal administrative units responsible for providing most government services

## 1.3 Indonesia–Netherlands Energy Working Group

The Indonesia–Netherlands Energy Working Group (EWG) was established in 1995 with the aim of strengthening the cooperation between Indonesia and the Netherlands in the field of energy. The EWG is co-chaired by the Indonesian Ministry of Energy and Mineral Resources and SenterNovem on behalf of the Royal Netherlands Embassy. In the framework of the EWG, energy-related activities are carried out jointly by Indonesian and Dutch organisations. The EWG meets annually to discuss the progress of these activities and to agree on the programme for the coming year.

It was decided at the EWG meeting in 2004 to expand the focus of the cooperation from the central government to the regional government in order to support the process of decentralisation. Since then, the following three activities focusing on the regional level are being implemented in the framework of the EWG in addition to the ongoing national activities:

1. CAREPI (Contributing to poverty Alleviation through Regional Energy Planning in Indonesia): this project – which is being implemented in North Sumatra, Yogyakarta, Central Java and West Nusa Tenggara on behalf of the European Commission within the COOPENER programme and is co-funded by the EWG – aims to formulate regional energy policies and to develop a micro hydro plant. CAREPI is being implemented by a consortium comprising European and Indonesian organisations and is led by the Energy research Centre of the Netherlands (ECN).

2. Introduction of renewable energy technology (RET) at technical vocational schools (SMKs) in Indonesia. The project focuses on increasing both the public's and policy-makers' awareness of renewable energy in Indonesia and on establishing regular renewable energy technology modules in SMKs in Indonesia. The project is led by ETC, Leusden, and is being implemented together with TEDC, Bandung.

3. Long-lasting cooperation has been established between universities in Indonesia and the Netherlands to promote and implement sustainable energy solutions and to develop training courses. The project is led by the Technical University of Eindhoven and is implemented together with the Unram University of Mataram, Muhammadiyah University of Yogyakarta and Sumatera Utara University of Medan.

The above activities started in early 2007 and will run until the end of 2009. Although these are separate activities, some integration between them has been sought by focusing on the same regions and universities in activities 1 & 3 and by focusing on the same energy technologies in activities 2 & 3.

The experience gained and the cooperation established through these activities is of the utmost importance for the newly proposed CASINDO programme, which aims to further integrate and expand the current EWG activities.

## 1.4 Target provinces

The proposed CASINDO project focuses on five provinces: North Sumatra, Yogyakarta, Central Java, West Nusa Tenggara and Papua. These provinces were selected by the Ministry of Energy and Mineral Resources based on the identified need for assistance in the province. The selected provinces are already included in the current EWG activities (with the exception of Papua, which will be included in CASINDO as a new province). A brief profile of each province is presented in Figure 1.3.

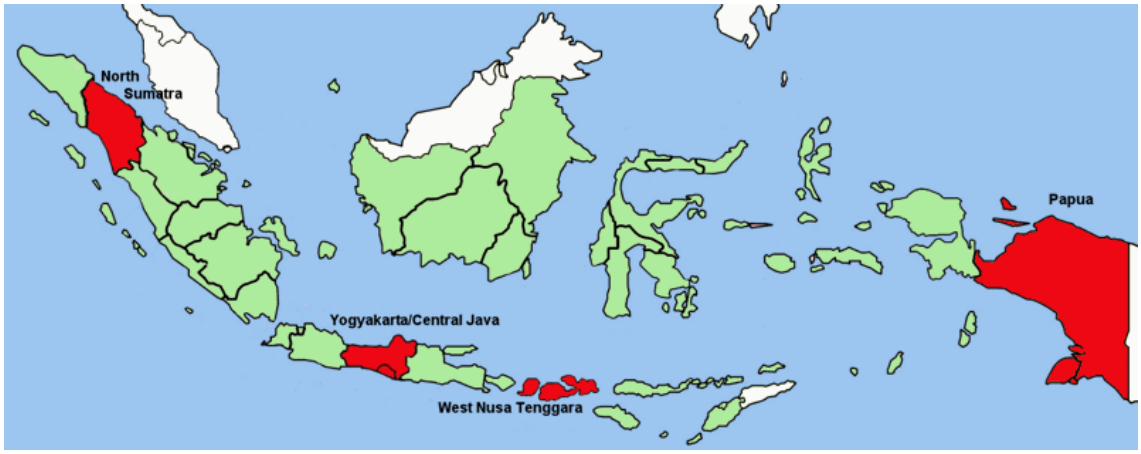


Figure 1.3: *Geographic overview target provinces CASINDO*

*West Nusa Tenggara Province* comprises the islands of Lombok and Sumbawa and is a rural region with approximately 4.2 million inhabitants of whom some 17% have an income below the poverty line. Total primary energy supply in 2005 amounted to some 6 million BOE, of which approximately 95% was imported. Coal constituted the largest share (36%), followed by diesel oil (26%) and petrol (18%). More than 2 million people do not have access to electricity despite the fact that there are large local (renewable) energy resources. The energy forum was established following an electricity crisis and consists of representatives from government, industry and public society. The technical team has also been established and is led by the University of Mataram.

*Central Java Province* consists of 35 regencies/cities with approximately 33 million inhabitants, of whom some 21% have an income below the poverty line. Total energy supply in 2005 amounted to 57 million BOE, made up of crude oil (82%), coal (5%), wood (7%), hydropower and geothermal. The region is a net exporter of refined oil products. This region has an electrification ratio of only 61% despite the fact that there are large local (renewable) energy resources. The energy forum and technical team have been established and have met several times during the past years. Diponegoro University in Semarang is coordinating the technical team in this province.

There are roughly 12.3 million people in the *North Sumatra Province*, which is mainly a rural area, except for the city of Medan (pop. approx. 5 million). Some 500,000 people live under the poverty line and do not have access to electricity. Approximately 86% of the villages are connected to the grid; the household electrification ratio is 72.7%. Sumatera Utara has an important role in the development of oil palm (15.7% or 1,023,350 ha). With its contribution in area equal to 15.7%, the contribution of crude palm oil (CPO) is 21.3%. With private plantation amounting to 377,336.70 ha, community plantation equal to 367,741.02 ha and 278,272.28 ha being the property of PT. Perkebunan Nusantara. The production of biodiesel at this moment is 10 tons per day, with 8 tons/day coming from PT. Pertamina Energy & PT. Perkebunan Nusantara 4, and 2 tons/day coming from private companies.

The other renewable energy sources in North Sumatra are geothermal, mini hydro and large-scale hydropower.

Total primary energy supply in 2005 was 33 million BOE. Fuel oil constitutes some 11%, diesel oil 39% and petrol 17%. During the past years several initiatives have been taken to formally establish the regional energy forum, but so far the regional government has been reluctant to give its approval. The regional technical team was established in 2007 and is led by the University of Sumatera Utara.

*The Special Region of Yogyakarta* (*Daerah Istimewa Yogyakarta*; DIY) *Province* (which is also known as *Yogyakarta*) is located in south-central Java. It is surrounded by the province of Central Java (*Jawa Tengah*) and bordered by the Indian Ocean to the south. The estimated population of DIY in 2005 was 3,281,800 people and 1,018,061 households. The province of Yogyakarta has a total area of 3,186 $km^2$. Administratively, Yogyakarta is divided into four regencies (kabupaten) and one municipality (kotamadya), namely Kulon Progo, Bantul, Gunung Kidul and Sleman regency and Yogyakarta municipality. Yogyakarta has a per capita gross regional domestic product (GRDP) of about 7.7 million IDR (Indonesian rupiah). The economic growth of Yogyakarta is mainly a result of the growth of the commercial services (e.g. tourism) sector (23.2%), agriculture (18.8%) and manufacturing (14.6%). Energy consumption of Yogyakarta is dominantly by oil fuel (3.8 million BOE); the electricity and the LPG consumption are estimated at about 0.90 and 0.4 million BOE, respectively. Referring to energy consumption by sector, the transportation sector (2.7 million BOE) is still the main consumer; it is followed by households (1.6 million BOE), the commercial sector (0.3 million BOE), industry (0.3 million BOE) and other sectors (0.1 million BOE). Elasticity of energy use of Yogyakarta for 2005 is estimated at 1.5, with the intensity of energy approximately 0.28 BOE per million IDR and final energy consumption per capita of around 1.5 BOE/capita/year. Average electricity use per capita per year is estimated at about 408.4 kWh. The number of villages connected to the utility grid (PLN) is high (electrified village ratio of 100%), while the household electrification ratio is around 74.8%. Yogyakarta has large potential sources of renewable energy, namely biomass and biofuel. The energy forum of Yogyakarta was established in 2007 and consists of representatives from government, industry and society. The technical team has been established and is led by PUSPER, the Muhammadiyah University of Yogyakarta.

*Papua Province* comprises 29 regencies/municipalities, 6 of which were established in January 2008. The Papua province is located in the east of Indonesia, and has a total land area of 309,9 thousand km2 or some 2.4 times the area of Java island. With its population of around 2 million people, Papua province is the least populated province in Indonesia. Based on 2005 statistics data, 38.7% of the people are categorised as poor. The electrification ratio in Papua is still very low, namely 25% of the total population. The energy forum is not yet established in Papua Province.

## 1.5 Relation to relevant current and future activities

It is important to note that a wide range of national, bilateral and multilateral donors have cooperation programmes with Indonesia. In the CASINDO project, relevant activities and programmes will be identified and sufficient awareness and cooperation with these activities will be maintained throughout the duration of CASINDO with the aim of exchanging experiences and results and avoiding the duplication of efforts. Examples of programmes that seem to be directly relevant to CASINDO include:

- The *ongoing EWG activities*, which will run until the end of 2009, are particularly relevant to the CASINDO project. Close coordination between the current EWG activities and CASINDO can easily be ensured because the current EWG partners are all included in the CASINDO consortium (see section 4).
- The proposed CASINDO project will be one of the components of *the Renewable Energy programme of the Netherlands Embassy*, which will be implemented in Indonesia during the period 2009-2011. The other components of this programme include biogas, geothermal and mini/micro hydro; These components are very relevant to CASINDO and therefore great care should be taken to establish and maintain links with these activities throughout the life of CASINDO.
- Relevant programmes of other donors – such as the Asian Development Bank, the World Bank and the European Commission – will be identified and communication channels will be established if deemed useful for CASINDO.

# 2. Objectives and expected impacts

## 2.1 Barriers to be removed

The decentralisation process in Indonesia started in 1999 and aims to shift authority from the central government to the local government, including the authority to manage and regulate energy policies and plans. However, as noted in the review of the energy sector in Indonesia conducted by the International Energy Agency in 2007/2008: 'after the long experience of a highly centralised and controlling government, decentralisation has led to difficulties in interpreting the balance of responsibilities between the national and local government and has revealed weaknesses in the technical capacity of local administrations.'

The key barriers that hamper the formulation and implementation of local energy policies and plans in the selected regions are a lack of institutional and technical capacity, a lack of infrastructure, a lack of integration of initiatives and a lack of awareness of energy issues among the general public. These barriers exist at the provincial level, while even stronger barriers exist at the district and the village level.

Indonesia is currently facing an energy crisis and some regions are already experiencing power shortages (North Sumatra, West Nusa Tenggara). It is estimated that up to 2012 it will be necessary to invest about US$ 20 billion in new power plants and power lines. Because its oil reserves are almost depleted, Indonesia has become a net oil importer since a few years. Oil is of utmost importance since in many regions (islands) it is the main or even only fuel for electricity generation. Given the prevailing (and expected future) high oil prices, alternative domestic sources of energy for electricity production urgently need to be identified and developed. There is a vast potential of renewable energy resources in Indonesia but this potential has so far been only marginally tapped because of a lack of specialist expertise and a lack of a conducive business environment to develop these projects.

To date, only limited regional energy planning has taken place because this is a newly assigned responsibility for the regions and they lack the capacity to formulate their own energy policy. At most an electricity crisis team has been set up dealing with electricity supply and to a lesser extent demand forecasts. Therefore, the concept of a regional energy forum, supported by a technical energy team, was developed. This concept is now implemented in some selected regions and some first and, more importantly, positive results are now becoming visible. The existence of a REF has clearly removed institutional barriers within the region and has increased the awareness about energy issues.

There also exist barriers at the national level that make integrated national energy and investment planning less adequate and also hamper the provision of adequate support to the regions and hinder interaction and good communication between national and regional policy makers. In Indonesia, the MEMR Agency for Education and Training (ETA) is the lead actor for energy training and is also responsible for co-ordinating MEMR's wider human capacity development. The ETA comprises four training and education centres, namely the centres for Electricity and New and Renewable Energy, Oil and Gas, Geology and Mining and Coal technology. The ETA centres provide training programmes and capacity development for MEMR personnel and for staff of the oil, gas and electricity sectors, both at the national level and in the regions. The focus is mainly on the traditional sectors oil, gas and electricity. ETA does not have sufficient funding to build the capacity necessary for meeting the ambitious goals set for renewable energy technologies in the national energy plan. This is further compounded by the increased demand for training of staff from regional governments. ETA is very strong in teaching technical subjects, but there is a lack of capacity and knowledge for economic and policy related subjects.

The MEMR Centre for Data and Information on Energy and Mineral Resources(DICEMR) is a relatively new agency under the MEMR and is responsible for MEMR data collection, storage and dissemination. As a result of high staff turnover in the past years, current DICEMR staff consists of a relatively high number of young and less experienced people. Capacity enhancement at the DICEMR therefore is necessary to meet the rapidly growing need for accurate, reliable and timely data. Capacity needs to be build and strengthened especially in the areas of energy policy formulation and energy modelling.

The Directorate for New Renewable Energy and Energy Conservation (DNREEC) is responsible for energy efficiency and renewable energy. Ambitious policy targets have been set for both in the national energy blueprint. Renewable energy is projected to contribute 15% to total energy mix in 2025, compared to less than 5% in 2005. For energy efficiency an economy-wide target of 1 % reduction in energy intensity is mentioned. However, there appears to be a shortage of trained staff in policy analysis and economics at the DNREEC to develop the necessary initiatives and projects for achieving these targets.

## 2.2 Overall objective and expected impacts of the CASINDO programme

*The overall objective of the CASINDO programme is 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 policies for renewable energy and energy efficiency and to develop and implement sustainable energy projects*

Sufficient technical and analytical human capacity is a precondition for the target provinces to be able to link energy provision to local economic development planning, to develop and implement energy policies and to establish energy businesses. Furthermore, it must be recognised that capacity building is an ongoing requirement and that therefore strong institutional government structures are needed to ensure that a sufficient level of capacity and knowledge among local policy makers, entrepreneurs, universities and technical schools can be maintained also in the longer term.

Furthermore, the energy policies formulated and implemented by regional governments must be in line with the national energy policy framework. Therefore, the CASINDO programme will also focus on the development of human capacity at national government departments and agencies, in particular at the Ministry of Energy and Mineral Resources, to ensure that good communication channels can be established between national and regional policy makers and to facilitate the dissemination of the CASINDO results to other provinces. A separate work package (WP7) is defined in section 4 for this purpose.

Within the overall objective, special attention will be paid to the energy needs of poor people who currently have no access to modern forms of energy and still rely to a large extent on traditional biomass for meeting their energy needs. Poverty alleviation through the improved provision of energy services is already an important thematic focus in the current EWG activities and will continue to be a key activity in the proposed CASINDO programme.

## 2.3 The results chain

In the CASINDO programme various capacity development activities will be carried out to address the barriers presented in section 2.1. The assumption is that these activities contribute to the achievement of the programme's overall objective. The 'result chain' is often used as a

framework to make explicit the linkages between these activities and their possible impacts. The result chain begins with 'inputs', moves through 'activities' and 'outputs', and culminates in 'outcomes' and 'impacts'[1]. The elements of the results chain are individually defined as:

- Inputs: the financial, human and material resources used
- Activities: the actions taken (or work performed by the mobilisation of resources) in order to produce specific outputs
- Outputs: resultant products, capital goods and services, as well as resultant changes relevant to the achievement of outcomes
- Outcome: the short- and medium-term effects (objectives) of an intervention resulting from the use of the outputs. The "outcome" is a change (intended or unintended) due directly or indirectly to an intervention.
- Impacts[2]: produced long-term effects that may be positive or negative, primary or secondary, direct or indirect, intended or unintended.

The CASINDO programme will build on the current and previous capacity building activities conducted in the framework of the EWG in Indonesia. The aim of CASINDO is to further integrate these activities and to intensify and expand these activities in the existing regions plus Papua province as a new region. This approach should in the long term result in an increasing human knowledge stock on energy issues, a sustainable energy strategy, more efficient use of energy resources, increased used of renewable energy technologies, less greenhouse gas emissions, a self-sustaining energy business climate, improved access for poor people to modern energy services and poverty reduction. This long-term impact, however, cannot be achieved within the 3-year time frame of CASINDO, but it is expected that the programme can lay the foundations and make a significant and useful contribution to this ultimate goal.

The outcome of the programme is to establish a self-sustaining and self-developing structure at the national and regional level to build and strengthen human capacity with respect to integrated energy planning, renewable energy development, energy efficiency and energy access for the poor and that the five target provinces in Indonesia have the capacity to develop and implement their own regional energy plans and to formulate policies for renewable energy and energy efficiency.

To achieve the above outcome, the CASINDO programme has to produce the following concrete overall outputs:

1. At the national level, running training programmes on renewables and energy efficiencies are in place for national, regional and local level public organisations.

2. At the national level, staff of DGEEU-DNREEC and DICEMR and ETCERE is provided with training to enhance their capacity to fulfil their normal tasks and has adequate capacity to support regional governments to develop and implement RE/EE and energy access policies.

3. In the 5 target provinces, there is a measurably increased capacity (in the REF) to develop and implement long term energy strategies, via support to the regional technical teams and backstopping capacity at the local universities and technical schools. The selected universities in each of these 5 provinces serve as lead university.

4. In the 5 target provinces, education and research programmes on renewable/sustainable energy and energy efficiency have been developed and implemented at the local universities and technical schools and an evaluation of these programmes have been conducted. Sufficient teaching capacity is generated at SMK and university level.

[1] Outputs, outcomes and impacts are jointly referred to as "results".
[2] Impact analysis is not part of this project.

5. Interaction and communication at and between both national and regional levels is strengthened to the point where relevant information on energy policy is adequately exchanged.

To produce the above outputs, a number of concrete activities have been defined which are grouped in to work packages (WP). These WPs are described in detail in section 4. For each WP specific outputs have been defined which are linked to one or more of the above overall outputs. Furthermore, a set of indicators has been defined for each output to enable monitoring & measuring the progress towards achieving the output.

Finally, the financial, human and material resources required to achieve the desired short term and longer term impacts are presented in section 3 and in the financial proposal of the CASINDO programme.

## 2.4 Capacity development

CASINDO is a capacity development programme that aims to build the knowledge and capacity of professional energy staff at national and regional levels. In general, capacity building tends to be a rather continuous and diffuse process, where some of the important results come from ongoing informal interactions among a number of people with different skills and areas of knowledge, while other results can be linked to particular training activities and a range of other distinct organised capacity building activities.

The informal type of capacity building will be developed in the course of many conversations among the programme partners and through an exchange of ideas, opinions and concerns about energy related issues. The formal type of capacity developing activities may include specific training courses, workshops, on-the-job training, awareness campaigns, dissemination and demonstration.

Capacity building activities will be conducted at the national, the provincial and the district/municipality level for the following target groups:

- Policy makers, including national government, regional government, governor, Dinas, regional parliament and Bappeda
- Entrepreneurs and NGOs
- Universities
- Teachers at vocational schools (SMKs)

The capacity building activities for the different target groups are to a certain degree interrelated, as shown in Figure 2.1.

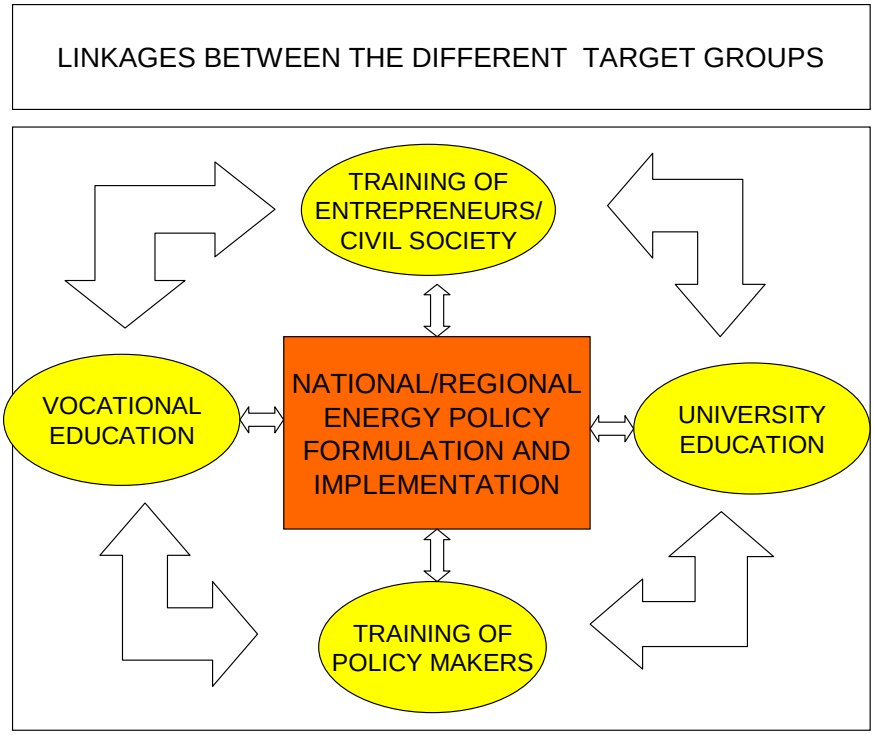


Figure 2.1: *Schematic overview linkages target groups*

The specific type of human capacity needed in a region is determined to a large degree by the regional energy policy and implementation plans. This policy defines the importance of the various fossil and non-fossil energy technologies for meeting future regional energy demand, which in turn determines the technological and policy expertise needed to implement the policy. All capacity development activities must therefore be linked with the regional energy policy and implementation plan.

There also exist interactions between the capacity building activities conducted for the various target groups. Vocational training and university education are specifically focused on building human capacity for developing and operating concrete sustainable energy projects needed to achieve the formulated policy objectives. Coordination of the content of the curricula and training models is therefore relevant to enhance the impact of these capacity building activities. Furthermore, in CASINDO an institutional model will be introduced that aims to set up specific programmes at the local university to train the teachers of technical schools (SMKs) in renewable energy technologies. This would significantly alleviate the heavy logistical burden of the Technical Education Development Centre (TEDC) to provide this training for the whole of Indonesia from their offices in Bandung.

The training of local policy makers and entrepreneurs in the social, financial, legal and policy aspects of regional energy sector development must also take into account the prevailing technological conditions; therefore, close coordination with the research conducted at the universities and vocational schools is necessary.

It is important to emphasise that the time frame for actually seeing the results of the capacity building activities differs according to the target group. The impact of the training activities for the technical team, the energy forum, local policy makers and entrepreneurs will probably be seen within the life of CASINDO by new energy policies and new energy businesses starting

up. However, it will take much more time before the impact of capacity building activities for students at universities and vocation schools will become really visible.

# 3. CASINDO consortium

## 3.1 Clients, partners and beneficiaries of the CASINDO programme

An overview of the clients, partners and beneficiaries of the CASINDO programme is presented in the Figure 3.1.

- CASINDO is one of the components of the Renewable Energy Programme that will be implemented in Indonesia by the Netherlands Embassy in the period 2008-2011. SenterNovem is the contracting authority for this component.

- The CASINDO consortium partners comprise the Ministry of Energy and Mineral Resources, the five technical teams in the target provinces, the Institute of Technology, Bandung, and the Technical Education Development Centre, Bandung, from Indonesia and the Dutch partners Energy research Centre of the Netherlands, Technical University Eindhoven and ETC Netherlands.

- The direct beneficiaries of the project will be the energy office and the office of education in the five target provinces, the regional energy forum, local energy service providers, local NGOs, and university and SMK students.

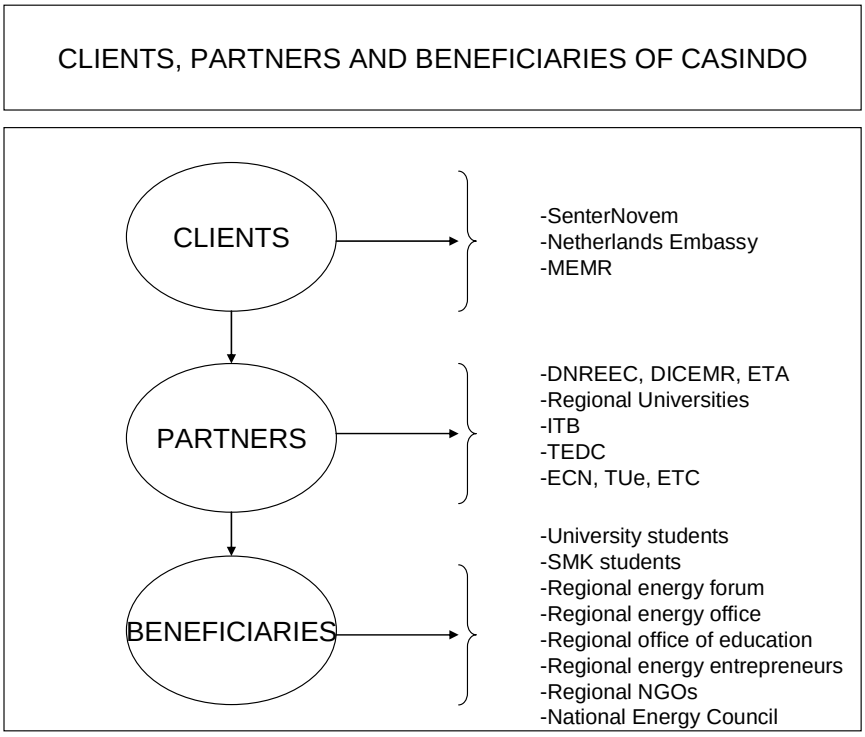


Figure 3.1: *CASINDO clients, partners and beneficiaries*

## 3.2 CASINDO partners

The organisations comprising the CASINDO consortium and their tasks/responsibilities in the CASINDO project are given below.

- **Ministry of Energy and Mineral Resources:**
  - *Directorate of New Renewable Energy and Energy Conservation (DNREEC)* **–** responsible for renewable energy and energy conservation policy strategy and a member of the Project Steering Committee.
  - *Data and Information Centre for Energy and Mineral Resources (DICEMR)* **–** responsible for setting energy policy at the national level and initiating and coordinating the institutional set up for the establishment of the regional energy forums and technical teams and overall management of the programme. The DICEMR is acting as the coordinating body for the five regional energy forums.
  - *Education and Training Agency (ETA)* – lead actor in energy training and responsible for coordinating MEMR's wider capacity development. The ETA provides training to staff from national and regional governments and also accepts candidates from the energy industry and universities. The Education and Training Centre for Electricity and Renewable Energy (ETCERE) of the ETA will assume the task of the national co-ordinator for the CASINDO programme.

- **Center for Regional Energy Management (PUSPER) of the Muhammadiyah University of Yogyakarta** – coordinator of the technical team in Yogyakarta and responsible for energy planning activities in Yogyakarta region, including the setting up of a regional energy database and an integrated energy planning tool, and supporting the regional forums in formulating regional energy policies. Also responsible for establishing a research and education programme on energy issues that are relevant to the province and to developing a structure that will enable the transfer of knowledge from the university to local industries. The Muhammadiyah University in Yogyakarta is currently implementing a project in the framework of the Indonesia Facility which focuses on biomass. To avoid duplication of efforts, CASINDO therefore will not initiate any new biomass-related activities in Yogyakarta, but will focus on other renewable and sustainable energy projects.

- **Diponegoro University – Electrical Department** – coordinator of the technical team in Central Java and responsible for the implementation of the targeted action activities in Central Java. Also responsible for establishing a research and education programme on energy issues that are relevant to the province and for developing a structure that will enable the transfer of knowledge from the university to local industries.

- **Electric Engineering department, University of Sumatra Utara (EED-USU)** – coordinator of the technical team in North Sumatra and responsible for identifying energy needs and priorities, developing energy planning capacity in North Sumatra region, including the setting up of a regional energy database and an integrated energy planning tool, and supporting the regional forums in formulating regional energy policies. Also responsible for establishing a research and education programme on energy issues that are relevant to the province and for developing a structure that will enable the transfer of knowledge from the university to local industries.

- **University of Mataram (UNRAM)** – coordinator of the technical team in West Nusa Tenggara. Will be responsible for identifying energy needs and priorities, developing energy planning capacity in West Nusa Tenggara region, including the setting up of a regional energy database and an integrated energy planning tool, and supporting the regional forums in formulating regional energy policies. Also responsible for establishing a research and education programme on energy issues that are relevant to the province and for developing a structure that will enable the transfer of knowledge from the university to local industries.

- **University of Cenderawasih, Jayapura** – coordinator of the technical team in Papua responsible for the implementation of the activities in Papua. Also responsible for establishing a research and education programme on energy issues that are relevant to the province and for developing a structure that will enable the transfer of knowledge from the university to local industries.

- **The Institute of Technology of Bandung (ITB) –** responsible for providing technical assistance to the regional technical teams in energy planning aspects and issues related to energy & poverty. The ITB is acting as the coordinating body for the regional teams. ITB also serves as backstopping knowledge institute on the national level. Provide backstopping for the establishing of research and education programmes on energy issues and the development of valorisation activities at the five target universities.

- **TEDC, Bandung –** responsible for identifying the SMKs that will be targeted and for training the teachers of the selected SMKs in renewable and energy efficiency.

- **Energy research Centre of the Netherlands (ECN), through its Policy Studies Unit –** responsible for the overall management of the programme, coordination of the various activities, supervision of the energy panning tool development, financial planning and reporting, and communications with SenterNovem and other bilateral/international organisations.

- **Technical University Eindhoven –** responsible for the overall coordination and implementation of the education and research activities conducted at local universities in the five target provinces

- **ETC-Nederland** – responsible for the overall coordination and implementation of the education activities targeted at the technical schools in the five provinces.

In addition to the above consortium members the following organisations have expressed their interest in getting involved in the CASINDO programme:

- AdvanceConsulting in Ede
- Biomass Technology Group BV in Enschede
- Technical University Delft, Delft

The above organisations might be subcontracted for a particular part of the programme if specific expertise is needed that can not be provided by the consortium partners. During the inception phase, their possible contribution will be determined.

## 3.3 Management structure and task description

The CASINDO programme is structured according to eight work packages (WPs). Each WP will be led by one of the consortium members. The objectives and activities of each WP are presented in section 4. The management structure of the proposed CASINDO programme is illustrated schematically in Figure 3.2.

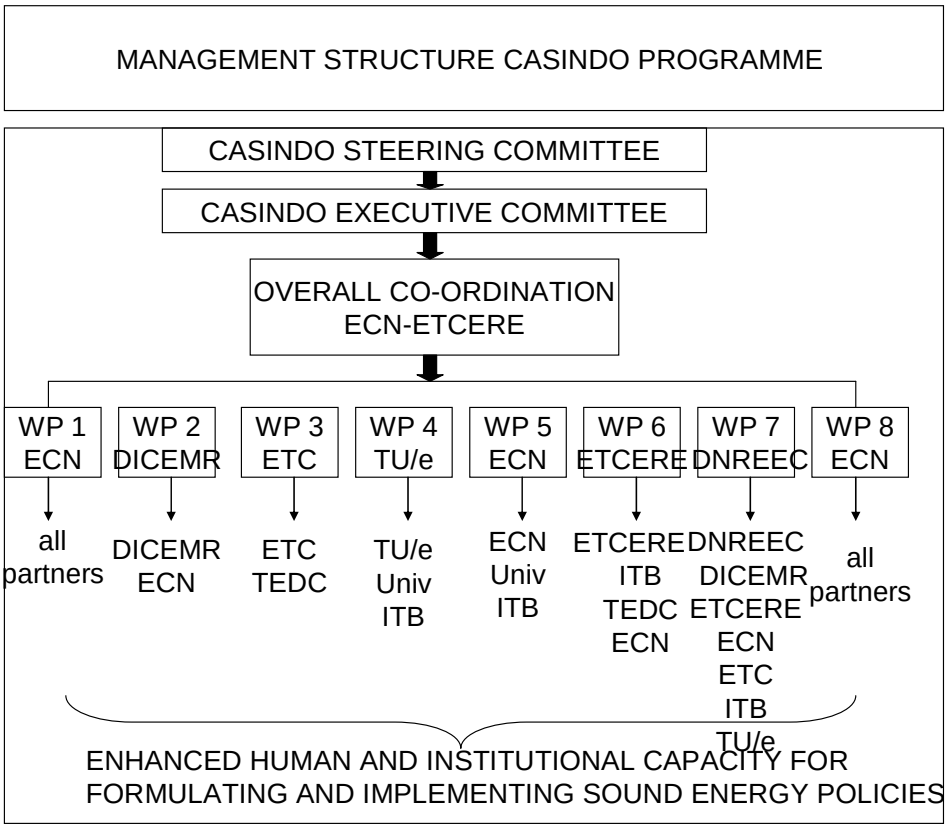

Figure 3.2: *Management structure CASINDO*

A programme steering committee (PSC) comprising representatives of the MEMR, SenterNovem and representatives from the five target provinces will be established. The PSC will meet once a year, back to back with the annual national seminar of the project, to discuss the progress made and the problems encountered, and possible solutions to these problems.

For the day to day communication a programme executive committee (PEC) comprising representatives of MEMR and SenterNovem will be established. The PEC will meet on a quarterly basis. Separate Terms of Reference for the PSC and PEC will be developed by SenterNovem

The overall co-ordination of the programme will lie with ECN and the ETCERE of the MEMR. This will involve ensuring a smooth implementation of the programme, providing progress reports to the PSC and the PEC, regular communication with SenterNovem and liaising with other relevant ongoing activities in Indonesia.

Each work package will be co-ordinated by a consortium partner, who will be responsible for co-ordinating the activities defined in the work package and ensuring the quality and timely production of the agreed deliverables.

# 4. Methodology

## 4.1 Overview

The overall programme concept is illustrated schematically in Figure 4.1 below. The proposed CASINDO programme is structured according to eight work packages (WPs). Each WP will be led by one of the CASINDO team members.

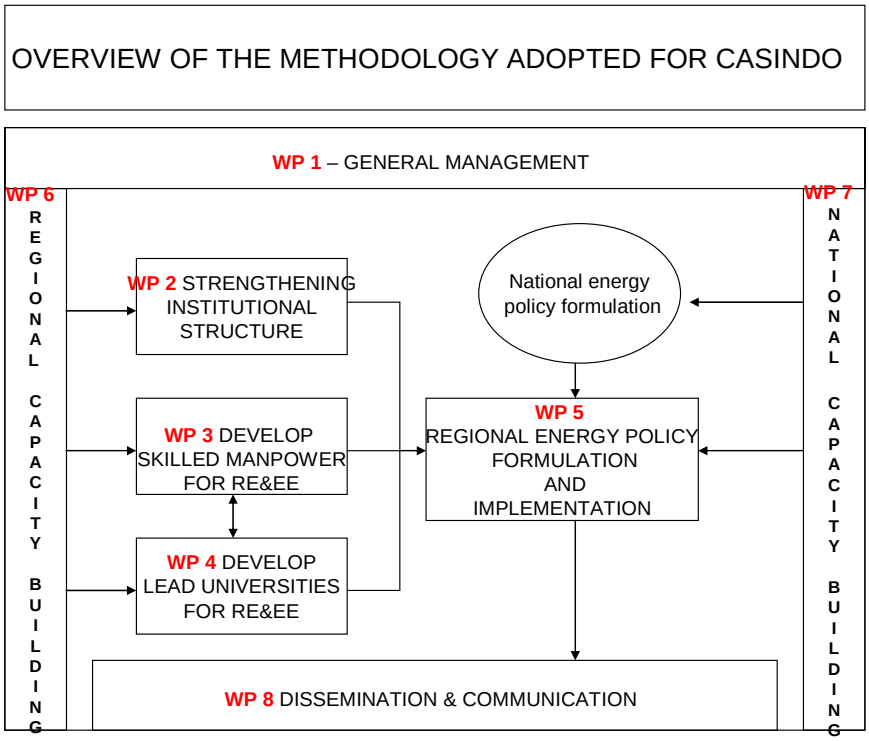


Figure 4.1: *CASINDO methodology*

The principle of 'learning by doing' is the starting point for all capacity development activities in CASINDO. Concrete outputs/results have been defined for the national and regional teams and to enable them to achieve these outputs the following types of training activities will be provided:

1. On-the-job training; national and local teams receive 'on-the-job' support by the consortium members throughout the duration of the programme. WP 3 (introduction of RE/EE modules at SMKs), WP 4 (establishment of education and research programme's at partner universities) and WP 5 (regional energy outlook, implementation plan, RE/EE plan) aim to provide this type of training.

2. Specific tailor made training courses; training courses on particular subjects to further support the teams in achieving the concrete outputs are included in WP 6 (focused on the target provinces) and in WP 7 (focused on the national level)

3. Activities related to dissemination of results and awareness raising are included in WP 8.

The objectives and activities of each WP are described in sections 4.2.1 to 4.2.8. A brief overview of each work package is presented below.

WP1: General programme management
The aim of this WP will be to accomplish efficient management and implementation of the programme in a timely and efficient manner, including financial planning, human resources management within the programme team, guidance to programme partners, communication with SenterNovem/Netherlands Embassy/EWG and liaison with the Programme Steering Committee.

WP2: Strengthening institutional structure
Regional energy forums have been established in the provinces of Yogyakarta, Central Java and West Nusa Tenggara. The aim of this WP will be to further strengthen these forums by means of specific training courses and/or workshops and to broaden the institutional set-up by establishing working relationships with other key stakeholders in the region (e.g. the regional bureau of education and Bappeda). In the provinces of Papua and North Sumatra, the focus will be mainly on the establishment of energy forums.

WP3: Development of skilled manpower for renewable energy and energy efficiency
The aim of WP3 will be to introduce training modules on renewable energy technologies that can be used at technical schools in the target provinces. This WP will involve the development of the training modules, training the teachers of the technical schools (SMKs) and introducing the modules at three SMKs in each target province. This introduction will take close account of the demand on the provincial labour markets for SMK graduates in RE&EE. The Ministry of Education at the national level and the provincial educational bureaus will be involved to ensure that this approach can be replicated and rolled out to other SMKs in the target provinces.

WP4: Development of lead universities for sustainable energy and energy efficiency
The aim of WP4 will be to continue the development of curricula for the universities in the target provinces; this will involve the development of theoretical and practical subjects in the field of sustainable energy. WP4 will also assist the universities in developing a research programme on applied research on renewable energy and in transferring knowledge to the local energy industry. Furthermore, it is envisaged to create a number of scholarships at the partner universities for the Master's programme on sustainable energy that is to be established.

WP5: Regional energy policy formulation and implementation
In the current EWG activities the focus is very much on developing capacity in the target provinces to enable the regional government to formulate sound energy policies. The aim of WP5 will be to further develop and broaden this capacity and to extend these activities to districts and municipalities. Furthermore, the focus will be shifted towards the implementation of the regional energy plan, which will involve the identification and development of concrete energy projects and the identification of the necessary investment schemes. Another aim of this WP will be to develop a detailed renewable energy plan and energy conservation plan for the region, based on the regional energy plan.

WP6: Developing and strengthening human capacity in the five target provinces
The aim of this WP will be to identify and to provide the capacity development needs for the successful implementation of WPs 2, 3, 4 & 5. These activities will be brought together under this WP in order to achieve efficient planning and execution of these activities. WP6 will comprise training activities targeted at the five target provinces.

WP7: Strengthening human capacity at the national level
This WP will deal with the training needs identified at national government departments and agencies, in particular at the DNREEC, the DICEMR and the ETA of the MEMR. The focus lies on RE and EE capacity building. During the inception phase, a detailed assessment will be conducted to identify the specific needs for training at the national level.

WP8: Dissemination and Communication
This WP will address the need for the ongoing dissemination of results throughout the programme, as well as the need for effective communication between all the key market actors involved in the programme. Means for disseminating the results will include the CASINDO website, a national seminar to be held in Jakarta in 2010 and 2011, and a programme leaflet describing the objectives, activities and results of the CASINDO programme.

## 4.2 Work Packages

### 4.2.1 Work Package 1: General management

**Background**
Well-defined programme management functions are particularly important in international collaboration programmes that comprise many programme partners and sub-contractors and take on activities at international, national, provincial and local levels. For this reason, and to assist the appropriate budgeting of time and resources for programme management, these functions have been put together as a WP. This WP includes the time that all partners will devote to preparing for and participating in the team meetings that will be held throughout the programme, preparing the progress reports and coordinating the various programme activities.

**Tasks and activities**
This WP will run throughout the programme duration and comprise the following tasks:

*1. Inception phase*
During this phase, the training needs of the DNREEC, DICEMR and ETA at the national level, of the technical teams and energy for a stakeholders at a regional level and the training needs of the kabupaten and kota will be assessed in detail, as will the need for expertise on sustainable energy and energy efficiency in the target provinces and the place for inclusion of linked SE & EE training/education modules at the SMKs and at the universities. These assessments will be conducted in WPs 3,4,5 & 7 and will be integrated in WP1 into one document which will also include a detailed training programme to address the identified training needs, a description of work and as well as the possible contributions from third parties (see section 3.2). The inception phase will start immediately after the contract is signed and will last 4 months.

*2. General management*
General management will involve the following activities:
- Setting up and implementing administrative and contractual arrangements with CASINDO partners. Contracts will need to be drawn up and signed with the nine CASINDO consortium members.
- Preparing and conducting a two-day kick-off meeting in Indonesia with all programme partners in order to discuss, elaborate and, if needed, adjust the work plan. A detailed planning of the activities, especially for the first programme year, will be agreed upon.
- Coordinating the activities of the various work packages, in particular the envisaged training activities conducted in the regions and at the national level.
- Communicating with the Programme Steering Committee (PSC). The PSC will be established by SenterNovem soon after the start of the programme. Draft reports produced by CASINDO programme will be sent to the PSC for comments.
- Establishing communication channels and procedures within the CASINDO programme to ensure an efficient and smooth implementation of the programme.
- Scheduling and monitoring the accomplishment of planned activities.

- Scheduling and monitoring the financial arrangements made with SenterNovem and the programme partners.
- Establishing effective collaboration between other relevant ongoing projects and programmes in Indonesia, in particular with the other activities carried out in the framework of Renewable Energy programme of the Netherlands Embassy.
- Maintaining regular communication with SenterNovem and the Netherlands Embassy about the progress regarding the implementation of the programme.

*3. Energy Working Group Meetings*

- Participating in the annual Energy Working Group Meetings.

*4. Preparing progress and final reports*

- Timely production of informative annual progress reports and final CASINDO programme report as agreed with SenterNovem

*5. Coordination of the work packages*

- Coordinating, planning and monitoring the activities and progress of the work packages

*6. Monitoring plan and budget breakdown*

- In the first month of the project a plan will be developed for monitoring the progress toward achieving the stated objectives. Furthermore, an estimated breakdown by 6-month periods of the CASINDO budget will be presented.

**Output and outcome of WP1**

WP1 will ensure a smooth implementation and the timely completion of all work packages, deliverables and progress reports. The criteria and associated indicators to measure the output and outcome are presented in the table below.

| **WP1 General Management** | | |
|---|---|---|
| **Results chain** | **Criteria** | **Indicators** |
| Output | Quality of management and good performance of the Consortium | - Good communication with the project steering committee measured through level and quality of communication<br>- Good communication and coordination within the consortium, measured by the number, means and quality of the communication, the clarity of roles and the complementarity of activities of the partners<br>- Clear defined description of work based on the needs assessment reports.<br>- Timely and appropriate reporting, measured against the schedule of deliverables and their approval by SenterNovem<br>- Efficient organisation and implementation of project team meetings, measured against the minutes of the meetings<br>-Inception report produced on time |
| Outcome | Smooth implementation and timely completion of all work | - Programme progresses on time and budget, as measured through progress reports and cost statements |

| | | |
|---|---|---|
| | packages, deliverables and progress reports | |

**Deliverables of this work package**
D1: 1st progress report, due January 2010
D2: 2nd progress report, due November 2010
D3: 3rd progress report , due August 2011
D4: Inception report, due August 2009
D5: Final CASINDO programme report due two months after the official end date of the programme
D37: Monitoring plan and budget breakdown, due in June, 2009.

### 4.2.2 Work Package 2: Strengthening the institutional structure for regional energy policy formulation and implementation

**Background**
The institutional model for regional energy policy formulation comprises the regional energy forum and the regional technical team. This model has been implemented and formally approved by the regional government in Yogyakarta, Central Java and West Nusa Tenggara. The aim of this WP will be to further strengthen these forums and the participating organisations such as the Regional Energy Office (DINAS). Furthermore, the intention is to expand the institutional model to include the Bappeda, the Regional Office for Education and possibly other stakeholders.

**Tasks and activities**

*1. To establish regional energy forums in North Sumatra and Papua*
North Sumatra and Papua do not yet have energy forums. The aim of this WP will be to identify the relevant stakeholders, to discuss the tasks and responsibilities of the forum, and to formally establish energy forums in the two provinces. Furthermore, it is envisaged to establish links with other relevant activities in the province to ensure close cooperation and avoid the duplication of efforts.

*2. To strengthen regional energy forums in the five target provinces*
Capacity development needs and priorities to enable the forum members to formulate and implement sound energy policies will be identified and training courses and workshops that address these needs will be organised and implemented (see WP6). The spectrum of capacity development that is expected to be required for the forum includes integrated energy policy analysis and integration of energy into local development planning, and may also include awareness raising among the general public on energy issues.

*3. To expand the institutional set-up by including BAPPENAS/BAPPEDA, the regional bureau of education and possibly other stakeholders*
In the CASINDO programme the focus will gradually shift from policy formulation to policy implementation. This means that developing energy projects and securing the necessary investment for these projects will be an important activity and it is expected that BAPPENAS/BAPPEDA can play an important facilitating role here.

The aim of the education activities at the local universities and technical schools will be to enhance the human technical capacity in the province for the development of concrete renewable energy projects. These activities will focus on a limited number of universities and technical schools but be set up in such a way that the approach can be rolled out to other institutions of higher education in the region. Close coordination will therefore be maintained with the Minis-

try of Education at the national level and the bureaus of education in the provinces to ensure that the activities are in line with the national and regional education quality standards and to facilitate broad replication in the provinces.

**Output and outcome of WP2**
The outcome of WP2 will be well established energy forums in the five target provinces and good communication channels with national policy makers, Bappeda, Regional Bureau of Education and possibly other stakeholders.

| WP2 Strengthening institutional structure in the region | | |
|---|---|---|
| **Results chain** | **Criteria** | **Indicators** |
| Output | Well-established energy forums in the five target provinces | - Official approval of the energy forum by local government<br>- Composition of the forum<br>- Deliverables produced on time |
| Outcome | Institutional structure strengthened and expanded | -Communication with regional energy office and regional bureau of education, Bappeda and other relevant stakeholders established, measured through minutes of meetings and number, quality and means of communication.<br>-Inclusion of regional budget provisions for regional energy fora actvities. |

**Deliverables of WP2**
D6: Minutes of meetings held with the forum, Bappeda and regional energy offices.

### 4.2.3 Work Package 3: Development of skilled manpower for renewable energy and energy efficiency

**Background**
The aim of WP3 will be to disseminate the earlier developed curriculum, syllabus and lesson modules on the renewable energy technologies (RETs) micro hydropower (MHP) and solar PV. As these RETs are currently the most applied in Indonesia, the need to teach them in medium technical schools (SMKs) in the five target provinces is thus the greatest. Energy efficiency (EE) issues will be integrated in the curriculum, syllabus and lesson modules of these RETs.

A small-scale curriculum, a syllabus and lesson modules for the subjects of biomass (BM), biogas (BG) and wind energy (WE) are currently in development and can be disseminated from the second half of 2009 onwards.

Thus far the curriculum, syllabus and lesson modules on the RETs micro hydropower and solar PV have been developed at two levels: for teachers of SMK and for SMK students. These materials were validated by external experts in accordance with the competency standards of the Directorate General of Electricity and Energy Utilisation (DGEEU).

The completion of the MHP and PV materials was accomplished by the Technical Education Development Centre (TEDC) of Bandung and the inputs of subject expertise on MHP and solar PV. In the course of the activities, four pilot schools – namely SMKN 1 Tarogong Kaler Garut (West Java), SMKN 2 Pengasih Kulonprogo (Yogyakarta), SMKN 2 Kendari (Sulawesi Tenggarra) and SMKN 2 Kuripan Lombok Barat (Nusa Tenggarra Barat) – were involved in the par-

tial testing of the educational materials. The Technical Training Programme of ETC Nederland had the final responsibility for the implementation of all activities involved.

**Tasks and activities**

*1. To assess the specific needs for technical expertise in the field of RE and EE*

WP 3 will start with an assessment among the relevant stakeholders on the national and regional level of the specific needs for SMK graduates in the field of RE and EE in both the public and private sector. This assessment will be conducted in the inception phase of CASINDO through interviews with selected SMKs and with other relevant stakeholders such as energy industry, Indonesian renewable energy association (MITI) and policy makers at national and regional level. The outcome of this assessment will be included in the inception report and may lead to a revision of the SMK-related activities as described below.

*2. To expand RET education to the programme's target provinces*
Based on the experiences with the introduction of the RETs MHP and solar PV in the four pilot SMKs, WP3 will aim at the further introduction of these RETs and the RETs BM, BG and WE in medium technical schools in the programme's target provinces. In this process special attention will be paid to the integration of EE within all these RETs, as this was partially done in the previous development of the curriculum, syllabus and lesson modules for all these RETs.

The following steps will be taken:
- The experiences of SMKN 2 Pengasih Kulonprogo (Yogyakarta) and SMKN 2 Kuripan Lombok Barat (Nusa Tenggarra Barat) will be taken as point of departure for the expansion in the project's target provinces of Yogyakarta and West Nusa Tenggara.
- In these two provinces, two other SMKs have to be selected. For this, SMKs in each province will be invited to issue an expression of interest in participating in the project. These expressions of interest are to include the SMK's track record on its affiliation with MHP/PV/BM/BG/WE/EE, as well as the demand in the SMK's immediate environment for skilled manpower for installing/operating/maintaining these RETs and taking care of related EE issues. The TEDC, the provincial educational bureau and the provincial DINAS, as well as the provincial energy forum (or relevant private companies if a provincial energy forum has not yet been established) will be responsible for the selection.
- When the expressions of interest are requested from the SMKs in these two provinces, a general assessment of the need for MHP/solar PV/BM/BG/WE/EE will be carried out. The mentioned parties should play a key role in this under the guidance of ETC and TEDC.
- Immediately after the selection procedure of the SMKs, an inventory of needs for RET/EE training will be made with these SMKs. The outcomes of these inventories will be shared with the provincial university linked to the project and provincial private companies active in RET/EE.
- At the same time, two SMKs will have to be selected in the provinces of Central Java, North Sumatra and Papua. The selection procedure will in principle go along the same lines as in the provinces of Yogyakarta and West Nusa Tenggara. Given the fact that provincial energy forums do not yet exist in North Sumatra and Papua, the selection will have to be done by the other mentioned institutions.
- After the selection of the two SMKs in each province, an agreement between each SMK and the project will have to be established, in which the SMK commits to mobilise a special group of teachers and students for the facilitation of the introduction of MHP, solar PV and related EE issues, and also commits to make its school facilities available for the same purpose. In the agreement it will also be mentioned what financial contributions are expected from the SMK.

- In the agreement, the project will commit itself to provide technical and managerial expertise relevant to the introduction of the RET/EE. The project will bear the costs related to this expertise.
- In summary, 10 SMKs will be served with programmes comprising a selection of new RETs programmes as follows:
- Yogyakarta: SMKN 2 Pengasih Kulonprogo (selection from MHP/PV/BM/BG/WE/EE) and two SMKs (MHP/PV/EE); West Nusa Tengara: SMKN 2 Kuripan Lombok Barat -Nusa Tenggarra Barat (selection from MHP/PV/BM/BG/WE/EE) and 2 SMK (MHP/PV/EE).
- Central Java: two SMKs (MHP/PV/EE with optional BM/BG/WE), North Sumatra (MHP/PV/EE with optional BM/BG/WE) and Jayapura 3 SMK (MHP/PV/EE with optional BM/BG/WE).
- West Java: SMKN 1 Tarogong Kaler Garut and Sulawesi Tenggarra and SMKN 2 Kendari will serve as additional pilot schools, as these schools have played an important role in the development of the RET materials.

*3. To adapt and embed RET curriculae, syllabi and lesson modules in SMKs: stage 1*
The now existing curriculae, syllabi and lesson modules on MHP and solar PV will be introduced at the selected SMKs. This will first be done at the SMKs in the provinces of Yogyakarta and Nusa Tenggarra Barat by taking advantage of the experiences in the SMKN 2 Pengasih Kulonprogo (Yogyakarta) and SMKN 2 Kuripan Lombok Barat (Nusa Tenggarra Barat). Feedback on the existing lesson modules on MHP and solar PV should be given by these two schools (the curriculae and syllabi will remain the same). This feedback should guide possible practical adaptations of the MHP/PV/EE lesson modules for teachers and students used in these schools; this mostly concerns the practical parts of the learning process (i.e. field visits, sites for on the job training). Also room will be made for province-specific applications in the lesson modules (appropriate theoretical examples). In the adaptation of the now existing curriculae, syllabi and lesson modules on MHP and solar PV, also EE issues related to these RETs will be taken into account.

In case these adaptations prove to be profound, the project will propose in close consultation with the provincial universities involved in the project, the provincial energy forums, the provincial DINAS and the Bureau of Education what adaptations are desirable. Knowledge valorisation of the newly developed materials will be taken on along the same lines, and in close coordination with the proposed activities in WP4 in this field. The project management will take up the task to streamline proposals for province-specific adaptations with MENR and the Ministry of Education.

The newly developed materials for BM/BG/WE/EE will be introduced at SMKN 2 Pengasih Kulonprogo (Yogyakarta) and SMKN 2 Kuripan Lombok Barat (Nusa Tenggarra Barat).

The whole process, as described above, will take one year.

*4. To adopt and embed RET curriculae, syllabi and lesson modules in SMKs: stage 2*
The development activities in the other project provinces – namely Central Java, North Sumatra and Papua – will also start in the first project year. When exactly depends on the establishment of a provincial network of energy and education stakeholders, and the establishment of a provincial energy forum in all three provinces; this will take the first project year.

The lesson modules adapted in the first project year will be introduced in the nine SMKs of these three provinces. The project will also establish with these nine schools an implementation agreement, as was done in the case of the first two provinces. The room for adaptations in the lesson modules will be limited, as far as non province-specific aspects are concerned. This means that only in the practical parts of the lesson modules can province-specific adaptations be made.

Also in stage 2 the project management will take up the task to streamline proposals for province-specific adaptations with the provincial DINAS and the provincial Educational Bureaus.

5. *To roll-out teacher and student training courses in MHP/ PV/BM/BG/WE/EE to other SMKs in the target provinces*

In the third project year, it will be established in which other SMKs in each province the teacher and student training courses in MHP/PV/BM/BG/WE/EE can be rolled out. This process should be demand driven; that is, the indication of interest by the other SMKs is central here. It is expected that only some SMKs will be interested in including RETs in their curriculae; this very much depends on the requirements the SMK's environment on the content of the professional education offered. Here, both the character of the local energy provision and the specific demands coming from the private sector play a decisive role. For this roll-out the active support of MEMR and the Ministry of Education will be sought.

| **Region** | **2009** | **2010** | **2011** |
|---|---|---|---|
| Yogyakarta | - Selection of two pilot SMKs<br>- Development of province-specific lesson modules<br>- Teacher&student training courses | - Start of 3-year programme on MHP/PV<br>- Introduction of BM/BG/WE/EE | - Development of roll-out programme |
| WNT | - Selection of two target SMKs<br>- Province-specific lesson modules<br>- Teacher and student training courses | - Start of 3-year programme on MHP/PV<br>- Introduction of BM/BG/WE/EE | - Development of roll-out programme |
| North Sumatra | - Selection of two target SMKs<br>- Establishment of network and forum | - Province-specific lesson modules<br>- Teacher and student training courses | - Start of 3-year programme on MHP/PV<br>- Development of roll-out programme |
| Central Java | - Selection of two target SMKs<br>- Establishment of network and forum | - Province-specific lesson modules<br>- Teacher and student training courses<br>- Start of 3-year programme on MHP/PV | - Development of roll-out programme |
| Papua | - Selection of two target SMKs<br>- Establishment of network and forum | - Province-specific lesson modules<br>- Teacher and student training courses<br>- Start of 3-year programme on MHP/PV | - Development of roll-out programme |

**Output and outcome of WP3**

This WP will result in an inventory of the needs for skilled manpower for the RE/EE, integration of RE&EE in SMK curriculae and students at SMKs trained in RE&EE. The indicators that will be used to measure the performance of WP3 are presented in the table below.

| WP3 Development of skilled manpower for RE&EE | | |
|---|---|---|
| **Results chain** | **Criteria** | **Indicators** |
| Output | Selection of pilot SMKs for project by public tender | - Selection procedure completed with selection of two SMKs per province |
| | Needs for RE/EE training assessed in 5 provinces | - Needs assessment prepared and included in inception report |
| | RE&EE training material developed and SMK teachers trained | - Training material on RE&EE available<br>- At least 10 SMK teachers trained, measured through number of teacher |
| | Interaction between SMKs / universities and business community on RE&EE | - At least 30 participants attending the yearly seminars with provincial universities and pilot SMKs for validation of developed educational materials. |
| Outcome | integration RE&EE in SMK curriculae | - RE&EE curriculae and training material embedded in project SMKs |
| | Students at SMKs trained in RE&EE | - At least 150 students who followed the SMK RE&EE courses |

**Deliverables of WP3**

D7: Report on the selection of three SMKs in each of the project's target provinces and working agreements between SMKs and the project.

D8: Province-specific adapted curriculae, syllabi and lesson modules on MHP and solar PV for SMK teachers and students in the provinces of Yogyakarta and Nusa Tenggarra Barat.

D9: Province-specific adapted curriculae, syllabi and lesson modules on MHP/PV/BM/BG/WE/EE for SMK teachers and students in the provinces of Central Java, North Sumatra and Papua.

D10: Report on the pilot teacher and student training courses in MHP/PV/BM/BG/WE/EE in Yogyakarta and Nusa Tenggarra Barat and on the integrated teacher and student training courses in MHP/PV/BM/BG/WE/EE in Yogyakarta and Nusa Tenggarra Barat.

D11: SMK integrated teacher and student training courses in MHP/PV/BM/BG/WE/EE in Central Java, North Sumatra and Papua.

D12: Report on the approach to roll out to an average of four SMKs per province of teacher and student training courses in MHP/PV/BM/BG/WE/EE to other SMKs in the target provinces.

D13: Report on the dissemination of the results of this WP in line with the requirements of WP8.

### 4.2.4 Work Package 4: Development of lead universities for sustainable energy and energy efficiency

**Background**
WP4 will focus on developing academic education and applied research in sustainable energy (SE) and energy efficiency (EE) related to sustainable energy at the five partner universities: Muhammadiya University (Yogyakarta), University of Sumatra Utara (Medan), University of Mataram (Mataram), Diponegoror University (Semarang) and University of Cendrawasih (Jayapura). This WP will also focus on knowledge valorisation of SE and EE research to enable the partner universities to establish cooperation with industry through research projects and provide backstopping activities and generate spin-offs for sustainable energy technologies.

The activities and plans that are described in this WP build on the collaboration activities with the universities in Medan, Mataram and Yogyakarta conducted over the past years in the framework of the EWG. These activities started in 2004 with a series of workshops organised for government staff and entrepreneurs as part of the Energy Exhibition in Jakarta and were mainly aimed at capacity development in sustainable energy technologies. In March 2007 representatives from the three universities visited Eindhoven University of Technology. During this visit it was decided to conduct a workshop at the three universities with the aim of introducing/familiarising university staff to/with several sustainable energy technologies. These workshops were held in December 2007 and have contributed to the initiation of research projects in sustainable energy. In addition, they have generated interest in education and research in sustainable energy among staff members. In August and November 2008 an inventory was made of the current education and research activities related to energy at these three universities, and plans to continue the collaboration efforts were discussed. The three universities expressed their wish to set up an education programme and to conduct research activities in sustainable energy technology. Education and research in energy efficiency are considered to be important as well. However, there are differences between the universities with regard to the specific educational and research needs and priorities, which means that the specific content and set-up of the programmes may differ for these universities.

The activities that are currently being carried out under the EWG 2008-2009 programme include:
- Developing the 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.

A fast-track programme is proposed for the universities in Papua and Central Java that are not included in the current EWG programme, with the aim of bringing them up to the same level as the other universities.

**Tasks and activities**

*1. To assess the specific needs of the universities involved in the CASINDO programme*
In each target province a local university will be involved in CASINDO with the aim to become the lead university in the region in the field of RE and EE. However, the needs for training of these universities to achieve this goal may be different and therefore an assessment of the specific needs of each university will be conducted in the inception phase of the programme. In addition, an assessment of the need for university graduates in the field of RE and EE will be as-

sessed. The outcome of this assessment will result in a detailed university-specific work plan based on the more general approach presented below.

*2. To implement a fast-track programme for Papua and Central Java*
Diponegoror University in Central Java and Cendrawasih University in Papua have not yet been involved in EWG activities. It is therefore proposed to offer these universities a fast-track programme during the first year of the project in order to bring them up to the same level as the three other universities. This fast-track programme will comprise the following components:

- General introduction to discuss the content of WP4.
- Workshop to introduce the staff of both universities to several sustainable energy technologies that would be of interest to them and to stimulate them to initiate research projects in sustainable energy technologies.
- Development of an inventory of current activities in research, education and knowledge valorisation, and development of plans to shape a future education programme and research activities in SE and EE technologies.
- A workshop conducted at the two universities to identify best practices to involve industry–university linkages in research projects and explain how to generate commercial spin-offs from research projects at the universities.

*3. To develop and implement an education programme*
The education programme in sustainable energy will comprise courses/subjects at various faculties and departments. For each of the partner universities, the size and content of the programme will be in line with the specific needs and priorities of the university. These needs are based on the available expertise and capacity for implementing such a programme, and the regional interest in and potential for certain SE and EE energy technologies. The programme will include faculties and departments such as Electrical Engineering, Mechanical Engineering, Chemical Engineering, Agriculture and Agricultural Engineering, and Economics. The education programme can be set up either as a certificate programme or as an MSc programme, depending on the needs and background of the university. A certificate programme will consist of a number of selective courses and regular courses that can be followed in addition to the regular BSc/MSc programme by students who are interested in SE and EE. When sufficient study credits are obtained by students, they will be awarded a sustainable energy certificate. An MSc programme will consist of a number of mandatory courses. If passed successfully, students will be awarded an MSc diploma in Sustainable Energy Technology. For the development of such education programmes, there is a large variety of BSc and MSc course material available at the TU/e. Syllabi and other reference material can be used for the development of new courses, although these will have to be adapted to the Indonesian situation. The development of an education programme will involve the development of different practical and theoretical courses/subjects at the Indonesian partner universities that are related to SE and EE technologies. Although a number of these courses/subjects will be more or less the same for all universities, others will be tailor made to meet the specific needs and priorities of the university. The focus of the SE and EE technologies will be on those technologies that are relevant to the province. In addition to the technological courses/subjects, courses will also be developed that aim at the successful implementation and operation of sustainable energy projects, such as project management and feasibility study courses. The courses will be given at several faculties and departments at the universities, because of the wide range of disciplines that are needed for the provision of these courses. To develop these courses, it will be necessary to:

- Transfer knowledge about existing curricula from TU/e to the partner universities. This knowledge transfer will comprise the exchange of relevant course material and interaction between experts. The knowledge will need to be translated and adapted to the Indonesian situation.
- Supply the equipment needed to conduct practical courses in SE and EE.

- Provide basic literature that staff and students can use as input for research projects, papers and course material.
- Start the pilot programme, whereby pilot courses will provide feedback from the students. Students with an excellent track record will be stimulated to enrol in the new programme by covering the tuition fee from the CASINDO programme.
- Conduct a final evaluation to measure the quality of the courses that comprise the education programme and provide feedback for improvement.

*4. To develop and implement a research programme*

The aim of this activity will be to improve the quality and quantity of the research activities in SE and EE at the five target universities. The focus of the research activities will mainly be on applied research in technologies that are interesting for the province, as well in the feasibility of these technologies for the region. Specific research topics will also depend on the specific interest and capabilities of the university staff. The research programme will be centrally coordinated in order to enhance and stimulate cooperation among faculties and departments, the exchange of lab equipment and the involvement of commercial partners in research. The development of a research programme will involve the following activities:

- Develop and update, together with university staff, a research agenda focusing on a number of SE and EE technologies that are relevant to the region concerned.
- Have each of the partner universities perform at least three small, short-term (<1 year) pilot research projects in SE and/or EE during the total project. The outcomes of these projects should be relevant to the province in which these universities are located.
- Provide support for the academic implementation of these research projects. This support will consist of:
  - Meetings in the region between TU/e staff and university staff to discuss progress and provide technical support
  - Support by experts from TU/e for research projects by email and phone.
- Procuring and installing laboratory equipment (in addition to the equipment for the practical courses) that is necessary for conducting applied research.

*5. Knowledge valorisation*

This activity will address the need to develop the capacity for the partner universities to pursue knowledge valorisation in SE and EE. This will involve the establishment of long-lasting cooperative relationships with SMEs, regional governments and local communities. Universities will also stimulate the commercial development of successful research projects and the commercial exploitation of expertise available at the university in consultancy work. This is particularly interesting since in this way the universities will intensify their applied research activities in sustainable energy. The universities will also be stimulated to provide backstopping for local activities in SE and EE such as the implementation of projects within the bilateral EWG framework, as well as backstopping for SME and communities. To develop this infrastructure for knowledge valorisation, the following activities are proposed:

- Conducting seminars and/or workshops at the partner universities for students, SMKs, companies, NGOs and government staff related to SE and EE topics in order to:
  - stimulate linkages with industry, government and other institutes in order to spur/initiate collaboration research projects.
  - stimulate spin-offs and entrepreneurship within the university
  - contribute to the awareness of these local industries about the existence of certain SE and EE technologies and the advantages of using them
- Developing an infrastructure within the universities to stimulate university spin-offs and cooperation with SMKs, regional government and local communities in research activities.

*6. Demonstration units*
Together with the Indonesian partner universities a sustainable energy technology demonstration unit that is most suitable for education and research purposes will be identified, purchased and installed. The unit will generate interest among students in SE and EE technologies, provide practical insights for both staff and students, and provide input for applied research activities and practical courses.

**Output and outcome of WP4**
This WP will result in a research programme for the five partner universities and in the execution of a number of concrete research projects. Furthermore, it will produce an education programme on sustainable energy for each university and will assist the universities in establishing the infrastructure for knowledge valorisation. It is assumed that the need for assistance of the two new universities in Central Java and Papua will be in line with that of the universities that are already included in the EWG programme. If this turns out not to be the case, the approach presented in this WP will be adjusted.

| **WP4 Development of Lead universities for SE&EE** | | |
|---|---|---|
| **Results chain** | **Criteria** | **Indicators** |
| Output | Need for MSc/certificate programme assessed | Report on needs assessment included in inception report |
| | Research & education programmes developed and implemented | - Curricula for education programme available for five partner universities<br>- Certificate programme and/or MSc programme defined for five partner universities<br>- At least 10 research projects identified and proposals developed<br>- Deliverables produced on time |
| | Demonstration units installed | -timely installation of appropriate demonstration unit, measured by installation date and type of installation |
| Outcome | Students at university trained in SE&EE subjects and existing knowledge valorised | - At least 75 students followed the SE&EE training course<br>- At least 10 completed research projects with the private sector<br>- |

**Deliverables of WP4**

D14: Report on the introductory workshops, on the inventory of current activities and plans, on the proposed approach for the development of an education programme, on the development of a research programme, and on research and knowledge valorisation at Diponegoro University (Central Java) and Cendrawasih University (Papua).
D15: Report on the development of research agendas for the five partner universities.
D16: Reports on the pilot research projects that have been conducted.
D17: Report on the education programmes, describing how the programme has been set up (certificate or MSc), the programme's content and how knowledge has been transferred to the lecturers who are going to implement the programme.
D18: Training material for the education programme.

D19: Report on project implementation plan to develop the infrastructure for knowledge valorisation and on the programme, objectives and results of the valorisation workshops
D20: Report on the demonstration units that have been installed at the partner universities.

**Planning**

| Region | 2009 | 2010 | 2011 |
|---|---|---|---|
| Yogyakarta/WNT/ North Sumatra | - Develop detailed implementation plan for education programme<br>- Start development of courses and knowledge transfer<br>- Develop and update research agenda<br>- Start research projects<br>- Annual seminar<br>- Identify best practices for knowledge valorisation<br>- Installation and procurement of demonstration units | - Continue and finalise development of courses and knowledge transfer<br>- Where possible start and evaluate pilot courses<br>- Develop and update research agenda<br>- Continue execution of research projects<br>- Annual seminar<br>- Develop plan to implement infrastructure for knowledge valorisation | - Start and evaluate pilot courses<br>- Conduct audit<br>- Develop and update research agenda<br>- Finalise all pilot research projects<br>- Annual seminar |
| Central Java/Papua | - Plan and conduct introductory workshop<br>- Develop detailed implementation plan for education programme<br>- Start development of courses and knowledge transfer<br>- Develop and update research agenda<br>- Start research projects<br>- Annual seminar<br>- Identify best practices for knowledge valorisation | - Continue development of courses and knowledge transfer<br>- Where possible start and evaluate pilot courses<br>- Develop and update research agenda<br>- Continue execution of research projects<br>- Annual seminar<br>- Develop plan to implement infrastructure for knowledge valorisation<br>- Installation and procurement of demonstration units | - Finalise development of courses and knowledge transfer<br>- Start and evaluate pilot courses<br>- Conduct audit<br>- Develop and update research agenda<br>- Finalise all pilot research projects<br>- Annual seminar |

### 4.2.5 Work Package 5: Regional energy policy formulation and implementation

**Background**
WP5 will cover the necessary activities and supporting material needed in order to formulate and implement a regional energy policy. It will enforce the institutional settings on a regional level between the regional technical team and the regional energy forum as well as introduce energy planning at a lower governmental level (districts/regencies).

The WP will strongly build on the energy outlook produced in the CAREPI project for North Sumatra, Yogyakarta, Central Java and West Nusa Tenggara, and will strengthen, broaden and deepen the human capacity for energy policy formulation developed over the past years in these provinces. This will be achieved through the development of an implementation plan for the formulated regional energy strategy and formulation of specific energy sub-sector policies, in particular a renewable energy policy. Papua, as a new province, has not yet produced an energy

outlook and therefore the focus there will first be on the development of an energy profile and energy strategy. If possible, a similar implementation plan will then be developed.

WP5 will take a major role in the whole project set-up, as it will combine a number of direct and indirect outcomes from WPs 2, 3, 4, 6 and 7. In order to enable the regional authorities to formulate and implement a specific regional energy policy, a two-part approach (as in the CAREPI project) will be followed. The first part will cover the activities related to the regional technical team, that is, it will focus on thorough knowledge of the regional energy situation and the development of the required scientific basis in the field of energy and energy policy. The second part, that for the regional energy forums, will focus on framework setting, energy policy formulation and implementation.

The regional technical team should develop as *the* centre for energy information and knowledge for the region and for regional policy makers and stakeholders. This does not mean that all responsibility regarding data collection etc. will lie with the team, but that all available information (which is now often collected and managed by different organisations such as Dinas, Bappeda, PLN, Pertamina) is made available to and analysed by the regional technical team. When discussing and formulating regional energy policy or measures, the regional energy forum should be able to acquire needed support, information and advice from the regional technical team. Setting up an annual energy balance will, for example, increase the knowledge and understanding of the regional energy situation, and the use of energy modelling tools (including LEAP) will enhance the analytical capacity to evaluate energy scenarios and plans. The regional technical teams also need to be able to provide the required support to develop a full FS for envisaged small scale RE projects, including assessment of their financing possibilities

In order to ensure sustainability of the institutional set-up, it is also necessary that the regional government take appropriate steps to incorporate the activities of the technical team in their regional planning and budget. The CASINDO programme will offer some support in order to create the necessary capacity and to work out a future working relationship between the technical team and the energy forum during and after the finalisation of the CASINDO programme, but the expectation remains that the institutionalising should become a part of the regional responsibility.

**Tasks and activities for the regional technical team**

*1. To assess the specific needs of the regional energy fora and their technical teams*
The aim of this activity is to identify the specific training needs of the technical teams and energy fora in order to further elaborate and make more region-specific the activities described in this WP. This assessment will take place in the inception phase of the CASINDO programme.

*2. To develop and maintain a high level knowledge about the regional energy profile:*
- Manage and maintain the regional energy database through collaboration and exchange with relevant regional data offices
- Manage and maintain a regional modelling tool (LEAP)
- Acquire knowledge about other relevant energy modelling tools
- Consolidate and improve the working knowledge of the energy modelling tool (LEAP)
- Deepen and improve the current version of the regional energy model (level of detail, environmental impacts, costs, …)
- Analyse observed energy trends
- Explore the possibilities, potential or incorporation into the regional version of lower level (district, municipal) energy planning tools and models
- Produce an energy balance and updated regional energy profile at the end of 2009, 2010 and 2011
- Produce updated regional energy outlook end of 2011

*3. To develop energy sub-sector policies based on the regional energy outlook*

- Identify sub-sectors for which policy is urgently needed
- Develop policy for selected sub-sector(s), for example, an energy conservation plan or a power sector plan
- Develop a renewable energy scenario for the region

*4. To evaluate and monitor investment plans developed by energy suppliers for achieving the energy strategy*

- Facilitate private sector initiatives in the energy sector
- Evaluate the feasibility and impact of the investment plans from the region's perspective and in light of the existing energy scenarios
- Monitor the progress of the capacity expansion plans in light of the needs identified by means of the energy scenarios

*5. To identify the needs for assistance in energy policy formulation matters at kabupaten/kota level and explore the ways to address these needs*

- Select the most relevant kabupaten/kota in the province
- Conduct interviews with selected kabupaten/kota to identify the most important energy policy issues and needs for assistance in energy policy formulation
- Initiate training programme to address these needs (see WP6)
- Evaluate training programme

*6. To interact reactively and proactively with the regional energy forums and stakeholders*

- Establish a smooth data and information exchange and collection system with the key responsibles in the region
- Provide up-to-date energy and energy-related information
- Provide energy scenario analysis
- Analyse the consequences of proposed policy measures and energy projects, and explore and propose alternatives to overcome identified obstacles
- Disseminate outlook and scenario highlights to relevant parties such as regional energy businesses, NGO's, SMKs and universities

*7. To develop and maintain expertise to provide feasibility studies (FS) for small-scale renewable energy projects (based on the (mHPP) experience from CAREPI), including financing schemes*

- Use harmonised templates to assess energy projects' socio-technical feasibility
- Develop expertise to assess energy projects' economic performance and feasibility, including involvement of public or private sector financing mechanisms
- Explore the possibilities of project's financing models and opportunities, including CDM; support, if required, the development of a CDM project design document (PDD).

*8. To identify the energy-related needs and priorities of poor communities and develop strategies to address these needs*

- Conduct energy needs assessment for a limited number of selected energy-poor communities
- Identify measures to address the identified needs
- Develop pro-poor energy strategies

**Tasks and activities for the regional energy forum**

*1. To formulate and implement medium- and long-term regional energy strategy*

- Develop a vision and regional energy policy plan based on the CAREPI Energy Outlook and incorporating new insights from this project
- Evaluate and update the regional energy policy plan regularly
- Define the specific regional renewable energy action plan: policy, strategy and targets
- Establish a working relationship between governmental and private sector stakeholders
- Prepare legal/institutional frameworks to implement energy policy and measures
- Identify priority areas for implementing RE demonstration projects
- Give guidance to the regional technical team about energy scenarios and required energy-related information
- Develop a strategy to apply national energy laws and policies
- Facilitate private sector initiatives in the energy sector

*2. To establish appropriate communication channels with lower level authorities*
- Provide guidance to lower level (district, regency and municipal) energy forums in setting up energy planning
- Ensure consistency and compatibility between regional and lower level energy policy measures

**Output and outcome of WP5**
Ideally, this WP will result in a process that is able to function on its own and that is embedded in the regional structure and budgeting. The regional technical team should be able to produce:
- An annual energy balance
- An annual update of the regional energy profile, including an analysis of the observed trends
- A further detailed and elaborated energy model (LEAP); this can mean more geographic, socio-economic and/or technical detail
- Dedicated renewable energy and energy conservation scenario(s) for the region
- Proposals and ideas to ensure and improve energy data collection for the region on the appropriate levels (regional, district, municipal)
- A template to be used for small-scale renewable energy projects, including techno, socio-economic and financing assessments
- An overview of financing schemes and possibilities for small scale RE projects
- Identification and feasibility study of at least two or three non-hydro, small-scale energy projects, and realisation of at least one of these

The regional energy forum should be able to produce:
- A consolidated institutional process for energy policy development and implementation
- A common understanding of regional energy strategies and objectives
- A road map for energy policy implementation
- A road map for energy project development and realisation

| WP5 Regional energy policy formulation & implementation | | |
|---|---|---|
| **Results chain** | **Criteria** | **Indicators** |
| Output | Members of technical team and energy forum trained in RE/EE and energy access policy formulation | - Well-established team for the regional technical team, measured by the number of staff members and the level of training received<br>- Well-established institutional setting and framework for regional energy forum and technical team, measured by frequency and quality of interactions<br>-Enhanced capacity and knowledge about regional energy planning, strategies and policy making, including pro-poor energy strategies, measured by type and quality of training courses followed. At least 50 members of the technical teams and at least 50 members of the energy forums trained on energy planning issues.<br>- At least 2 lower level authorities with enhanced knowledge about local energy planning |
| Outcome | Sound regional energy policies, including pro-poor strategies, and implementation plans at the provincial, district and municipality levels | - annual energy balance prepared fcontaining 2006, 2007 and 2008 data by universities (In Papua energy balance 2005 prepared)<br>- regional energy outlook updated in 2011 (Papua prepared in 2011<br>- pro-poor energy strategies developed by all teams<br>- feasibility study for 3 non-hydro RE project completed by all teams<br>-RE action plan and EE policy plan prepared by all teams |

**Deliverables of WP5**

D21: Update of regional energy balance report by end of 2009
D22: Update of regional energy balance report by end of 2010
D23: Update of regional energy balance report by end of 2011
D24: Elaborated report on energy sub-sector policy (e.g. power sector or conservation policy, including scenarios (mid/end 2010)
D25: Report on the regional renewable energy action plan (end 2010)
D26: Report on activities aimed at lower level authorities
D27: Report on developed energy supply projects, including FS, implementation and financing models
D28: Update of Regional Energy Outlook, including the pro-poor strategies (mid 2011)

| | | 2009 | 2010 | 2011 |
|---|---|---|---|---|
| RTT | Task 5.1 | Energy balance 2006/7 | Energy balance 2007/8 | Energy balance 2008/9 |
| | Task 5.2 | Update energy profile | Update energy profile | |
| | | | | Energy outlook |
| | Task 5.3 | Evaluate and monitor energy investment plans | | |
| | | | | |
| | Task 5.2 | | Sub-sector and renewable energy scenario development and analysis | |
| | | | | |
| | Task 5.4 | Identify lower level and needs | Develop and perform training programme for lower level | Evaluate implemented training programme for lower level |
| | | | | |
| | Task 5.5 | Support REF | | |
| | | | | |
| | Task 5.6 | FS non-hydro project | FS non-hydro project | FS non-hydro project |
| | Task 5.6 | | Realisation non-hydro project | |
| | | | | |
| | Task 5.7 | Select and conduct energy needs assessment poor communities | Identify measures, develop pro-poor strategies | Evaluate developed and implemented pro-poor strategies |
| | | | | |
| REF | | Develop vision based on CAREPI energy outlook | | |
| | | | Develop energy strategies | |
| | | | Develop and implement pro-poor strategies | |
| | | | Implement training programme for lower level | |
| | | Framework setting and consolidation of relationship govt – private sector | | |
| | | Guidance to RTT | | |
| | | Guidance to and collaboration with lower level | | |
| | | | | |

### 4.2.6 Work Package 6: Developing and strengthening human capacity in the regions

**Background**

This capacity development work package incorporates the needs that arise in several of the other work packages for capacity building, skills development and knowledge transfer in the five target provinces. These activities will all come under this WP in order to create synergy and avoid overlaps between the various activities.

An important component of this WP will be to support and enable the Education and Training Agency (ETA) of the MEMR to develop and conduct a training programme for representatives

from all provinces in Indonesia. This will address an urgent need identified during the seminar on regional energy planning held in August 2008 in Jakarta to extend the capacity development activities also to other regions not included in the CASINDO programme.

WP6 will also cover the envisaged training activities by TEDC for teachers and students of the target SMKs and the energy planning capacity building activities by ITB for the regional technical teams.

Finally, WP6 will address the identified training needs at the most relevant kabupaten/kota in the target provinces.

The project will actively seek synergy between the activities of the ETA, TEDC and ITB regarding the development of training material and the implementation of training courses in energy planning, energy conservation, solar PV, biomass/biogas and wind energy.

**Tasks and activities**

*1. To develop and execute a training programme on renewable energy technologies and energy efficiency by the ETA*
The training programme will be conducted by the ETA and consist of the following training courses:

Course 1: Regional energy planning
Course 2: Energy and water conservation for buildings
Course 3: Energy conservation for industries
Course 4: Installation and maintenance of photovoltaic systems
Course 5: Design/utilisation of biomass/biogas
Course 6: Resources mapping and feasibility study of wind power

For each training course the following activities are foreseen:

- Development of curriculum
- Development of training module
- The actual training
- Evaluation of the training and revision of curriculum and/or training material if needed

*2. Teacher and student training programme in renewable energy technology and energy efficiency conducted by the Technical Education Development Centre (TEDC)*

This task will involve the following activities:

**I. Pilot teacher and student training in MHP/PV/BM/BG/WE and related energy efficiency (EE) issues in Yogyakarta and Nusa Tenggarra Barat**
During the first project year, one group of pilot teachers will be established; the teachers will come from the three provincial SMKs that are operating in the first year of the project (the provinces of Yogyakarta and Nusa Tenggarra Barat). Three pilot student groups will also be established, one per SMK in the same provinces.

The training of the group of teachers will be done with the up to now developed curriculae, syllabi and lesson modules on MHP/PV/BM/BG/WE and related EE issues. TEDC will take care of this training, supported by subject experts on both RETs. The teacher training will take four months, and be divided into four blocks of one month.

After the four months of teacher training, the pilot student groups will be trained in selected parts of the MHP/PV/BM/BG/WE/EE curriculae. This selection is necessary, because for MHP a complete 3-year programme has been developed, which cannot be carried out in one pilot stu-

dent group. It is thus necessary to that both pilot student groups take part in different parts of the total MHP curriculum and that after completion of both pilot student group training programmes the experiences of these training programmes are put together. In this pilot phase educational quality benchmarks will be established and examination standards formulated; TEDC will develop these benchmarks and standards for submission to the MEMR and the Ministry of Education.

**II. Mainstreaming teacher and student training in MHP/PV/BM/BG/WE and related energy efficiency (EE) in Yogyakarta and Nusa Tenggarra Barat**
In the second project year, the four SMKs of the provinces of Yogyakarta and Nusa Tenggarra Barat will start a full 3-year programme on MHP/PV/BM/BG/WE/EE. The implementation of this programme will be guided by the TEDC and done in close consultation with the provincial energy forums, and the provincial DINAS & Education bureaus for maintaining/fine-tuning educational quality and examination standards.

In the same project year, the involved SMK teachers will be backstopped by TEDC in the application of the new curriculae, syllabi and lesson modules.

**III Teacher and student training in MHP/PV/BM/BG/WE and related energy efficiency (EE) in Central Java, North Sumatra and Papua**
Later in the second project year, when provincial energy forums will be functioning in the provinces of Central Java, North Sumatra and Papua, a full 3-year programme on MHP and solar PV will be started. In this, active use will be made of the experiences of the mainstreaming of the teacher and student training in MHP/PV/BM/BG/WE/EE that will have taken place in the second project year in the provinces of Yogyakarta and Nusa Tenggarra Barat. The TEDC will facilitate and backstop this process in close consultation with the provincial energy forums and the provincial departments of MENR & Education.

*3. Advanced training in integrated energy planning and modelling for the technical teams in the five target provinces by the Institute Technology Bandung*

The training programmes will be different for the provinces that are already included in the EWG activities (North Sumatra, Yogyakarta, West Nusa Tenggara, Central Java) and for Papua. In Papua, the envisaged training programme will be comparable with the programme that was implemented in the other regions over the past two years. In the other regions, a more advanced training programme that includes advanced energy modelling will be developed.

The ITB plays an important role in the current CAREPI project as provider of training courses, as a general helpdesk for the regional technical teams, as a central coordinator of the energy planning related activities and as the Indonesian counterpart for the ECN. The ITB is expected to continue this role also under CASINDO with an extension of its training and support activities to the national level.

*4. Training programme for the energy forums and kabupaten/kota in the five target provinces*
Based on an assessment of the specific training needs at the most relevant kabupaten/kota in the province, a training programme will be developed and implemented by the regional technical team.

**Output and outcome of WP6**
WP 6 will result in strengthened capacity among local decision makers, local universities and local technical schools to develop energy polices and concrete energy projects and to link energy provision to local economic development planning. The indicators defined for measuring the progress are presented in the table below.

| WP6 Developing and strengthening human capacity in the provinces | | |
|---|---|---|
| **Results chain** | **Criteria** | **Indicators** |
| Output | Training programmes for energy professionals and SMK students developed and implemented | - Curricula and training modules developed and training courses given |
| | Evaluation of training courses conducted | - report on the evaluation prepared |
| Outcome | Energy professionals and SMK students in the five target regions trained | - at least 150 SMK students received training in RE<br>- at least 100 regional energy professionals trained in energy planning issues |

**Deliverables of WP6**
D29: Training material developed by the ETA for six courses
D30: Report on the evaluation of the six training courses
D31: Report on SMK teacher and student training by TEDC
D32: Report on training activities in the five target provinces for energy forums and representatives from kabupaten/kota

### 4.2.7 Work Package 7: Strengthening human capacity at the national level

**Background**
The current EWG activities are implemented in a limited number of provinces in Indonesia with the aim of assisting the regions in formulating and implementing their own energy policies. The focus of the CASINDO programme will continue to be on the selected regions but a clear need for developing capacity at the national level has also been identified. This WP will address this need.

National and regional policy formulation and implementation are obviously linked and it is clearly stated in the new energy law that regional energy policies should be in line with the national energy plan. Therefore, sufficient human capacity at the national level, especially at the DNREEC, the DICEMR and the ETA of the MEMR, is a prerequisite for establishing good communication channels between the regions and the national government on energy related matters and for ensuring that a self sustaining-structure will be in place at the end of the programme for building and strengthening sufficient human capacity to formulate and achieve national and regional policy goals.

The ETCERE of the ETA will play a key role in ensuring the sustainability of the CASINDO capacity building activities. ETCERE is specifically tasked to provide training to national and regional government departments and agencies on technical and policy aspects of renewable energy and energy conservation issues. However, at the present moment there is insufficient capacity and expertise at the ETA to duly carry out this task; therefore within the CASINDO programme, capacity building activities are implemented to enhance the energy planning and management capabilities of the ETA.

**Tasks and activities**

*1. To strengthen human capacity at the Directorate for New Renewable Energy and Energy Conservation of the DGEEU*

In the framework of the EWG several training courses on integrated energy policy formulation and energy modelling have been carried out for the MEMR staff in the past. However, the high turnover of staff experienced in recent years necessitates the training of new inexperienced staff and the knowledge of the current staff needs to be broadened. To achieve this, a training programme will be developed consisting of short term courses, medium term training and long term education:

- The aim of formal long term education is to acquire a Master degree in renewable energy and energy efficiency at a university in the Netherlands. The CASINDO programme can not provide the funds for this long term education but can assist the DNREEC, the DICEMR and the ETA in applying for scholarships. The intention is to prepare a group application on behalf of the CASINDO consortium for some 15 people and to submit it to the StuNed Scholarship Programme. First discussions with the Nuffic office in Jakarta who manages this programme revealed that there is a high probability that this application will be approved. This Master programme is meant for MEMR staff who have already some experience in energy issues and are able to meet the requirements set by StuNed for potential candidates.

- Medium term training in the Netherlands is envisaged for young and new staff who have only limited experience and do not qualify for the MSc programme. The 6-week training course will include subjects like integrated energy planning, energy modelling, renewable energy policy & technology, energy conservation and pro-poor energy strategies. The main aim of this training is to broaden and strengthen the general knowledge level of the participants.

- On the short term, specific in-depth training courses implemented in Indonesia by the consortium members or experts from outside the consortium. A series of these specific courses are foreseen that aim to provide in-depth knowledge about a particular subject to deepen the knowledge of the participants. At least three such courses will be implemented, namely courses on integrated energy planning, renewable energy and on energy conservation. A course may comprise several training sessions given over a timeframe of 1-2 years. These courses are meant as “train-the-trainer” for MEMR staff who intend to teach the subject and for staff who need to deepen their knowledge in order to better be able to formulate policies.

The above description of the envisaged training activities is very general and needs to be further elaborated and detailed based on an assessment of the specific training needs of NDREEC which will be conducted during the inception phase of the programme.

*2. To strengthen human capacity at the Data and Information Centre of the Ministry of Energy and Mineral Resources*

In the context of the CASINDO programme, the DICEMR will be responsible for supporting the regional energy forums and for aligning regional and national energy plans. In order to be better able to perform this task, the DICEMR indicated the need for additional training in subjects like energy data collection, demand/supply analysis and development of CDM projects.

- The availability of reliable, accurate and recent data is a prerequisite for formulating sound RE/EE policies. The structure currently in place to collect this data needs to be improved and

training is foreseen in how to set up and maintain such a structure which will include training on how to conduct energy surveys.

- Energy demand/supply analysis is another important task of DICEMR. Several training courses on integrated energy planning and the energy LEAP model have already been given but further, more advanced, training is still required.

- CDM appears to be an important mechanism for promoting renewable energy technology projects in Indonesia. However, there is a lack of knowledge on the requirements a country needs to have in place in order to solicit successfully for CDM participation. Clear national legislation and rules need to be developed in order to faciliatate future investors, like e.g. the CO2 emission factor from electricity generation to be used for emission credits calculation, Furthermore, the DICEMR should be able to cooperate and communicate with the regions about the CDM in general and in particular how to support the development and implementation of projects.

The above three areas of capacity building will be further elaborated during the inception phase of CASINDO. DICEMR staff will be interviewed in this period to identify the specific subjects that need to be included in each area. Furthermore, the experts who will conduct the training will be identified and recruited.

*3. To train the staff of the Education and Training Centre for Electricity and Renewable Energy in order to enable them to become trainers in the subjects energy planning, energy conservation and renewable energy and to further develop and implement energy training programmes of the Centre*

The ETCERE of the ETA is responsible for capacity development of government staff at national and regional level, both for the renewable energy and energy efficiency sub-sectors. In order to enable the ETCERE to develop and implement the training courses mentioned under activity 1 in WP 6 and to achieve the ETCERE's target of 200 trained staff in the regions by 2012, approximately 20 persons will receive intensive training in Indonesia in order to become train-the-trainers". To this end, two intensive training courses will be developed and implemented in Jakarta for ETCERE staff in particular and for MEMR staff in general.

- An intensive training course on national and regional energy planning and energy conservation will include subjects like integrated energy planning, data collection and evaluation, energy modelling, energy scenario analysis, energy conservation potential and energy conservation policy. This training course will consist of 2 or 3 one-week training sessions and will be implemented in the first year of the CASINDO programme. A last session is envisaged in the last year of the programme to evaluate the experiences gained by ETCERE and other MEMR staff with regional training courses and regional policies.

- An intensive course on renewable energy which will include subjects like renewable energy potential, renewable energy policy, financial support schemes to promote renewable energy, basic understanding of renewable energy technology. This training course will comprise 1 or 2 one-week training sessions and will be implemented in the first year of CASINDO.

A detailed programme for both courses will be developed in the inception phase based on discussions that will be held in this period with ETCERE and other MEMR staff. This programme will be included in the inception report, together with the expert team that will be responsible for the execution of this training.

Since the clear linkages between the training material already and in the future available at the TEDC and the identified training needs at ETCERE, TEDC staff will be involved in providing the training. Also ITB will contribute to provide the trainings regarding energy planning.

**Output and outcome of WP7**

The result of WP7 will be strengthened capacity among national decision makers and national training centre personnel and a total of 200 energy professions is trained in RE and EE subjects. Indicators to measure the progress towards output and outcome are given in the table below.

| **WP7 Strengthening human capacity at the national level** | | |
|---|---|---|
| **Results chain** | **Criteria** | **Indicators** |
| Output | Assessment to identify training needs at MEMR conducted | - report on needs assessment prepared and included in inception report |
| | Courses in relevant subjects are developed | - Training modules developed |
| | ETCERE staff is trained as trainer | -at least 15 ETCERE staff involved in the training<br>- frequency, quality and type of training provided |
| | DNREEC staff is trained in formulating national policies | - at least 5 DNREEC staff participated in the training<br>-frequency, quality and type of training provided |
| | DICEMR staff is trained in energy policy and energy modelling subjects | -at least 8 DICEMR staff involved in the training<br>-frequency, quality and type of training provided |
| Outcome | energy professionals in the regions trained by ETA | - at least 200 energy professionals in the regions trained by ETCERE staff |
| | Good communication channels between MEMR and the provinces established | - quality of frequency of communication |

**Deliverables of WP7**

D33: Training material developed for training activities conducted for the DNREEC, DICEMR and ETA

### 4.2.8 Work Package 8: Dissemination & communication

**Background**
This work package will address the need for the ongoing dissemination of results throughout the duration of the project, as well as the need for effective communication between all key market actors involved or associated with the work.

Communication between project partners and target groups will require particular attention to address the needs of the stakeholders involved, all of whom have different perspectives and priorities.

**Tasks and activities**

*1. To organise and conduct a national seminar on regional energy planning*
On 27-28 August 2008 the 'National seminar on regional energy planning' was held in Jakarta. The event was attended by more than 130 representatives from the 33 provinces in Indonesia. The high attendance rate and the lively discussions showed that there is a lot of interest in energy policy issues in the regions. It is therefore proposed to hold a similar seminar in early 2010 with the main aim of presenting the regional energy outlook of North Sumatra, Yogyakarta, Central Java and West Nusa Tenggara, and another seminar in 2011 to present the results of the CASINDO programme.

To disseminate the results of WP4 and to promote the concept of research, education and knowledge valorisation aimed at RE and EE technologies, a seminar will be held at the end of the programme. At this seminar each of the participating institutes will present the results from the activities described in WP4 to other universities, the Ministry of Education and the Ministry of Research and Development. This seminar will be held at a central location in Indonesia.

*2. To develop and maintain a CASINDO website*
A website will be prepared to document the programme's activities and present the results in a format that is aimed at the beneficiary groups mentioned in section 3.1. All the deliverables produced by CASINDO (except progress reports) will be posted on the website. The website will also include information from the programme that will be useful to energy practitioners.

*3. To prepare and update a leaflet describing the objectives, activities and results of CASINDO*
The leaflet will be produced in both English and Indonesian.

*4. To participate in international seminars, workshops and conferences to present CASINDO*
This activity will address the need to present the CASINDO programme to other countries in the region. This can be achieved through participation in relevant international conferences, workshops and seminars.

**Output and outcome of WP8**
Through the wide range of dissemination channels, the outcome will be to provide continuous information to all relevant stakeholders about the results of the project during its full duration.

| WP8 Dissemination & Communication | | |
|---|---|---|
| **Results chain** | **Criteria** | **Indicators** |
| Output | Communication and dissemination at the national and the regional level | - CASINDO results presented to appropriate level<br><br>- Results presented in the media (print, radio, TV) and posted on the website |
| Outcome | Enhanced awareness of the CASINDO activities and results | - Number of visits to the website |

**Deliverables of WP8**

D34: Report on national seminar on regional energy planning
D35: Website established and regularly updated
D36: Project leaflet, regularly updated

## 4.3 List of deliverables and schedule

| Deliverable no. | WP | Deliverable name | Language | Lead partner | Month of completion |
|---|---|---|---|---|---|
| D1 | 1 | 1st progress report | English | ECN | 9 |
| D2 | 1 | 2nd progress report | English | ECN | 19 |
| D3 | 1 | 3rd progress report | English | ECN | 28 |
| D4 | 1 | Inception report | English | ECN | 4 |
| D5 | 1 | Final report | English | ECN | 34 |
| D6 | 2 | Minutes of meetings held with energy forum | Bahasa Indonesian | DICEMR | 32 |
| D7 | 3 | Report on the selection of three SMKs for each project's target province and working agreements between SMKs and the project | English/ Bahasa Indonesian | ETC | 12 |
| D8 | 3 | Province-specific adapted curriculae, syllabi and lesson modules on MHP and solar PV for SMK teachers and students for the provinces of Yogyakarta and Nusa Tenggarra Barat | Bahasa Indonesian | TEDC | 14 |
| D9 | 3 | Province-specific adapted curriculae, syllabi and lesson modules on MHP/PV/BM/BG/WE/EE for SMK teachers and students for the provinces of Central Java, North Sumatra and Papua | Bahasa Indonesian | TEDC | 12 |

| Deliverable no. | WP | Deliverable name | Language | Lead partner | Month of completion |
|---|---|---|---|---|---|
| D10 | 3 | Report on the pilot teacher and student training programme in MHP/PV/BM/BG/WE/EE in Yogyakarta and Nusa Tenggarra Barat and on the integrated teacher and student training programme in MHP/PV/BM/BG/WE/EE in Yogyakarta and Nusa Tenggarra Barat | English/BI | TEDC | 12 |
| D11 | 3 | SMK integrated teacher and student training programme in MHP/PV/BM/BG/WE/EE in Central Java, North Sumatra and Papua | English/ Bahasa Indonesian | ETC | 18 |
| D12 | 3 | Report on the approach to roll-out to an average of four SMKs per province of teacher and student training programme in MHP/PV/BM/BG/WE/EE to other SMKs in the target provinces | English/ Bahasa Indonesian | ETC | 18 |
| D13 | 3 | Report on the dissemination of the results of this work package in line with the requirements of WP8 | English/ Bahasa Indonesian | ETC | 24 |
| D14 | 4 | Report on the introductory workshops, on the inventory of current activities and plans, and on the proposed approach for the development of an education programme; development of a research programme; research and knowledge valorisation at Diponegoro University and Cendrawasih University | English/ Bahasa Indonesian | TU/e | 12 |
| D15 | 4 | Report on the development of research agendas for the five partner universities | English/ Bahasa Indonesian | TU/e | 12/24 |
| D16 | 4 | Reports on the pilot research projects that have been conducted | English/ Bahasa Indonesian | TU/e | 24 |
| D17 | 4 | Report on the education programmes, describing how the programme has been set up (certificate or MSc), the programme's content and how knowledge has been transferred to the lecturers who are going to implement the programme | English/ Bahasa Indonesian | TU/e | 18 |
| D18 | 4 | Training material developed for the education programme | Bahasa Indonesian | TU/e | 18 |
| D19 | 4 | Report on project implementation plan to develop the infrastructure for knowledge valorisation and on the programme, objectives and results of the valorisation workshops | English/ Bahasa Indonesian | TU/e | 26 |

| Deliverable no. | WP | Deliverable name | Language | Lead partner | Month of completion |
|---|---|---|---|---|---|
| D20 | 4 | Report on the demonstration units that have been installed at the partner universities | English/ Bahasa Indonesian | TU/e | 18 |
| D21 | 5 | Regional energy balance 2006 | English/ Bahasa Indonesian | ECN | 12 |
| D22 | 5 | Regional energy balance 2007 | English/ Bahasa Indonesian | ECN | 24 |
| D23 | 5 | Regional energy balance 2008 | English/ Bahasa Indonesian | ECN | 36 |
| D24 | 5 | Elaborated report on energy subsector policy | English/ Bahasa Indonesian | ECN | 27 |
| D25 | 5 | Report on regional renewable energy action plan | English/ Bahasa Indonesian | ECN | 28 |
| D26 | 5 | Report on activities aimed at lower level authorities | English | ECN | 30 |
| D27 | 5 | Report on development of energy supply projects | English/ Bahasa Indonesian | ECN | 30 |
| D28 | 5 | Update of Regional Energy Outlook | English/ Bahasa Indonesian | ECN | 34 |
| D29 | 6 | Training material developed by ETCERE | Bahasa Indonesian | ETA | 14 |
| D30 | 6 | Report on training courses provided by ETCERE | Bahasa Indonesian | ETA | 26 |
| D31 | 6 | Report on SMK teacher and student training | Bahasa Indonesian | TEDC | 26 |
| D32 | 6 | Report on training activities for energy for kabupaten & kota | Bahasa Indonesian | ECN | 26 |
| D33 | 7 | Report on training activities conducted for NDRE, DICEMR and ETA | English | ECN | 24 |
| D34 | 8 | Report on national seminar | English | ECN | 36 |
| D35 | 8 | Website established and updated | English | ECN | 6/12/18/24/ 30/34 |
| D36 | 8 | Project leaflet | English/ Bahasa Indonesian | ECN | 7 |
| D37 | 1 | Monitoring plan & budget breakdown | English | ECN | 1 |

# 5. The longer term sustainability of the CASINDO programme

The CASINDO programme should lead to the establishment and/or strengthening of the structures at national and regional level that enable a continuation of human capacity development as well as the continuation of energy planning also after the end of the programme. Due attention therefore must be paid to the financial mechanisms that should be in place at both levels to ensure that the regional technical teams, TEDC, ITB and the ETCERE can continue their capacity development activities. These mechanisms need to be identified and developed in the course of the CASINDO programme but an indication of how these mechanisms could be designed is presented below.

At the regional level, the technical team together with the energy forum are the key institutions of the institutional model developed for regional energy policy formulation. The sustainability of this model is ensured if these institutions are integrated in the annual planning and budget cycle's of the regional government. This requires that this model is formally approved and endorsed by the regional government. In the provinces of West Nusa Tenggara and Yogyakarta the regional energy forum and the technical team were officially approved by the provincial government in 2007 and now receive some funding, though very limited, from the regional government. This model seems successful in creating a sustainable structure and therefore serves as an example for the other target provinces. WP 2 of the CASINDO programme aims to introduce and elaborate this institutional model in the target provinces.

At the national level, public funding is the principal source of funding for energy sector related research and training activities since the concerned institutions are part of the national administration. Bilateral and multilateral donors are also significant funding sources. The contribution of the private sector in this field so far has only been marginal. Most funding is used for research on the tradition energy sectors oil, coal and electricity. Only a small amount is allocated for renewable energy and energy conservation which seems not consistent with the growing role these technologies are expected to play in meeting future energy demand in Indonesia. CASINDO therefore should develop a strong case for increased funding for the ETCERE training centre so ETCERE can continue and expand its training activities, both nationally and regionally, in renewable energy technologies and energy efficiency.

The training and other capacity building activities focused at the partner universities and SMKs will enable them to become the lead university/SMK in the field of RE/EE in the region. This will significantly strengthen their position and may lead to a growing number of students which will generate more income for the universities and SMKs. In CASINDO the partner universities will pay special attention to establishing long-lasting cooperative relationships with SMEs with the aim to stimulate the commercial exploitation of expertise available at the university in consultancy work. All these activities contribute to putting in place the self-sustaining structure that is defined as the main outcome of the programme.

## 6. Activity Time Schedule

| **Duration (months) / deliverables** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** | **21** | **22** | **23** | **24** | **25** | **26** | **27** | **28** | **29** | **30** | **31** | **32** | **33** | **34** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WP1: Management | D37 | | | D4 | | | | | D1 | | | | | | | | | | D2 | | | | | | | | | D3 | | | | | | D5 |
| WP2: Strengthen struct. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | D6 | | |
| WP3: Skilled labour | | | | | | | | | | | | D7 | D9 | D8 | D10 | | | D11 | | | | | | D13 | | | | | | | | D12 | | |
| WP4: Lead universities | | | | | | | | | | | | D14 | D15 | | D20 | D17 | | D18 | | | | | | | D15 | D16 | D19 | | | | | | | |
| WP5: Regional energy planning | | | | | | | | | | | | D21 | | | | | | | | | | | | D22 | | | D24 | D25 | | D26 | D27 | | | D28 |
| WP6: Regional capacity devel. | | | | | | | | | | | | D29 | | | | | | | | | | | | D29 | D31 | D30 | D32 | | | | | | | |
| WP7: National. capacity devel. | | | | | | | | | | | | | | | | | | | | | | | | D33 | | | | | | | | | | |
| WP8: Dissemination & communication | | | | | | D35 | D36 | | | | | D35 | | | | | | D35 | | | | | | D35 | | | | | | D34 | D35 | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Joint project team meeting | | | | **M** | | | | | | | | | | **M** | | | | | | | | | | | **M** | | | | | | **M** | | | |
| Project dissemination events | | | | | | | | | | **S** | | | | | | | | | | | | | | | | | | **S** | | | | | | |
| Inception/ progress/final reports | | | | **IR** | | | | | **PR** | | | | | | | | | | **PR** | | | | | | | | | **PR** | | | | | | **FR** |
| Project steering committee | | | | **M** | | | | | | **M** | | | | | | | | | **M** | | | | | | | | | **M** | | | | | | |