



SEA-C.R.

Southeast Asia Consult & Resource Co., Ltd.

Bangkok/Chiang Mai, March 2005

Study

On the

Co-operative Education and Industrial Relation

***Center (CEIRC) of KMIT/NB services in the context of
technology transfer***

Southeast Asia Consult & Resource Company Limited has prepared this study together with

Mr. Karl Segschneider (team-leader)

Mr. Thanthong Thongkren

Mr. Surin Chaiwut

Mr. Prachit Thimakham



SEA-C.R.

Southeast Asia Consult & Resource Company Limited

Executive Summary

This study confirms that technology transfer based on co-operative education ought to be continued at KMIT/NB. It strongly recommends KMIT/NB to opt for continued cooperation with existing net-works. The excellent ground-breaking efforts in co-operative education on the Master Degree level resulted in strong partner organizations. A continued partnership will increase the Institute's reputation and potentially increase KMIT/NB revenues.

1. General results

The principle of technology transfer through co-operative education in Thailand is well established for the Bachelor-level, and for most parts in its infancy, the Master level. A considerable demand exists for co-operative education with Thai industry, and existing education related institutes are gearing up to meet this demand. The Thai government actively supports co-operative education and sees it as a decisive tool to increase productivity of Thai production industry. Here, German models are lauded as a benchmark in technology transfer for the developing Thai system.

2. Existing University/Industry Cooperation and Technology Transfer

Both, the Thai Industry and educational facilities are net-importers of hi-level engineering / advanced technology. Existing educational facilities offer the industry vocational education, co-operative education and co-operative research. A recent strong move towards trilateral cooperation can be described for the education-related sectors. The move is supported by the excellent technological infrastructure of many educational institutes. Another important factor is trust in the educational University/Industry relationship based on longstanding experience in bi-lateral cooperation.

3. CEIRC Potential Future Cooperation Partners in Technology Transfer

There are a number of potential future cooperation partners for CEIRC. Those selected and highlighted in this study have strong international technology transfer links and networks. They welcome cooperation with CEIRC. They are active in various forms of educational cooperation with the private sector:

- KMUTT (King Mongkut University of Technology Thonburi)
- RMUT (Rajamangkala University of Technology)
- TGGS (Thai German Graduate School)

4. CEIRC Support Options for Technology Transfer in Thailand

CEIRC has a number of support options to strengthen its own technology transfer, either through cooperation, or CEIRC activity expansion in addition to the center's program and

service portfolio. Some of the service aspects have the potential to be transformed into income-generators.

5. Cooperation options in the field of energy efficiency/renewable energy

Two potential international cooperation options with regard to engineering aspects in the fields of energy efficiency and renewable energy have been identified. The potential cooperation partners are

- The United Nations Development Programme (UNDP) and **Energy for Sustainable Development**
- ASEAN Center For Energy (ACE)

6. Suggestions

In general, the project has been run for too short a period of time. So, in spite of excellent work from the IP-appointed team and their counterparts, CEIRC has been able to generate only moderately active support by KMIT/NB. Nonetheless, due to the market and marketing potential of co-operative education, this study strongly recommends continuing CEIRC. A starting point could be a close partnership with TGGS, KMUTT and RMUT, i.e. an extension into research, the energy sector and introduction of industry related services.

Contents

	Page
Executive Summary	i
Acronyms (Database of abbreviations)	iv
List of graphs	v
List of tables	v
Part 1	
Summative Results <i>A concise study circular for distribution</i>	1
Part 2:	
Descriptive Results	
<i>Project background</i>	5
<i>Study Results:</i>	7
1. General results	7
2. Existing University/Industry Cooperation and Technology Transfer	9
3. CEIRC Potential Future Cooperation Partners in Technology Transfer	12
4. CEIRC Support Options for Technology Transfer in Thailand	17
5. Cooperation options in the field of energy efficiency/renewable energy	19
6. Recommendations and suggestions	23
<u>Attachments 1:</u>	
• Conceptual frame	I
• Methodology	III
• Itinerary	VII
• Terms Of Reference	VII
<u>Attachments 2:</u>	
Resource Book to the Study <i>(See attached CD)</i>	

Acronyms (Database of Abbreviations)

Abbreviation	Full Name/Expression
ACE	ASEAN Center For Energy
ADB	Asia Development Bank
APAEC	ASEAN Plan of Action for Energy Cooperation
APG	ASEAN Power Grid
BOI	Thailand Board of Investment Royal Thai Government
BKK	Bangkok
CEIRC	Co-operative Education and Industrial Relation Center
CHEPS	Chemical Engineering Practice School
CMU	Chiangmai University
CO-OP	Co-operative education
DIOGE	Develop Industry-Oriented Graduate Education
DOAE	Department of Agricultural Extension
FCET	Federation of Co-operative Education in Thailand
FTI	Federation of Thai Industries
GDP	Gross Domestic Product
GTCC	German Thai Chamber of Commerce
GTZ	Gesellschaft für Technische Zusammenarbeit
HR	Human Resource
IEAT	Industrial Estates Authority
IP	Institute für Projektplanung
JGSEE	Joint Graduate School for Energy Efficiency
KMUTT	King Mongkut University of Technology Thonburi
KMIT/NB	King Mongkut Institute of Technology/North Bangkok
NECTEC	National Electronics and Computer Technology Center
NIA	National Innovation Agency
NSTDA	National Science and Technology Development Agency
PR	Public Relation
RIT	Rajamangala Institute of Technology (now RMUT, see below)
RMUT	Rajamangala University of Technology
RWTH	Rheinisch-Westphälisch Technische Hochschule
R&D	Research and Development
SEA	Southeast Asia
SEA-C.R.	Southeast Asia Consult & Resource Company Limited
SME	Small and Medium Enterprises
SSI	Semi-Structured Interview (plural: SSI's)
TC	Trilateral Cooperation
TGGS	Thai German Graduate School
TGI	Thai German Institute
TOR	Terms of Reference
TT	Technology Transfer
UBI	University Business Incubators
UNDP	The United Nations Development Programme
USA	United state of America

List of Tables

Table	Content	Page
Table 1:	CEIRC Support Options for Technology Transfer	4
Table 2:	CEIRC in the eyes of others	12
Table 3:	CEIRC Potential Future Cooperation Partners	13
Table 1 (repeated):	CEIRC Support Options for Technology Transfer	17
Table 5:	CEIRC Support Options for Technology Transfer contributing to additional income generation	19
Table 6:	CEIRC Cooperation options in the field of energy efficiency/renewable energy	21

List of Graphs

Graph	Content	Page
Graph 1:	Industry/Educational Sector Cooperation This graph shows a structure summary of cooperation needs as voiced during the SSI. In its details it only reflects needs defined by at least 2/3 of the SSI partners.	9
Graph 2:	Existing educational facilities/industry cooperation of SSI partners (generalized)	10
Graph 3:	Technology Transfer at the Faculty of Science and Food Engineering, KMUTT	14
Graph 4:	Technology transfer at RAJAMANGALA UNIVERSITY OF TECHNOLOGY (RMUT)	15
Graph 5:	Technology Transfer at KMUTT and the Joint Graduate School of Energy and Environment	16
Graph 6:	Technology Transfer in Chemical Engineering Practice School , KMUTT	17
Graph: 7	Asian Centre for Energy Governing Council	22

Summative Results (Study Circular)

Introduction

'Develop Industry-Oriented Graduate Education and Research in Engineering (short: **DIOGE**) at the King Mongkut Institute of Technology/North Bangkok (short: **KMIT/NB**) in Thailand is a GTZ-project implemented via the Institute für Projektplanung GmbH (**IP**). The project ends in March 2005. The underlying purpose of this study is to show whether technology transfer based on co-operative education ought to be continued at KMIT/NB and in what form.

For this purpose an extensive number of semi-structured interviews (SSI's) have been conducted. This primary data was then verified through secondary data research. Data-sources accessed are internet and/or library-based, including publications by the target group. Data-analysis is based on triangulation principles¹. The sector focus of the SSI's was the agro-industry and food-processing, as well as renewable energy/energy efficiency.

1. General results

- a) The principle of technology transfer through co-operative education in Thailand is well established for the Bachelor-level, and for most parts in its infancy, the Master level
- b) A considerable demand exists for co-operative education with Thai industry. Here, the German models of vocational training and various forms of co-operative education are lauded as a benchmark for developing the Thai system. The German system is considered to be excellent in achieving exceptional results in technology transfer.
- c) Co-operative education and support programs (e.g. international student exchanges) are increasingly used as a PR tool. The aim is to attract students to the universities and institutes, in order to increase revenues and reputation.
- d) As a tendency the energy/energy efficiency focus offers a larger potential for cooperation agreements in co-operative education; either as a sole focus or in combination with agro-sector specific topics.
- e) The Thai industry supports further developments of technology transfer through co-operative education. The only reservation voiced was that - at times – there are not enough suitably motivated professors to support students².
- f) Trilateral cooperation is of interest to all study participants. Three main cooperation motives were described during the SSI. (See also graph 1, next page.)
 1. To market local Thai education options and offer locally available technical solutions backed up through cooperation/technology transfer with a foreign body.

1 Mikkelsen, B. (1997): Methods for Development Work and Research, p. 209

2 The problem of motivation of professors is in most instances due to organizational and administrative restrictions. See descriptive summary

2. Develop technology transfer options together with the Thai government and a foreign body.
 3. To engage in research and development.
- g) The SSI partners also wished for a national trilateral cooperation between universities, companies and government organizations; for example, in the form of a Federation of Co-operative Education in Thailand (FCET). Such cooperation should support national and international PR activities for technology transfer related programs and locally existing Research & Development options.

2. Existing University/Industry Cooperation and Technology Transfer

- a) Both, Thai Industry and educational facilities are net-importers of hi-level engineering / advanced technology.
- b) Some technology export occurs with regard to medium and low-level technology to neighboring countries. The Thai government and educational facilities are the main actors in this regard.
- c) Educational facilities offer the industry vocational education, co-operative education and co-operative research.
- d) The industry needs/demands HR and (technical) staff training programs, as well as industrial engineering specialists.
- e) Both, the Thai Industry and educational facilities are promoted by the government through support or incentive programs. These programs focus on technology transfer, HR development and R&D. Their aim is to increase productivity of the Thai industry.
- f) A recent strong move of the sector towards trilateral cooperation (see also graph 1) is due to the
 - Excellent technological infrastructure of many educational institutes,
 - Trust in the educational University/Industry relationship based on a longstanding experience in bi-lateral cooperation, and
 - Currently favorable government policy frames.
- g) The Federation of Thai Industries - although strongly supportive – plays only a minor role in actively promoting university / industry cooperation.

3. CEIRC Potential Future Cooperation Partners in Technology Transfer

There are a number of potential future cooperation partners for CEIRC. Those highlighted here have strong international technology transfer links and networks. They welcome cooperation with CEIRC. They are active in various forms of education cooperation with the private sector:

- KMUTT (King Mongkut University of Technology Thonburi)
- RMUT (Rajamangala University of Technology)

- TGGG (Thai German Graduate School)

Through establishing or expanding the existing cooperation and collaboration network by including the partners suggested above, CEIRC and the faculty of engineering at KMIT/NB

- Further strengthen their access to engineering expertise recognized internationally,
- Gain access to a mixture of research & development and education related technology transfer that is very interesting for the industry,
- Increase the faculty's options to cooperate with the industry through Education + R&D + Applied engineering Solutions in Production, and
- Include the energy market in its co-operative education program.

With an extended net-work, CEIRC has additional options to support technology transfer in Thailand (see below). It can increase its own role in engineering co-operative education and improve student attraction/interest to study at KMIT/NB.

4. CEIRC Support Options for Technology Transfer in Thailand

<i>Option</i>	<i>Objective</i>	<i>Measures/tools</i>	<i>Target groups</i>
1. Through Cooperation			
Focus on energy related aspects of engineering	Link CEIRC with the energy market	Focus on implementing and extending the existing co-operative education of the JGSEE to the KMIT/NB campus	Mostly students and partly industry
	Increase energy related services	Through partnership link the TGGG network to further increase access to knowledge resources for the existing co-operative education and energy related R&D	Mostly industry and partly exceptionally gifted students
	Link the fields of engineering, agro-industry and energy	Strengthen cooperation with the department of Agricultural Extension through offering part-time continuation of education (less than study, more than training)	Administrators looking for qualitative and personal competency development

2. Through (CEIRC) Expansion			
Expand CEIRC services	Increase participants in the co-operative education program	Extend CEIRC's range to trilateral cooperation	International students studying in Thailand
		Extend CEIRC services beyond the faculty of engineering by including other KMIT/NB faculties	Externally: The industry/students Internally: Professors and KMIT/NB administrative decision-makers

3. Through CEIRC Addition			
Open additional portfolio for CEIRC	Increase number of students from outside of Thailand	Add foreign student support program and join international education programs, for example 'ERASMUS' from Europe	International students
Add internal training section	Increase active participation of professors	Professor education, motivation and mediation measures delivered by trainings, coaching and/or 'on the job training' in co-op participating companies	Internal staff
Add PR section/staff	Increase PR options	Initiate an out-reach program with a local or international universities and join road-shows	The Industry/students
Increase efforts in student care	Increase reputation and network	Care-Follow-up-Center: Keep in contact with students finishing co-op education. Build an Alma Mater network	Students
Add a new CEIRC branch	Industry related services	Co-operative Education Match-Making and Resource Pooling Center	National and international Industries, Chambers of Commerce, Education programs

Table 1: CEIRC Support Options for Technology Transfer

5. Cooperation options in the field of energy efficiency/renewable energy

Two potential international cooperation options with regard to engineering aspects in the fields of energy efficiency and renewable energy have been identified. These are

- The United Nations Development Programme (UNDP) and **Energy for Sustainable Development**
- ASEAN Center For Energy (ACE)

6. Suggestions

General remarks: The IP-appointed team did an excellent job. However, the project time-table was restricted to two years. Such a tight timeframe is not sufficient to generate motivation for active and sustainable support for CEIRC at KMIT/NB.

Nonetheless, the market demand for co-operative education is very strong as indicated by the increasing number of education-related institutes offering such (or similar) services. Therefore, the study strongly recommends continuing CEIRC.

The continuation can not only potentially generate additional revenues for KMIT/NB, but also markedly increase prestige and marketability with students. To continue CEIRC a close partnership with TGGS, KMUTT and RMUT, i.e. an extension into research, the energy sector and an introduction of industry related services, is currently the most promising approach.

Descriptive Summary

Project background

The **Co-operative Education and Industrial Relation Center**, hereafter referred to as **CEIRC**, is part of a larger project to support and ‘Develop Industry-Oriented Graduate Education and Research in Engineering (DIOGE)’. The **DIOGE** project works with two Thai project partners, King Mongkut Institute of Technology-North Bangkok (KMITNB) and the Rajamangala Institute of Technology (formerly RIT³). **DIOGE** supports existing, and develops new options for Thai industry co-operative education as a form of technology transfer with a special focus on SME’s.

CEIRC is an inherent part of DIOGE and is located at KMITNB. It was first established in 2001 with a focus on the **Bachelor-level** of engineering in co-operative education (co-op). The **CEIRC** options to be drafted by this study are considered an extension of the bachelor level co-op activities to include the master-level. Therefore, this study took short/mid/ and long-term objectives of the existing **CEIRC** into consideration while developing the SSI structure:

- Coordination of activities concerning co-operative education,
- Coordination of activities relating to co-operative education programs,
- Coordination of networking,
- Guideline development for education,
- Marketing and Promotion for engineering services and education, and to
- Harmonize bachelor degree curricula with Master degree curricula.

The first indicators for this study on **CEIRC** including the **master-level** were developed during a plan of operations workshop on January the 7th and 8th, 2004, in Bangkok in the DIOGE context⁴. Under **result 2**⁵, this study is mentioned as one of three critical milestones: ‘Preparation of the draft on future operations of the Co-operative Education and Industrial Relation Centre’. The principal functions of such a center were given as follows:

- Build an information net-work,
- Regularly implement meetings and events,
- To supply the industry with information,
- To provide advisory service to the industry,
- Facilitate technology transfer, and
- Consider and enhance possibilities for a public-private partnership.

³ Since January 2005 the Institute has been awarded university status and is now called Rajamangala University of Technology (RMUT)

⁴ Arthur DelVecchio, Workshop Moderator, January 12th, 2004

⁵ I.e., to establish a functioning Co-operative Education Office for technology transfer

Further input to the study inception was given by the ‘procedures of identifying [DIOGE] cooperating industries⁶’, as applied by CEIRC of the bachelor level. Any cooperation recommended by this study had to be able to accommodate existing CEIRC work-procedures. In particular it had to allow for cooperation with other associations, links to technical/industrial fairs, exhibitions and conferences, as well as recommendations from within KMITNB by use of CEIRC internal structures

Based on the input described above, the final TOR for this study was defined during a meeting at KMITNB on December the 21st, 2004. The following experts were present at the meeting:

- Prof. Dr. Maier, DIOGE Senior Advisor
- Dr. Surangsee Dechjareru, lecturer at KMITNB and counter-part to Prof. Dr. Maier
- Mr. Karl Segschneider, Director, Southeast Asia Consult & Resource Co. Ltd.

After a brief survey of data-sources to be applied for this study and informal pre-study interviews with identified target-groups, it was decided to extend and amend the existing TOR to their current form (see attachments).

⁶ By Prof. Helmut Maier, November 2004

Study Results

1. General results

a) Technology Transfer through Co-operative Education

The principle of technology transfer through co-operative education (co-op) in Thailand is well established for the Bachelor-level and for most parts in its infancy for the Master level. The use of co-op is, especially for the Bachelor Degree level, is common practice in many universities and technological institutes in the Bangkok area and the Eastern Seaboard. This is mostly due to the industrial structure of Thailand. Most industry is concentrated in and around Bangkok.

b) Local Cooperation

A very considerable demand exists within Thai industry for co-operative education through universities or institutes. Thai industry favors further development technology transfer by means of co-operative education. The only reservation voiced was that - at times – there are not enough suitably motivated professors to support students⁷ (See also 1d).

Cooperation is of interest to all study participants. Three main cooperation motives were described during the SSI:

- To market local Thai education options and offer locally available technical solutions backed up through cooperation/technology transfer with a foreign body.
- Develop technology transfer options together with the Thai government and a foreign body.
- To engage in research and development.

SSI partners also wished for an increased national trilateral cooperation between universities, companies and government organizations (see also 2.b). Such cooperation should support national and international PR activities for technology transfer related programs and locally existing Research & Development options. (See Graph 1, next page) Proposed/discussed was the introduction of a **Federation of Co-operative Education in Thailand (FCET)** that could

- Promote and support Thailand's dual/co-operative educational development,
- Promote and link increased application of dual/co-operative education approaches in schools and universities,
- Regulate and organize PR for education in Thailand, and that, and
- Lobbies locally and internationally for new developments and opportunities for dual/co-operative education.

The **Federation of Thai Industries (FTI)** - although strongly supportive – plays only a minor role in actively promoting educational facilities / industry cooperation.

⁷ The problem of motivation of professors is in most instances due to organizational and administrative restrictions. See descriptive summary

c) Cooperation with Germany

Here the German models of vocational training and various forms of co-operative education are lauded as benchmark for developing the Thai system. The German system is considered to be excellent in achieving exceptional results in technology transfer. Regarding engineering, German competence, know-How and expertise is still considered to be a world leader. However, this position is increasingly challenged by a strong Japanese influence in engineering co-operative education⁸. France, the USA and U.K. are also increasing efforts in co-operative education; for example, through the newly (relative) established education cooperation centers at KMIT/NB of U.K. and France.

d) Co-operative Education Structures

Co-operative education and support programs (e.g. international student exchanges) are increasingly used as a PR tool. The aim is to attract students to the universities and institutes, so as to increase revenues and reputation. The danger exists within this context that universities are not properly prepared to introduce co-op programs to their institute. This can sometimes result in sub-standard curricula, and/or lacking cooperation within the university/institute itself.

A willingness to introduce changes to the university administration structure and a great flexibility in cooperation are signs of a successful co-op model. A sufficient time-frame gives professors the opportunity to adapt to the new roles and duties co-operative education requires of them. The study found that when these base-conditions are missing, the professor/industry/student relationship within a co-op program tends to lack sufficient motivation for a successful implementation/completion of the program.

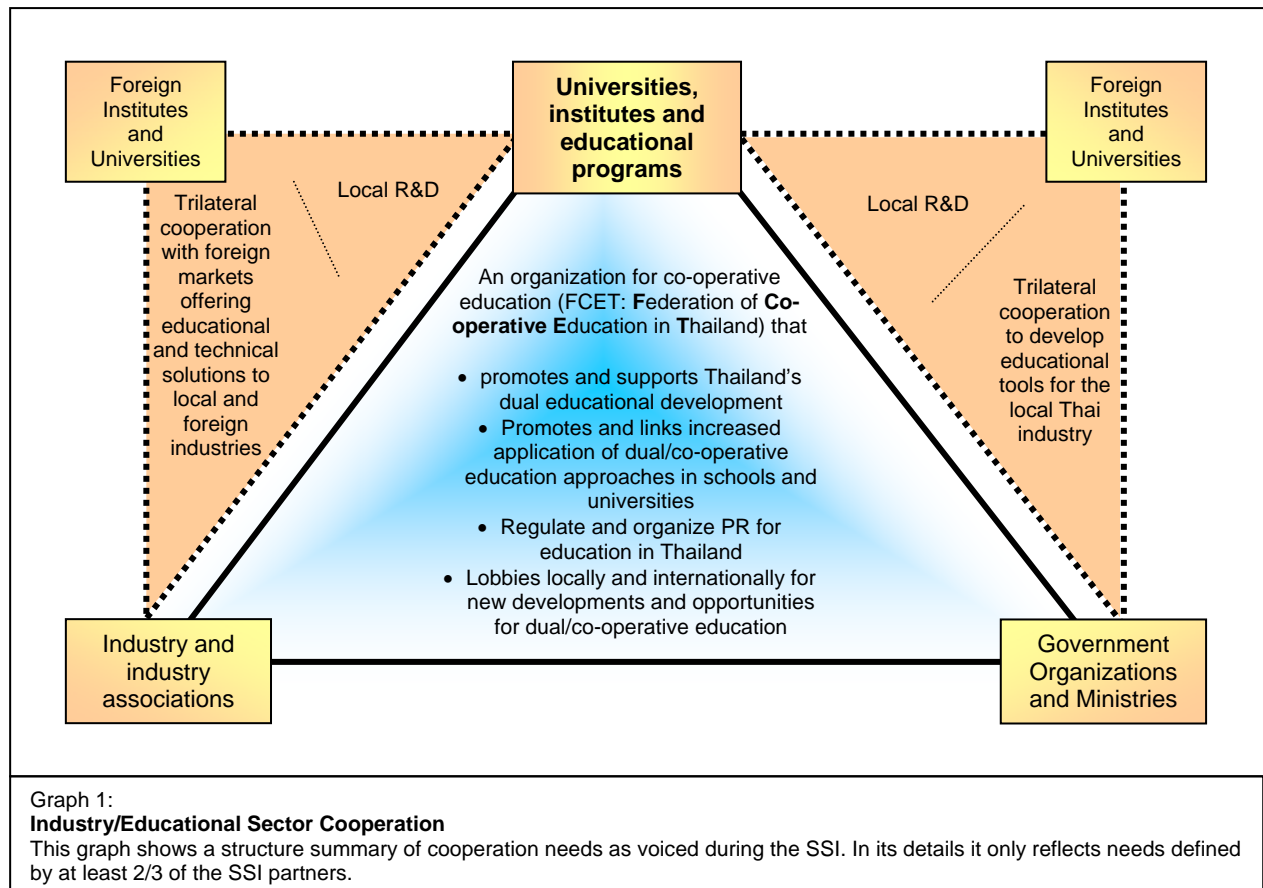
e) The agro- and the energy sector

As a tendency the energy/energy efficiency focus offers a larger potential for cooperation agreements in co-operative education. This focus can very well be in combination with agro-sector specific topics.

With regard to engineering services for the agro-industry, the needs in co-operative education exist but, as yet, are not sufficiently developed. Faculties for agro-industry or food-processing related engineering are, so far, only partially successful, like for example at KMUTT. However, programs to introduce co-operative education are in their infancy, i.e. within the first year of operation.

⁸ For the High-Level Engineering sector, Japan has already replaced Germany as top study destination outside of Thailand (Information from FTI and GTCC)

Energy and energy-use, on the other hand, has been a main topic for the Thai government since regularly occurring strong rises in oil-prices influence GDP performance. Energy is well established in its engineering aspects at Universities and institutes. A large number of energy related co-operative education programs, as well as multinational cooperation in the energy sector exists (For details on one example see paragraph 5).



2. Existing University/Industry Cooperation and Technology Transfer

a) Structure

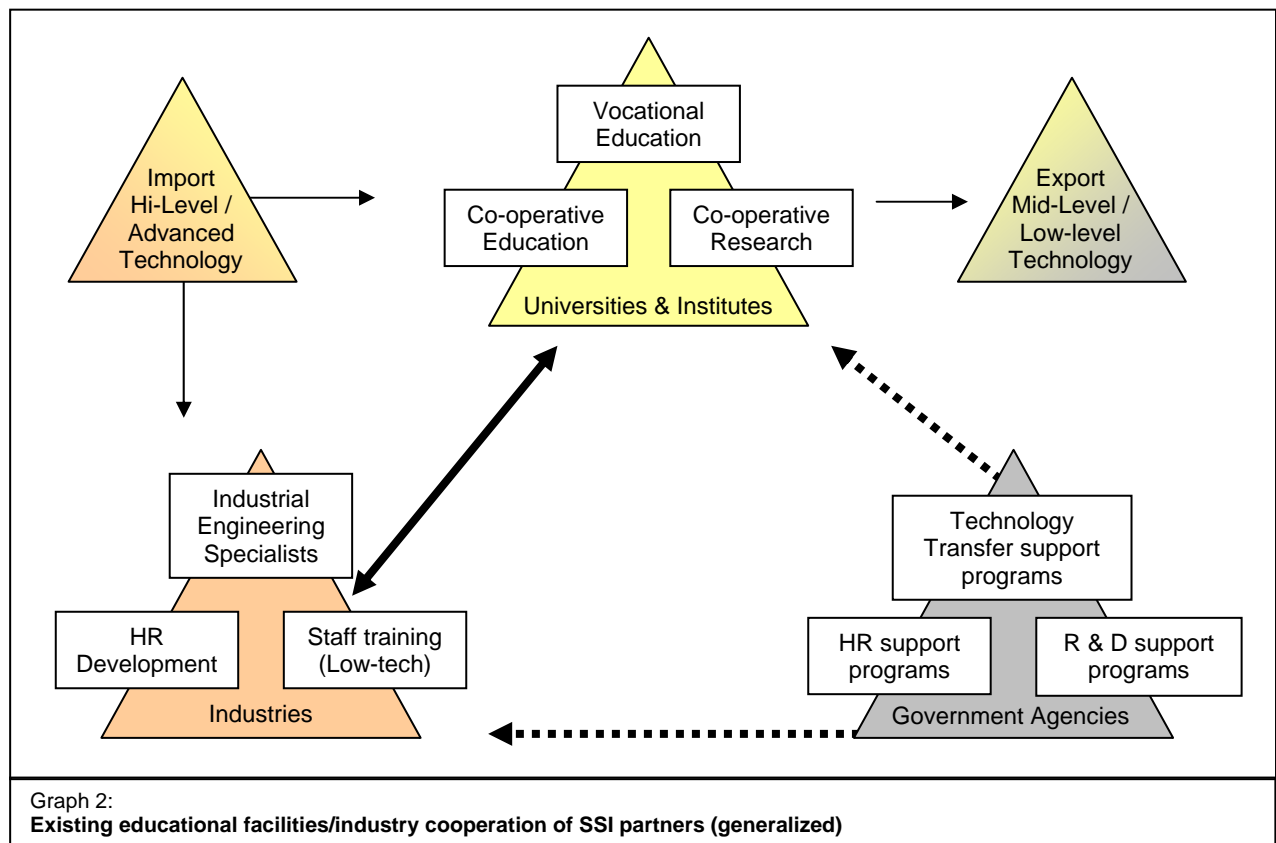
Both, the Thai Industry and educational facilities are net-importers of hi-level engineering / advanced technology. Both are promoted in their co-operative education activities by the government through support or incentive programs. These programs focus on technology transfer, HR development and R&D. Their aim is to increase the productivity of Thai industry. Government policies are occasionally subsidizing⁹ technology transfer, especially in combination with investments.

⁹ Subsidizing takes the form of tax-breaks and other tax or investment incentives. For an example see also chapter 4c.

The government is currently attempting to install a system called **University Business Incubators (UBI)**. The aim is to facilitate the creation of student entrepreneurs and enhance industry/university links on a market or business/income generation level. In the future, the UBI might replace subsidies currently directed at co-operative education programs.

Technology transfer out of Thailand (technology export) occurs with regard to medium and low-level technology to neighboring countries. Both the Thai government and educational institutes are involved. On average the net-export occurs when one or more process-steps within a locally established supply-chain are outsourced to a neighboring country.

Another form of technology export is via existing international bilateral education agreements. These draw an increasing number of students from neighboring countries like Laos, Vietnam, Cambodia and especially China. However, only a limited number of (SEA) foreign students participate in co-operative education.



b) Trilateral cooperation

Educational facilities offer the industry vocational education, co-operative education and co-operative research. The industry needs/demands HR and (technical) staff training programs,

as well as industrial engineering specialists. Cooperation to facilitate need and demand in this context has resulted in a recent strong move towards trilateral cooperation.

Trilateral cooperation functions on two different levels (See also graph 1 on previous page):

1. A local university/institute cooperates with a foreign university/institute to **service the industry**, and
2. A local university/institute cooperates with a foreign university/institute and the Thai government to **facilitate the development of educational tools**.

The strong surge in trilateral cooperation is possible due to

- o Excellent technological infrastructure of many educational institutes,
- o Trust in the educational institutes/Industry relationship based on a longstanding experience in bi-lateral cooperation, and
- o Currently favorable government policy frames.

Trilateral cooperation is the fastest growing component of co-operative education as the sector is entering its next development stage. It moves away from co-op as an innovation in education towards the stage of co-operative education as standard education-offer at universities/institutes. Competition between universities is at times intense and trilateral cooperation plays an increasing role in distinguishing services and excellence of performance of one institute from another.

There are two main objectives of trilateral cooperation, i.e.

- To supply new student services including international part-time study options, and
- To add industry oriented services in research and development.

Especially the latter one is increasingly used by the industry to outsource costly development procedures to often much better equipped institutes¹⁰.

Government agencies and departments are equally interested to increase cooperation in the fields of research and development. This is especially true for the agricultural sector. The Ministry for Agriculture and Co-operatives is currently very interested in uniting their agricultural development efforts with energy issues. New concepts (for Thailand) of sun- and wind-energy farming or bio-gas production are linked with existing private sector research to create new income generating activities for rural farmers¹¹.

¹⁰ Exemptions from this trend are large international corporations who can offer all needed services in-house.

¹¹ The current programs of GTZ in Thailand might be of interest for CEIRC in this context

3. CEIRC Potential Future Cooperation Partners in Technology Transfer

The collaboration with other institutes needs to consider CEIRC's current situation. During the SSI with KMIT/NB and other institutions, the study collected a number of weak and strong points as indicated by the SSI partners:

<i>Weak points</i>	<i>Solve</i>
The DIOGE project officially ends in March.	There is no direct need to solve this potentially weak point. The excellent performance of the parting staff has firmly established the Bachelor - and Master Degree level curricula. Participating students will continue with the program for some years to come. However, in the long-run, the loss of the strong cooperation and financing partner GTZ might have to be replaced by a new partner or partnership.
The loss of some key personnel for CEIRC.	The remaining personnel are very capable and competent. Some structural administrative changes are needed to give the remaining personnel the additional resources they need to continue with the same commitment and performance.
Structural adaptation to support co-operative education not complete.	Adapt administrative structure allowing continuation of the development of CEIRC on an extended level of cooperation
Co-operative education has as yet not been integrated as principle, but still works as a 'project'.	Extend co-operative education principles into other faculties at KMIT/NB with a special focus on student-related services. Consider cooperating with other faculties at KMIT/NB.
CEIRC lacks some motivation among its personnel.	This is mostly due to administrative restraints of professors. Allow the system to be more flexible.

<i>Strong points</i>	<i>Use</i>
KMIT/NB (CEIRC) already has cooperation agreements with a very strong partner, RMUT. Their faculty of engineering is an outstanding organization for using and promoting co-operative education.	Form a strategic partnership with RMUT to make up for structural weaknesses at KMIT/NB.
KMIT/NB is part of a strong network of other King Mongkut Institute/University branches, for example JGSEE	Through this network KMIT/NB can easily access and participate in co-operative education related topics and activities that are beyond its current program. Utilize the network to increase options for students, professors and cooperation with the industry.
KMIT/NB has access to almost fifty years of cooperation experience with Germany	Tradition is a strong motivation factor in both Thailand and Germany. Use this positive cultural trait to find new and additional partners in technology transfer.

KMIT/NB is strategically and physically excellently located to partner with the Thai German Graduate School (TGGGS)	Utilize the new investment of TGGGS in its Research and development center by forming a partnership. TGGGS can benefit through access to the industry and KMIT/NB can win through continued participation/extension of their co-op program in industry applied research & development.
Excellent personnel	Use for KMIT/NB internal public relations
Strong student commitment	Use for public relations

Table 2: *CEIRC* in the eyes of others

Considering strong and weak points, there are a number of potential future cooperation partners for CEIRC. Those suggested here have strong international technology transfer links and networks. They welcome cooperation with CEIRC. They are active in various fields of education cooperation with the private sector and they all have adapted their co-op policies exceedingly well to existing education structures.

- **KMUTT (King Mongkut University of Technology Thonburi)**
- **RMUT (Rajamangala University of Technology)**
- **TGGGS (Thai German Graduate School)**

<i>Name of Institute/faculty</i>	<i>Special field of expertise</i>	<i>Co-operative education</i>	<i>Technology Transfer with</i>	<i>PR-Activities</i>
King Mongkut University of Technology Thonburi (KMUTT):				
JGSEE (Joint Graduate School for Energy Efficiency)	Energy and environment, energy efficiency and renewable energy	<ul style="list-style-type: none"> ▪ Master-level ▪ PHD level 	<ul style="list-style-type: none"> ▪ Europe ▪ The US ▪ Asia/Pacific 	<ul style="list-style-type: none"> ▪ Outreach program ▪ Road shows
CHEPS (Chemical Engineering Practice School)	Chemical engineering	<ul style="list-style-type: none"> ▪ Master-level 	<ul style="list-style-type: none"> ▪ Europe ▪ The US ▪ Asia/Pacific 	<ul style="list-style-type: none"> ▪ Road shows ▪ Special open door events
Faculty of Science and Food Engineering	Applications in Mathematics, Food Science	<ul style="list-style-type: none"> ▪ Bachelor-level 	<ul style="list-style-type: none"> ▪ Europe ▪ The US ▪ Asia/Pacific 	<ul style="list-style-type: none"> ▪ Road shows ▪ Special open door events
Radjamangala University of Technology (RMUT)				
RMUT (Rajamangala University of Technology)	Applied engineering solutions	<ul style="list-style-type: none"> ▪ Master-level ▪ Bachelor-level 	<ul style="list-style-type: none"> ▪ Europe ▪ The US ▪ Asia/Pacific 	<ul style="list-style-type: none"> ▪ Road shows ▪ Special open door events ▪ 'Industry-Screening' events

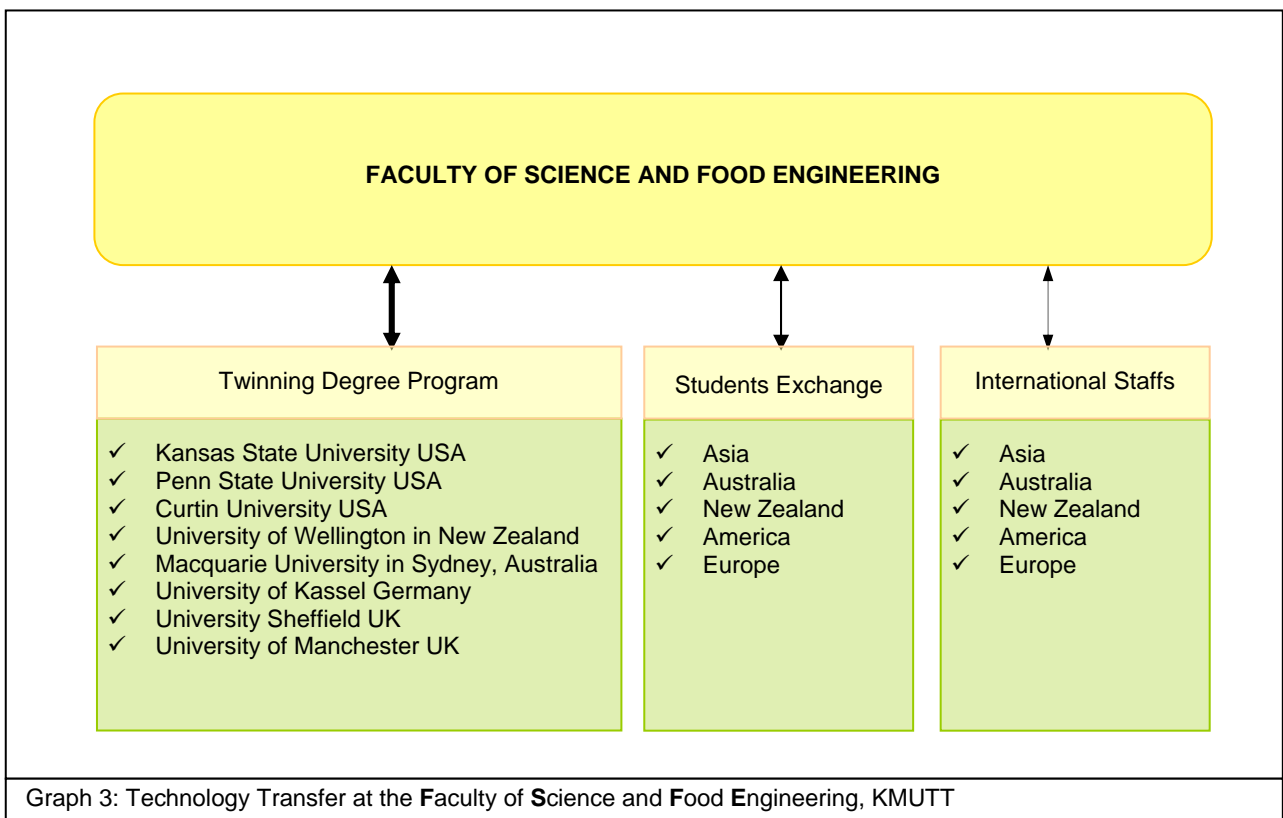
For Research & Development				
TGGS (Thai German Graduate School) and affiliated Institutes	Applied engineering solutions, machinery, Tool & Die and others	<ul style="list-style-type: none"> ▪ Bachelor-level ▪ Master-level ▪ PhD level 	<ul style="list-style-type: none"> ▪ Europe ▪ The US ▪ Asia/Pacific 	<ul style="list-style-type: none"> ▪ Road shows ▪ Special open door events ▪ 'Industry-Screening' events

Table 3: CEIRC Potential Future Cooperation Partners

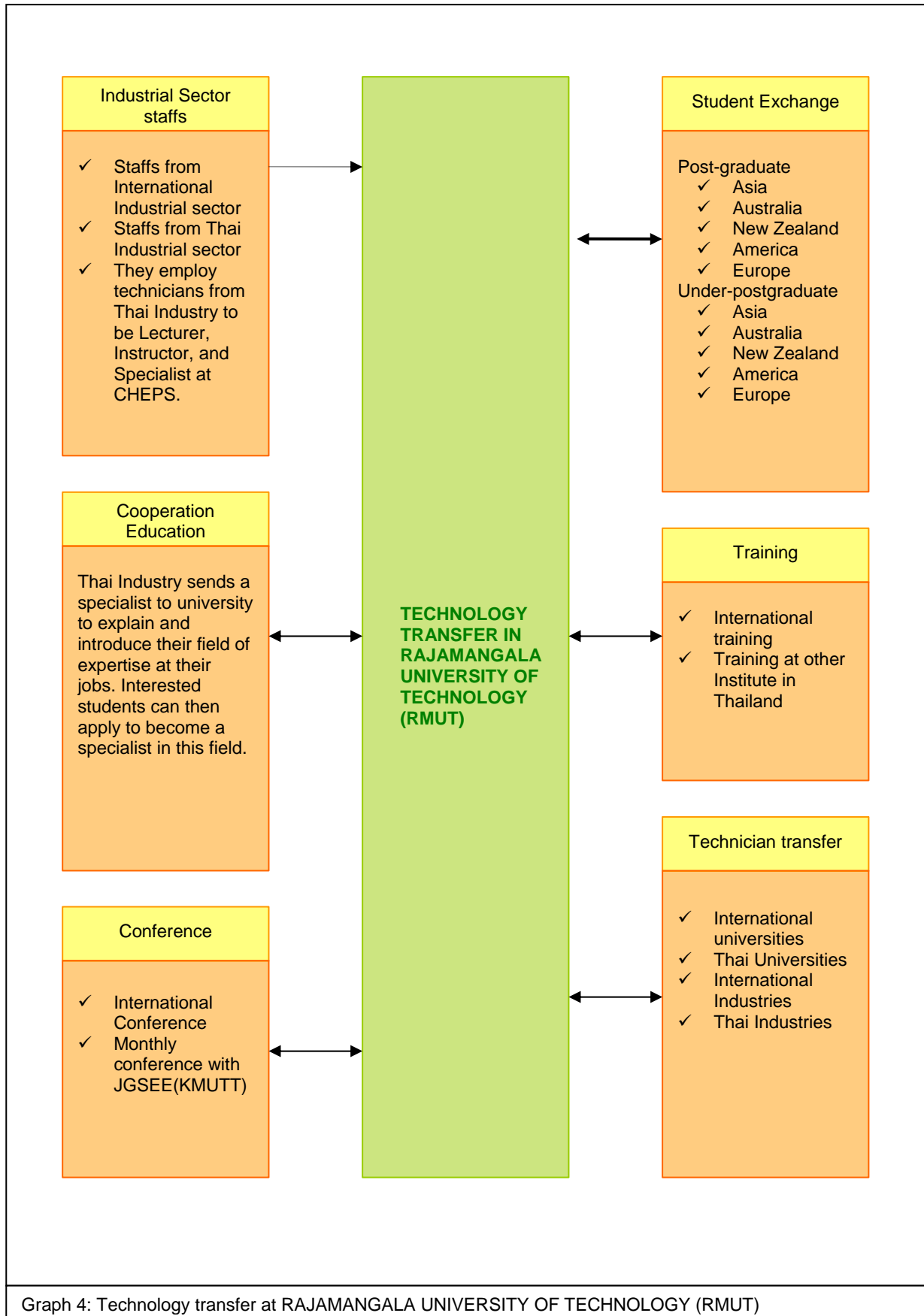
By establishing or expanding the existing cooperation and collaboration network through including the partners suggested above, CEIRC and the faculty of engineering at KMIT/NB

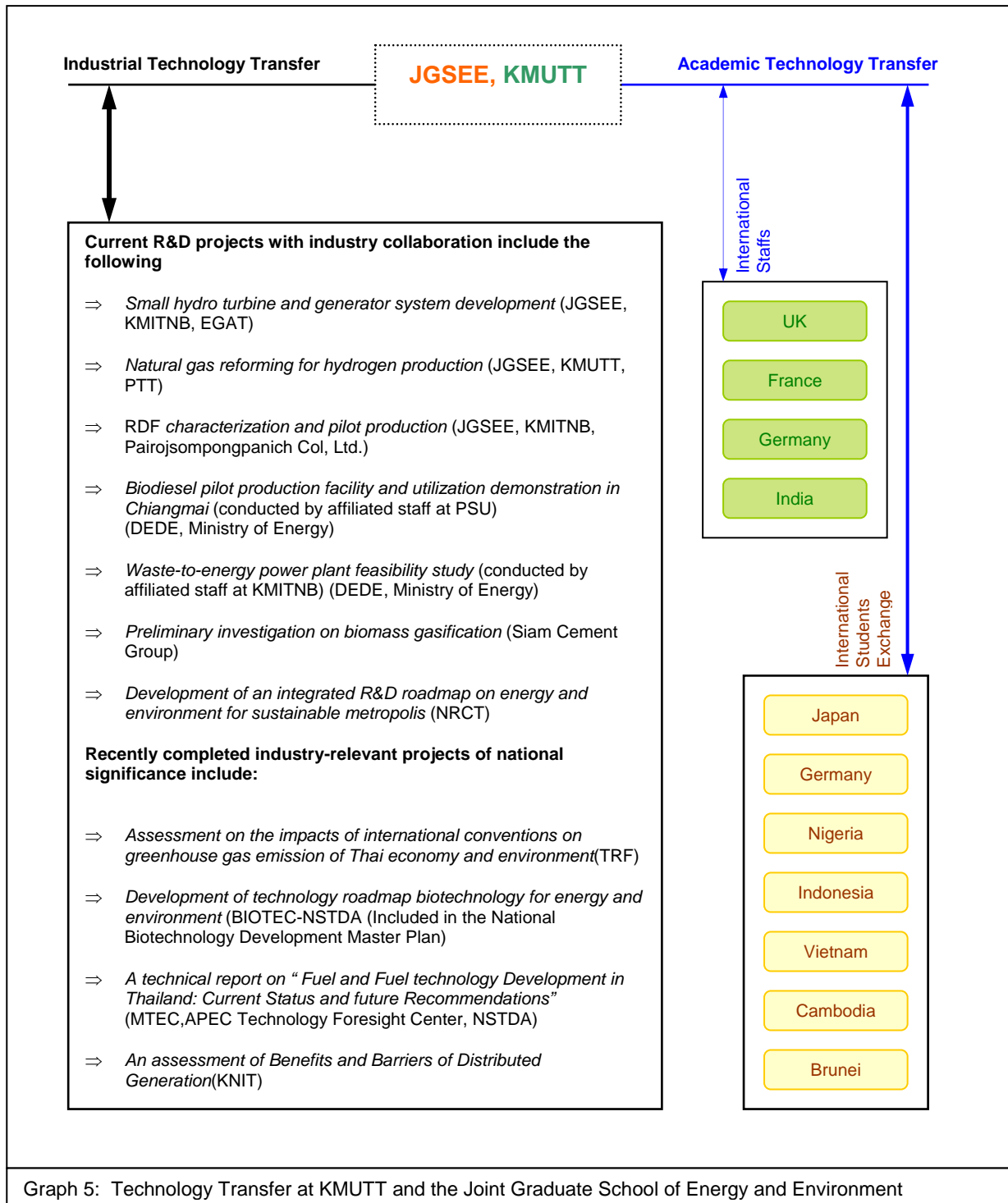
- Further strengthen their access to engineering expertise recognized internationally
- Gain access to a mixture of research & development and education oriented technology transfer that is very interesting for the industry
- Increase the faculty's options to cooperate with the industry through Education + R&D + Applied engineering Solutions in Production
- Include the energy market in its co-operative education program.

With such an extended net-work, CEIRC has the option to support technology transfer in Thailand. It can increase its own role in engineering education and improve student attraction/interest to study at KMIT/NB. On the following pages are organograms describing structural aspects of KMUTT, JGSEE and RMUT to facilitate further cooperation development.

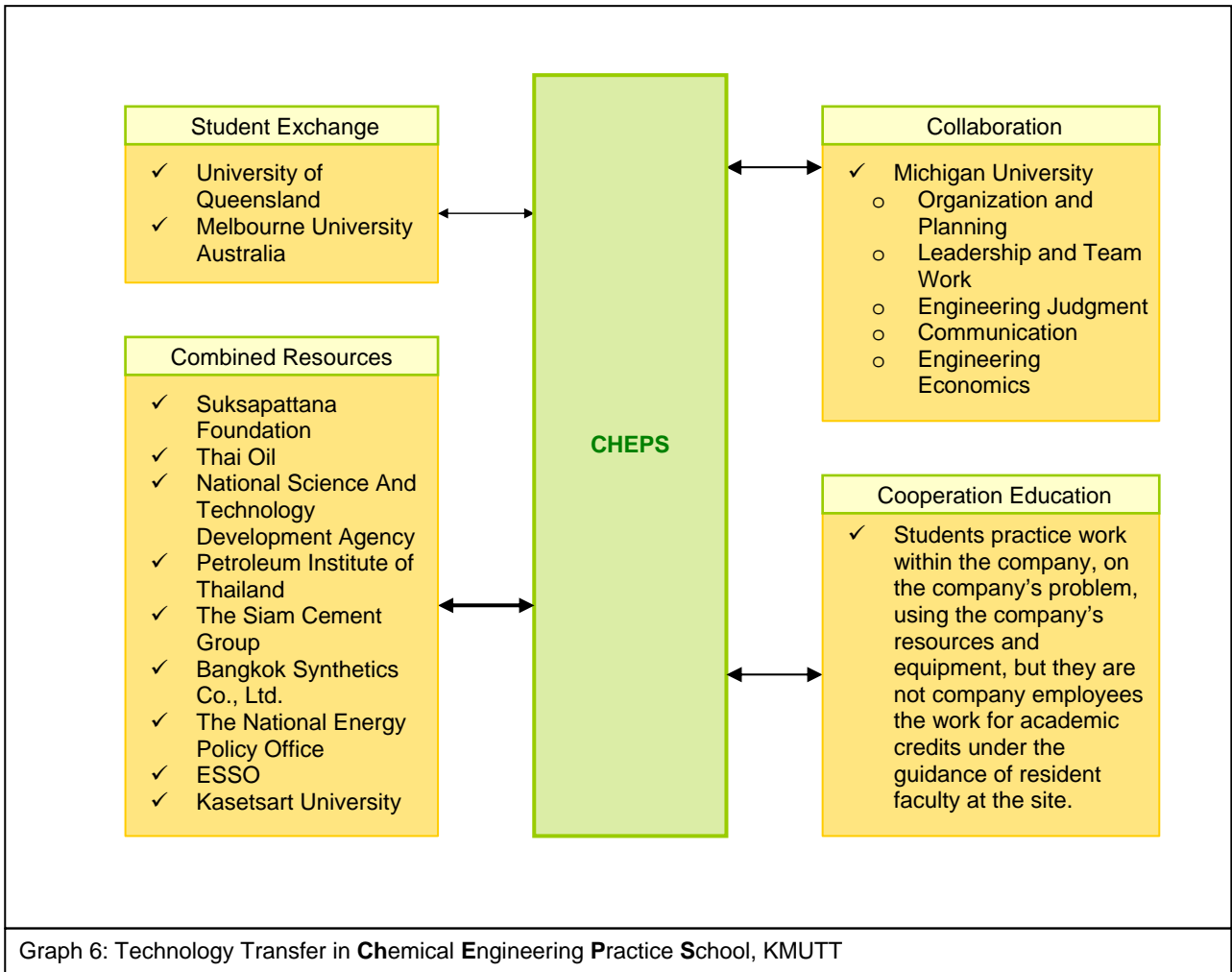


Graph 3: Technology Transfer at the Faculty of Science and Food Engineering, KMUTT





Graph 5: Technology Transfer at KMUTT and the Joint Graduate School of Energy and Environment



4. RC and Technology Transfer in Thailand

4.a CEIRC Support Options for Technology Transfer in Thailand

Based on the description of the previous paragraphs, the study identified a number of options that can be applied in technology transfer through co-operative education.

<i>Option</i>	<i>Objective</i>	<i>Measures/tools</i>	<i>Target groups</i>
1. Through Cooperation			
Focus on energy related aspects of engineering	Link CEIRC with the energy market	Focus on implementing and extending the existing co-operative education of the JGSEE to the KMIT/NB campus	Mostly students and partly industry
	Increase energy related services	Through partnership link the TGGS network to further increase access to knowledge resources for the existing co-operative education and energy related R&D	Mostly industry and partly exceptionally gifted students

	Link the fields of engineering, agro-industry and energy	Strengthen cooperation with the department of Agricultural Extension through offering part-time continuation of education (less than study, more than training)	Administrators looking for qualitative and personal competency development
2. Through (CEIRC) Expansion			
Expand CEIRC services	Increase participants in the co-operative education program	Extend CEIRC's range to trilateral cooperation	International students studying in Thailand
		Extend CEIRC services beyond the faculty of engineering by including other KMIT/NB faculties	Externally: The industry/students Internally: Professors and KMIT/NB administrative decision-makers
3. Through CEIRC Addition			
Open additional portfolio for CEIRC	Increase number of students from outside of Thailand	Add foreign student support program and join international education programs, for example 'ERASMUS' from Europe	International students
Add internal training section	Increase active participation of professors	Professor education, motivation and mediation measures delivered by trainings, coaching and/or 'on the job training' in co-op participating companies	Internal staff
Add PR section/staff	Increase PR options	Initiate an out-reach program with a local or international universities and join road-shows	The Industry/students
Increase efforts in student care	Increase reputation and network	Care-Follow-up-Center: Keep in contact with students finishing co-op education. Build an Alma Mater network	Students
Add a new CEIRC branch	Industry related services	Co-operative Education Match-Making and Resource Pooling Center	National and international Industries, Chambers of Commerce, Education programs

Table 1(repeated): *CEIRC* Support Options for Technology Transfer

4.b CEIRC and Technology Transfer contributing to additional income generation

Some of the technology transfer options described above can be used for or linked to additional income generation for KMIT/NB in the mid- or long-term. Some of the measures suggested here have been discussed during the SSI in some detail. Main considerations for the propositions are always to

- Complement other recommendations of this study,
- Utilize the existing cooperation and network options, and
- To enhance partnership options of CEIRC with other institutions

<i>Activity</i>	<i>Target group/financing source</i>	<i>Cooperation partner</i>	<i>Objective</i>	<i>Measure</i>
Co-operative Education matchmaking	<ul style="list-style-type: none"> National and International Industry 	<ul style="list-style-type: none"> German-Thai Chamber of Commerce (GTCC), IEAT (Industrial Estates Authority of Thailand) 	<ul style="list-style-type: none"> Win foreign or local investors in Thailand for a cooperation with KMIT/NB 	<ul style="list-style-type: none"> Develop a curriculum that offers from a single service center Co-operative and vocational education HR development Engineering specialists Research and development
Resource Pooling Center	<ul style="list-style-type: none"> National and International Industry 	<ul style="list-style-type: none"> GTCC 	<ul style="list-style-type: none"> Win foreign or local investors in Thailand for a cooperation with KMIT/NB 	<ul style="list-style-type: none"> Cooperate or partner with companies offering Industry Start-Up Services
Research Cooperation Center	<ul style="list-style-type: none"> National and International Industry Students 	<ul style="list-style-type: none"> Partnership with TGGS 	<ul style="list-style-type: none"> Increase KMIT/NB attractiveness for industry and students 	<ul style="list-style-type: none"> Combine co-operative education for the Master or PhD level with industry-sponsored research tasks
Co-op education and training for Ministries' staff	<ul style="list-style-type: none"> Ministry of Agriculture (and potentially others) 	<ul style="list-style-type: none"> RMUT, faculty of agricultural engineering TGGS 	<ul style="list-style-type: none"> Enhance KMIT/NB trilateral cooperation potential with the government sector 	<ul style="list-style-type: none"> Partnering with TGGS for R & D related tasks and RMUT for agriculture specific engineering
Research and Development matchmaking	<ul style="list-style-type: none"> National and international companies International investors 	<ul style="list-style-type: none"> TGGS and Thai German Institute (TGI) 	<ul style="list-style-type: none"> Establish KMIT/NB as provider of cost-effective research-services including tailor-made personnel options 	<ul style="list-style-type: none"> Form a partnership with TGGS and TGI Develop a curriculum similar to dual education but for the university level and working engineers

Table 5: CEIRC Support Options for Technology Transfer contributing to additional income generation

5. Cooperation options in the field of energy efficiency/renewable energy

Two potential international cooperation options with regard to engineering aspects in the fields of energy efficiency and renewable energy have been identified. The potential cooperation partners are

- The United Nations Development Programme (UNDP) and **Energy for Sustainable Development**
- ASEAN Center For Energy (ACE)

On the United Nation Development Program

The Regional UNDP programs are currently in a phase of reorganization. Bangkok will in this context receive a number of new program offices. The co-operative education program of KMIT/NB can approach those offices to introduce itself as potential cooperation partner. Below is some back-ground information on the UNDP structure development that can assist in further preparation for first contacts.

General remarks

- Central offices of governance program and energy program will be located in BKK.
- UNDP's Global Environmental Facility (GEF) will move to BKK soon.
- The new distribution scheme for program offices are an UN effort to support UN decentralization.

Specific remarks

The dual regional program concerning energy is located in BKK and is called: 'Energy for Sustainable Development/Regional Energy Program for Poverty Reduction'. It has the following main objectives:

- Efficient energy use,
- Efficient and effective energy supply,
- Financing for energy, and
- Monitoring and capacity building.

Important aspects for the success of the energy program are considered to be:

- Knowledge design,
- Knowledge transfer, and
- Active knowledge dissemination.

The program tries to link energy and poverty issues and is currently in its 2nd year of its two year inception/start-up phase.

Activities:

- UNDP is currently conducting a gap-analysis (energy/poverty/development including SMEs), and is
- Undertaking a policy mapping.

Tools for current activities are: Pilot Project Identification, trilateral cooperation (see global village), prioritizing policies and problems areas

Regional Projects in cooperation:

- Currently preparing in cooperation: the UN's 'Regional Human Development Report on Energy 2006'
- Global village Project
 - Together with World Bank
 - Participating countries: Laos, Cambodia, Vietnam, Indonesia, Philippines and Mongolia
 - Activities: Mostly Workshops on Energy (rotating, last one in March in Cambodia)
 - HR-Pooling
 - Sustainable land-development
 - Sustainable environment development

<i>Partner Organization</i>	<i>Project</i>	<i>Project objectives</i>	<i>KMIT/NB Contribution/Measure</i>	<i>Remarks</i>
UNDP: Energy for Sustainable Development	Energy for Sustainable Development / Regional Energy Program for Poverty Reduction	<ul style="list-style-type: none"> • Efficient energy use • Efficient and effective energy supply • Financing for Energy • Monitoring and Capacity building 	Integrated energy related knowledge design and transfer: Develop curricula and programs in engineering co-operative education for Bachelor and Master levels in rural areas	<ul style="list-style-type: none"> • The project headquarters is located in Bangkok • The project is in its second year inception phase
			Knowledge dissemination: Develop a training exchange program to offer rural SMEs opportunities to exchange/switch their energy related staff for up to 7 days with a large company in Bangkok	
ASEAN Center for Energy (ACE)	ASEAN Plan of Action for Energy Cooperation (APAEC)	To facilitate the implementation of the ASEAN Power Grid (APG) in all aspects and for all types of energy	International Co-operative Education: Develop an exchange program for Bachelor and Master Degree levels with a focus on regional energy producing companies, international standards and the process of linking energy sources, resources and logistics throughout ASEAN	<ul style="list-style-type: none"> • Office is at the Ministry of Energy, BKK • Project is only in its first project commissioning phase (2005) • Many project aspects are still being defined
			Trilateral Research & Development: cooperation between KMIT/NB's co-operative education program of the faculty of engineering, TGGS and all sub-projects of APAEC	

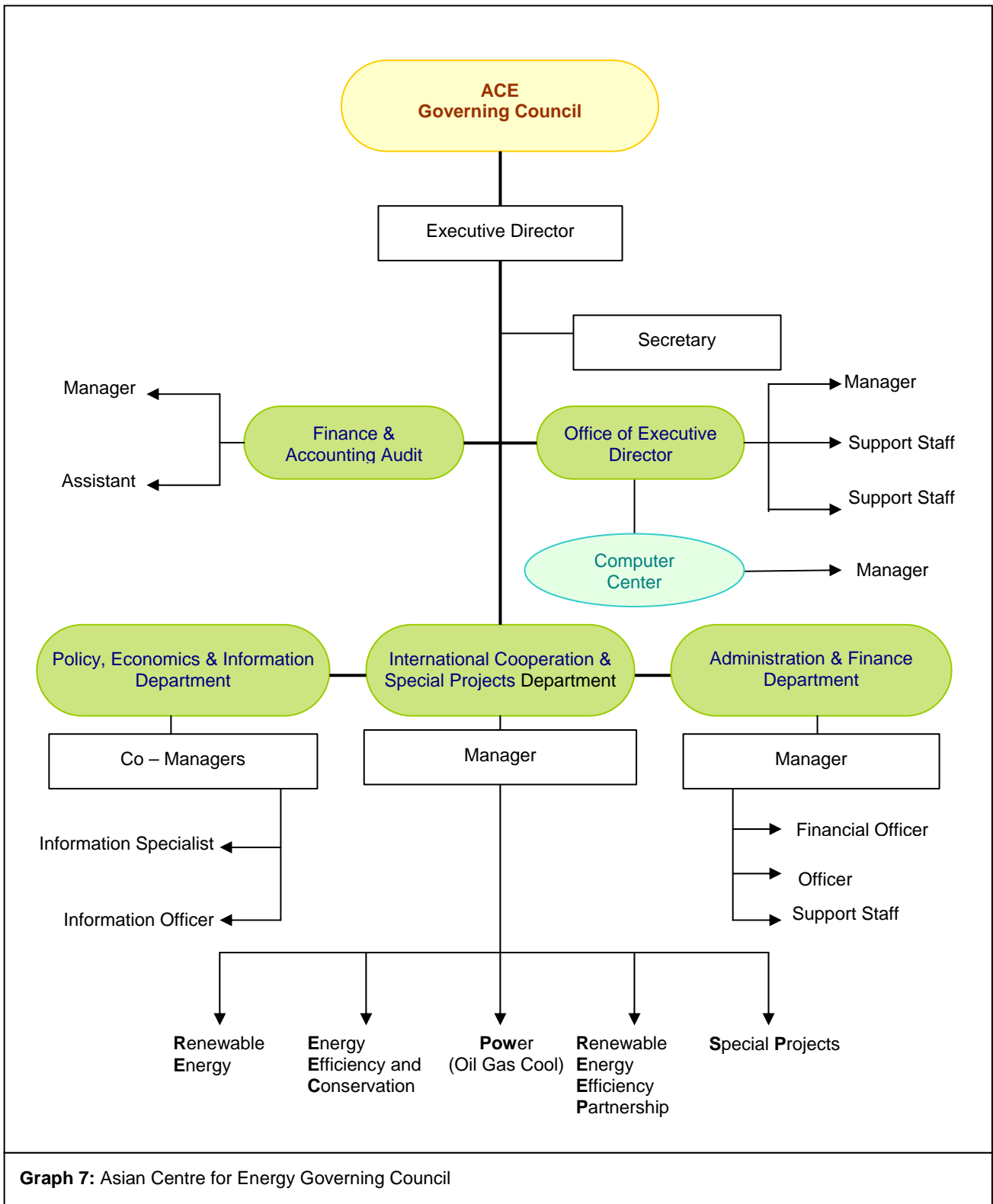
Table 6: CEIRC Cooperation options in the field of energy efficiency/renewable energy

On the ASEAN Plan of Action for Energy Cooperation (APAEC)

The ASEAN Plan of Action for Energy Cooperation is currently in a preparation and inception phase. It is also called **ACE** for ASEAN Center for Energy. As a high-level cooperation effort between the governments of ASEAN it is a decentralized organization and has numerous offices in the participating countries' Ministries' of Energy. ACE consists of 6 (six) program areas. These are:

1. ASEAN Power Grid (Special Project: APG)
2. Trans ASEAN Gas Pipeline (Special Project: TAGP)
3. The development of oil, gas and coal as energy source (Power)
4. Energy Efficiency and Conservation (EE&C)
5. Renewable Energy (RE)
6. Regional Energy Policy and Planning (REPP)

The organizational/decision-making structure of ACE is as follows:



Graph 7: Asian Centre for Energy Governing Council

6. Suggestions

The IP-appointed team did an excellent job. However, the project time-table was restricted to two years. Such a tight timeframe is in itself not sufficient to generate motivation for active and sustainable support for CEIRC at KMIT/NB. Nonetheless, the market demand for co-operative education is very strong as indicated by the increasing number of education-related institutes offering such (or similar) services. Therefore, this study strongly recommends continuing CEIRC.

The continuation can not only potentially generate additional revenues for KMIT/NB, but also markedly increase prestige and marketability with students. To continue CEIRC a close partnership with TGGS, KMUTT and RMUT, i.e. an extension into research, the energy sector and an introduction of industry related services, is currently the most promising approach.

To facilitate recommendations of this study, CEIRC should be empowered to act in a number of areas. The table below shows the most basic tasks that should be attended to. An excellent and more detailed listing of activities for CEIRC after the DIOGE project can be found in chapter 4 of the short-term mission report on DIOGE of Dr. Schneider from August the 4th, 2004.

Area	Task
Curricula	<ul style="list-style-type: none"> • Adapt existing curricula to better fulfill the needs of industry • Develop additional co-operative education options for students • Develop a co-operative education curriculum especially for the field of research and development • Develop new curricula with a focus on government training needs
Staff	<ul style="list-style-type: none"> • Adapt structure to better accommodate staff needs • Train staff to improve student/industry/professor relationships • Send professors to work in companies on a specific short-term task
Network	<ul style="list-style-type: none"> • Extend the network in accordance with <ul style="list-style-type: none"> ➤ CEIRC development plans ➤ Building of new cooperation agreements ➤ Building of partnerships • Initiate a monitoring of network-activity
Structure	<ul style="list-style-type: none"> • Increase CEIRC flexibility with regard to administrative matters • Increase student services

Final remarks

IP has already released a considerable amount of data concerning the DIOGE project and in this context the tasks of CEIRC. For more details see bibliography in the attachments 2.

Some of the SSI partners identified in the TOR were not able to contribute to this study. This was due to either time constraints or policy changes of the partners. This study then substituted them with other partners identified via secondary data study.

This study puts a focus on the most promising future cooperation partners of CEIRC. A compilation of information and data concerning other partners can be found in the attachments 2 (only on CD as soft-copy).

Attachments

Conceptual Frame

Working definitions:

A. Technology Transfer (TT)

Technology Transfer is for this study defined as co-operative education (co-ed) on the Bachelor and Master levels with regard to industrial agriculture (agro-industry), food-processing, energy efficiency and renewable energy.

B. Trilateral Cooperation (TC)

Trilateral Cooperation is defined for this study as co-operative education efforts shared or commonly undertaken by three parties either nationally in Thailand or internationally in the region. One of the partners ought to be from either the German public or private sector.

C. Support options for TT and TC

Support options for TT and TC refer to

- Administration
- Planning
- Networking, and
- Human-Resource-Pooling

with regard to technology, management and facilitation.

D. Aspects of Thai law for TT and TC

Aspects of Thai law considered for this study especially refer to

- Contracting
- Private-Public sector cooperation
- Investment, and
- Liability

E. Financing/cooperation options

Financing/cooperation options with international organizations in co-operative education refer to the United Nation Development Program (UNDP) and the Asia Development Bank (ADB)

Primary study target groups¹²

- ⇒ **Rajamangala University of Technology (RMUT)**
- ⇒ **King Mongkut University of Technology Thonburi (KMUTT)**

¹² A detailed lists of all study participants please find in the resource book

- ⇒ **Chiang Mai University (CMU)**
- ⇒ **National Innovation agency (NIA)**
- ⇒ **Federation of Thai Industry (FTI)**
- ⇒ **Thai German Institute (TGI)**

Secondary study target groups

- ⇒ **Thai Board of Investment** (i.e. Office of the Secretary General, Agro Industry Division and Energy Division)
- ⇒ **German Thai Chamber of Commerce** (Economics Division)
- ⇒ **Ministry of Industry** (i.e. Office of the permanent Secretary, Office of Industrial Economics)
- ⇒ **Ministry of Agriculture and Co-operatives** (i.e. Department of Agricultural Extension, Office of the permanent Secretary)

Study design

The study is designed as a team effort involving one senior expert and one information designer working in close cooperation with KMITNB, as well as a number of research support staff. The aim of conducting the study in a closely cooperating team is to create synergies between analysis-generated knowledge, information-design based abstractions for presentation and feedbacks by experienced DIOGE-Project personnel.

Implementation steps/study time-table

Time	Location	Activity	Objective
17.01.2005	Chiang Mai	<i>Signing of contract, beginning of study</i>	
17.01.05 – 28.01.05	Chiang Mai	<ul style="list-style-type: none"> • Primary and secondary data-sources scanning • First informal contacts with target groups 	<ul style="list-style-type: none"> • Re-affirm and adapt implementation outline • Verify study objectives
29.01.05	BKK	<ul style="list-style-type: none"> • Establishing temporary offices in Bangkok 	<ul style="list-style-type: none"> • Increase communication efficiency
30.01.05 – 23.02.05	BKK	<ul style="list-style-type: none"> • First round of semi-structured interviews (SSI) • Secondary data collection 	<ul style="list-style-type: none"> • Finalize study adaptation • Outline structural, organizational and policy concepts of target groups

11.02.05	BKK	<i>Final extension of study scope and objectives</i>	
24.02.05 – 02.03.05	Chiang Mai	<ul style="list-style-type: none"> • First data analysis 	<ul style="list-style-type: none"> • Begin of first study-draft • Adapt/up-date listing of contacts for second round of SSI • Adapt topics for SSI
03.03.05 – 08.03.05	BKK	<ul style="list-style-type: none"> • Second round of semi-structured interviews (SSI) 	<ul style="list-style-type: none"> • Finalise data collection
09.03.05 – 17.03.05	Chiang Mai	<ul style="list-style-type: none"> • Second data analysis 	<ul style="list-style-type: none"> • Finalise and submit first draft
18.03.05 – 30.03.05	<i>Chiang Mai</i>	<i>Adaptations to first draft</i>	
31.03.05	<i>Chiang Mai</i>	<i>Submission of final study</i>	

Itinerary of activities for the study

Date/Time	Interviewee	Position	Institution
Fri 11/2/48	Ms. Wacharee Tintani	Director, Agro-Industry Div.	Thailand Board of Investment Royal Thai Government (BOI) BOI Thailand Board of Investment Royal Thai Government 555 Vibhavadi-Rangsit Rd. Chatuchak ,Bangkok 10900
Fri 11/2/48	Mr. Satit Sirirangkamanont	Secretary General	Thailand Board of Investment Royal Thai Government (BOI) BOI Thailand Board of Investment Royal Thai Government 555 Vibhavadi-Rangsit Rd. Chatuchak ,Bangkok 10900
Mon 14/2/48 9.00 AM	Dr..Wantanee	Department Director	NATIONAL INNOVATION AGENCY (NIA) 73/1 Rama 6 Rd. Thung Phaya Thai Rajthevee Bangkok 10400 Tel. 02-644-6000 Fax. 02-644-8443-4
Tue 15/2/48 1.00PM	Dr. Surangsee		King Mongkut Institute of Technology in North Bangkok (KMIT/NB) Rama7 Thonburi

Wed 16/2/48 2.00PM	KAMAL RIJAL		United Nation Development Program (UNDP) 3rd Ratdamnern Nok Service building
Thu 17/2/48 1.00PM	Assoc. Prof. Dr. Issaree Hunsacharoonroj (Ph.D)		Radjamangkala University of Technology (RMUT) Director of Institute of Research and Development Rangsit-Nakornnayok Rd. khlong Hok thanyaburi Phatumthani 12110 Tel. 02 549 4681-4 Fax 02 5775038 or 02 5494680
Thu 17/2/48 3.00PM &4.00PM.	Mr. Narong Varongkriengkrai Mr.Walter Kretschmar	Director th	Thai-German Institute (TGI) 700/1 Moo.1 Amata Nakorn Industrial Estate Km.57 Bangna-Trad Rd., T.Klong Tanru A.Muang Chonburi 20000
Fri 18/2/48 1.00PM	Mr.Bandhit	Director	King Mongkut University of Technology in Thonburi (KMUTT) Joint Graduate School for Energy Efficiency Prachautit Rd. Bangmod Thungklu BKK Tel.02 872 9014-5
Fri 18/2/48 4.00PM	Mr.Walter Kretschmar	Director	Thai-German Institute (TGI) 700/1 Moo.1 Amata Nakorn Industrial Estate Km.57 Bangna-Trad Rd., T.Klong Tanru A.Muang Chonburi 20000
Mon 21/2/48 10.00AM.	Mr.Stefan Buerkle	Chief	German Thai Chamber of Commerce (GTCC) Business Economics and Advisory Division 25 th Floor, Empire Tower3 Sathon Rd. BKK
Tue 22/2/48 9.30 AM.	Assoc. Prof. Dr. Issaree Hunsacharoonroj (Ph.D)	Director	Radjamangkala University of Technology (RMUT) Director of Institute of Research and Development Rangsit-Nakornnayok Rd. khlong Hok thanyaburi Phatumthani 12110 Tel. 02 549 4681-4 Fax 02 5775038 or 02 5494680
Tue 22/2/48 10.30 AM	Asst. Prof. Dr. Mantanee Sedpakdee	Dean	Radjamangkala University of Technology (RMUT) Faculty of Agricultural Engineering and Technology Rangsit-Nakornnayok Rd. khlong Hok thanyaburi Phatumthani 12110 Tel.02-5493300 Fax.02-5771955

Tue 22/2/48 2.00PM.	Mr.Phadetpai	Deputy Permanent Secretary	Ministry of Industry Rama 6 Rd Ratchathewi BKK Tel.02 2023242-3
Wed 3/3/48 1.30 PM.	Dr.Somchai Hiranvarodom	Dean ,Faculty of Engineering	Radjamangkala University of Technology (RMUT) Rangsit – Nakornnayok Rd. Khlonghok Thanyaburi Phathumthani 12110
Wed 3/3/48 3. 00 PM.	Asst.Prof.Dr.Mantanee Sedpakdee	Dean, Faculty of Agricultural Engineering and Technology	Radjamangkala University of Technology (RMUT) Rangsit-Nakornnayok Rd. Klong hok Thanyaburi Prathumthani 12110
Thu 3/3/48 9.30 AM.	Dr. Chulhathep Pongsroypech	Dputy Director	Department of Agricultural Extension (DOAE) 2143/1 Phaholyotin Rd. Chatuchak, Bangkok 10900
Thu 3/3/48 9.30 AM.	Mr.Mingpan Chayavijitsil	Head of the Human Resource Development Board	Federation of Thai Industries (FTI) 4 th Floor Zone c Queen Sirikit Nation Convention Center 60 New Rachadapisek Rd. Klongtoey Bangkok 10110
Fri 4/3/48 9.00 AM.	Dr.Hong – Ming Kung	Asst. Director	King Mongkut University of Technology in Thonburi (KMUTT) College of Chemical Engineering King Mongkut University of Technology Thonburi 91 Prachautit Rd. Bangmod Thungklu Bangkok 1014 0
Fri 4/3/48 9.00 AM.	Assoc.Prof. Dr. Dech Budcharoentong	Dean	King Mongkut University of Technology in Thonburi (KMUTT) Faculty of Science and Food Engineering King Mongkut's University of Technology Thonburi 91 Prachautit Rd. Bangmod Thungklu Bangkok 1014 0
Fri 4/3/48 9.00 AM.	Dr.Christoph Mencke	Professor and IOP Advisor	King Mongkut University of Technology in Thonburi (KMUTT) Joint Graduate School for Energy Efficiency 91 Prachautit Rd. Bangmod Thungklu Bangkok 1014 0
Mon 7/3/48 10.00AM.	Assoc.Methinee Heowchungcharaen	Head	Chiang Mai University (CMU) Department of Food Engineering Faculty of Agro-Industry 55 Moo.2 T.Maehere A.Muang Chiangmai 50100

Mon 7/3/48 1.00PM.	Assoc.Prof. Isra Teerawatsakul	Head	Chiang Mai University (CMU) Department of Industrial Engineering Faculty of Engineering Chiangmai University 50200
Mon 7/3/48 5.00PM.	Dr.Somchai Jomdwong	Asst. of Dean	Chiang Mai University (CMU) Faculty of Agro-Industry, Chiangmai University 50200

Terms of Reference (TOR)

For an

International short-term (KZFK) expert on:

Define the CEIRC (Co-operative Education and Industrial Relation Center) as a service center for industry, and as a provider of technology transfer for Small and Medium Enterprises (SME).

Project Number: PN 99.2161.0-001.00

Background information:

Project Name:

Development of Industry – oriented Graduate Education and Research in Engineering

Study stage:

Thailand

Time frame:

January 2005 to February 2005

Activities of the Short Term Expert:

The activities of the assignment, which are to be executed in close cooperation with the persons in charge of the DIOGE project, are as follows:

1. Get familiar with the established concept, approach and strategy of the DIOGE project using the relevant project documents and homepage.

2. Investigate present policies and practices of technology transfer between some relevant Thai university and the Thai industry, with focus on Thai SMEs.
3. Identify major technological fields where technology transfer (research, consultancy and training) is carried out between universities and Thai industry.
4. If available, describe efficient organizational procedures perceived in institutes, organizations or further facilities related to technology transfer.
5. Analyze feasibility of an efficient cooperation of KMITNB/RIT (CEIRC/DIOGE) with agencies and institutes like NSTDA (ITAP), NECTEC, NIA, TGGS (RWTH Aachen), FTI, TGI etc. in matters of technology transfer to SMEs.
6. Find out possible constraints or existing restrictions (by Thai law or constitution of university) limiting the provision of technology transfer and further services of universities to Thai industry.
7. Based on findings from activities 2. to 6. elaborate a proposal how to start and implement technology transfer activities at CEIRC (KMITNB) and CEEP (RIT).
8. Document the findings and recommendations in a final report.

TOR-Details

In this context, the short-term experts' activities are focused in four (4) implementation-steps:

- **Step 1:**

Assess the status quo (as is) between some Thai Universities and Thai Industries with regard to

- ⇒ Technology Transfer (TT) Policy
- ⇒ TT technological fields
- ⇒ TT organizational requirements
- ⇒ Trilateral cooperation

- **Step 2:**

Feasibility of third party cooperation with CEIRC, through assessing the status quo with regard to third party

- ⇒ Technology Transfer (TT) Policy
- ⇒ TT technological fields
- ⇒ TT organizational requirements
- ⇒ Trilateral cooperation

- **Step 3:**

Outline frame of TT options within the Thai law

Outline frame of trilateral cooperation within the Thai law

- **Step 4:**

Constructively analyze results of steps 1-3 for drafting of an implementation plan

- **Step 5:**

Shortly outline existing/future project financing options/cooperation by at least 2 international organizations in the field of energy

To this end, the study shall examine in primary and, where appropriate in secondary form,

- CEIRC support options for technology transfer and trilateral cooperation, i.e. in particular:
 - Administration
 - Planning
 - Networking
 - Human-Resource-Pooling with regard to technology, management and facilitation
- Existing Cooperation between Thai universities - i.e., Rajamangkala University of Technology (RMUT), King Mongkut University of Technology Thonburi (KMUTT) and Chiang Mai University (CMU) – and Thai industries. Thai industries are defined as the sector of industrial agriculture, food-processing, energy efficiency and renewable energy, only.

- Existing Technology Transfer of RMUT, KMUTT and CMU (describe and present the results in organo-gram form)
- Potential future CEIRC cooperation partners, i.e. National Innovation Agency (NIA), Federation of Thai Industries (FTI) and Thai German Institute (TGI) with regard to industrial agriculture, food-processing, energy efficiency and renewable energy sector cooperation
- Aspects of Thai law with impact on Technology Transfer and trilateral cooperation especially regarding:
 - Contracting
 - Private-Public sector cooperation
 - Investment
 - Liability
- Existing/future project financing options/cooperation by at least 2 international organizations in the field of energy, i.e., UNDP (United Nation Development Project) and ADB (Asia Development Bank)

To this end and besides data collection through standard study tools, the study shall organize Semi-Structured-Interviews (SSI) with stakeholders identified above.

Study structure of content:

In order to provide a clear format for study results, the study presents treated and analyzed data in the following form:

Book 1:

1. Exec Summary (not more than 1 page, A4, Ariel 11)
2. Summative Results (up to 3 pages A4, Ariel 11)
3. Descriptive summary (not more than 12 pages, A4, Ariel 11)
4. Attachments: Team, Methodology, TOR

Book 2:

Resource book with data-sources and data-base

Contracting and Remuneration:

Contract owner:

Southeast Asia Consult & Resource Company Limited (SEA-C.R.),
Chiang Mai branch

Financial Administration with

Head-office Southeast Asia Consult & Resource Company Limited (SEA-C.R.),
156/118 Moo10, Khankhlong Road
T. Suthep, A. Muang
Chiang Mai 50200

Time frame:

Final study result approximately 2.5 months after signing of contract with 30 Man/Days
applicable for remuneration

Remuneration:

(All costs and overhead included, no VAT applicable)

Terms of payment:

50% upon signing of contract and against invoice
50% after submission of final study and against invoice