



Annual Report 2005

APEC Center for Technology Foresight
Bangkok, Thailand



Asia-Pacific
Economic Cooperation



Technology Management Center (TMC)
National Science and Technology Development Agency (NSTDA)
Thailand

Contents

Preface	5
1 Background	6
1.1 Objective, core competencies, and scale of operation	6
2 APEC-Wide Foresight Project	8
2.1 Foresighting Future Fuel Technology (2004 - 2005)	8
2.2 Post-Foresight Engagement activities	13
2.3 Concept of the new APEC-wide project (Roadmapping Converging Technologies to Combat Emerging Infectious Diseases)	14
3 Multi-economy foresight training, conference, and seminars	16
3.1 Tools for Managing the Future: A Portfolio Approach	16
3.2 Creating Future with a difference	19
3.3 ASEAN Technology Foresight and Scan Project	21
3.4 Emerging Technologies	23
3.4.1 Results:	24
4 Workshop and Consultancies at single-economy level	27
5 Promotions through Network	28
6 Infrastructure	29
6.1 Website	29
6.2 Budget Report	34
6.3 Staffs	35
7 Plans and Activities for 2006	35
A Report of Side Meetings	37
B International Advisory Board (IAB) members (2004-2005)	42

List of Figures

1	Integration of Future Fuel Supply	10
2	Photos from “Foresighting Future Fuel Technology” meetings, Vancouver, Canada	11
3	Photos from “Foresighting Future Fuel Technology” meetings, Ping-Tung, Chinese Taipei	11
4	International foresight workshop: Tools for Managing the Future “A Portfolio Approach”	17
5	APEC Workshop on Emerging Technologies	25
6	A sample of the result pages from google search engine.	32

List of Tables

1	Explanation of acronyms using in Figure 1	10
2	List of downloaded publications.	31
3	List of 15 Keywords	32
4	Budget for Fiscal year 2005	34
5	Non-budget for fiscal year 2005.	34
6	APEC CTF Plans and Activites for 2006	36

Preface

It has been nearly a decade that APEC Center for Technology Foresight was established in Thailand under the support of National Science and Technology Development Agency (NSTDA). During this period, the center has implemented a number of foresight projects that involved more than 2,500 experts and participants in many economies.

This report presents records of activities of the Center in 2005. Several main activities were completed including the APEC-wide project on “Foresighting Future Fuel Technology” and the ASEAN Technology Foresight and Scan Project. The details of each activity are given in this report and further details are also provided on the Center’s website (www.apecforesight.org). The report is expected to share some experience that the Center has learned while making its contribution during the year to the public in many aspects including policy research, long-term planning, and strategic decision-making.

The Center’s missions could not have been achieved without substantial support from a great number of people. Special gratitudes are given to our international advisors and members of the foresight community.

Sakarindr Bhumiratana, Ph.D.
President
National Science and Technology Development Agency, Thailand

1 Background

The APEC Center for Technology Foresight (APEC CTF) is a project of the Industrial Science and Technology Working Group (ISTWG) of APEC. The Center was set up through the support of the Royal Thai government and as a unit in the National Science and Technology Development Agency (NSTDA) with the important mission to serve all APEC economies. Through this establishment origin, the Center has been chartered with a mission to promote foresight knowledge and capability throughout the APEC region. The Center fully participates in the biannual ISTWG meetings and holds a side meeting in order to keep the ISTWG members informed of its ongoing activities and to seek the opinions, suggestion and support from all ISTWG members.

APEC CTF has regularly been submitting proposals to APEC ISTWG to compete with other projects for funding from APEC. Yet it is important to note that NSTDA provides the core funding and employs the staff. The Center also relies on the support and in kind contributions of member economies, to whom it is bound by mutual interest and trust rather than formal relationships. The Center also has International Advisory Board (IAB) to guide and advise the overall plan and activities on the Center's programs.

Since the Center has been established up to 2005, APEC CTF has conducted and finished 7 APEC-wide foresight projects, published a number of general books on foresight, conference papers and reports. It has also been consulting and facilitating a number of foresight projects in many APEC economies at national and institutional levels, as well as holding regular training workshops on foresight tools. Through these activities CTF has built competency in foresight methodologies and strong relationship with clients and international experts, resulting in a growing network of supporters and alumni who see value in linking their activities to those of CTF.

1.1 Objective, core competencies, and scale of operation

The Center's activities and operation in 2005 were undertaken according to the Scope and Purpose of the Center which has been adopted by a meeting of the IAB in November 2004. The objectives, core competencies, and scale of operation are as follows:

Objective

To develop and diffuse foresight capability across APEC through multi-economy studies, training, consultancy and related activities.

Core Competencies of the Center

- Capability to coordinate and facilitate multi-economy foresight studies (with embedded training);
- Expertise in training and consultancy services;
- Expertise in foresight methodologies and practice;

Underpinned by

- Ability to work effectively across a range of cultures and types of organizations;
- Ability to understand and communicate basic science and technology and its implications for socioeconomic development.

Scale of Operation

The APEC Center for Technology Foresight operates as a semi-virtual center. From a solid base in its host economy - Thailand - the Center aims to serve and involve all the members of APEC through partnerships and networking.

2 APEC-Wide Foresight Project

2.1 Foresighting Future Fuel Technology (2004 - 2005)

In early 2004, APEC Center for Technology Foresight (CTF) proposed an APEC-wide foresight study on future fuel technology, which was planned to conduct in 2004-2005. The project was fully supported by ISTWG and won an endorsement and cooperation from the Energy Working Group (EWG) in the implementation phase afterward¹.

The project was also co-sponsored and co-organized by:

1. Office of the National Science Advisor, Canada;
2. Industry Canada;
3. National Metal and Materials Technology Center (MTEC), National Science and Technology Development Agency (NSTDA), Thailand;
4. Industrial Technology Research Institute (ITRI), Chinese Taipei;
5. Bureau of Energy, MOEA, Chinese Taipei;

The first Stage of the project was performed in 2004 by using MTEC and CTF's budget and in-kind contributions from the co-sponsors. Stage I was highlighted by the "Scenario 2030" Workshop held in Krabi, Thailand during 13-15 December 2004 where 57 participants from 11 APEC member economies participated. This resulted paper presentations², survey presentation, and facilitated small group discussions. Six scenarios for the future of APEC were also developed and energy

¹This EWG-ISTWG cooperation was triggered by the coordination work of Professor Greg Tegart, CTF's Executive Advisor, and later materialized largely due to significant effort of Dr. Fanghei Tsau from Chinese Taipei's Industrial Technology Research Institute (ITRI).

²The papers are:

1. Hydrogen for the future fuel by Dr. Withaya Yongchareon, Chulalongkorn University, Thailand
2. Conventional Hydrocarbons by Dr. Kuniko Urashima, NISTEP, Japan
3. Methane Gas Hydrates by Ken White, Acton White Associates, Canada
4. Biofuels by Ken White, Acton White Associates, Canada
5. Fueling an Integrated Energy Future, Eddy Isaacs and Don Simpson, Energy Innovation Network, Canada
6. Modeling Tools for Energy Scenario Analysis: The Canadian Transportation Energy and Emissions Model, Robert Hoffman and Bert McInnis, Robbert Associates Ltd., Canada

security emerged as a common theme. The Center has subsequently published and circulated the report from Stage I among participating experts for reviewing and to focal points through its web site and e-mail. This report is available online at www.apecforesight.org.

In Stage II, which was performed during 2005, technology roadmapping (TRM) was implemented to examine future fuel options by focusing on three future fuel options and exploring their interaction through 2005-2030 based on the “Scenarios 2030”. They are:

- Conventional and unconventional hydrocarbons
- Biofuels
- Hydrogen/fuel cells

With significant inputs from the government of Canada to facilitate the process, every effort has been made to produce the roadmaps technically and factually sound through engagement of experts from across the APEC region. Eventually, the future fuel roadmaps aim to inform policy makers of technical opportunities and issues.

In 2005, two TRM workshops was held in Vancouver, Canada in April (it was attended by 64 participants from 12 economies) and Pingtung, Chinese Taipei in August (48 participants from 11 economies), with a final symposium in Chiang-mai, Thailand in November (159 participants from 13 APEC economies). Apart from the support from the APEC Central Fund, co-sponsoring economies also made significant contributions, e.g. event hosting and other in-kind contributions.

During this second stage, three future fuel roadmaps were formed from the continuous work of three subgroups; whose member consists of experts and facilitators, at and between the TRM workshops. These roadmaps illustrate the details of barriers, gaps analysis, possible pathways and resources needed for future development of separate future fuel at different time scale in the future.

Nevertheless, the integration of different fuel and energy supply was considered essentially to create maximum impact on the investment in extraction, production and distribution infrastructure while meeting needs for overall energy security, good public health and sustainable development. There are some opportunities to introduce some fuels in stationary applications. This involves in both to accommodate and increasing demand. On the other hand, it also displaces those primary energy sources that suitable for producing transportation fuels (mainly oil and biomass).

This provides some opportunities for a broader approach to energy futures as envisioned in the Krabi scenarios workshop. The integrated roadmap (Figure 1) shows a dynamic future fuel supply incorporating with the products of the entire TRM process.

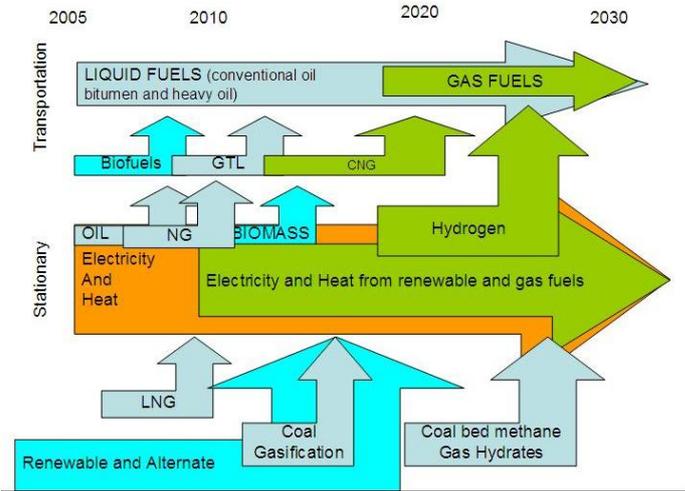


Figure 1: Integration of Future Fuel Supply

Table 1: Explanation of acronyms using in Figure 1

Acronym	Explanation
GTL	Gas-to-Liquid
CNG	Compressed Natural Gas
NG	Natural Gas
LNG	Liquid-Natural-Gas

The report on Integrated Future Fuel TRM and a wrap-up report of the entire project have been drafted for circulating at the final symposium (November 2005). The report targets at decision-makers, energy experts, foresight practitioners, the mass media and the general public.

The summary report with the complete scenario including the roadmap report, recommendations and policy implications were completed after the Chiangmai Symposium and distributed to participants and APEC Focal Points in early 2006.



Figure 2: Photos from “Foresighting Future Fuel Technology” meetings, Vancouver, Canada



Figure 3: Photos from “Foresighting Future Fuel Technology” meetings, Ping-Tung, Chinese Taipei

2.2 Post-Foresight Engagement activities

Two presentations were made by Dr. Nares Damrongchai (as a Policy Researcher of CTF) based on the Center's previous projects: Nanotechnology: the Technology for the 21st Century and DNA Analysis for Human Health in the Post Genomic Era.

1. Nanotechnology Foresight in Asia-Pacific, Damrongchai, N., and Tegart, G., presented at Asia Pacific Nanotechnology Forum, Bangkok, 14 January 2005. Full paper is available online at <http://www.apnf.org/ocs/viewabstract.php?id=104&cf=2>
2. DNA Technology in Asia-Pacific: Scenario for 2015, Damrongchai, N., presented at First UNESCO Bangkok Bioethics Roundtable, Bangkok, 11-15 September 2005.

Post-Foresight Engagement Activities on Future Fuel Technology

The continuous enthusiasm among participants after finishing a foresight project, and the capability of bringing foresight outputs to influence policy are thought of as indications of a successful foresight project. However, it is not unusual for a very successful foresight process (active participations, quality discussions, creative scenarios, etc.) to have rather poor implemented results after concluding a foresight project. This is because:

- In a foresight project, lacking of real leadership in implementation (no clear project leader apart from staff of CTF, who usually acts as the facilitator) can potentially result lacking of enthusiasm after concluding a foresight project.
- Although, experts who participated in a foresight process already aware of the benefit of foresight, they may either have insufficient understanding in foresight or have no authority. Therefore, it is difficult for them to take leading role in post-foresight phase.
- Most discussions after the foresight process continue into the technical community not policy area. Therefore, it is out of reach from the limited technical expertise of CTF staff.
- Even though some of CTF staff may have good knowledge in specific technical area, the limited number of staff prevents full participation in post foresight activities.

The ongoing APEC-wide project on future fuel technology shows significant improvement by addressing some of the above issue, with Thailand's National Metal and Materials Technology Center (MTEC) assuming full leading role in the project. Moreover, the TRM is likely to be followed up at least in Thailand by MTEC and PTT (the country's major oil producer). It remains to be discussed whether and how far CTF should involve in finished projects in the future. As it currently stands, CTF appears to pursue exit policy having limited post foresight involvement or facilitation role in the subject, apart from occasionally participating and making presentations at related academic/policy fora.

2.3 Concept of the new APEC-wide project (Roadmapping Converging Technologies to Combat Emerging Infectious Diseases)

Emerging and re-emerging infectious diseases is high on the agenda of APEC, as stated in the 2005 Leaders Declaration regarding Influenza Pandemic preparedness. For APEC to have sufficient preparedness, all control options - pharmaceutical or non-pharmaceutical, must be considered and fully explored. In most cases these options require new technological developments and/or convergence between existing technologies.

This project aims to enhance the region's capacity in using converging technologies, i.e. two or more disparate technologies or disciplines that come together, to contribute to the prevention and management of emerging infectious diseases that could become widespread in the APEC region. In the first stage (self-funded, to be conducted in 2006) the project will identify a group of converging technologies by using bibliometric analysis and scenario planning. Then in the second stage (to request additional funding from APEC), through workshops in Japan and Chinese Taipei or Korea in 2007, it will invite experts in various technological areas throughout APEC to jointly build roadmaps of these technologies. Since technologies usually take time to develop, this participatory process will stimulate immediate action needed to be taken today, and guide future collaboration in the region toward the next decade, in the perpetual combat against diseases.

The final output, the technology roadmaps, will provide specific recommendations for governments of member economies, the academia, and the industry to cooperate and respond to the region's urgent need in not only short term but medium to longer term. Particular attention will be given to providing of clear guidance (with

performance measures and targets) for technological and human capacity building in developing members of APEC, where infectious diseases are prevalent and resource is scarce. The expected outcome is for APEC to maintain long term security through practical solutions in managing infectious diseases and bioterrorism.

3 Multi-economy foresight training, conference, and seminars

3.1 Tools for Managing the Future: A Portfolio Approach

21-24 February 2005, Amari Watergate Hotel, Bangkok, Thailand

This fourth year training workshop was led by Professor Ron Johnston during 21-24 February 2005 in Bangkok, Thailand. The workshop attracted 17 participants from 5 economies; Canada, New Zealand, Singapore, Vietnam, and Thailand. The highly rated course by participants in 2002, 2003, and 2004, is again refined for 2005. The course gave all participants an opportunity to learn and use a portfolio of tools such as Scenario Planning, Delphi Polling, Technology Roadmapping, and Environmental Scanning. Participants were also able to understand the forces that can shape the future, design and manage a foresight project effectively and acquire the know-how to connect foresight with policy and planning successfully along with new detail case studies.

The Foresight training workshop has been improved continuously from the previous years. This year, a new session, “The Use of Foresight around the World” was introduced at the earlier session of the workshop in order to illustrate the development of foresight methods. In this session, the participants were also demonstrated both success and failure examples of foresight projects from around the world. Moreover, “Detail Case Studies of Application of the Future tools” session provided in-depth analysis of foresight projects, and underlined key factors of tools and implementation in each project. Examples of the case studies include “Transportation in the EU case”, “Irrigation in Australia”, “Post-Genomic Health care across the APEC economics”, etc.

Various forms of evaluation were conducted at the end of the workshop to ensure quality of the evaluation. They included a workshop evaluation form, and self-evaluation achievement.

Final evaluation showed high satisfaction on the course. The overall content of the course received a high average score of 3.64 (from a full scale of 4.0). The participants were also pleased with the information and knowledge obtained in the class which was rated as 3.61 and the course materials were also scored very high at 3.65. Participants have reasonably good chance to communicate with the facilitators during the workshop which was rated at 3.47. Furthermore, the rest of the indicators were also rated more than 3 from the full scale of 4.0.

Some of the comments from participants suggested that they needed more time and more complex case studies including other types of foresight tools, for example value chain, benchmarking, life cycle, eastern philosophical aspects and qualitative approaches.



Figure 4: International foresight workshop: Tools for Managing the Future “A Portfolio Approach”

3.2 Creating Future with a difference

21-23 September 2005, NOVOTEL Hotel on Siam Square, Bangkok, Thailand

APEC Center for Technology Foresight (APEC CTF) has organized international foresight training workshops since 2002. Early of this year, a second workshop was planned and conducted after the first workshop in February 2005. The title of this second training was “Creating Futures with a Difference”. This attracted learners who might have some anxieties of their futures and believe that the future can be changed. The training course was designed for CEOs, senior managers, policymakers, government and NGO community as well as youth generations.

The workshop was led by Professor Sohail Inayatullah from Tamkang University, Sunshine Coast University, and Transcend Peace University, who has many years of experience in futures studies. He has conducted several trainings and taught at many universities in Chinese Taipei and Australia, for example Tamkang University, Queensland University of Technology, and Transcend Peace University. Prof. Inayatullah is also a joint project leader of Mt. Eliza where trainings are provided twice a year in Australia.

Prof. Inayatullah desired to create communities of learning toward ecological view rather than emphasizing only on power of human brain. It is expected that after six months, people will be still in contacted. Such communities would learn from their hearts and soul, and be sensitive to nature of human environment as well as the universe. Finally and importantly, it was expected that all participants would have fun while learning together.

The workshop attracted 20 participants from 3 APEC Economies; Indonesia, Malaysia, and Thailand. Six APEC CTF’s team members participated and assisted for the entire of the training. Methods and tools were taught in depth along with group exercises based on Prof. Inayatullah’s recent publication on “Questioning the future: methods and tools for organizational and societal transformation”.

The approach focused not just on the technical issues of forecasting theory and methodology but the pedagogy involved in Foresight.

The deliverables of the workshop were - exposure to the following methods:

1. futures triangle
2. futures wheel
3. scenario planning

4. causal layered analysis

5. visioning.

Participants were asked to comment and complete an evaluation form at the end of the workshop. The overall final evaluation score is 4.25 (on a 5-scale basis), where the average scores from nearly every topic are between 4.00 and 4.50. Most of the comments showed that they were pleased with this foresight workshop. They found this workshop useful and changed or provided new ways of thinking.

3.3 ASEAN Technology Foresight and Scan Project

ASEAN Technology Foresight and Scan Project is a project of the ASEAN Sub-Committee on S&T Infrastructure and Resources Development (SCIRD). The mission aims to develop capability in technology foresight amongst ASEAN member countries and to establish a regional network of “foresight champions” in the ASEAN member countries.

The project started with the Design and Methodology Workshop on 4-5 August 2003 in Hanoi which was attended by focal points of SCIRD of ASEAN member countries. Key resource people were Prof. Ron Johnston, Prof. Akio Kameoka and Mr. Terutaka Kuwahara. The meeting decided that each country may conduct an in-country on the sector of its own interest and human resource development should be the main priority.

The 5-day training workshop conducted by Prof. Ron Johnston and Prof. Akio Kameoka in 2003 in Bangkok on foresight tools was attended by nine countries, three members each who will conduct the in-country projects afterward. The participants were trained not only through “hands-on” exercises of a number of foresight tools; they also formulated the pre-proposals of their own projects. Consequently, in 2004, these participants were assigned to conduct the in-country projects. Communications were maintained throughout the period through emails, bi-monthly newsletter, and a website.

The final workshop was held in Bangkok on 12-13 May 2005. Eight countries presented the results of their projects with comments from Prof. Yongyuth Yuthavong, the human resource topic expert. On the second day, the presentation of the Japanese 8th Foresight Program was given by Prof. Akio Kameoka. He then advised group works in developing a roadmap for human resource development in ASEAN.

This project is the largest foresight exercise that ASEAN has ever attempted. It was estimated that during each foresight exercise, there will be more than tens or even hundreds of policy makers, technical experts, academia and private sector in intensive discussions in each country. Our 30 or so “foresight champions” have gained confidence and experience in conducting foresight exercises on their own. The in-country projects also identified issues in various sectors that policy makers should pay attention to. Some of the issues cannot be solved by one country because it is regional project in nature. However, it is hoped that this project will initiate the use of foresight in developing of the next ASEAN Plan of Action on Science and

Technology.

After the workshop, participants were asked to evaluate the quality of the workshop in many aspects on a scale basis of 5 to 1. Most of the participants thought the workshop was well organised, especially, presentation by Prof. Yongyuth Yuthavong, Foresight in Japan by Prof. Kameoka, length of the workshop and communication between participants and facilitators. They also want to apply foresight technique in their organisation.

There were some useful comments from the participants suggesting that, experts should conduct the training course on Technology Foresight and new information on evolution of science for each country (regularly), “It was a very informative and fruitful meeting. The exercise done during the last day is beneficial for us and can be incorporated in the next technology foresight activities in our country. To go through the process or having a hands-on experience is the best way to learn and develop.”, “Capability building activities should be continued to encourage on the gains achieved in the project”, “Workshop is very well organised. The support staff is very helpful and accommodating. Thank you very much. Congratulations to Thailand”.

3.4 Emerging Technologies

APEC Workshop on Emerging Technologies: The Global Challenges of Convergence

14-15 December 2005 at Pathumwan Princess Hotel, Bangkok, Thailand. This event was co-organised by Office of Naval Research (U.S.A), Thailand's Academy of Science and Technology, APEC Center for Technology Foresight, NSTDA, Ministry of Science and Technology (Thailand). There were 39 participants from 10 APEC economies.

Rationale:

The Emerging Technologies workshop sponsored by APEC was built on the earlier effort "National Innovations and Competencies in a Globalized World," held May 2004 in the United States, which looked at the issue of globalization of innovation (Colorado Workshop). The May 2004 workshop focused on the responses of economies in restructuring their national innovation systems to globalization. APEC CTF was then asked to host a subsequential event, the International Workshop on Emerging Technologies: "The Global Challenges of Convergence".

Objectives:

This workshop aimed to answer and discuss "How do economies that are attempting to globalize their National Innovation Systems deal with emerging technologies?", where it focused in areas of globalization; emerging technologies: nanotechnology, biotechnology, information technology; science policy and innovation.

The workshop objectives were also to gain an understanding of:

- The opportunities and challenges arising from the convergence of emerging technologies; in particular IT, Nanotechnology, and Biotechnology;
- Effects on national innovation infrastructure, policies, workforce capacity, and S&T investments;
- Issues surrounding application development, and resource allocation and availability.

This workshop brought together international experts to discuss and share information on successful approaches to understanding emerging technologies and the

challenges faced by national and organizational innovation systems in nurturing investments, capacity, development, and commercialization in emerging technologies. Participants were innovation stakeholders from industry, government, universities, and associations, including; entrepreneurs, researchers, and policy developers.

3.4.1 Results:

The key product of this seminar was a report summarizing the opportunities and challenges economies face in creating industries, research, and workforce skills in emerging technologies. We hope that this will be used to develop a research agenda for APEC in the area of globalization and emerging technologies. Dr. Sujata Millick (email: Sujata_Millick@onr.navy.mil) from Office of Naval Research is preparing the final report of the two workshops.

International Conference on Emerging Technologies - Opportunities for New Businesses

16 December 2005 at Ball Room, Pathumwan Princess Hotel, Bangkok, Thailand. The organizers are NSTDA and Ministry of Science and Technology, Thailand.

Ministry of Science and Technology, as the main government agency responsible for science and technology development in Thailand, accordingly organised an International Conference on “Emerging Technologies - Opportunities for New Businesses” back-to-back with the APEC workshop on Emerging Technologies. The conference aimed to highlight global trends in emerging technology and innovation, their role in shaping the future socioeconomic environment, and business opportunities that might emerge from such trends. 169 participants (8 economies) from the general public, policy makers, and business people were invited to attend the congress.

Relevant agencies and individuals both in public and private sectors heighten and widen their perspectives on global technological trends that impacts Thai society and economy. Research organizations were expected to adjust direction and priority for their own research programs, while the business sector finds opportunities for new application and investment in technologies that will become important. Some of the experts in this workshop were also attended the APEC workshop on Emerging Technologies: The Global Challenges of Convergence.



Figure 5: APEC Workshop on Emerging Technologies

4 Workshop and Consultancies at single-economy level

Kasetsart University 2023

Dr. Malee Suwana-Adth, a member of APEC CTF International Advisory Board, convinced the President of Kasesart University on the merit of foresight. APEC CTF was asked to conduct a foresight project on the future of the University on 2023 when it is 80-year old.

The foresight project for Kasetsart University to look into the next 20 years of the University was completed in May 2005. From the four scenarios of 2023, a preferred scenario for the next five years was developed. Then the vision, mission, core competency and strategic positioning were derived. Balanced Scorecard was used to develop strategic objectives, key performance indices, targets, and strategic initiatives.

After the workshop, comments were made on the composition of participants in this study. It should include other stakeholders, for example farmers, representative of labours or alumni. Alumni usually know actual strength and weakness of the University, but it is quite hard for them to attend the workshop. Therefore, a survey should be conducted in order to gather information.

5 Promotions through Network

APEC Technology Foresight Network (TFN)

Summary of Current Profiles:

Experts: 66 (13 new profiles)

Publications: 49 (6 new profiles)

Events (past events): 13

Discussion forum: None!

Website Revision

Following Professor James Morrison's advice, website of this project had two major modifications and development during the end of 2004 until mid of 2005 as follows:

- *Removing of organization and economy profiles (inactive profiles)*
During November 2004 to October 2005, APEC CTF outsourced a programmer to modify the website and managed all technical matters resulted from removing inactive organization and economy profiles. Only expert profiles remain and will be emphasized. However, data of organization and economy profiles still available in the database for queries and other future uses.
- *New self-publication upload function now is available. (special offer for the members)*

Of particular importance in one of the project strategies is publication from the members. All the network members are allowed to upload their own publications by themselves. The purpose is to promote sharing of foresight experience among the members as well as other visitors through uploaded publications. Hopefully, this activity will lead gradually to further discussion and to stimulate thinking in broader viewers.

Face-to-Face Conference

In 2005, there is no progress on the face-to-face meeting nor is any consultant hired for this project per suggestion of the IAB meeting in 2004 due to the center's other project major involvement and its workloads.

6 Infrastructure

6.1 Website

APEC CTF regularly updates information about foresight projects and events of the center since 1997. The available information includes current and future activities, foresight research projects, foresights in APEC, etc. Most of the updates emphasized APEC-wide foresight projects and marketing on foresight training workshops. APEC CTF marches onward to further on website development on both contents and format layouts to provide foresight information worldwide. It was also expected that the website will be an efficient way to diffuse foresight knowledge: a tool for further on analysis of projects' results, a center of particular network and its activities, and finally a powerful communication tool to connect global visitors with APEC CTF. Hopefully, it would lead onto active and fruitful future foresight projects.

Change of Domain Name and New Web Design:

APEC CTF followed the IAB advice in changing domain name of the Center from <http://www.nstda.or.th/apectf> to <http://www.apecforesight.org>. The domain name was purchased from networksolutions.com in January 2005. APEC CTF received positive feedback from people and visitors because the name is easier to be remembered and it reflects CTF's actual resources and activities, i.e. foresight.

In 2005, APEC CTF was approached by many web visitors requesting to obtain exclusively free publications (please see free publication downloads). Additionally, some of them were seeking for further information about foresight projects and collaboration between institutes. For example, in September 2005, a Thai institute of education recently made contact with APEC CTF asking for more information about foresight and inquired the APEC CTF's Director to give foresight lecture for over a hundred audiences in the institute. Another example was from marketing of foresight training workshop, many workshop registrants stated that they obtained information about the course training from the center's website. It is expected to receive more feedback from the web visitors in the coming years. APEC CTF hired a web designer to improve layout of previous web design. The new web design was launched to public on 1st September 2005.

Summary of Visiting Counts:

Monthly Visits (total)

Nov. 04:	670
Dec. 04:	807
Jan. 05:	470
Feb. 05:	350
Mar. 05:	727
Apr. 05:	818
May 05:	471
Jun. 05:	523
Jul. 05:	954
Aug. 05:	1,105
Sept. 05:	610
Total:	7,514

Change of
Domain
Name
Impact

Foresight Projects: from Nov. 04 to Sept. 05

Future Fuels:	1,727 (2,091)	from June 2004
DNA:	46 (2,219)	from Nov 2001
NANO:	58 (9,943)	from July 2001
HMC:	34 (2,115)	} From 25 th May 2000
ST:	36 (1,270)	
TLC:	70 (2,083)	
WSM:	40 (2,087)	

NOTES:

1. Foresighting Future Fuel Technology
2. DNA Analysis for Human Health in the Post-Genomic Era
3. Nanotechnology: the Technology for the 21st Century
4. Healthy Futures for APEC Megacities
5. Sustainable Transport
6. Technology for Learning and Culture
7. Water Supply and Management

TrueHits.net registration:

APEC CTF continues subscribing on the Thai government's IT free services through NECTEC at TrueHits.net which systematically tracks on visiting counts and visitors' detailed information such as number of IP, ISP addresses, countries, etc. The services charged at a minimal cost of 1,800 Baht per year from 23rd February 2005 to 22nd February 2006. The full detailed reports provided on the website at truehits.net. To access the information, username and password are required.

Free Publication Downloads:

Publication downloads were recorded systematically while at each download, personal information of each downloader is required, such as email, position, and organization. A summary of the downloaded publications from January 2002 to October 2005 is listed in Table 2, ordered by maximum numbers of downloads.

Web Promotion:

APEC CTF outsourced Online Advertising Company to promote CTF's website due to decreasing of visiting counts back in 2003. Moreover, it was intentionally to promote CTF's website visibilities and increase link popularity in the five global search engines, Yahoo, Google, MSN, AOL, Lycos. Descriptions of 15 keywords (as shown in Table 3), estimated of 350 words in each keyword, were provided to the company to attract visitors at the global search engines. The promotion undertaking is running in an expansion of 2004 for a period of 12 months, started from March

Table 2: List of downloaded publications. Total number of publications downloaded in 2004 was 930

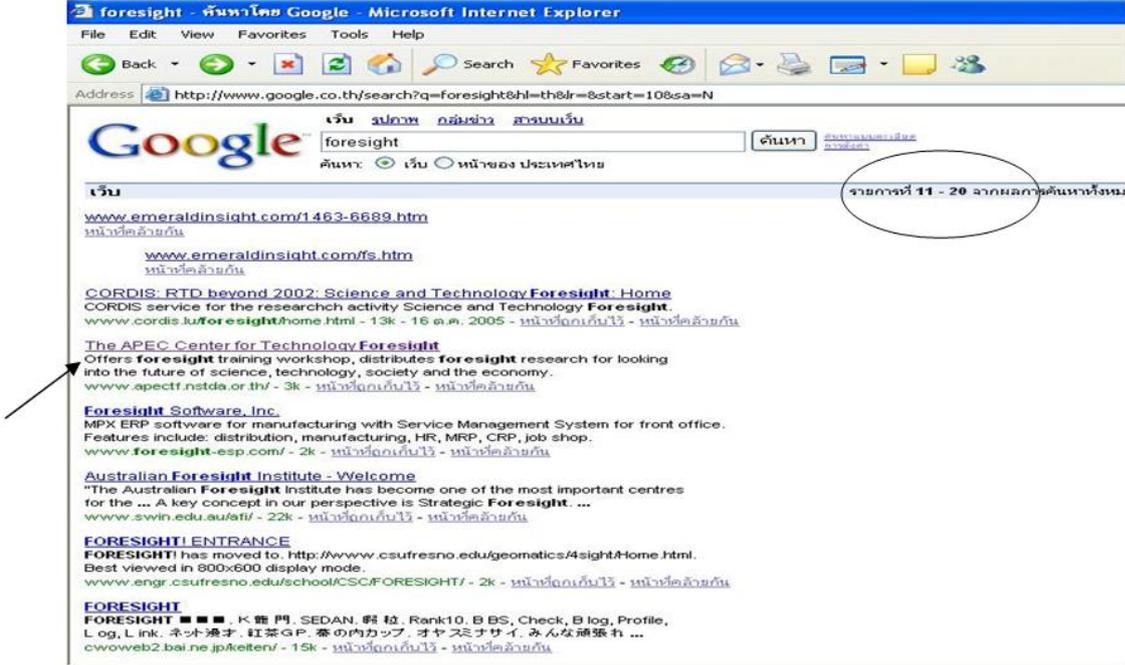
No	Publication Title	# of downloads
1	Nanotechnology the Technology for the 21st Century Volume 1	232
2	Introducing Foresight and the APEC Center for Technology Foresight	226
3	Nanotechnology the Technology for the 21st Century Volume 2	197
4	Technology Foresight as a tool for strategic science and technology planning and policy development	82
5	APEC Technology Foresight in Thai Language	79
6	The Future of APEC Megacities: A Foresight Approach	56
7	IT for Education (Full report in Thai language)	54
8	Application of Technology Foresight	47
9	Technology for Learning and Culture in the APEC Region to 2010 Volume 1	45
10	Authority, Legitimacy and Credibility of Technology Foresight Studies	42
11	DNA-Analysis for Human Health in the Post-Genomic Era Volume I	40
12	Healthy Futures for APEC Megacities: Summary Report of a Foresight Project	39
13	Technology for Learning and Culture in the APEC Region to 2010 Volume 2	37
14	Sustainable Transport for APEC Megacities: Issues and Solutions Volume 1	35
15	Sustainable Transport for APEC Megacities: Issues and Solutions Volume 2	31
16	DNA-Analysis for Human Health in the Post-Genomic Era Volume II	30
17	Water Supply and Management in the APEC Region Volume 1	29
18	Technology Foresight (file size: 39MB)	29
19	Training of the trainers for strengthening local government capacity on foresight project (English Abstract)	28
20	Multi-Country Foresight - Issues and Challenges: a paper based on a foresight study in progress, on the Future for Water Supply and Management in the APEC Region to 2010	25
21	Activities Report 1999-2000	23
22	Annual Report 2001	23
23	Information Leaflet	22
24	Water Supply and Management in the APEC Region Volume 2	21
25	IT for SMEs (English Abstract)	17
26	Annual Report 2003	15
27	Annual Report 2000	11
28	Annual Report 2002	11
29	Annual Report 1998	8
30	Annual Report 1999	5
31	Activities Report 1998	3
	Total	1,546

2005 to July 2006. The company guaranteed website of APEC CTF would be listed in one of the top 20 URLs that were displayed at the searched result pages. Entry of each keyword must be used one at a time, and the results searched pages will be listed and ordered by the highest ranking.

Table 3: List of 15 Keywords

1. DNA analysis in human health	9. Foresight training workshop
2. Delphi research	10. strategic planning
3. Scenario planning	11. Future studies
4. Foresight	12. Scenario
5. Foresight institute	13. Strategic planning consulting
6. Environmental Scanning	14. Future fuel technology
7. Megacities	15. Change management skill
8. Post genomic	

Figure 6: A sample of the result pages from google search engine.



It is difficult to claim the success of the web promotion because we can not access all personal information of each click from external visitors. However, there are increasing numbers of visitors who have learnt about the APEC CTF from the

website, linked to us, and also requested for further assistance on planning and future project collaborations of their foresight projects.

6.2 Budget Report

1. Thai-Government Budget for Fiscal year 2005 (As of 30th September 2005)

Table 4: Budget for Fiscal year 2005

List of items	Carried forward from Year 2004	Budget	Spent	Committed	Balance (Baht)
1. Salaries		1,988,410.50	1,857,252.90	-	131,157.60
2. Expenses	362,884.02	2,111,606.54	610,111.39	1,413,065.00	451,314.17
Advertisement			62,757.79	15,000.00	
Publications			54,500.00	42,190.00	
Hosting guest			39,451.01	14,375.00	
Meeting & Training				1,341,500.00	
Honorarium			101,449.50		
Tax			11,390.38		
Internet membership			3,831.77		
Fee for experts and consultants			31,566.13		
In country travel			16,072.99		
Foreign country travel			289,091.82		
3. Foresight projects	1,397,057.00	2,722,723.00	1,973,823.56	779,971.96	1,365,984.48
Pre-Foresight Future Fuel	1,220,000.00	1,437,340.00	1,585,371.96	698,371.96	373,596.08
Webpage	20,000.00		20,000.00		-
Foresight network	157,057.00	1,285,383.00	368,451.60	81,600.00	992,388.40
	725,768.04	6,211,623.58	3,077,475.68	2,826,130.00	1,948,456.25

Fiscal year 2005 start from 1st October 2004 to 30th September 2005

2. Non-budget for fiscal year 2005

Table 5: Non-budget for fiscal year 2005.

Project	Carried forward from Year 2004	Income	Expenses	Balance
Tools for Managing the Future		453,897.68	454,396.38	- 498.70
Creating Future with a Difference		334,500.00	254,134.39	80,365.61
KU Foresight		585,000.00	369,000.00	216,000.00
Future Fuel		1,536,940.40	1,536,940.40	-
ASEAN Tech. Foresight and Scan	3,653,030.33		1,906,389.11	1,746,641.22
		2,910,338.08	4,520,860.28	2,042,508.13

Carry forward to year 2006

3. In-kind Contribution of the Fiscal Year 2005

APEC Economies: Australia, Brunei Darussalam, Canada, China, Indonesia, South Korea, Malaysia, Philippines, Singapore, Chinese Taipei, USA and Vietnam provided in-kind contribution of about four million Baht for the Foresighting Future Fuel project and IAB meeting last year.

6.3 Staffs

Ms. Kasina Limsamanphan has left the Center to a Non Government Organisation. However, Mr. Phutthapong Yodsuwankun has joined the Center as a new assistant policy researcher. In summary, our current staffs are:

1. Executive Director:
Yada Mukdapitak
2. Policy Reseacher:
Nares Damronchai
3. Administrator:
Chongchit Charoensingkorn
4. Assistant Policy Researcher:
Mayuree Vathanakuljarus
5. Assistant Policy Researcher:
Phutthapong Yodsuwankun

7 Plans and Activities for 2006

The main activity in year 2006 will be the new APEC-wide project (as discussed in 2.3). However, there will be other activities, for example, foresight training workshop, IAB meeting, etc. as shown in Table 6.

Table 6: APEC CTF Plans and Activities for 2006

Projects	Oct. 2005	Nov. 2005	Dec. 2005	Jan. 2006	Feb. 2006	Mar. 2006	Apr. 2006	May. 2006	Jun. 2006	Jul. 2006	Aug. 2006	Sep. 2006
1 APEC Wide Project 1.1 Future Fuels		Symposium in Ch- angnai	Final Re- port	Publish and dis- tribute		Project Approved		Post Foresight		Start Project		
	1.2 Roadmapping Converging Technology to Combat Emerg- ing Infectious Diseases	Submit Proposal										
2 APEC Technology Foresight Network Web Promotion												
	3 Training workshop 2006											
3 3.1 Tools for managing the Fu- ture 3.2 Technology Roadmapping			Marketing			Workshop 1			Workshop		Workshop 2	Workshop 3
			Marketing				Marketing					
	3.3 Creating the Future with a difference											
4 ISTWG	Meeting 1					Meeting 2						
5 IAB		Meeting										

APPENDIX

A Report of Side Meetings

29th APEC ISTWG Meeting, APEC Secretariat, Singapore.

27th October, 2005, 15:15 - 16:10

Number of participants: 38 participants from 15 economies plus the APEC Secretariat: Australia (1); Brunei Darussalam (1); Canada (1); Hong Kong, China (2); Indonesia (1); Japan (4); Korea (4); New Zealand (1); The Philippines (2); Russia (2); Singapore (1); Chinese Taipei (5); Thailand (9); Vietnam (2); Macao, China (1); and APEC Secretariat (1).

Objectives:

- To ensure that the Center's activities respond to the needs of APEC members
- To seek ISTWG delegates' ideas on the new project and comments on the progress of the current project
- To promote understanding of the value of technology foresight

Outcomes:

Three sessions were reported: Activity Report, the current APEC-wide project on Foresighting Future Fuel Technology, and a concept for new APEC-wide project on converging technologies.

1. Activity Report (October 2004 - September 2005)

Dr. Chatri Sripaipan, Senior Advisor of the National Science and Technology Development Agency of Thailand, reported on the activities undertaken by the Center during the months of October 2004 and September 2005. The presentation covered a range of activities under the Center's main objectives to diffuse knowledge and capabilities on foresight across the APEC region. Those were carried through the APEC-wide project, consultancy, training and workshops, conference and seminars, APEC Technology Foresight Network (TFN), web sites and publications. Below are the major activities carried out by the Center during the past year:

- APEC-wide study on Foresighting Future Fuel Technology - The proposal was submitted to BMC to request for funding and received approval for the amount of \$102,595 in 2004 to be used in Stage II in 2005. The execution of the project was divided into two stages:
 - Stage I (self-funded): web-based promotion with online pre-workshop survey to encourage expert’s participation, Scenario Workshop in Krabi, Thailand
 - Stage II: Technology Roadmapping Workshops in Vancouver, Canada and Pingtung, Chinese Taipei. Details were given in the subsequent session.
- ASEAN Technology Foresight and Scan is a two-year project which intends to build up technology foresight capacity in ASEAN (7 out of 10 members are APEC member economies). Eight member countries of ASEAN had successfully completed their foresight projects. A concluding workshop was organized in Thailand in May 2005.
- Consulting service was provided to a project initiated by Thailand’s Kasetsart University with the objective to look into the future of the University amidst current change following the planned restructuring of Thai university systems. The project utilized a 20-year scenario and balance scorecard methodologies.
- The web-based APEC Technology Foresight Network (TFN) was set up with the assistance of Canada to provide pathways among foresight experts to exchange information related to foresight and an efficient way to diffuse the results of foresight activities. This project materialized the Center’s commitment in enhancing connections between individuals engaged in technology foresight activities.
- An APEC workshop on “Emerging Technologies: The Global Challenges of Convergence” is to be held in Bangkok during 14-16 December 2005. This APEC-funded project is proposed by USA and co-sponsored by Thailand.

2. Progress of the APEC-wide study on Foresighting Future Fuel Technology

Dr. Nares Damrongchai, APEC CTF’s Acting Executive Director, gave a presentation on the progress of the project. A Scenario 2030 Workshop participated by 57

APEC experts from 12 economies was conducted in Krabi, Thailand during 13-15 December 2004. As a result a Pre-Workshop Survey, Position Papers, and facilitated small group discussions, 6 scenarios for the future of APEC were created and energy security emerged as a common theme. The Center subsequently published a report on the findings of Stage I.

Stage II, carried out through 2005, entered the process of technology roadmapping (TRM), aiming to examine future fuel options by focusing on three future fuel options and exploring their interaction over the time period of 2005-2030 based on the Krabi scenarios. These were:

- Unconventional hydrocarbons
- Biofuels
- Hydrogen/fuel cells

With significant inputs from the government of Canada in facilitating the process, every effort has been made to make the roadmaps technically and factually sound through engagement of experts from across the APEC region. A series of TRM workshops was held in Vancouver, Canada during 27-29 April (attended by 64 participants from 12 economies) and Pingtung, Chinese Taipei during 10-12 August (48 participants from 11 economies), with a final symposium in Chiangmai, Thailand during 3-4 November 2005. In addition to the support from APEC Central Fund, co-sponsoring economies made significant contributions e.g. event hosting and other in-kind contributions.

During Stage II, three fuel roadmaps resulted from the continuous work of three subgroups, whose member consists of experts and facilitators, at and between the TRM workshops. These roadmaps illustrate in detail the possible pathways of the separate future fuel technologies, providing analysis of gaps, barriers, and resources needed for future development of each fuel type at different points in time. At present (October 2005) a report on Integrated Future Fuel TRM and a wrap-up report of the entire project has been drafted for circulation at the final symposium, targeted at decision-makers, energy experts, foresight practitioners, the mass media and the general public.

An important success factor of this project has been the cooperation between ISTWG and EWG. This was a result of a long effort by all parties involved e.g. Australia, Canada, and particularly Chinese Taipei through the work of Dr. Fanghei

Tsau, Chair of EWG Expert Group on Energy Efficiency & Conservation who submitted a separate proposal to EWG on this subject to coincide with ISTWG and eventually organized the joint TRM workshop between both working groups in Chinese Taipei in August 2005. The Center is very much grateful to all these efforts.

All reports and documents that this project have produced so far are currently available online for participating experts and the general public for reviewing and download at www.apecforesight.org. A final report with the complete scenario and roadmap report, recommendations and policy implications will be completed by year end after the Chiangmai Symposium and distributed in early 2006.

3. Concept of a new APEC-wide study on Converging Technologies for Sustainable Agro-Industry

Dr. Suthee Phoojaruenchanachai, Researcher of Thailand's National Electronics and Computer Technology Center presented a concept of the Center's new APEC-wide study. The title is "Converging Technologies for Sustainable Agro-Industry". This new project tries to aim at exploring the future where various technologies will possibly converge and enable practices towards more sustainable agro-industry. Such applications are precision agriculture, post-harvest process, and monitoring and decision support. The key technologies will likely be those in various types of sensors, new information systems, and process automation, among others. Convergence may be seen in the larger areas of biology, information, and mechanical technologies. The new project could utilize the scenario and roadmapping methodologies. In this project, as well as the previous project on future fuels, cooperation among relevant working groups will be required as a critical success factor.

Immediate supports to the proposed concept were given from Canada, Australia and New Zealand. Canada offered to communicate with its Agricultural Technology Cooperation Working Group representative. Australia has been interested in this topic and did actually organize a meeting on the same subject last year. New Zealand has been particularly interested in clean dairy production that involves a large amount of animal farming. The Philippines asked whether issues those are critical to agricultural system e.g. seasonal climate forecast, water supply, land use, many of which are non-technical but are current problems, will be considered. The Center responded that the scope of the project remains to be decided to serve the best interest of members.

The Lead Shepherd commented that the Center has long experience and good reputation in conducting technology foresight projects on timely subjects e.g. fuel

technology. The proposed concept of this new project will provide another chance for an approach in a more holistic manner (rather than merely technology aspects). To realize this, getting other working groups and other parties e.g. Asia-Pacific Climate Center (APCC) to involve is definitely important.

The Center concluded by urging the focal points to communicate with their respective representatives from the other working groups and make inquiries as to what kind of contribution they need from the foresight point of view, regarding this subject. Meanwhile the Center will also continue its dialogue with member economies and other working groups to get their further viewpoints and cooperation before proposing the new project in the next ISTWG meeting early next year.

Meeting closed at 16:10

B International Advisory Board (IAB) members (2004-2005)

1. Arthur Carty
President, National Research Council (NRC), Canada
2. Greg Tegart
Executive Advisor, APEC Center for Technology Foresight
3. Hsien-Chun Meng
Director General,
Science and Technology Information Center, National Science Council, Chinese Taipei
4. Youngrak Choi
President,
Science and Technology Policy Institute (STEPI), Republic of Korea
5. Hiroshi Nagano
Director General,
National Institute of Science and Technology Policy (NISTEP), Japan
6. Malee Suwana-Adth
Special Consultant,
National Center for Genetic Engineering and Biotechnology (BIOTEC),
National Science and Technology Development Agency (NSTDA), Thailand
7. Ron Johnston
Executive Director,
Australian Center for Innovation and International Competitiveness Limited (ACIIC),
University of Sydney, Australia
8. Yongyuth Yuthavong
Director,
Thailand Graduate Institute for Science and Technology (TIGST),
National Science and Technology Development Agency (NSTDA), Thailand

Contacts

The APEC Center for Technology Foresight
National Science and Technology Development Agency
73/1 Rama Vi Road, Rajdhevee, Bangkok 10400, Thailand
Tel. ++662 644 8150 Ext. 706, 743, 713, 768
Fax. ++662 644 8191

URL: www.apecforesight.org
Group mail: apectf@nstda.or.th