

APEC CENTER FOR TECHNOLOGY FORESIGHT

ANNUAL REPORT 2001

Asia Pacific Economic Cooperation



National Science and Technology Development Agency of Thailand



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Preface

First of all, I would like to congratulate the APEC Center for Technology Foresight (APEC CTF) for welcoming the first Executive Director, Dr Witaya Jeradechakul from Srinakharinwirot University, Thailand, who begins his work tenure in January 2002. The staff team is also expanded and prepared for the following years of challenge.

2001 marked another productive year for the APEC CTF. In a way the Center is entering into the second phase of development, with more international activities and strengthening work within Thailand. I noted a few remarkable achievements of the year. First, the APEC Technology Foresight Network was launched in July as a web-based discussion forum for foresight experts around the world. The project received exceptional support from the Center's good friend, the National Research Council of Canada. Second, the demand for training and consultancy from member economies has been on the rise. In the past year, the Center provided services on request to Malaysia and Vietnam. It also took the courage to plan an international workshop despite the world's economic downturn, and it turned out to be a big success with 29 participants from 11 countries in February 2002. Lastly, the Center conducted a multi-economy study on one of the most exciting technological fields, *Nanotechnology: the Technology of the 21st Century*. The calibre of experts and their institutions that participated was impressive. The project reached some of the top experts in the field and linked it with the key institutions in some economies.

I look forward to seeing the Center continue to play a key role in enhancing cooperation among APEC economies on foresight for a better future of APEC, and pledge to give it my full support.

Professor Pairash Thajchayapong
Chairman of the Steering Committee, APEC Center for Technology Foresight, and
President of the National Science and Technology Development Agency, Thailand
May 2002



INTRODUCTION



APEC (Asia-Pacific Economic Cooperation) was established in 1989 in response to the growing interdependence among Asia-Pacific economies. It is the primary regional vehicle for promoting open trade and practical economic cooperation. APEC encompasses enormous diversity in many dimensions – political systems, language, physical environments, economic prosperity, level of scientific and technological development etc. In 2000, its 21 member economies accounted for 55% of total world income and 46% of global trade. In order that development is sustainable both economically and environmentally, APEC encourages various cooperative activities such as the Center for Technology Foresight. APEC is a relatively loose grouping, based on consensus and voluntary commitments of members. It has numerous Working Groups and Task Forces which oversee cooperative projects and ultimately report to annual meetings of Finance Ministers and APEC Leaders. Other Ministerial Groups also meet from time to time.

In APEC terminology, the word 'economy' is used instead of 'country'. The members are Australia; Brunei; Canada; Chile; China; Hong Kong, China; Indonesia; Japan; South Korea; Malaysia; Mexico; New Zealand; Papua New Guinea; Peru; the Philippines; Russia; Singapore; Chinese Taipei; Thailand; the USA, and Vietnam.

The APEC Center for Technology Foresight (CTF) was initiated by the National Science and Technology Development Agency of Thailand, and developed with the assistance of foresight experts from many countries. It was officially launched on February 3 1998 with an opening ceremony presided over by the Thai Minister for Science, Technology and Environment.

The origins of the APEC Center for Technology Foresight can be traced to an initiative by Professor Yongyuth Yuthavong, then Director of the National Science and Technology Agency of Thailand (NSTDA), in late 1994. He became interested in the possibility of technology foresight as a tool to assist strategic planning in science and technology both in Thailand and in the wider context of the activities of the Asia-Pacific Economic Co-operation (APEC).

In October 1995, through Prof Yongyuth's influence, Thailand proposed the concept of an APEC Center for Technology Foresight to the APEC S&T Ministers' meeting in Beijing to provide a focus for the application of technology foresight in the Asia-Pacific region. The proposal was accepted and NSTDA applied through the APEC Industrial Science and Technology Working Group (ISTWG) for funding from the APEC Central Fund to carry out a feasibility study, which was granted.

From early 1996 until mid 1997 a series of meetings was held in Bangkok with experts from Japan, Australia, Korea, UK and the Philippines providing training in foresight techniques and developing a feasibility study for an APEC Center. During this period a survey of opinions from experts in APEC economies was carried out to provide a base for possible topics to be tackled by the Center. The details of this survey and the feasibility study were presented to an APEC Symposium on Technology Foresight organised by NSTDA in Chiangmai in June 1997. All the participants strongly endorsed the concept of an APEC Center. The Thai Government agreed to support the Center, but the launch unfortunately coincided with the the Asian economic crisis (1997) and so the initial budget was much lower than had been hoped. In the event, NSTDA decided to go ahead with the Center on a reduced scale with a part-time staff.

During the early years of the CTF, a very wide spread of activities was undertaken, including foresight studies at various levels, different kinds of training and conferences, publications and a website. An external evaluation of the CTF was arranged in mid-2000, and one of the key recommendations was that the staff team should be expanded as soon as possible to the level originally envisaged, including a full time Executive Director. With some recovery from the economic crisis of the late 1990s, NSTDA agreed that this was possible although the budget of the CTF was still not at the level first proposed. NSTDA also agreed to the recruitment of an Administrator and additional Policy Researcher.

Thus by the end of 2001, the CTF was poised to enter a second phase of development. With a staff team almost doubled by new senior posts, and with four years of solid work undertaken, the CTF moved into a position of expanding its international activities and influence, and deepening and strengthening its work within Thailand. 2001 saw growing demand for the CTF's training and consultancy expertise and it is now increasingly able to raise revenue to supplement its core funding from the Thai government.

Throughout 2001, the scope and purpose of the CTF was as outlined below, and this is not expected to change in 2002.

Objective	To develop and diffuse foresight capability across APEC through multi-economy studies, training, consultancy and related activities.
Core Competencies of the APEC CTF	<ol style="list-style-type: none"> 1) Capability to coordinate and facilitate multi-economy foresight studies (with embedded training); 2) Expertise in training and consultancy services; 3) Expertise in foresight methodologies and practice; <p style="text-align: center;"><i>Underpinned by:</i></p> <ol style="list-style-type: none"> 4) Ability to work effectively across a range of cultures and types of organisation; 5) Ability to understand and communicate basic science and technology and its implications for socio-economic development.
Scale of operation	<p>The APEC Center for Technology Foresight is both a national and an international Center. From a solid base in its host economy – Thailand - the Center aims to serve and involve all the members of APEC.</p> <p>The CTF is also pleased to cooperate with non-APEC members where appropriate.</p>

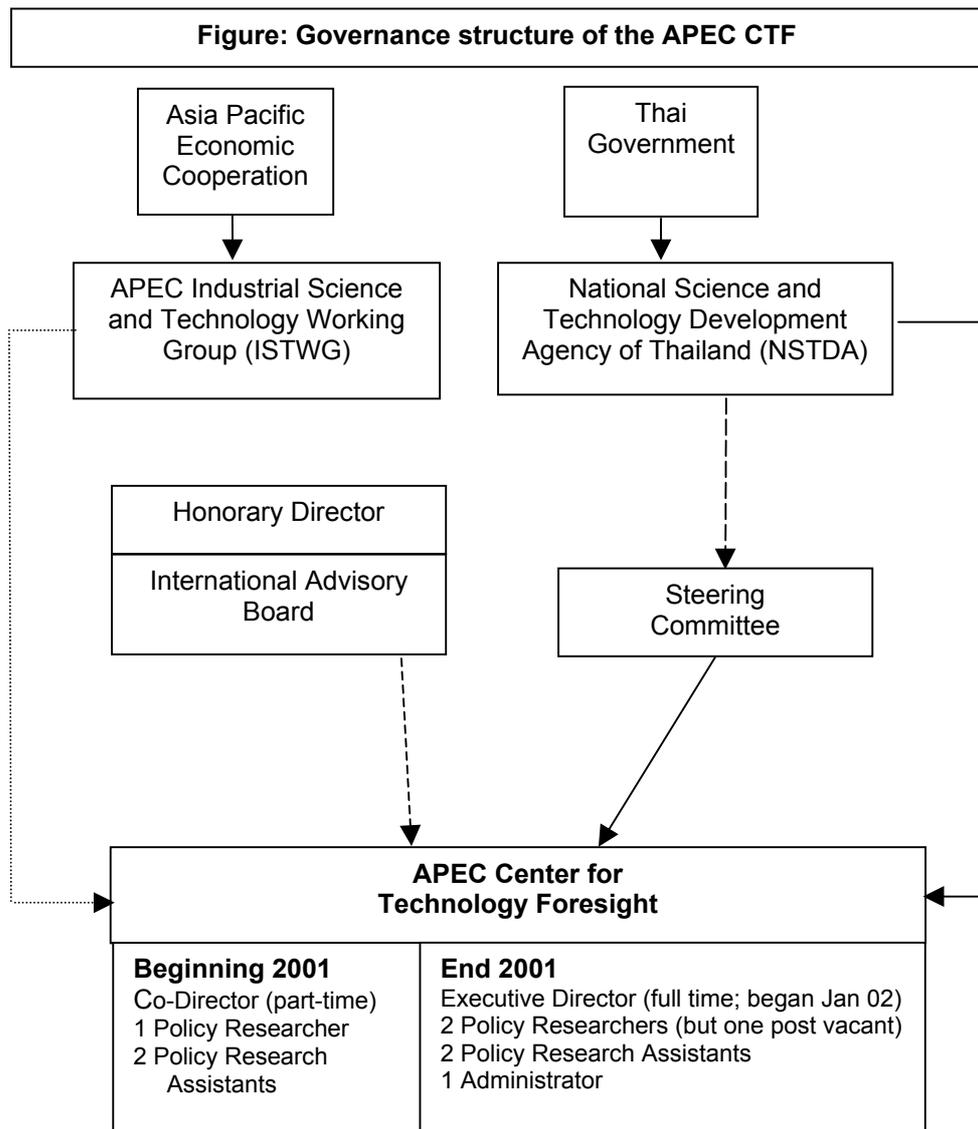
Kindly note that throughout this report, the abbreviation

APEC CTF

Is used for the APEC Center for Technology Foresight

1) GOVERNANCE

It is important to note that the APEC CTF is a unit of the National Science and Technology Development Agency of Thailand (NSTDA), albeit a rather unusual one. Its core funding comes from NSTDA and staff are employees of NSTDA. The CTF is a project of the Industrial Science and Technology Working Group of APEC, to whom it reports biannually, and where it competes with other projects for funding for specific activities. ISTWG support has been strong, with financial backing for the feasibility study, the establishment of the CTF and all of its multi-economy foresight projects to date (except that funding was not sought for this year's project on Nanotechnology). The CTF also relies very much on the support and 'in-kind' contributions of member economies, to whom it is bound by mutual interest and trust rather than formal relationships.



1.1 Steering Committee and International Advisory Board

In line with the recommendations of the feasibility study, the CTF has a **Steering Committee (SC)** of mainly Thai officials (mostly appointed by position) which met on 29 March and 17 September 2001. The role of the Steering Committee is to ensure responsibility for financial affairs and management. The Chair of the Steering Committee is the President of NSTDA.

The CTF also has an **International Advisory Board (IAB)** which met on 1 May and 13 December 2001, with members from Australia, Canada, Japan, Korea, Chinese Taipei and Thailand. The IAB provided guidance to the CTF on many aspects of its work and operations, especially the foresight projects and activities across APEC.

Steering Committee in 2001

Advisor:

Mr. Santhad Somchevita

Permanent Secretary,
Ministry of Science, Technology and Environment, Thailand (MOSTE)

Chairman:

Professor Pairash Thajchayapong

President of the National Science and Technology Development Agency, Thailand (NSTDA)

Members:

Dr. Anamai Singhabhandhu

Deputy Permanent Secretary,
Ministry of Science, Technology and Environment, Thailand (MOSTE)

Mr. Thamarak Karnpisit

Chief Executive Planning Advisor,
National Economic and Social Development Board, Thailand (NESDB)

Associate Professor Songkram Luangtongkum

Deputy Permanent Secretary,
Ministry of University Affairs, Thailand (MUA)

Mr. Manu Leopairote

Permanent Secretary,
Ministry of Industry, Thailand (MOI)

Mr. Pradap Pibulsonggram

Director-General,
Department of Economic Affairs, Ministry of Foreign Affairs, Thailand (MFA)

Professor Montri Chulavatanatol

President,
Kenan Institute of Asia, Thailand

Mr. Khemadhat Sukondhasingha

Deputy Secretary General,
The Federation of Thai Industries, and President of SIKOR Group of Companies, Thailand

Dr. Krissanapong Kirtikara

President of King Mongkut University of Technology, Thonburi, Thailand (KMUTT)

Dr. Sadiq Hasnain

Senior Policy Advisor, National Research Council of Canada

Secretary

Dr. Chatri Sripaipan

Co-Director,
APEC Center for Technology Foresight

International Advisory Board Members 2001

Chairman, and Honorary Director

Canada

Dr. Arthur Carty

President, National Research Council of Canada

Executive Advisor:

Australia

Professor Greg Tegart

Former Director, APEC Center for Technology Foresight

Members:

Australia

Professor Ron Johnston

Executive Director,
Australian Centre for Innovation and International Competitiveness Limited,
University of Sydney

Canada

Mr. Jacques Lyrette

Vice-President, Technology and Industry Support,
National Research Council of Canada

Korea

Dr. Taeyoung Shin

Head, S&T Indicators and Analyses,
Science and Technology Policy Institute

Japan

Mr. Terutaka Kuwahara

Director, Technology Forecast Research Team,
National Institute for Science, Technology and Environmental Policy

Thailand

Professor Sipphanondha Ketudat

Chairman of the Executive Board,
Office of the National Economic and Social Development Board

Dr. Malee Suwana-adth

Independent Consultant (Technology Management) and Special Consultant,
National Center for Genetic Engineering and Biotechnology, NSTDA

Professor Yongyuth Yuthavong

Director, Thailand Graduate Institute for Science and Technology, Thailand

Secretary

Dr. Chatri Sripaipan

Co-Director, APEC Center for Technology Foresight

1.2 APEC Industrial Science and Technology Working Group.

The APEC CTF is a project of the Industrial Science and Technology Working Group of APEC, and its mandate to promote foresight across APEC is derived from this group. The CTF therefore regards it as essential to participate fully in the biannual meetings of the group, and to hold Side Meetings before each ISTWG meeting in order to keep members informed of its activities and seek their participation and their opinions. In 2001, the 20th ISTWG meeting was hosted in Hanoi by Vietnam on 22nd-27th April and the 21st meeting took place in Penang, Malaysia on 8th-11th October <<http://www.usm.my/r&d/apecst>>.

There are also formal accountability requirements when APEC Central Funding has been granted to support any of the CTF's activities. Thus, the CTF also submitted a detailed

Evaluation Report in January, 2 weeks after the completion of its APEC-wide foresight projects on *Technology for Learning and Culture* and *Megacities*, as required by APEC regulations. Unfortunately however, no feedback on this report has been received as the relevant ISTWG “small group” was not functioning properly during 2001.

**20th APEC ISTWG Side Meeting Report
on APEC TECHNOLOGY FORESIGHT**
by APEC Center for Technology Foresight
National Science and Technology Development Agency
(URL: <http://www.apectf.nstda.or.th> Email: apectf@nstda.or.th)
24 April 2001 14.00-16.00 hrs.
Hanoi Horizon Hotel, Song Hong Room
Hanoi, Vietnam

Objectives:

- ❖ To ensure the Center’s activities respond to the needs of APEC members
- ❖ To seek ISTWG delegates’ ideas on new foresight projects
- ❖ To promote understanding of the value of technology foresight

Program:

- | | |
|-------------|--|
| 14.00-14.05 | Introduction
By Dr. Chatri Sripaipan, Co-Director, APEC Center for Technology Foresight and Vice President, National Science and Technology Development Agency (NSTDA) |
| 14.05-14.15 | Six-month Activities Report
By Dr. Chatri Sripaipan |
| 14.15-14.35 | The Center’s Evaluation Report
By Dr. Chatri Sripaipan |
| 14.35-14.50 | Discussion on APEC Technology Foresight Network Project
By Dr. Chatri Sripaipan |
| 14.50-15.20 | New APEC Foresight Project Presentation: “ <i>Nanotechnology – The Technology of the 21st Century</i> ”
By Prof. Greg Tegart, Executive Advisor, APEC Center for Technology Foresight |
| 15.20-15.50 | New APEC Foresight Project Presentation: “ <i>Feeding APEC: A Technology Foresight study of Genetically Modified Food</i> ”
By Dr. Sutat Sriwatanapongse, Director, Thailand Biodiversity Center and Dr. Chatri Sripaipan |
| 15.50-16.00 | Open Discussion |

Participants: 23 delegates from 9 economies: Canada, China, Malaysia, New Zealand, USA, Philippines, Russia, Thailand and Vietnam.

Outcome:

Dr. Chatri Sripaipan, Co-Director of APEC Center for Technology Foresight (CTF), welcome all participants. He then reported on the Center’s six-month activities after the 19th ISTWG meeting. Main activities included planning 2 new APEC-wide foresight projects to be proposed in this meeting, completing 2 new publications, conducting post foresight activities, planning foresight workshops in Malaysia and Mexico this year and an international foresight training workshop “Tools for Managing the Future: a Portfolio Approach” in Bangkok in February 2002.

After 3 years of operation, CTF had an external evaluation as promised at the time of its establishment and the External Review Report was completed. CTF was grateful to Dr. Paul Gander, Senior Policy Advisor at MoRST, New Zealand and to Professor Xue Lan, Vice-President, Development Research Academy for the 21st Century at Tsinghua University, China who were the evaluators. A special meeting of the International Advisory Board and the Steering Committee was convened in December 2000 to review the Evaluation Report and set new direction for the CTF. The meeting acknowledged that the CTF had demonstrated its capacity in carrying out multi-economy foresight by completing 4 projects. It endorsed the recommendations of the evaluators and revised the objective of CTF, definition of foresight and scope of CTF to provide a clear focus for future growth. Its host, the National Science and Technology Development Agency of Thailand, agreed to increase its core staff from 3 to 6.

The progress of the APEC Technology Foresight Network was reported. Its purpose was to provide a tool for communication among members to share ideas and best practices. Members could be organizations and individuals who do foresight work or related activities. The prototype model had been developed and refined. The National Research Council of Canada agreed to cover start-up costs of Can\$37,000. The Network was aimed to launch in August 2001 and CTF committed future running costs and staff time. Member economies interested in joining the APEC CTF Network were urged to nominate co-ordinators for relevant organizations.

Prof. Greg Tegart, the Center's Executive Advisor, gave a presentation on a new APEC Foresight project on "Nanotechnology--The Technology of the 21st Century". The project was proposed by Thailand and co-sponsored by Canada, the Philippines, Chinese Taipei as a self-funded project. Researchers in US, Japan and Australia expressed interests. Issues to be addressed in the study could be: opportunity areas for developing economies, funding of nanotechnology R&D, training and exchange of interdisciplinary scientists, creation of new industry sectors, etc. China commented that the project should have a main theme and focus on applications. China and USA would refer the matter to relevant agencies with the intention to participate. The Philippines hoped that the study could identify R&D areas in its Nano-Science Research Program. China further pointed out that in Technomart IV there would be a forum on advanced materials focussing on nanotechnology. CTF agreed to seek opportunity for cooperation with the forum.

Dr. Sutat Sriwatanapongse, Director, Thailand Biodiversity Center and Dr. Chatri Sripaipan presented the new APEC foresight project proposal on "Technology Foresight Study of Genetically Modified Food in APEC". The project would seek partial funding from the APEC Central fund to support the participation of some experts and an Expert Meeting facilitator. CTF and in-kind contributions from member economies would be expected to cover 75% of the total cost. Because of the potential gains to be made from cooperation with the Agricultural Technology Cooperation (ATC) Working Group, CTF had been negotiating to set up a joint project. While there was a strong general support for the GM food project at the side meeting, both Canada and USA indicated that the substantial policy issues within this proposal would be more appropriately assessed by the expertise within the ATCWG and for that reason the project should only proceed under the direction of ATC. In these circumstances, the meeting had the view that the thrust of the study should be directed to a foresight study of gene technology which is clearly within the ambit of the ISTWG. The project would be redeveloped and brought to the next ISTWG meeting in Malaysia.

The meeting closed at 16.00 hours.

**21st APEC ISTWG Side Meeting Report
APEC Technology Foresight**

By APEC Center for Technology Foresight
National Science and Technology Development Agency
(URL: <http://www.apectf.nstda.or.th> Email: apectf@nstda.or.th)
October 9, 2001: 14.00-15.30 hrs.
Penang, Malaysia

Objectives:

- ❖ To ensure the Center's activities respond to the needs of APEC members
- ❖ To seek ISTWG delegates' ideas on new foresight projects
- ❖ To promote understanding of the value of technology foresight

- 09.00 – 09.15 Activities Report
Dr. Chatri Sripaipan, Co-Director, APEC Center for Technology Foresight and Vice President, National Science and Technology Development Agency (NSTDA), Thailand
- 09.15 – 09.35 Progress Report on the current APEC-wide foresight project, "*Nanotechnology: The Technology for the 21st Century*"
Prof. Greg Tegart, Executive Adviser, APEC Center for Technology Foresight
- 09.35 – 09.55 Discussion on a new APEC-wide foresight project proposal, "*DNA Analysis for Human Health in the Post-Genomic era*"
Prof. Greg Tegart and Dr. Nares Damrongchai, Policy Researcher, National Center for Genetic Engineering and Biotechnology, NSTDA
- 09.55 – 10.10 Presentation of APEC Technology Foresight Network, including ISTWG's role <<http://www.apectf.net>>
Dr. Chatri Sripaipan and Prof Greg Tegart
- 10.10 – 10.30 Open Discussion

Participants: 24 delegates from 9 economies: Australia, China, Korea, Malaysia, New Zealand, the Philippines, Chinese Taipei, Thailand and the United States

Outcome:

Dr. Chatri Sripaipan, Co-director, APEC Center for Technology Foresight, welcomed all delegates and reported the activities of the center during the past six months after the 20th ISTWG meeting in Hanoi.

- **Multi-economy foresight studies.** The self-funded project on Nanotechnology - the Technology of the 21st Century, which received strong support at the 20th ISTWG in Hanoi, is progressing well and a new concept paper on "*DNA Analysis for Human Health in the Post-Genomic era*" is being proposed.
- **Foresight training workshops.** The Center provided a training workshop for the Ministry of Science, Technology and Environment, Malaysia, during 7-10 May 2001 in Langkawi. The workshop was conducted for staff training in preparation for Malaysia's first national foresight program. The Center would run another workshop for NISTPASS, Vietnam, in Haiphong on food processing from 22-25 October 2001. The Center also received an invitation to facilitate a training workshop for the University of Science Malaysia in early 2002. Besides the requests, the Center is organizing an international workshop entitled "*Tools for Managing the Future: A Portfolio Approach*" in Bangkok, 18-22 February 2002. Technology roadmapping would be one of the tools discussed.
- **International links** have been established with UNIDO, ASEAN and the Commonwealth.

- **Others.** The Center has launched the APEC Technology Foresight Network on September 17 with cooperation and assistance from the National Research Council of Canada. The Center will expand its staff from 3 to 6. New staff include an executive director, an administrator, and a policy researcher. It has submitted two articles on sustainable transport and on healthy megacities for the *Foresight* journal to be published shortly.

Professor Greg Tegart, the Center's Executive Advisor, reported on the progress of the current multi-economy foresight project, Nanotechnology - the Technology of the 21st Century. The Center with the strong support of the National Research Council of Canada has been preparing for the Experts' meeting, 5-7 November, in Ottawa. About 30 experts from at least 10 economies are expected. Though China may not send an expert to this meeting, it would accumulate some reports related to the topic in China and send them to the Center.

Professor Tegart and Dr. Nares Damrongchai, Policy Researcher, National Center for Genetic Engineering and Biotechnology, National Science and Technology Development Agency, Thailand presented the new concept paper on "DNA-Analysis for Human Health in the Post-Genomic Era". The topic of gene technology was given high priority at the APEC Technology Foresight Symposium in Chiang Mai in 1997. The technology has been evolving rapidly since then. ISTWG has also encouraged biotechnology projects and it was indicated in the 20th ISTWG side meeting in Hanoi that a proposal on gene technology would be welcome. After various consultations, the Center decided to present the concept paper for discussion. If the reaction is favorable, the Center will develop the modified concept paper into a formal proposal to be submitted to the next ISTWG in early 2002, including a request for partial funding from the APEC Central Fund (approx. US\$50K). If the project is approved by ISTWG and BMC, it will produce an Issues Paper and engage project partners and begin web-based discussion with experts around the region in the latter part of 2002. By early 2003, an Experts Workshop is expected to take place.

The proposal was favourably received and there was a lively discussion on a number of issues such as: the post-genomic era, the development and role of bioinformatics; extension beyond the human genome, and societal and ethical issues. The participants agreed to take the concept paper to their experts and to feed back comments to the Center by the end of the year. The Center will continue its discussions with experts in Thailand and elsewhere to sharpen the focus of the topic with a view to bringing forward a detailed proposal for the next ISTWG meeting.

Kasina Olarnriksupuck, the Center's Assistant Policy Researcher, reported on the APEC Technology Foresight Network www.apectf.net that the Center launched the network on September 17 with the support of the National Research Council of Canada. NRC has jointly initiated and developed this project and will hand it over to the Center to run in 2002. The network aims to facilitate networking and exchange of foresight information, provide support and advice to members regarding foresight, creating an inventory of current foresight activities and reports of completed projects and provide opportunities for innovative ways for members to collaborate. Members of the network are foresight practitioners, but most of the information will be public. The Center is seeking cooperation and support from member economies to nominate "Economy Contacts", complete "Economy Profiles", to publicize the network in each economy, and to encourage individuals and organizations to join. Korea and New Zealand indicated the interest to join the network.

The meeting ended at 15.20.

2) INFRASTRUCTURE

2.1 The APEC CTF team.

As described above, the team of the CTF expanded significantly during this year with 3 new posts for an Executive Director, and Administrator and an additional Policy Researcher. A vacant post for an Assistant Policy Researcher was also filled. Thus considerable effort was put into recruitment and the existing staff -

- Dr Chatri Sripaipan (Co-Director)
- Ms Tamsin Jewell (Policy Researcher), and
- Ms Mayuree Vathanakuljarus (Assistant Policy Researcher)

were joined by:

- Ms Kasina Olarnriksupuck (Assistant Policy Researcher) – from January, and
- Ms Chongchit Charoensingkorn (Administrator) – from October

Dr Witaya Jeradechakul was recruited as Executive Director, to begin in January 2002 at which time, Dr Chatri would cease to be Co-Director but would continue to take an active interest in the CTF as the Vice-President of NSTDA.

Dr Witaya's career has had two distinct characteristics. In academia, he is a former 'associate professor' who taught courses at both undergraduate and graduate levels with specialization in education, language application, management science, and qualitative research methodology at Srinakharinwirot University, Bangkok. As an administrator, he is a former campus Dean of Faculty of Humanities/Social Science, Srinakharinwirot University at Phitsanuloke (1983-1985); Vice President for International Affairs of Srinakharinwirot University central campus at Prasanmitr (1986-1992); Executive Director of Thailand Management Association (TMA) (1993-1995); and Director-General of the Thailand Committee of the Pacific Basin Economic Council, (1996-2001). With areas of concentration and interest in language, education, and management science and their applications in both national and international perspectives, he is well qualified for the job and now has to turn his attention to developing foresight expertise.

Efforts to recruit an additional policy researcher failed and will be continued in 2002.

Prof Greg Tegart, former Director and now Executive Advisor also supported many of the CTF's activities in 2001 and provided advice throughout the year to aid the CTF's planning and operations.

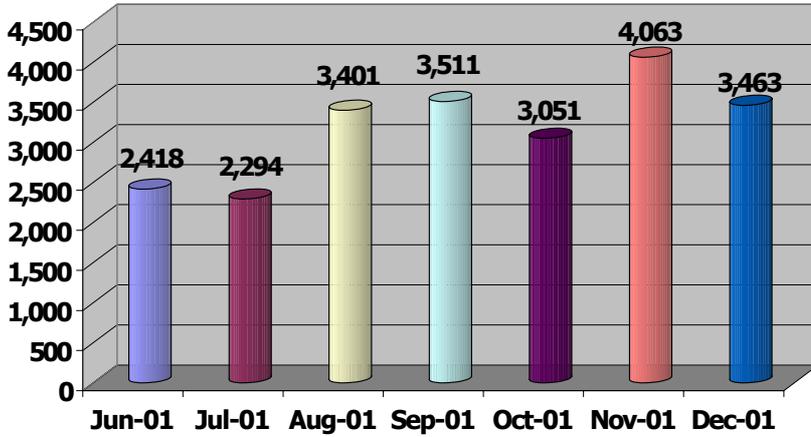
2.2 Web Site Development and Promotion <<http://www.apectf.nstda.or.th>>

The APEC CTF web site has been providing information about the Center, its activities, foresight research projects, and foresight in APEC since October 1997. Its role as an information resource on technology foresight, and a place to exchange information and ideas about foresight generally now overlaps somewhat with the new site of the APEC Technology Foresight Network and so in the long term, it may be logical to merge the two sites. However, there is no duplication of material and at this time the Center's site remains the only one to provide information on our own activities and projects, and links to other relevant sites. It is used especially to provide the material connected with the research projects, such as Issues Papers and project descriptions. Almost all the CTF's publications can be downloaded.

During 2001, the CTF tried using free web promotion services such as yahoo.com, lycos.com, etc to increase its visibility. As it became evident that this was not proving effective, the Center decided to use the services of a Web Promotion company instead. The contract began at the end of August, and since the first 2 months were for 'installation', any improvement in the number of visitors would be anticipated from around November 01. The contract runs for 8 months.

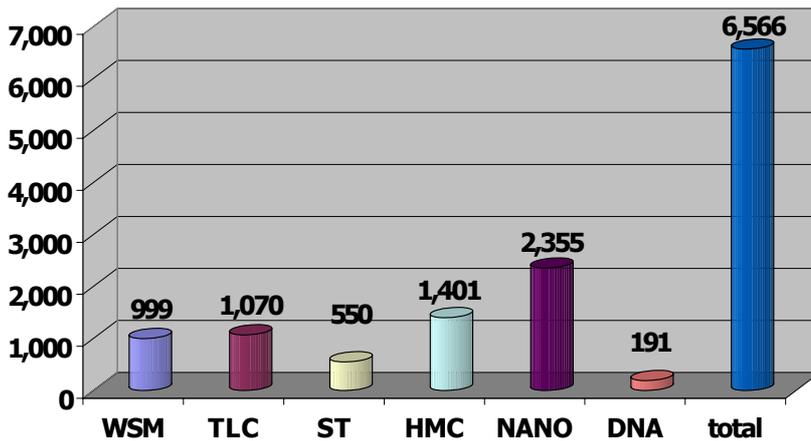
Graphs 2.2.1-3 Summary of Website Visits

Monthly visits to entire site



January – May
data not recorded

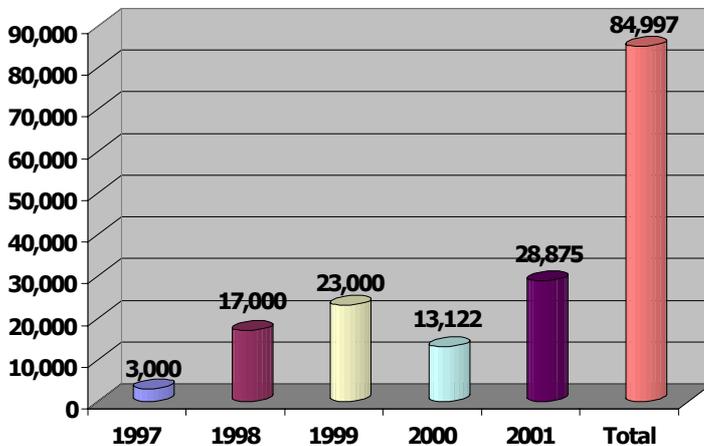
Projects from May 2000 to December 31, 2001



All project pages
opened before
May 2000, except
- Nano 31 July 01
- DNA 13 Nov 01

Key: name of project
WSM = Water Supply and Management
TLC = Technology for Learning and Culture
ST = Sustainable Transport
HMC = Healthy Futures for APEC Megacities
NANO = Nanotechnology
DNA = DNA-Analysis for Human Health

Website visit counts since 1997



Web Promotion Reports

The agreement with the “Webpromotion” was that the company would guarantee that any search undertaken with the major search engine tools (google, yahoo, lycos etc) would yield the Center within the top 20 results. This would apply to searches of 15 Key words which are listed in the table below. By the end of December 2001, the Center’ s website had already been listed and ranked first in the result pages of many search engines.

Table: 15 Key words: searches for these words in the major search engines should yield the CTF within the top 20 results listed:

1. Critical technologies	6. Foresight Training	11. Technology for learning and culture
2. Delphi	7. Megacities	12. Technology forecasting
3. Foresight	8. Scenario Planning	13. Technology foresight
4. Foresight methodologies	9. Sustainable Transport	14. Technology roadmapping
5. Foresight research	10. Technologies for sustainability	15. Water supply and management

Furthermore, the company produced other reports each month, starting from September 2001. These could also be accessed conveniently online through a web page called “Extreme Tracking”. This information allowed the CTF to learn where visitors to its web site were located, in terms of continent and type of web address (.com / .org etc). Further details will be available in the Annual Report 2002, since the bulk of the Web Promotion work will be done next year.

2.3 Budget Report

The CTF had 2 main sources of funds and resources in 2001, and also raised a small amount of revenue through charging for its services. The main sources were:

1. Thai Government, through NSTDA: core funding for the staff and operations. The APEC financial year runs from January – December but the Thai financial year runs from October - September. By the end of the Thai financial year 2001, the CTF had spent all of its allocated budget (Thai Baht 6.3 Million) for the first time ever! In previous years, the main constraint was staff time not funds and there had been significant underspends. But this also reflects the fact that the budget had been slightly reduced while core costs had increased; the level of activity funded from the core budget was similar to the previous year. The CTF’s budget for financial year 2002 (beginning October 2001) was only slightly higher than 2001, at Thai Baht 6.7 Million but staff costs are significantly higher due to the new recruits and thus funds for ‘operations’ are lower.

Table 2.3.1 Budget Report (from October 1, 2000 to September 30, 2001)

No.	Items	Budget* Allocated (฿)	Spending	Committed	Balance
	Total Budget (year 2001, Oct. 00-Sept.01)	8,450,100			
1	เงินเดือนและค่าจ้าง / Salaries including new staff **	2,303,134	2,303,134		
2	ค่าตอบแทน ใช้สอย วัสดุ / Expenditures: perdiem, publication, office equipment, etc	675,500	617,672	786,240***	
3	ค่าใช้จ่ายสาธารณูปโภค / Utilities **	37,500	37,500		
4	เงินอุดหนุน / Support Research Fund	1,893,332	69,451	195,052***	
5	รายจ่ายอื่น / OTHER Expenses				
	- ค่าใช้จ่ายในการจัดประชุม / Meetings, Public Seminars, and Workshops	967,534	1,043,280		
	- ค่าใช้จ่ายในการจัดดำเนินงาน Post Foresight	336,100	84,407		
	- International exchange expenses	2,070,000	2,476,422		
		8,450,100	6,594,366	981,292	874,442

* Budget reallocated upon actual expenditures

** Transferred to other departments

*** Transferred to year 2002

- In-kind contributions from participants in its activities. These have always been very important to the CTF, but were especially significant this year as there was no APEC funds for the APEC-wide foresight project on "Nanotechnology".

Table 2.3.2 APEC Member 'in-kind' contributions to the CTF activities in 2001

Estimated total value = US\$ 228,000

<p>Australia Preparation of a Position Paper (nanobiosystems) and Economy Paper for the Nanotechnology Project. Participation in the Nanotechnology Experts Meeting in Canada; 2 International Advisory Board members.</p>
<p>Canada Hosting Costs for the Experts Meeting on 'Nanotechnology'; Preparation of a Position Paper Paper (nanophotonics) and Economy Paper for the Nanotechnology Project; Participation in the Experts Meeting; Assistance to recruit Experts from other APEC economies for the nanotechnology meeting; Development of the APEC Technology Foresight Network; 2 International Advisory Board Members and 1 Steering Committee Member.</p>
<p>China Hosted the CTF (including covering all expenses) at Technomart IV, providing CTF with a platform to promote its projects on Megacities and Nanotechnology.</p>
<p>Chinese Taipei Preparation of a Position Paper Paper (nano-structured materials) and Economy Paper for the Nanotechnology Project; International Advisory Board member.</p>
<p>Japan Participation in the Nanotechnology Experts Meeting in Canada; Preparation of a Position Paper Paper (nanoelectronics) and Economy Paper for the Nanotechnology Project; International Advisory Board member.</p>
<p>New Zealand Preparation of an Economy Paper for the Nanotechnology Project. Participation in the</p>

Nanotechnology Experts Meeting in Canada
<u>Korea</u> International Advisory Board member.
<u>Philippines</u> Participation in the Nanotechnology Experts Meeting in Canada; Preparation of a Paper on “Nanotechnology Issues for Developing Economies” and Economy Paper for the Nanotechnology Project.
<u>Singapore</u> Preparation of an Economy Paper for the Nanotechnology Project; Participation in the Nanotechnology Experts Meeting in Canada.
<u>USA</u> Participation in the Nanotechnology Experts Meeting in Canada; Preparation of a presentation on planning and funding for Nanotechnology in the USA.
<u>Vietnam</u> Co-hosting an APEC Technology Foresight Symposium in Vietnam.

3) FORESIGHT PROJECTS

3.1 APEC-WIDE PROJECTS:

3.1.1 Nanotechnology: the Technology of the 21st Century

This project proposal was initiated by Prof Greg Tegart, Executive Advisor to the APEC CTF, and he developed a Concept Paper for the CTF with assistance from the National Research Council of Canada. The project proposal for a self-funded project was enthusiastically supported at the 20th ISTWG meeting in Hanoi, Vietnam in April 2001 with 7 economies deciding to co-sponsor (Canada, China, Korea, Philippines, Chinese Taipei, USA and Vietnam) and a further 6 economies pledging their support and participation (Australia; Hong Kong, China; Japan, Malaysia; New Zealand and Singapore).

There was then an extensive discussion of the goals, scope and process of the project with the International Advisory Board of the CTF on 1 May 2001, and in the few days following this, the CTF was able to finalise the project design and plans.

Position Papers on *nanophotonics* (Canada), *nanobiosystems* (Australia), *nanoelectronics* (Japan) and *nano-structured materials* (Chinese Taipei) were sought in advance of the Experts Meeting as background material and these proved to be substantial and valuable contributions. All the economies invited to contribute papers agreed to do so. The Issues Paper prepared by Prof Greg Tegart was well received and several economies expressed their intention to use it in their planning.

The project was self-funded, partly to 'test the ground' for support for foresight projects in APEC – the result was that participation of APEC member economies was still strong but none of the less developed ones participated at their own expense (the CTF and NRC helped to support experts from Thailand and the Philippines). An Additional Paper on *Nanotechnology Issues for Developing Economies* was provided by the Philippines, which ensured that such issues were brought into the project, but did not succeed in engaging other less developed economies. Prof Tegart and Dr Chatri also tried to discuss such issues during their seminar at Technomart IV in Suzhou China, about a month before the APEC experts Meeting.

The calibre of experts and their institutions that participated in this project was impressive – the project undoubtedly reached some of the top experts in this field and linked in with the key institutions in some economies. These links were not made through the ISTWG focal points, but through the networking and support of the IAB. Although a few ISTWG contacts were helpful during the project, many others did not provide any assistance whatsoever even where the economy had co-sponsored the project.

The Experts Meeting

This was generously hosted by the National Research Council of Canada from 4-7 November 2001, in Ottawa. There were 26 experts from 9 economies: Australia (2); Canada (10); Chinese Taipei (2); Japan (1); New Zealand (1); the Philippines (1); Singapore (5); Thailand (2) and the USA (2). Participants met informally at a welcome reception on the evening of 4th November, and then met over a further 3 full days.

On day 1, papers were presented and discussed (position papers, issues for developing economies and status review of each economy), and technological opportunities were identified; debate was lively and participants clearly found it useful.

On Day 2, Prof Tegart and Dr Chatri led a scenario creation process, beginning with identifying the core issues and the focus question for the scenarios: *what are the likely paths of development of nanotechnology in the APEC region to 2015?* Scenarios were refined and completed early on Day 3, leaving plenty of time for discussions to draw out the implications, outcomes and actions. Final discussions addressed gender issues and ethical concerns, and then next steps in the project. The latter part of the meeting (following completion of the scenarios) was the most difficult part for the facilitators, and participants also expressed some confusion about how to draw out the implications. This may be a reflection of the fact that most of the participants were technology experts rather than planners and policy makers and may have little experience with developing strategy.

List of participants and a summary of the evaluation forms returned by participants are given in appendix I and II.

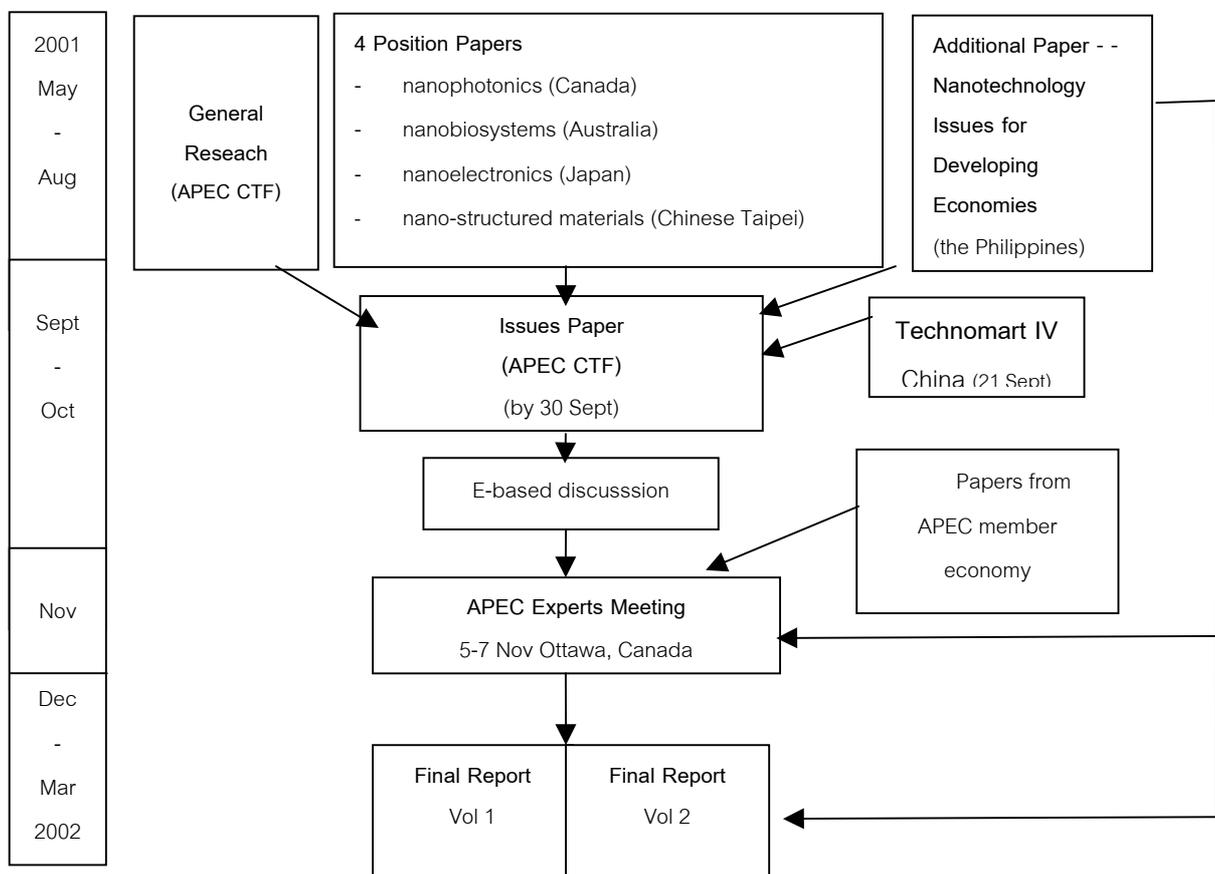
It was clear from these that the workshop was valued by participants, as comments were mostly very positive: for example, “networking and knowledge gain exceeded my expectations”, “a unique opportunity to review the S&T of nanotechnology as well as the social, cultural issues” and “I had a most enriching experience personally, and I am certain that the workshop overall will produce interesting materials and have an impact in economies in APEC. You guys run a very good program!”

Outcomes:

The final report, in 2 volumes, is due for publication in early 2002.

CTF has long recognised the difficulties of making the outcomes of its APEC-wide foresight projects meaningful and relevant to the vast geographical area and diverse economies of APEC, especially when dealing with such broad S&T areas. It is an issue that is reviewed in the light of each project experience. It was concluded after this project that it would not be reasonable to expect the projects to yield action plans. The projects goals are to sensitise economies to important new technology areas and their future implications and to create networking opportunities for experts from around APEC. The Center may need to think carefully about how to promote its projects to potential sponsors and participants without raising unrealistic expectations.

Nanotechnology Project Process



3.1.2 Feeding APEC – is Genetically-Modified Food the answer?

A Concept Paper and Project Proposal for this new technology foresight project was developed by the CTF for presentation at the 20th ISTWG meeting in Hanoi, Vietnam in April. Due to lack of consent from 2 economies, Thailand withdrew the proposal from the meeting.

The project proposal was developed by the CTF, with considerable support from Thailand’s National Center for Biotechnology and Genetic Engineering (BIOTEC) who were keen to take a prominent role in the project. The CTF had originally conceived of general project on Food but had become very concerned at the overlap such a project would have with other activities within APEC, and had therefore decided to focus on a technology topic that would fall clearly into the remit of ISTWG. The CTF also entered into extensive discussions with the Agricultural Technical Cooperation Working Group to try to enlist their

support and participation in the project. Having studied their aims and program, CTF felt that a foresight study could be a useful complement to their activities.

Both Malaysia and the Philippines had offered to co-sponsor and other economies had also expressed their interest. However, at the 20th ISTWG meeting, delegations from Canada and the USA expressed the view that such a project would be more appropriately conducted by the Agricultural Technical Cooperation Working Group (ATCWG) who, they argued, had the mandate to deal with biotechnology issues. Since APEC operates by consensus, this lack of consent from 2 economies made it necessary for Thailand to withdraw the project proposal.

ISTWG advised the CTF that a new project proposal on 'gene technology' would be sympathetically received at the next ISTWG meeting in Malaysia in October 01, though it would be important not to include 'food' issues.

3.1.3 DNA-Analysis for Human Health in the Post-Genomic Era

The CTF responded to the ISTWG advice by developing a Concept Paper for a foresight project in the field of gene technology but applied to human health and presented this to the 21st ISTWG meeting in Penang, where it was received a very positive response in both the CTF's Side Meeting and another Side Meeting on "Infectious Disease and Other Health Issues". The aim was to submit a full proposal to the 22nd ISTWG meeting in early 2002. Again, Thailand's BIOTEC were very helpful and will be key partners in the project if it receives ISTWG support.

3.1.4 Megacities: A Foresight Approach

APEC-wide foresight projects on Sustainable Transport for APEC Megacities and Healthy Futures for APEC Megacities were carried out by the CTF over 1999-2000. During 2001, these projects were followed up with:

- ◆ Brief article in a book published by the Pacific Economic Cooperation Council on 'Cities of the Pacific Rim – diversity and sustainability'.

- ◆ A seminar at Technomart IV in Suzhou, China, on 21 September 2001. The audience comprised a very enthusiastic and interested group of over 200 participants, mainly from city administration and Suzhou Technological University. Prof Tegart was also interviewed for local radio and television.

- ◆ A discussion of the project's outcomes at the 27th Anniversary Meeting of the Chart-Thai party of Thailand. The overall theme of the meeting was 'Quality of Life in Cities'.

3.1.5 Evaluating Past APEC Projects

The CTF sent a short (one-page) evaluation form to all alumni of 4 past projects from 1998-2000. The response rate was very low at only 5%. Responses were positive but, given the response rate, CTF must assume that those with negative attitudes did not bother to reply. One response was especially interesting though:

"I am now a follower of the foresight technique. When we were at the workshop I thought that we were creating science fiction with our four overviews of the water problem. Few months later I started realizing that our collective imagination was very realistic. Now I think that when you want to plan for the future, the opinion of the experts to foresight many aspects of our civilization is unavoidable." Dr Oscar Monroy, Mexico.

3.2 THAI PROJECTS

The APEC Center for Technology foresight encouraged other agencies to undertake foresight projects, through a variety of methods suited to needs of each agency and project.

In 2001, there were three foresight research projects whose budgets had been carried over from the previous year. All of these projects actually completed in 2002 and thus a fuller report will be contained in the Annual Report 2002.

3.2.1 IT for Education

This was a follow up to the APEC – wide project on “Technology for Learning and Culture in the APEC Region 2020”. Education reform in Thailand had been on the rise with the advent of the Education Act, B.E. 2542 (1999). Its section 9 was devoted to the promise of information technology development in order to reduce knowledge gap, increase education delivery efficiency and open new opportunities for learning. Yet the macro policy of IT for education development remained unclear, not mentioning the detail for implementation in far-reached communities. Dr Pichet Durongkaveroj, the Thai foresight sectoral project leader and advisor to the president of King Mongkut’s University of Technology Thonburi (KMUTT) wrote this foresight project with an objective to look, into year 2012, at various possibilities of how IT could shape the teaching and learning modes in far-reached communities. The project engaged the Office of the National Education Council extensively in the planning and implementation process, as well as community leaders. The project expected to derive at IT development strategies suitable to different communities, with full regard of participation and needs of those communities.

Project leader: Dr. Pichet Durongkaveroj, Advisor to the President of KMUTT
Objectives: to review the current and related technological development to envisage future scenario(s) of the Thai educational setting to looking into strategic planning for IT for education
Methodology: Scenario Planning
Time frame: October 2001-June 2002
Funding: the Center has awarded a grant of 700,000 baht

3.2.2 IT for SMEs

The IT for SMEs project was initiated by the Ministry of Industry, Department of Industrial Promotion (DIP), in year 2000. The project was led by Mr. Pairat Piathanom, Managing General of Tele-engineering and Services with the joint coordination of the working group of the Department of Industrial Promotion. The purposes of the project were to promote the Role of Information Technology among SMEs and to determine through consensus what DIP policies and plans to promote use of IT would be beneficial to the SMEs. The key foresight method used was Delphi Survey with two-rounds. It was sent to 2,000 SMEs in three areas of the industry: Automobiles, Electronics, and Food. To increase participation rate and also to disseminate knowledge of IT benefits to SMEs, the project organized four regional seminars.

Project leader: Mr. Pairat Piathanom
Managing General of Tele-engineering and Services
Objectives: to promote the Role of Information Technology among SMEs; and to assess preferred government policies
Methodology: Delphi Survey.
Time frame: January 2002 - March 2003
Funding: the Center has awarded a grant of 602,950 baht

3.2.3 Healthy Cities for Thailand

The Training of the Trainers for strengthening Local Government Capacity on Foresight project was a follow up to the APEC – wide project on “Healthy Futures for APEC Megacities”. It was a training workshop for 24 trainers of city administration in 5 provinces i.e Bangkok, Yala, Chonburi, Nakhon Ratchasima and Payao. The main purpose was to improve the quality and effectiveness of urban planning according to the concept of ‘healthy city’ by using scenario-planning approach. The workshop ran from July 23 to 27, 2001 at Chaopraya Park Hotel, Bangkok. Sessions included were “Healthy Cities” and foresight approach.

Participants did an exercise on scenario-development and results analysis. It was intended that follow up training activities in cities should take place and this will be monitored in 2002.

Project Leader: Dr. Somchai Durongdej, Head of the Department of Nutrition
Faculty of Public Health, Mahidol University

Objectives: to improve the quality and effectiveness of training in urban planning
including the promotion of scenario-planning techniques.

Methodology: One 5-day training workshop, including 2 days of scenario-planning,
plus follow up activities around the country.

Time frame: December 2002 – June 2003

Funding: the Center has awarded a grant of 683,000 baht

4) TRAINING AND CONSULTANCY

4.1 Workshop for MOSTE Malaysia (May)

The CTF was invited to provide a 4-day foresight training workshop for officers of the Ministry of Science, Technology and Environment of Malaysia, from 7-10 May 2001 in Langkawi. This formed part of MOSTE's preparation for a national foresight program.

Participants:	21 participants from S&T Division, MOSTE, Malaysia
Main objective:	To provide general understanding of foresight concepts and national foresight practices in various countries, and to involve participants in a scenario planning exercise, as a preparation for their own plan to implement a national foresight program on new and emerging technologies.
Scope of workshop:	Lectures & discussions about foresight including relevant case studies; overview of Malaysian S&T and issues for the future; a demonstration scenario-planning exercise and delphi survey and discussion of possible approaches for a Malaysian foresight study.
Facilitators:	Prof. Greg Tegart, Dr. Chatri Sripaipan
Assistant facilitator:	Kasina Olarnriksupuck

Evaluation outcomes:

18 out of 21 participants filled in the open-ended evaluation form.

◆ **Benefits from the workshop:**

10 stated more understanding of foresight, 6 stated appreciation of foresight and expressed commitment to put it into use, 2 mentioned benefits from the process as opportunity to "get to know people" and as means to "generate good opinions".

◆ **New skills, knowledge, value gained:**

2 stated confidence in handling foresight if required, 11 stated more understanding of foresight methods and 1 was "not sure". Others wrote that foresight could widen ways of thinking, improve analysis skills, be a new way to look at the future and assess circumstances, think creatively and increase the objectivity of planning.

◆ **Workshop Rating: Scale of 5 as good and 1 as poor**

8 participants rated 5 for the process, with 10 rated 4 (average 4.4)

8 participants rated 5 for the content and issues coverage, with 10 rated 4 (average 4.4)

10 participants rated 5 for organization and materials, with 8 rated 4 (average 4.6)

◆ **Final notes from evaluation:**

5 gave additional comments that more in-depth training and exercises should be provided.

One suggested training for other government departments too.

◆ **Other indications of outcomes:**

The key person responsible for drafting the Terms of Reference for the Malaysian National Foresight Study commented that his understanding and appreciation of foresight was much greater, and that on the basis of this workshop, he would substantially revise the TOR.

Conclusion:

In the view of the CTF, the workshop met its objective. We base this conclusion on the very positive evaluation forms returned and importantly, the notes from key participants who are to plan and conduct the national foresight; these clearly indicated that they have more understanding and appreciation of foresight with some commitments to use it as a planning tool. The workshop has also influenced an adjustment in the ToR. A few stated that further training would be beneficial.

4.2 Workshop in Vietnam on Food Processing (October)

This training workshop was one outcome of the "APEC Symposium on Technology Foresight" held on April 23, in Hanoi which proved to be the starting point of foresight activities in Vietnam. The CTF was invited to conduct the workshop on "Food Processing in Vietnam" for the National Institute of Science and Technology Policy (NISTPASS), Ministry of Science, Technology and Environment (MOSTE) from October 22-25 in Hai Phong City.

This workshop was conducted in both English and Vietnamese simultaneously. Some of the participants spoke English well but many did not; the CTF team did not speak Vietnamese at all. Therefore the translation provided mainly by Dr Sinh was essential.

Participants:	23 participants from food processing-relevant agencies
Main objective:	To provide knowledge of foresight approach and areas of concerns addressed in some other food processing foresight studies and to involve participants in a scenario planning exercise for food processing industry planning in Vietnam.
Scope of workshop:	Lectures & discussions to introduce the concept of foresight; presentations and discussions on issues regarding 'Food for the Future', agriculture and food processing issues in Vietnam; a scenario-planning culminating in identifying priority policies and actions.
Facilitators:	Prof. Greg Tegart, Dr. Chatri Sripaipan
Assistant facilitator:	Pun-arj Chairatana
Evaluation Results:	No. of respondents: 13 from 23 participants.

♦ **How have you and your organization benefited from this event?**

Respondent No:

1. To master foresight in food processing.
2. Priority setting has always been a challenge for every sector. From the workshop we have learnt something new to see or to forecast¹ our future needs. Perhaps it could help us to determine the right way for setting the priorities for our sectors not only in food processing.
3. Technology foresight for improving of food processing.
4. Important knowledge for research in future.
5. Technology foresight for improving of food processing.
6. Approaching to a quite new methodology in the field of S&T forecasting.
7. Know more about the new technique applying for long term strategy planning. Exchange ideas with other participant during the workshop.
8. New knowledge and technique has been learned.
9. My institute benefits from a new methodology.
10. Learning new concept and approach that could be applied.
11. For me – good. For institute – good.
12. I am learning a very interesting methodology as foresight.
13. I benefit from participation method.

♦ **What new skills, knowledge or value have you gained?**

1. (No translation)
2. To see account from different view points (look into the future from the present and from the future backward to the present). Discover potential influencing factors and describe them. Build scenarios based on these events.
3. Identification of issues and key drivers for food processing. To value the inputs to the scenario for develop of new GM food product in Vietnam.
4. Skills, knowledge on analysis, selection and construction of priorities, drivers and uncertainties for construction of scenario.
5. Identification of issues and key drivers for food processing. To value the inputs to the scenario for develop of new GM food product in Vietnam.
6. The process of producing different scenarios.
7. Methodology to think and do clearly and systematically about works relating to planning. Steps and ideas of foresight technique.
8. The way of organizing workshop is very new. Communications during the workshop is quite rich.
9. To build scenario for my NISTPASS. Each learner can learn actively in each group. The knowledge of the workshop is very new in Vietnam. To learn working in group.
10. Group working experiences
11. Scenarios – drivers, uncertainties

¹ Two participants (No. 2 and No. 6) cannot differentiate the term of foresight from forecasting. However they showed understanding in Question 2 that foresight emphasizes possibilities of different future scenarios.

12. (no translation)
 13. The technique of how to organize a foresight exercise.
- ◆ **Please provide any additional comments on how the event could have been improved.**
 1. It is necessary to organize more workshops like this for various sectors in Vietnam.
 2. The theme for key study chosen was too difficult.
 3. Training course in larger scale in foresight on food processing on raw local material in Vietnam.
 4. Training course on technology foresight in food processing on raw local materials in Vietnam.
 5. The event has been organized perfectly.
 6. Should provide more quantitative techniques in foresight method. If it has? May be because of limited time. Next phase.
 7. We hope we will learn more new skills and knowledge and training every year. Thanks.
 8. It is necessary to diffuse foresight wider to the other sector in Vietnam.
 - ◆ **Please use the following scale to rate the workshop.**
5 (Good) _____ 4 _____ 3 _____ 2 _____ 1 (poor) _____
Participant ratings of the workshop organization (out of 5)
 - ◆ Process: Average (mean) response = 4.46
 - ◆ Content and Coverage of Issues 4.45
 - ◆ Organization and materials 4.15

4.3 Workshop on Technology Roadmapping in Bangkok (13 December 2001)

The CTF provided a half-day training workshop on Technology Roadmapping, at NSTDA in Bangkok on the afternoon of the 13 December 2001. The event was led by Professor Ron Johnston, Executive Director of the Australian Center for Innovation and International Competitiveness Limited (ACIIC), University of Sydney, Australia. There were 32 participants from NSTDA, Ministry of Science, Technology, and Environment, and the private sector (full details in appendix III).

4.4 Design and Preparation for an International Foresight Workshop (February 2002)

The Center organised a general technology foresight training workshop with participants from 6 APEC economies in 1998. This received some subsidy from the APEC Central Fund since it was one of the launching events of the new Center. Without this subsidy, the Center was regrettably unable to offer the training event in the following years due to the economic downturn, which made it impossible for sufficient numbers of potential participants to find funds for the fees and for overseas travel. Instead, the Center concentrated on training sessions within economies, notably Thailand, Malaysia and Vietnam.

At the end of 2000, Prof Ron Johnston, a member of the Center's International Advisory Board, proposed to the CTF that it was time to start planning for a new international workshop. It was decided to allow plenty of lead time, since the CTF was not sure of the demand and whether the economic recovery had been sufficient. Thus, during 2001, very considerable effort was expended to design, plan and market a course called: *Tools to Manage the Future: A Portfolio Approach*. The efforts of Prof Johnston and the CTF were richly rewarded in February 2002 when the course ran with 29 participants from 11 economies. A full report will be contained in the Annual Report 2002. The support of the Commonwealth Science Council (CSC) was a key ingredient in the success of marketing this course, and the developing relationship between the CSC and CTF over 2001 indicated the CTF's growing reputation (see section 7: International Cooperation).

5) THE APEC TECHNOLOGY FORESIGHT NETWORK
<http://www.apectf.net>

This was a major new initiative of the CTF, which was under development throughout the year, though the official launch took place on 17 September.

The Network project was originally conceived by Mr Jacques Lyrette, Vice-President of the National Research Council of Canada and member of the International Advisory Board of the CTF, based on his experience of the Canadian Technology Network. The idea was to connect foresight practitioners globally, to enable them to share ideas and experiences. At the same time, by recruiting foresight experts to the Network, a very valuable data base would be developed of foresight practitioners contact details, their areas of expertise and interest and their projects and publications.

The Network was designed and developed by the NRC, specifically the coordinators of the Canadian Technology Network (CTN) and the Canadian Institute for Science and Technology formation (CISTI), in consultation with the CTF. The web site was hosted by the NRC with the intention to transfer it to the CTF in 2002. The NRC also took on the role of Moderators and Administrators of the site, but again, the plan was to transfer this after suitable training activities for the staff of the CTF, in early 2002.

The APEC Technology Foresight Network was launched at an evening Reception held at the Siam City Hotel, presided over by the President of NSTDA, Prof Pairash Thajchayapong. The Guests of Honor were His Excellency the Ambassador of Canada Dr. Andrew McAlister, who delighted the audience by opening his speech in Thai although it was one of his very first engagements in the country, and Mr Jacques Lyrette, who explained the genesis of the Network and demonstrated the website with a 'live' Internet connection. The CTF used this occasion to publicise all of its activities and present a colourful display of its achievements and publications.

By the end of 2001, the Network was just beginning with a small number of initial members. Major efforts to recruit members will take place in 2002.

6) FORESIGHT PUBLICATIONS

During 2001, the CTF produced 4 new publications.

Firstly, a book of some 180 pages was written in Thai, “การมองอนาคตเพื่อภูมิภาคเอเชียแปซิฟิก” (APEC CTF and Foresight for Asia Pacific Region) to explain the work of the CTF in the language of its host economy. All previous publications had been in English which is the official language of APEC and obviously the one that reaches the widest audience across the region. But it was deemed important for the local hosts to understand the importance of the work their government was funding, and to promote foresight amongst Thais in the hope of their ongoing support for the CTF. This book also included translations into Thai of the shorter policy volumes of the final report of each APEC study, to ensure that Thai policy-makers and decision-takers could also benefit as much as possible from the studies.

Secondly, an article on *Sustainable Transport for APEC Megacities* was prepared by Prof Greg Tegart (Executive Advisor to the CTF) and Mr Ainsley Jolley (Consultant to the Sustainable Transport study). This was accepted for publication in *Foresight: the Journal of Future Studies, Strategic Thinking and Policy Vol 3 No 5*.

Thirdly, the CTF was invited to participate in a panel on Regional Foresight at the 21st International Symposium on Forecasting “The Future of Forecasting”, hosted by the Georgia Institute of Technology, USA June 2001. Since the CTF was unable to attend, due to a clash with the NSTDA Annual General Meeting, Tamsin Jewell (Policy Researcher) prepared a report on this theme which was distributed by the panel organizer (Dr Guenter Clar, European Commission Research DG, Science & Technology Foresight).

The Annual Report 2000 was also published in March 2001.

For a list of all the CTF's publications to date, please see appendix IV. Almost all of our publications can be downloaded free from the web site at:
<http://www.nstda.or.th/apec/html/publica1.html>.

7) INTERNATIONAL COOPERATION

7.1 Technology Foresight Symposium: Hanoi Vietnam 23 April 2001 (one day prior to the ISTWG meeting).

This one-day event was co-hosted by the National Institute for Science and Technology Policy and Strategic Studies (NISTPASS) of Vietnam and the APEC CTF. The theme was *Technology Foresight for Development*. Speakers included Prof. Greg Tegart (Executive Advisor), Dr. Chatri Sripaipan (Co-Director) and Dr. Sutat Sriwatanapongse, Director of the Thailand Biodiversity Center who talked about the project he had led on "Thai Foresight in Agriculture". There were other speakers from Vietnam and sequential translations from English / Vietnamese were provided. The event was presided over by the Vice-Minister of MOSTE Vietnam and there were approximately 80 attendants from 8 APEC member economies.

One valuable outcome was that high-level government support was secured for foresight activities in Vietnam, and the CTF was subsequently asked to provide a training workshop in Haiphong in October 2001 in a support of their first foresight study on food processing see section 4.2 for details).

7.2 ISTWG Policy Forum

Immediately preceding the ISTWG meeting in Penang, Malaysia, an APEC Science and Technology Policy Forum was held. This meeting was considerably more active and dynamic than the ISTWG meeting itself, with broad participation including high level government and academic scientists, technologists and S&T managers, as well as around 40% private sector participants. Thus the Forum is likely to have a strong impact on ISTWG itself. One purpose of the forum was to see if there was sufficient interest and rationale to convene a meeting of APEC S&T Ministers (the last one was 3 years ago), and this was actually agreed – it may be hosted by New Zealand in early 2003.

The Forum was structured around 4 key issues which were extensively debated through a web-based forum, and then explored through further discussions over 1 and ½ days, concluding with recommendations to ISTWG and APEC. In future, it seems likely that projects that fit these four issues are far more likely to obtain ISTWG support and APEC Central funding. The 4 issues were:

- Developing S&T Networks in the APEC Region
- Strategic Technology Roadmapping
- Human Capacity Building for S&T in the New Economy
- Connecting Research and Innovation

The outcomes of discussion on these issues have many implications for the CTF. The CTF monitored all the discussions and took an active role in two: Developing S&T Networks in the APEC Region and Strategic Technology Roadmapping. Prof Greg Tegart attended the first, and attempted to convey how multi-economy foresight projects could help to build such networks effectively.

The theme of 'Strategic Technology Roadmapping' was of special concern to the CTF. The CTF participated fully in the web discussion, while at the meeting itself Dr Chatri Sripaipan was grateful to the organisers for the opportunity to chair one of the small group break-out sessions and to contribute to plenary discussions. While the CTF was broadly supportive of the efforts to promote this valuable foresight technique, it was concerned that claims for its effectiveness and applicability should not be exaggerated, especially at the expense of the many other valuable foresight techniques that might be more appropriately adopted for certain situations. The CTF therefore put significant efforts into intervening in this theme, to share its critique of Technology Roadmapping as it had been presented this far in the Forum with other delegates and was pleased to find a generally sympathetic audience. While the CTF strongly supported the intentions of members to share experiences and outcomes of Roadmapping activities across the region, it was dubious about whether an APEC-wide technology roadmap should be attempted.

7.3 COMMONWEALTH SCIENCE COUNCIL <<http://www.comsci.org>>

In several meetings and other communications throughout 2001, Dr Ken Lum, Director of the Science and Technology Division of the Commonwealth Secretariat, and Secretary of the Commonwealth Science Council (CSC) demonstrated a keen interest in the CTF's activities. The membership of the CSC is much larger than APEC but includes over a third of the APEC members. Under the influence of His Excellency Minister Ngubane of South Africa (current Chair of the CSC; South Africa have had a unique and valuable national foresight program)), the Council is clearly a great supporter of foresight activities, and Dr Lum offered to encourage mutual members to participate in our activities whenever he gets the chance.

The Council generously provided for 5 travel awards to enable its members to join the foresight training workshop on *Tools to Manage the Future*, in Bangkok 2002. An expert in nanotechnology applications in 'high-tech' medicine from Cyprus had hoped to take part in the Nanotechnology Experts Meeting but was regrettably unable to attend at the last minute.

7.4 United Nations Industrial Development Organisation (UNIDO)

CTF had meetings with Mrs Dan Liang, Director of Investment and Technology Promotion branch (21 Feb) and Dr Toshiyuki Miyake, Project Manager, Investment and Technology Promotion Branch (3 April).

With Mrs Liang, CTF held general discussions about how to cooperate and promote foresight. UNIDO wish to extend their activities into Asia, in a similar fashion to their work in Latin America and Eastern Europe. UNIDO was aware that CTF was already operating in APEC economies and preferred to cooperate rather than risk duplication. It was agreed to keep each other informed of activities.

Dr Miyake then proposed a bilateral project, under UNIDO with Japan as the donor country and Thailand as the beneficiary. Through discussions, CTF attempted to focus the project onto applying foresight in the private sector. A secondary goal would be to develop guidelines on foresight methods more appropriate for developing economies. This topic appeared to be a particular interest concern of UNIDO, and was a major theme of UNIDO's foresight conference in Vienna in April. This project would be between NSTDA and UNIDO, but CTF staff (who are also NSTDA staff) would be fully involved. Were there to be an opportunity to develop this into a regional project, it was thought that the CTF could then become formally involved.

Unfortunately, despite these promising beginnings at the start of the year, nothing concrete developed. By the end of 2001, CTF was still waiting for news about the possible Thai-Japan project.

7.5 ASEAN TECHNOLOGY SCAN AND FORESIGHT PROJECT

The Committee on Science and Technology of ASEAN initiated a new project with two parts:

- (I) Feasibility study and program on technology scan and foresight for ASEAN; and
- (II) Design, development and delivery of training courses on technology scan and foresight.

Dr Chatri Sripaipan (Co-Director) bid successfully to be selected as the ASEAN foresight training expert, to provide part (II) but the project was critically dependent on the recruitment of Japanese Consultants for both parts and these could not be found. At end of 2001, it seemed unlikely that the project would get off the ground.

7.6 APEC R&D LEADERS' FORUM

The APEC R&D Leaders' Forum is a project of ISTWG which is co-hosted by Canada and Chinese Taipei but whose meetings are intended to rotate around APEC member economies. NSTDA agreed to host the 4th meeting of the Forum in Phuket, Thailand in November 2002, on the theme of "The Challenges for Research and Technology Organizations in the Knowledge-based Economy". In view of their experience of dealing with ISTWG and with experts from across the APEC region, the staff of the CTF were asked to provide substantial support to the organisation of this meeting. In late 2001, CTF staff helped to refine the Concept Paper for the meeting and to recruit the CTF's International Advisory Board members to support the event. A report of this event will be contained in the Annual Report 2002.

APPENDIX I
Nanotechnology List of Participants
APEC Experts' Meeting on Nanotechnology
4-7 November 2001 at the Delta Hotel, Ottawa
Hosted by the National Research Council of Canada

Australia

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APEC CTF

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**APPENDIX II
Nanotechnology Evaluation Report
November 2001, Ottawa, Canada**

15 of the 26 Experts completed an Evaluation form.

Summary of Results:

The form asked the following questions:

- 6) Does the workshop meet your expectations? In what ways?
- 7) What do you think are the benefits of foresight process? What should be improved?
- 8) Are you satisfied with the outcomes of the workshop? How would the outcomes benefit the development of nanotechnology in your economy and in the APEC region?
- 9) Workshop organization:

	Excellent	Very Good	Good	Fair	Poor
Venue.....					
Food & Beverage.....					
Program.....					
Documents preparation.....					
Communications before the workshop.....					

A selection of participants comments:

Question 1:

- ◆ *It is much better than my expectation not only to share the development experiences in the nanotech with the experts from different economies but also learn the methodology of foresight.*
- ◆ *Yes, one of my main expectations was to be informed about the nanotechnology activities in other APEC countries. I was also very interested in experiencing a foresight process and found it extremely useful.*

Question 2:

- ◆ *I was very impressed with the entire foresight process. The whole mechanism was extremely useful to identify what is essential in the field and how it reflects on society as a whole.*
- ◆ *Thinking outside the box! Good opportunities for thinking through issues and discuss cross-cultural matters.*

Question 3:

- ◆ *...Chinese Taipei will launch the national foresight program from 1 January 2002 and nanotechnology will also be chosen as one of the national program. Therefore, the methodology for the scenario study during the meeting will be useful for the NFP and of course the outcomes benefit the development of nanotechnology in my economy.*
- ◆ *..I do not think that the outcomes would influence much what happens in the US, but considering that we are well on our way to implement the NNI, it is not surprising. It was an extremely educational experience for me personally, and I expect that the conclusions will have an impact in even economies in Latin America that did not participate in the workshop. I will do my best to disseminate the materials that you make available among those in LA.*

Participant ratings of the workshop organization (out of 5)

- | | |
|--------------------------------------|-------------------------------|
| ◆ Venue: | Average (mean) response = 4.5 |
| ◆ Food & beverages: | 4.4 |
| ◆ Program: | 4.2 |
| ◆ Document Preparation | 4.2 |
| ◆ Communications before the workshop | 3.8 |

APPENDIX III

Training Workshop: Technology Roadmapping
List of participants
December 12, 2001

PRIVATE SECTOR

The Brooker Group Public Company Limited

Dr. Peter Brimble, President

OFFICE OF THE PRIME MINISTER

Office of the National Economic and Social Development Board

Mr. Thamarak Karnpisit

Chief Executive Planning Advisor

MINISTRY OF SCIENCE, TECHNOLOGY AND ENVIRONMENT

Office of the Permanent Secretary

Ms. Kobkeao Akarakupt,

Director of Office of Policy and Planning

Dr. Yada Mudapitak

Chief, Office of Policy and Planning

Pollution Control Department

Miss Anuda Tawatsin

Environmental Officer

Department of Science Service

Ms. Nara Phatharanavik, Chief, Policy and Planning Sub Division

NATIONAL SCIENCE AND TECHNOLOGY DEVELOPMENT AGENCY

Central Office

Dr. Chachanat Thebtaranonth, Vice-President

Dr. Chatri Sripaipan, Vice-President

Dr. Witaya Jeradechakul, Executive Director, APEC CTF

Dr. Kittiwat Uchupalanan, Acting Director of Organization Development

Ms. Akraya Nualchawee, Project Analyst

Ms. Chongchit Charoensingorn, Administrator

Ms. Mayuree Vathanakuljarus, Assistant Policy Researcher

Ms. Navarat Thamviharnkhun, Technical Officer

Ms. Nucharin Ratchukool, Assistant Researcher

Ms. Siriporn Pittayasophon, Assistant Policy Researcher

Mr. Pasu Tiewtranon, Assistant Policy Researcher

Mrs. Supatra Ngarmsaard, Planning Analyst.

Ms. Tamsin Jewell, Policy Researcher

BIOTEC

Dr. Malee Suwana-Adth, Special Consultant

Dr. Omjai Yuktavety, Director of Management Division

Dr. Ruud Valyasevi, Researcher

Miss Walaitip Chotiwongpipat

Research Development Design and Engineering Promotion Manager

Ms. Thipayawan Thanapaisal, Policy Researcher

Ms. Tipawan Tangjitpiboon, Assistant Researcher

Ms. Uthaiwan Grudloyma, Technical Officer

Ms. Watcharin Meerod, Planning Analyst

MTEC

Dr. Paritud Bhandhubanyong, Director

Dr. Sommit Kotarawibul, Assistant Director

Ms. Anchaliya Sahachartkosi, Policy and Planning Analyst

NECTEC

Ms. Apinya Kamolsook, Research Assistant

National Information Technology Committee Secretariat (NITC)

Dr. Kasitorn Pooparadai, Researcher

Dr. Pituma Puntawee, Researcher

Foresight Project Outputs

1. **Water Supply and Management in the APEC Region**
Vol 1: Summary Report (1999) Vol 2: The Supporting Material (1999)
2. **Technology for Learning and Culture in the APEC Region to 2010**
Vol 1: Summary Report (2000) Vol 2: The Supporting Material (2000)
3. **Sustainable Transport for APEC Megacities: Issues and Solutions**
Vol 1: Summary Report (2000) Vol 2: Full Report (2000)
4. **Healthy Futures for APEC Megacities**
Vol 1: Summary Report (2000) Vol 2: Summary Record of a Foresight Project (2000)
5. **The Future of APEC Megacities: A Foresight Approach: Review of Studies by the APEC Center for Technology Foresight 1998-2000 (December 2000)**
6. **APEC CTF and Foresight for Asia Pacific Region (in Thai 2001)**
ศูนย์คาดการณ์เทคโนโลยีเอเปคกับการมองอนาคตเพื่อภูมิภาคเอเชียแปซิฟิก

General Books on Foresight

1. Proceedings of the APEC Symposium on Technology Foresight, held in Chiang Mai, Thailand in July 1997.
2. Applications of Technology Foresight: Proceedings of the First Public Seminar, held in Bangkok, Thailand in February 1998.

Conference Papers

1. *Technology Foresight as a Tool for Strategic Science and Technology Planning and Policy Development* by Prof Yongyuth Yuthavong and Dr Chatri Sripaipan. Presented to the 5th ASEAN Science and Technology week in Hanoi, Vietnam, in October 1998.
2. *Multi-Country Foresight – Issues and Challenges*: a paper based on a foresight study in progress on the Future for Water Supplies and Management in the APEC Region to the year 2010, by Ms Tamsin Jewell and Dr Chatri Sripaipan. Presented to the 3rd International Conference of the International Association of Technology Assessment and Forecasting Institutions, in New Delhi, India, in November 1998.
3. *Sustainable Cities – can Foresight help us?* by Prof Greg Tegart, presented to POLMET 2000 – the 6th International Conference on Pollution in Metropolitan Cities, in Kuala Lumpur, Malaysia, March 20, 2000.
4. *Technology Foresight for Urban Sustainability – Regional Collaboration* by Prof Greg Tegart, presented to the 17th World Congress of the Eastern Regional Organisation for Planning and Housing, in Asan City, Korea, October 11-13, 2000
5. *Sustainable Transport for Megacities: Issues and Solutions* , by Prof Greg Tegart, presented to the 17th World Congress of the Eastern Regional Organisation for Planning and Housing, in Asan City, Korea, October 11-13, 2000
6. *Foresight for Healthy Megacities, remarks presented* by Dr Chatri Sripaipan to the PECC General Meeting on Sustainable Cities, in Bangkok, Thailand, October 17-18, 2000

7. *The Approach to and Potential for New Technology Foresight: Proceedings of the International Technology Foresight Conference, March 2000*. Published by the National Institute for Science and Technology Policy, Japan, 2001.
8. *Sustainable Transport for APEC Megacities*: by Prof Greg Tegart (Executive Advisor to the CTF) and Mr Ainsley Jolley (Consultant to the Sustainable Transport study) in *Foresight: the Journal of Future Studies, Strategic Thinking and Policy* Vol 3 No 5.
9. *Regional Foresight – the experience of the APEC Center for Technology Foresight* by Tamsin Jewell (Policy Researcher) for the panel organizer (Dr Guenter Clar, European Commission Research DG, Science & Technology Foresight), *Regional Foresight* at the 21st International Symposium on Forecasting, hosted by the Georgia Institute of Technology, USA, June 2001.

Other Reports

1. Annual Reports 1998, 1999, 2000
2. Activities Report 1998
3. Activities Report 1999-2000 (published in 2001)

