

ANNUAL REPORT 1999

APEC Center for Technology Foresight

National Science and Technology Development Agency
(NSTDA)



Table of Contents

1. Message from the Director	3
2. Introduction	4
3. Steering Committee	6
4. International Advisory Board	7
5. Staff	8
6. APEC Links	9
7. Side Meetings at the APEC Industrial Science and Technology Working Group	10
8. Multi-country Foresight Research Studies	13
9. Post-foresight Activities	19
10. National Foresight Research Study <i>“Thailand’s Technology Foresight for Agricultural Development”</i>	20
11. Involvement in the National Project <i>“Science and Technology for Development: Visions and Strategies for 2020”</i>	21
12. Foresight Training	22
13. Public Lecture on <i>“The Role of Foresight in ‘Wiring up’ the National Innovation System”</i>	24
14. Public Seminar on <i>“Science Policy and Innovation”</i>	25
15. Forum	26
16. Building International Linkages	27
17. Web Site Development	28
18. Publications	29
19. Budget Report	30
20. Future Plan	31
Annex I:	List of Participants in the Experts Meeting in Vancouver, 3-6 May 1999
Annex II:	List of Participants in the Experts Meeting in Melbourne, 27-29 July 1999
Annex III:	Evaluation Report 1998 for APEC

1. Message from the Director

The APEC Center has now completed two years of operation. In that short time the Center has already established a reputation among the APEC economies and it is being approached for assistance with national and sectoral Foresight exercises.

The second year has seen major activity in multi-economy studies. The study on Water Supply and Management was completed and published in two volumes, one for policy-makers and the other containing supporting material. These were well received and there have been post-Foresight presentations in Hong Kong, China; Malaysia; the Philippines; and Thailand. Others are scheduled in 2000.

With support from the APEC Central Fund, obtained with the strong support of the Industrial Science and Technology Working Group, studies have commenced on Technology for Learning and Culture, and Megacities. The latter has two components namely Sustainable Transport and Healthy Futures for APEC Megacities. All of the studies have involved Experts' Workshops to build scenarios and identify issues and one, Technology for Learning and Culture, has involved a major Delphi Study to reach a wider group of experts and stakeholders. The support of APEC economies has been outstanding with up to twelve economies participating in the Workshops and more in the Delphi Study.

While some events have been held in Bangkok, the concept of Bangkok as a virtual Center has gained strength with two Workshops being held elsewhere-Technology for Learning and Culture in Vancouver, Canada with the strong support of the National Research Council of Canada, and Sustainable Transport in Melbourne, Australia with the strong support of the Australian Department of Industry, Science and Resources and the Center for Strategic Economic Studies of Victoria University of Technology. This support is gratefully acknowledged.

Both studies have progressed rapidly and the reports will be published early in 2000. A study on Healthy Futures for APEC Megacities has commenced with the strong support of the Kenan Institute for Private Enterprise at the University of North Carolina and the Center for Disease Control in Atlanta again strengthening the broader APEC involvement with the APEC Center.

The development of the Center would not have been possible without the continued generous support from the Thai Government and the support of the Director and staff of National Science and Technology Development Agency (NSTDA). The Steering Committee of Thai officials has continued to provide valuable advice and the wisdom and support of members of the International Advisory Board is gratefully acknowledged.

Multi-economy Foresight studies have thrown up many challenges for the staff of the Center and without their continued strong support and enthusiasm the rapid progress made in 1999 would not have been possible. I wish to acknowledge the valued support from my Co-Director, Dr Chatri Sripaipan, and the dedicated staff of Ms Monthida Sitathani, Ms Tamsin Jewell, Ms Mayuree Vathanakuljarus and Ms Nalinrat Viwatanant.

I have completed my two year term as Director and now hand over to Dr Arthur Carty, President of the National Research Council of Canada as Honorary Director and I wish him every success in the future of the Center. I am pleased that my association will continue in the role of Executive Advisor.

Professor Greg Tegart

2. Introduction

Establishment

The APEC Center for Technology Foresight was launched on 3rd February 1998, with the approval and generous support of the Royal Thai Government. The office is in Bangkok, Thailand but the Center serves and involves all APEC member economies. Its establishment followed a comprehensive feasibility study, initiated by Thailand and subsequently endorsed at the first APEC Minister's Conference on Regional Science and Technology Cooperation in Beijing in 1995. During the study, the concept of the Center was developed by the National Science and Technology Development Agency of Thailand (NSTDA), with the help of international experts, and an APEC Technology Foresight Symposium with over 100 participants from 16 different economies was held in Chiang Mai, Thailand. The study found widespread support for the establishment of the Center from APEC member economies and from foresight experts around the world. The Center was subsequently established in 1998 with a grant of USD 50,000 from the APEC Central Fund and with an allocation from the Royal Thai Government.

Definition

This Center has adopted the following definition of technology foresight:

“Foresight involves systematic attempts to look into the longer-term future of science, technology, the economy, the environment and society with a view to identifying the emerging generic technologies and the underpinning areas of strategic research likely to yield the greatest economic, social and environmental benefit.”

Objectives

The objectives of the APEC Center for Technology Foresight are to:

- Promote the adoption of technology foresight across APEC member economies
- Provide a means for comparison of technology foresight exercises and implementation in APEC member economies and across the world, with a view to stimulating Best Practice in appropriate methodologies for Foresight in APEC economies
- Conduct technology foresight exercises on an APEC-wide basis, and between relevant member economies
- Improve the quality and effectiveness of technology-related planning and development and priority-setting for research, across APEC member economies
- Develop a technology foresight research and application capability available to APEC member economies and international agencies

Why Foresight?

Technology Foresight provides a mechanism for exploring technological, economic and social futures and helps APEC member economies to identify areas of mutual interest and concern. Technology Foresight offers a powerful tool for understanding and managing technology development and for wider strategic planning on both a national and regional basis. Applied on a regional basis, foresight can also improve the interaction between economies, increasing understanding of each other's strengths and constraints and helping to identify common technology-based development opportunities. The Center intends to make a significant contribution to the policy and planning of science and technology within member economies and throughout the region.

Summary of Activities 1999

In the second year of its operation, the Center focused its activities on developing and enhancing research capabilities as well as promoting technology foresight and outcomes of the foresight research across the APEC region. The Center also organized several public events and foresight training; strengthened national and international linkages; developed its web site; and produced several publications.

The Center undertook 2 new multi-country foresight research projects in 1999, *“Technology for Learning and Culture”* and *“Megacities.”* The Center was granted financial support of USD 150,000 from the APEC Central Fund for the research activities in 1999-2000. The project on ***Technology for Learning and Culture***, commenced in early 1999 with substantial support from the National Research Council of Canada, and was

completed in early 2000. The study involved scenario planning, conducted at the Experts Meeting in Vancouver, and a Delphi study. The final reports were expected in March 2000.

The other project, *Megacities*, consisted of two sub-components—*Sustainable Transport* and *Healthy Futures for APEC Megacities*. The sub-component on Sustainable Transport began in early 1999 and was completed by the end of the year. It received strong support from the Australian Government and the Centre for Strategic Economic Studies of Victoria University, who prepared the Issues Paper and hosted an Experts workshop in Melbourne. The study involved scenario development, experts consultation, and research visits.

The other sub-component, Healthy Futures for APEC Megacities, was undertaken with help from very supportive US partners at the Centers for Disease Control and Prevention at Atlanta and the Kenan Institute of the University of North Carolina at Chapel Hill. A Discussion Paper and a project outline were developed with several revisions through consultation with distinguished experts within and beyond APEC. The project activities involve development of scenarios by a core group of experts in early 2000, which will be reviewed and drawn on by a bigger group of experts later in the year, before a preparation of the final report for distribution.

Besides conducting new multi-foresight research studies, the Center put substantial efforts into ensuring that the outcomes of its first research study, Water Supply and Management, carried out in 1998, was promoted to benefit member economies. Several post-foresight activities were organized, including presentations in Hong Kong, China, Malaysia, the Philippines, and Thailand.

The Center was also involved in the development of technology foresight capabilities of its host economy, Thailand, by supporting the national project on Technology Foresight for Agricultural Development of Thailand as well as participating in the project on Science and Technology for Development 2020.

Foresight training, another crucial activity of the Center, was inhibited by the economic downturn and the issue of financing. However, in late 1999, the Center conducted training at a national level, which proved to be extremely useful. This included a scenario workshop in November and a future methodologies workshop in December. The Center was also invited to facilitate a training workshop in Malaysia and Mexico in 2000.

Two public seminars were organized in Bangkok, consisting of a presentation on the linkage between Foresight and Innovation by Prof. Ben Martin of SPRU and presentations on Canadian experience on science policy and innovation as well as innovation in SMEs by Executives from the National Research Council of Canada. The two events proved very successful and attracted over 100 participants from various sectors.

The Center also maintained its web site as a channel for distribution of information on technology foresight and its activities to the general public. To achieve this, the center had to become more knowledgeable about foresight activities going on within and outside the region. The Center also became a member of two international associations, European Science and Technology Observatory (ESTO) and International Association for Technology Assessment and Forecasting Institutions (IATAFI).

Finally, the center put efforts into making best use of all the materials concerning foresight activities by producing and marketing several publications.

3. Steering Committee

The Steering Committee met four times in 1999 to oversee the work of the center: March 11th, June 18th, September 28th, and December 2nd 1999. The December meeting was combined with the International Advisory Board.

The Role of the Steering Committee is:

- to oversee the operation and management of the Center
- to approve the work plan and project proposals of the Center
- to monitor the progress of the Center
- to monitor the outputs of the Center's studies and their implementation
- to assist in identifying opportunities to obtain additional resources

Steering Committee members in 1999

Steering Committee members	Position
Mr Sunthad Somchevita ogy and Environment (MOSTE)	Permanent Secretary, Ministry of Science, Technol- (<i>Advisor</i>)
Professor Pairash Thajchayapong (<i>Chairman</i>)	Director of the National Science and Technology Development Agency (NSTDA)
Dr Suvit Vibulsresth	Deputy Permanent Secretary, Ministry of Science, Technology and Environment
Mr Thamarak Karnpisit	Chief Executive Planning Advisor, the National Economic and Social Development Board (NESDB)
Associate Professor Songkram Luangtongkum Deputy Permanent Secretary, Ministry of University Affairs (MUA)	
A representative of..	Permanent Secretary, Ministry of Industry (MOI)
Dr Somkiati Ariyapruachaya (<i>Jan-Feb99</i>)/ Director of	Director-General, Dept of Economic Affairs, Minis- try of
Mr Kobsak Chutikul (<i>Mar-Dec 99</i>)	Foreign Affairs (MFA)
Professor Montri Chulavatanatol	Faculty of Science, Mahidol University
Mr Khemadhat Sukondhasingha and President of the SIKOR Group of Companies	Secretary General, the Federation of Thai Industries,
Dr Krissanapong Kirtikara	President, King Mongkut University of Technology Thailand (KMUTT) and Chair, Thai Foresight Unit (TFU)
Professor Greg Tegart (<i>Secretary to SC</i>)	Director of APEC TF Center and Honorary Professor of Science Policy at University of Canberra and Distinguished Visiting Professor at Victoria Univer- sity of Technology, Melbourne
Dr Chatri Sripaipan (<i>Assistant Secretary to SC</i>)	-6- Co-Director of APEC TF Center

4. International Advisory Board

The International Advisory Board of the Center met twice in 1999: on May 2nd and December 2nd 1999. The December meeting was combined with Steering Committee.

The Role of the International Advisory Board is:

- To provide guidance to the Center by establishing the broad strategies, identifying opportunities and ensuring relevancy
- To act as an extension of the Center by promoting the role of the Center, providing outreach and advocacy
- To monitor the progress of the Center against the work plan and provide advice
- To provide insights into Technology Foresight activities in the member economies
- To promote the participation of the APEC members in activities of the Center

International Advisory Board members 1999

International Advisory Board members	Position
Professor Yongyuth Yuthavong (<i>Chairman</i>)	Director, Thailand Graduate Institute of Science and Thailand Technology (TGIST), National Science and Technology Development Agency
Professor Sipphanondha Ketudat Thailand	Chairman of the National Economic and Social Development Board (NESDB), Thailand
Professor Ron Johnston and Australia	Executive Director, Australian Centre for Innovation International Competitiveness, University of Sydney
Dr Arthur Carty Canada	President, National Research Council
Mr Terutaka Kuwahara Japan	Director, 4 th Policy-oriented Research Group, National Institute of Science and Technology Policy (NISTEP)
Dr Taeyoung Shin Korea	Director, Industrial Innovation Studies, Science and Technology Policy Institute (STEPI)
Professor Greg Tegart of Australia (<i>Secretary to IAB</i>) of nology, Melbourne	Director of APEC TF Center and Honorary Professor Science Policy at University of Canberra and Distinguished Visiting Professor at Victoria University Tech-
Dr Chatri Sripaipan Thailand (<i>Assistant Secretary to IAB</i>)	Co-Director of APEC TF Center

5. Staff

Director: Professor WJ McG (Greg) Tegart (Australia)

Co-Director: Dr Chatri Sripaipan (Thailand)

1 January-31 July 1999

1 August-31 December 1999

Ms Monthida Sitathani	Senior International Coordinator (NSTDA)	
Ms Tamsin Jewell	International Coordinator	Policy Researcher
Ms Mayuree Vathanakuljarus	International Coordinator	Assistant Policy Researcher
Ms Nalinrat Viwatanant	International Coordinator	Assistant Policy Researcher

The staff all worked part-time for the Center in the first half of the year 1999. In the second half of the year, the Center moved out of its host's International Cooperation Department, and linked with a newly created Science, Technology and Innovation Policy Research Unit of NSTDA. Three staff transferred to new positions as policy researchers. Ms. Jewell was absent on maternity leave for seven months of 1999.

The division of responsibilities between the Director and Co-Director, remained the same as in 1998:

Role of the Director

- Be responsible for the operation of the APEC Center for Technology Foresight
- Search for financial resources available in other APEC member economies
- Prepare an operational plan of the APEC Center
- Oversee budget allocation
- Oversee administrative affairs
- Formulate strategies to encourage and motivate involvement of APEC member economies
- Initiate and strengthen linkages among APEC member economies
- Set up corporate networking among key players
- Be responsible for participating advisors and researchers

Role of the Co-Director

- Assist the Director in monitoring the operation of the APEC Center for Technology Foresight
- Be Acting-Director when the Director is not on duty
- Supervise administrative affairs
- Implement the programs and activities of the APEC Center
- Manage and facilitate budget allocation
- Be accountable for that part of the budget that comes from NSTDA
- Be responsible for participating advisors and researchers

6. APEC Links

The Center received strong support from the APEC Secretariat and from the Industrial Science and Technology Working Group (ISTWG) in 1999.

At the APEC Secretariat, based in Singapore, Mr Shin Jhong Weon left his post as Director (Program) and was replaced by Mr Ji Hye Yang. The Center would like to express its gratitude to Mr Shin for his excellent advice and assistance during its early phases: the feasibility study, the establishment of the Center and further applications for research funds. Mr Ji and his team at the Secretariat continued this good relationship towards the end of 1999, providing prompt and helpful advice on various matters, from evaluation to financial regulations.

In 1999, the Industrial Science and Technology Working Group of APEC was led by Dr Martin Gallagher, General Manager of the Department of Industry, Science and Resources (DISR) in Australia. The Center had need of his advice and assistance on several occasions, and would like to thank him for his support. In addition, the help and initiative of Dr Matt Gredley (APEC and North Asia Section, International Relations and Technology Diffusion Branch of DISR) was very much appreciated.

The Center held 'Side Meetings' at all meetings of the ISTWG, in order to keep member economies informed about its work, and to encourage their participation. These are described fully in the following section of this report.

Finally, in December 1999, the Center completed a self-evaluation report covering its work in 1998, according to APEC regulations. This was done at the end of the disbursement period of the US\$50,000 that had been so generously allocated from the APEC Central Fund for the establishment of the Center. The report that was submitted is presented in Appendix III. The Center now awaits the comments of the APEC Secretariat and ISTWG.

7. Side Meetings at APEC Industrial Science and Technology Working Group

In 1999, the Center attended the APEC Industrial Science and Technology Working Group (APEC ISTWG) to organize side meetings:

- Side meeting at the 16th APEC ISTWG meeting in Hong Kong, China
- Side meeting at the 17th APEC ISTWG meeting in Washington, USA

■ **Side meeting at the 16th APEC ISTWG meeting on “Mechanisms for Wider Participation of APEC Member Economies in Future Activities of the APEC Center for Technology Foresight” on 2 March 1999 in Hong Kong, China**

Objectives:

- To Report the Outcomes of the Technology Foresight Research Study on “Water Supply and Management.”
- To Outline the Center’s Plans for Two New Research Studies (Technology for Learning and Culture and Megacities) and Other Activities in 1999-2000.
- To Collect Ideas on How to Motivate APEC Member Economies to Participate in Future Activities of the APEC TF Center, Particularly in Research Studies.
- To Set Up Effective Mechanisms for Gaining Wider Participation in the Future APEC Technology Foresight’s Activities.

Program:

14.00-14.05	Introduction by <i>Prof. Greg Tegart</i> , Director of APEC Center for Technology Foresight
14.05-14.10	Opening Remarks by <i>Prof. Pairash Thajchayapong</i> , Director of Thailand’s National Science and Technology Development Agency
14.10-14.30	Findings of the Study on “Water Supply and Management” by <i>Prof. Greg Tegart</i>
14.30-14.45	Discussion on Possible Improvements for Future Projects
14.45-14.55	Plan for the Study on “Technology for Learning and Culture by <i>Prof. Greg Tegart</i>
14.55-15.05	Program for Experts’ Meeting in Vancouver in May by <i>Dr. Chatri Sripaipan</i> , Co-Director of the APEC Center for Technology Foresight
15.05-15.20	Plan for Study on “Megacities” by <i>Prof. Greg Tegart</i>
15.20-15.40	Report on “APEC Science Foresight: an example from Thailand” by <i>Prof. Montri Chulavatnatol</i>
15.40-16.00	Discussion on Effective Mechanisms to Ensure More Active Participation from Member Economies.

Summary record:

Attendance: The meeting was attended by 20 people from 13 economies: Australia; Canada; China; Hong Kong, China; Japan; Korea; Malaysia; Mexico; the Philippines; Chinese Taipei; Thailand; USA; and Vietnam.

Discussions:

- Selection of topics for technology foresight studies
- Prior to the establishment of the APEC Center for Technology Foresight, a survey was conducted in 1997 to obtain topics of high importance to member economies. These topics

were discussed and highlighted in a Symposium in Chiang Mai, Thailand in June 1997. Finally, the topics for technology foresight studies (i.e. Water Supply and Management in 1998, Megacities and Technology for Learning and Culture in 1999) were chosen by the International Advisory Board of the Center and approved by its Steering Committee.

-The Center welcomed member economies suggestion of new topics, but asked delegates to bear in mind that with limited resources, the Center could only conduct one study at a time, but would be able to do more with the active participation of member economies.

- **Difficulties in the conduct of the study**

-The topics for technology foresight studies spread over a wide range of government ministries making it difficult for ISTWG focal points to obtain proper representation in the study

-The Authority, Legitimacy, and Credibility of a multi-country foresight study were discussed in a paper to be found in <http://www.apectf.nstda.or.th>

-It was acknowledged that multi-country foresight studies do have language and cultural problems, but it was also agreed that these are surmountable.

Suggestions

-Other working groups of APEC should be informed of the outcomes of the studies.

-The Center should try to integrate technology foresight into the agenda of other APEC working groups.

-The Center should be more precise on the profile of the experts to participate in the experts' meeting. The experts should be knowledgeable in the field and have institutional support so that they can contribute as individuals, draw on the resource of the institutions and influence other people.

-Some APEC studies may be repeated at the national level. The Center can act as consultant and earn consultancy fees.

-The Center should serve as a resource to provide foresight methodologies to member economies.

-The Center should hook up to other foresight studies. This was done through links in the website.

- **Presentation on "APEC Science Foresight: an example from Thailand"**

Prof. Montri Chulavatanatol reported on his project on *Science Foresight in Thailand*. The objectives of this study were (a) to assess the public understanding of science and basic research; and (b) to chart the future of science and basic research in Thailand. He was interested to learn about the situation in other economies and whether they would wish to extend his project further to APEC level.

Comments

-Mexico has conducted a survey through the Bureau of Census to gauge the public perception in science and scientists.

-Mexico and Canada indicated that they would support the development of a Science Foresight study at the APEC level.

Objectives:

~~Side Meeting at the 17th APEC ISTWG meeting on "Research Activities on APEC Technology Foresight" on 17 August 1999 in Washington State, USA~~
To report on ongoing research exercises of the APEC Center for Technology Foresight

(2) Sustainable Transport

- To outline a plan for a research exercise on “Healthy Cities”
- To report on post-foresight activities of the APEC Center for Technology Foresight
- To collect ideas of participants on how to APEC-widely implement post-foresight activities
- Expected technology foresight activities at the Side Meeting of upcoming 18th APEC ISTWG Meeting in Thailand in March 2000

Program:

8:30-8:40	Introduction by <i>Professor Greg Tegart, Director, APEC Center for Technology Foresight</i>
8:40-8:55	Report on the progress of the research study on “ Technology for Learning and Culture ” by <i>Dr. Chatri Sripaipan and Ms. Monthida Sitathani</i>
8:55-9:05	Discussion
9:05-9:15	Report on the progress of the research study on “ Sustainable Transport ” by <i>Professor Greg Tegart</i>
9:15-9:25	Discussion
9:25-9:35	Report on the progress of the research study on “ Healthy Cities ” by <i>Dr. Chatri Sripaipan</i>
9:35-9:45	Discussion
9:45-10:00	Wrapping up the project of Megacities by <i>Professor Greg Tegart</i>
10:00-10:15	Discussion on Post-foresight activities of the APEC Center for Technology Foresight and how to implement research results
10:15-10:30	Technology foresight activities at the 18 th APEC ISTWG in Bangkok, March 2000 by <i>Ms. Monthida Sitathani</i>

Summary record:

Attendance: 23 delegates from 11 economies and the APEC Secretariat

Summary: Professor Greg Tegart, Dr. Chatri Sripaipan, and Ms. Monthida Sitathani of the APEC Center for Technology Foresight reported on the progress of the research studies on Technology for Learning and Culture and the Megacities.

Discussions:

1. To encourage more respondents to the Delphi questionnaire, it was suggested that an alternative name such as opinion leader be given in addition to “expert.”
2. There is no real definition of Megacities in terms of population or other desirable/undesirable characteristics. A megacity can be viewed as a community of small cities.
3. Safety should be an indicator of healthy cities.
4. In the analysis of the Delphi survey, the opinions of various groups of respondents should be elucidated.
5. Climate change was suggested to be a possible foresight topic.
6. The Technology for Learning and Culture project should look into the skill requirement issue.
7. The Center will intensify cooperation with other APEC working groups.

The Center plans to continue organizing side meetings at future APEC ISTWG meetings to continually promote the work of the Center and to gather feedback from member economies.

8. Multi-country Foresight Research Studies

- ☆ Technology for Learning and Culture in the APEC Region to 2010
- ☆ APEC Megacities
 - Sustainable Transport for APEC Megacities to 2010
 - Healthy Futures for APEC Megacities to 2020

1. Foresight Research Project on “*Technology for Learning and Culture in the APEC Region to 2010*”

Background:

The convergence of telecommunications, computer technology and software is having a profound effect on the way we work, entertain ourselves and educate our present and future generations. The new wave of technology impacts on all economies and it is essential to ensure that the technology is properly used as a tool for development and promotion of individual values and cultures. This is particularly true in the APEC economies which vary widely not only in terms of physical information infrastructure but also in terms of culture and language. This project sought to assess the situation in the APEC economies and to draw out the critical issues to be addressed by policymakers, educators and the information industry.

Objectives:

- To develop a strategic and coherent view of the challenges, threats and opportunities associated with technology for learning and culture in and across APEC economies
- To identify areas for social and technological research, and issues needing policy decisions

Project Schedule

Event / Activity

Remarks

Issues Paper

November 1998

This was prepared by the National Research Council of Canada, and was made available on our web site at <http://www.apectf.nstda.or.th>
A public seminar on Technology for Learning and Culture was held in Bangkok on 4 Nov 98 to launch the project and present the Issues Paper

Experts Meeting

topics
economies. The report of

The Experts Meeting in Vancouver to develop scenarios and Delphi
Vancouver, Canada was successfully held with 26 experts from 11
3-6 May 1999 the meeting was made available on our web site.

Delphi Study

June-July 1999

August-November 1999

December 1999- January 2000

This involved a large number of participants from all APEC economies.

-Preparation of questionnaire & list of experts

-Delphi Survey 1st round (520 distributed, 134 responses)

-Delphi Survey 2nd round (134 distributed, and 60 responses)

Research Meeting,

Bangkok 3 December 1999

This meeting reviewed the study progress and discussed preparation of the final report

Preparation of the Report

December 1999-February 2000

Distribution of the Report

to interested parties

throughout APEC

From March 2000 onwards

Presentation of results at 18th ISTWG Meeting in Thailand during 14-17
March 2000 and follow-up *meetings in member economies*

Facilitators and Consultant details:

- **Mr Jacques Lyrette** - Canada
Vice President (Technology and Industry Support), National Research Council of Canada

1500 Montreal Road, Building M-58

Ottawa, Ontario K1 0R6 Canada

Tel: (613)-998-3664

Fax: (613)-998-3839

Email: Jacques.Lyrette@nrc.ca

Mr Lyrette played a key role in developing the concept of the project, through the preparation of the Issues Paper. He presented it at a public seminar in November 1998, attended the Experts Meeting, and helped develop Delphi questions.

- **Professor Ron Johnston** -Australia

Executive Director, Australian Centre for Innovation & International Competitiveness Ltd (ACIIC),
Faculty of Engineering, University of Sydney

NSW 2006, Australia

Tel: (612)-9351-3934

Fax: (612)-9351-3974

Email: rj@aciic.eng.usyd.edu.au

Professor Johnston prepared the Issues Paper, facilitated the Experts Meeting including the scenario-planning process, co-wrote the meeting report (with Ms. Pacey), and wrote the summary volume of the final report (with Professor Tegart). Professor Johnston also advised on all other stages of the project.

- **Ms. Lucile Pacey** - Canada

Private consultant specializing in Distance Education policy and planning; education reform and the application of technology, and Co-chair of the Vancouver Host Committee for the first World Education Market (WEM) scheduled for May 2000 in Vancouver.

1001 – 1450 Pennyfarthing Drive, Vancouver,

British Columbia V6J 4X8 Canada

Tel: (604)-737-1843

Fax: (604)-737-1847

Email: Lucillep@insinc.ca

Ms. Pacey co-facilitated the Experts Meeting, co-wrote the meeting report, and helped to develop Delphi questions

- **Dr Taeyoung Shin** -Korea

Director, Industrial Innovation Studies, Science and Technology Policy Institute (STEPI)

26th Floor, Specialty Construction Center

395-70, Shindaebang-Dong, Donjak-Gu

Seoul 156-010, Korea

Tel: (822) 3284-1871

Fax: (822) 849-8014

Email: tshin@stepi.re.kr

Dr Shin was the Delphi Facilitator of the project. He helped develop the questionnaires, analyzed the results of each round of the study, and produced a final report of the Delphi. He also participated in the Experts Meeting on Delphi issues.

- **Mr Terutake Kuwahara**- Japan

Director, Fourth Policy-oriented Research Group National Institute of Science and Technology Policy.

1-11-39, Nagata-cho, Chiyoda-ku, Tokyo 100-0014 Japan

Tel: 81-3-3581-0605

Fax: 81-3-3503-3996

Email: kuwahara@nistep.go.jp

Mr Kuwahara provided consultation to the Experts Meeting.

Project Methodology:

This project commenced with the development of an Issues Paper by National Research Council (NRC) of Canada and a public seminar in November 1998 in Bangkok to present and discuss this. Subsequently, a scenario exercise was conducted at the Experts Meeting in Vancouver from 3-6 May 1999. This was generously hosted by the NRC. The 57 Delphi topics generated from the meeting were later classified into 6 areas and used to develop the 1st round Delphi questionnaire: (1) technologies (2) management (3) contents and learning resources (4) government policies (5) HRD/training and (6) culture. These Delphi topics were then refined and a draft of the Delphi questionnaire was initially developed by Dr Taeyoung Shin. The process of the questionnaire development involved interactions among the Vancouver experts—such as Ms. Lucille Pacey, Mr Jacques Lyrette, Prof. Ron Johnston, Dr Taeyoung Shin, Dr Pichet Durongkaveroj as well as the Center's Directors and staff, who provided useful comments and suggestions. For the 1st round of the Delphi study, the Center distributed 520 copies of the questionnaire APEC-wide and received 134 responses from 14 member economies (26%). After the result of the 1st round was processed, the Center developed the 2nd round questionnaire and distributed it to the experts who participated in the previous round. The 2nd round study received 60 responses from 11 member economies (45%).

The final report of this project will be produced in two volumes, the executive summary and the full report. The publications of both volumes are expected to be ready for distribution in the 18th APEC ISTWG meeting, being organized in Thailand during 14-17 March 2000, before they will be distributed widely across the APEC region. The study will be followed up through several post-foresight activities in 2000 and beyond.

Summary of APEC-wide Participation:

■ Representation of member economies at the Experts Meeting: total- 12 economies

Thirty seven participants from 12 different APEC member economies attended the Experts meeting in Vancouver, twenty-six of which were experts representing 11 member economies. Most of the Experts were self-funded, although some support was generously contributed from the APEC Central Fund. (*list of participants in the Annex I*)

■ Participation of member economies in the Delphi Survey:

Economy	1st Round Number of Response	2nd Round Number of Responses
Australia	8	4
Canada	11	8
China	2	-
Chinese Taipei	11	4
Hong Kong, China	17	8
Indonesia	7	3
Japan	3	2
Korea	14	9
Malaysia	8	3
Philippines	20	5
Singapore	6	3
Thailand	23	11
USA	3	-
Vietnam	1	-
Total	134	60

1. Foresight Research Project on “APEC Megacities”

2.1 Sustainable Transport for APEC Megacities to 2010

Background:

The combination of population and rising incomes has had a profound effect on the demand for transport, both of people and of goods, in Megacities. Rapid growth in demand has led to major problems in congestion on roads and at airports and to consequent economic costs, both in delays in delivery of people and goods and in health costs of air (and water) pollution. In extreme cases, cities have been brought to standstill by vehicle congestion.

A major concern was that significant growth is anticipated in many of the cities in APEC economies which are already experiencing difficulties and thus technologies need to be identified to cope with the projected transport problems. The concept of “Sustainable Transport” has been developed to describe the notions of economic efficiency, environmental sustainability and social sustainability. The project sought to assess the situation in APEC Megacities and to draw out the critical technology thrusts needed to attain sustainable transport systems by 2010.

Objectives:

- To develop a strategic and coherent view of the challenges, threats and opportunities associated with sustainable transport in and across APEC economies
- To identify areas for social and technological research, and issues needing policy decisions.

Project Schedule:

Event/Activity

Issues Paper

Remarks

Prepared by the Centre for Strategic Economic Studies of Victoria University of Technology, Australia. It was made available on our web site: <http://www.apectf.nstda.or.th>

Experts Meeting

Melbourne, Australia

27-29 July 1999

The Experts Meeting in Melbourne was successfully held with 16 experts from 7 member economies. The Meeting's materials are available upon request.

Preparation of the Report

August-November 1999

The draft report was prepared by Mr. Ainsley Jolley of CSES.

Research Meeting

Bangkok, 1 December 1999

The report was critiqued.

Distribution of Report to interested parties throughout APEC

March 2000

Presentation of results at 18th ISTWG Meeting in Thailand in 14-17 March 2000 and inputs to APEC Transport Ministers' Meeting in Thailand in early 2000

Project Consultant:

Mr Ainsley Jolley

Director, Emerging Technologies and Asian Growth Project, Centre for strategic Economic Studies, Victoria University of Technology

Footscray Campus, Victoria University

PO Box 14428, Melbourne City MC VIC 8001, AUSTRALIA

Tel. 03 9248 1004 Fax: 03 9248 1048 Ainsley.Jolley@vu.edu.au

Experts Meeting Facilitator:

Professor Ron Johnston

Executive Director, Australian Centre for Innovation and International Competitiveness Ltd (ACIIC), Faculty of Engineering, University of Sydney

NSW 2006 AUSTRALIA

Tel. 02 9351 3934 Fax: 02 9351 3974 rj@aciic.eng.usyd.edu.au

Project Methodology:

The research study on APEC Sustainable Transport began with the development of the Issues Paper in early 1999, with substantial help of Mr Ainsley Jolley from the Centre for Strategic Economic Studies (CSES), Victoria University. Subsequently, the Center, in cooperation with CSES, organized an Expert's Meeting in Melbourne during 27-29 July 1999. This was largely funded by a generous grant of AUD \$ 20,000 from the Department of Industry, Science and Resources, Australia. This meeting involved a scenario workshop and identification of policy and technological issues and a set of prioritized actions. Mr Jolley prepared a draft report of the project based on the materials supplied by the group of experts at the meeting and after the meeting. The draft report was later circulated to the involved participants for comments. He also paid a visit to Bangkok, financed by the Center, during late November-December 1999 to collect feedback. A number of research visits were arranged to several transport agencies in Thailand, which generated a number of useful discussions. The research meeting on 1 December 1999 also produced valuable comments to the final report of the draft project.

When finalized the report will be published in two volumes— a summary report for executives and full report for transport experts. The Center will present the report in the 18th APEC ISTWG being held in March 2000 before disseminating it widely across the region. Post-foresight activities of the project will be organized over the year 2000 to promote the study outcomes.

Research Visits:

Mr. Ainsley Jolley discussed his draft report, and the issues of sustainable transport in Thailand, with executives of the following public organizations:

29 November 1999	Office of the Commissions for the Management of Road Traffic (OCMLT) of Office of the Prime Minister
29 November 1999	Department of Traffic and Transportation of the Bangkok Metropolitan Administration (BMA)
30 November 1999	Office of the National Economic and Social Development Board.
1 December 1999	Ministry of Transport and Communications

APEC-wide Participation:

This project was supported by the Australian government, who generously contributed AUD \$ 20,000 for the Experts Meeting in Melbourne, 27-29 July 1999. Representatives of 7 APEC member economies attended this meeting: Australia; Canada; China; Hong Kong, China; the Philippines; Singapore and Thailand. (*list of participants in the Annex II*)

1.2 Healthy Futures for APEC Megacities to 2020

This project was begun in 1999, and a Discussion Paper was prepared by the Centre for Diseases Control at Atlanta and the Kenan Institute of Private Enterprise at the University of North Carolina at Chapel Hill, USA. It was circulated to experts within and beyond APEC, resulting in several revisions. The Center also developed linkages with a number of experts worldwide, who provided inputs to the project and indicated their willingness to participate in the project activities.

Background:

Megacities are major urban areas that, by sheer size and potential, are centers of economic and political life and significant shapers of a nation's culture and economy. Many such megacities in APEC have mega-problems, developing in ways that raise critical issues of health, well-being and sustainability. The World Health Organization (WHO) recognises, in its program on "Healthy Cities", that a healthy city requires balance in and among the "physical, emotional, mental, and spiritual" aspects of life. Achieving this balance is a systemic issue, and especially complex at megacity level, requiring all relevant sectors to work together towards common goals. To tackle this complex subject, the project is using the foresight methodology of scenario-planning.

Objective:

To explore issues that are critical to the future of megacities in APEC, and identify policy approaches and positive interventions towards their healthy development.

Project Schedule:

Event/ Activity	Remarks
Discussion paper October 1999	To set a framework for the study and stimulate discussion This has been prepared by the Centers for Disease Control, Atlanta, USA, and the Kenan Institute of Private Enterprise, University of North Carolina at Chapel Hill, USA.
Exchange of ideas and information with experts from APEC and from relevant global organisations November 1999 – January 2000	To finalize the project goals and procedures, and identify appropriate participants.
Core Experts Meeting Bangkok, Thailand, 2-3 February 2000	Exchange of ideas and information, to elaborate on concepts and work towards the creation of alternative scenarios of megacities in the year 2020
Preparation for Experts Meeting February-May 2000	Refining scenarios, finalising an Issues Paper and involving further experts.

Partner Organizations in this Project:

❖ The Kenan Institute

The Frank Hawkins Kenan Institute of Private Enterprise, an affiliate of the Kenan-Flagler Business School, encourages cooperation among business, academia and government to foster private-sector development and to utilize the private sector to serve the public interest in the United States and worldwide. The Kenan Institute develops innovative public-private and private-private partnerships that build the capacity of people, business and communities to prosper in market-based environments. These programs are anchored in research that provides the basis for replicating and extending these outreach programs nationally and internationally.

Contact:

Dr John D. Kasarda Email: john_kasarda@unc.edu

Director and Kenan Professor

Kenan Institute of Private Enterprise, Kenan-Flagler Business School, University of North Carolina, Chapel Hill, NC 27599-3440, USA Tel: 919-962-8201 Fax: 919-962-8202

URL: http://www.bschool.unc.edu/infocenters/kenan_institute.html

❖ CDC

The Centers for Disease Control and Prevention (CDC), located in Atlanta, Georgia, USA, is an agency of the Department of Health and Human Services. CDC's mission is to promote health and quality of life by preventing and controlling disease, injury, and disability. CDC aims to base all public health decisions on the highest quality scientific data, openly and objectively derived and to place the benefits to society above the benefits to the institution.

Contact:

Dr Melinda Moore Email: mym5@cdc.gov

Associate Director for Global Health [and Acting Director, Div. Of Emergency and Environmental Health Services], National Center for Environmental Health Centers for Disease Control and Prevention (CDC), 4770 Buford Highway N.E., MS F-29, Atlanta GA USA 30341 Tel: 770-488-7231 Fax: 770-488-7742

URL: <http://www.cdc.gov/>

Project Consultant:

Professor Ron Johnston

Contact:

Prof Ron Johnston Email: rj@aciic.eng.usyd.edu.au

Executive Director, Australian Centre for Innovation & International Competitiveness Ltd (ACIIC), Faculty of Engineering, University of Sydney NSW 2006 Tel: (02) 9351 3934 Fax: (02) 9351 3974

URL: <http://www.aciic.org.au>

9. Post Foresight Activities

The APEC Center carried out its first foresight research project on “*Water Supply and Management in the APEC Region to 2010*” in its first year of operation, 1998. After the completion of the research study and the publication of the final report in early 1999, the Center put great effort into promoting the results of the study across the APEC region, especially in economies which had been most actively involved in the research process. These economies included Hong Kong, China; Malaysia; the Philippines; and Thailand.

Post-foresight Activities for the Water Supply and Management research study:

5 March 1999 Kong,	Presentation to the Hong Kong Water Supplies Department in Hong China
29 April 1999	Presentation at the Academy of Sciences Malaysia Forum “The Future of Water Supply and Management” in Kuala Lumpur, Malaysia
12-14 May 1999	Presentation in the Regional Scoping Meeting on the Water Sector, GWP/ SEATAC in Manila, the Philippines
8-9 July 1999 Science,	Presentation in the 3 rd Annual Meeting of the ASEAN Academy of Engi- neering and Technology and Similar Organizations in Manila, the Philippines
21-22 July 1999	Presentation in the Meeting on Water Sector Mapping and Visioning for Thailand, Bangkok

Post-foresight activities for the water study will continue in 2000. A meeting in Mexico in mid-2000 has already been arranged. The Center also planned to take all available opportunities to promote the outcomes of the other two research projects—Technology for Learning and Culture and Megacities.

10. National Foresight Study

“Thailand’s Technology Foresight for Agricultural Development”

The APEC TF Center assisted the **Thai Foresight Unit**, a virtual organization of NSTDA, in carrying out a national foresight research project on “*Thailand Technology Foresight for Agricultural Development.*” The Center provided staff support as well as financial support of 200,000 Baht. The objective of the project was to study the demand of technology in agriculture in the future in order to plan the development of science and technology. The study involved interviews with experts, a Delphi survey, and a scenario planning exercise. The summary of the project activities is provided below:

April 1998	Formulation of questions for interview and identification of
experts for the interview	
May-June 1998	Interviews with experts
July-August 1998	Formulation of Delphi questionnaire
September-October 1998	1 st round Delphi survey
December 1998- January 1999	2 nd round Delphi survey

10. National Foresight Study

“Thailand’s Technology Foresight for Agricultural Development”

The APEC TF Center assisted the **Thai Foresight Unit**, a virtual organization of NSTDA, in carrying out a national foresight research project on “*Thailand Technology Foresight for Agricultural Development.*” The Center provided staff support as well as financial support of 200,000 Baht. The objective of the project was to study the demand of technology in agriculture in the future in order to plan the development of science and technology. The study involved interviews with experts, a Delphi survey, and a scenario planning exercise. The summary of the project activities is provided below:

April 1998	Formulation of questions for interview and identification of experts for the interview
May-June 1998	Interviews with experts
July-August 1998	Formulation of Delphi questionnaire
September-October 1998	1 st round Delphi survey
December 1998- January 1999	2 nd round Delphi survey
February 1999	Scenario-planning workshop
March-August 1999	Preparation of 1 st draft final report
2000 onwards	Distribution of the report and promotion the study across the country

Project Methodology

■ Interview with Experts

The study started with the structured interview of 35 stakeholders (experts in agriculture-related fields).

■ Delphi Study

A Technology Foresight Committee, consisting of 11 experts, was set up to formulate a questionnaire for the project. The questionnaire consisted of 71 Delphi topics, including 30 technological, 17 management and 14 policy questions. Two rounds of the Delphi study were conducted:

- **1st round response rate 29%** (311/ 1070)

Distributed to 1,070 experts: 710 public and 360 private sectors

Responded from 311 experts: 242 public and 69 private sectors

- **2nd round response rate 67%** (208/311)

Distributed to 311 experts: (as above)

Responded from 208 experts 184 public and 24 private sectors

■ Scenario Planning Workshop

After the Delphi process was completed, a scenario- planning workshop was conducted involving 40 experts on various aspects of agriculture. Based on the Delphi results, the experts identified key uncertainties and developed 3 scenarios. The three scenarios included “*Thai Technology to Enhance Agriculture,*” “*Public- private partnership strengthens Thai Agriculture,*” and “*Thailand as the World’s Kitchen.*” These scenarios were used to identify core common national agendas, which consisted of:

- Good governance for the Thai agriculture-related workers
- Research & development in technology, based on local knowledge & skills
- Develop an agriculture database accessible from all over the country (use of IT)
- Enhancing capability of farmers and strengthening grass root organizations.

■ First Draft Report

On 30 August 1999, the Thai Foresight Unit presented the study (1st draft) to H.E. Mr. Boonchu Rojanastien, the senior Advisor on economics to the Prime Minister, who has a special interest in national agricultural development issues, and top executives from public agencies on agriculture. The presentation attracted an audience of 40 and was well received.

11. Involvement in the National Project of Thailand on “S&T for Development: Visions and Strategies for 2020” or S&T 2020

The Ministry of Science, Technology and Environment (MOSTE) of Thailand launched a national project on “Science and Technology for Development: Visions and Strategies for 2020” (S&T 2020) in October 1999 with the National Science and Technology Development Agency (NSTDA) being the Secretariat to the project. The Science, Technology and Innovation Policy Research Unit of NSTDA played the key role as the center of the Secretariat team, with the APEC-TF Center staff participating as members of the team.

The project involved:

- A process of recognizing and clarifying the role S&T can play in the development of a harmonious and prosperous society in Thailand
- National visions and strategies, generated through a participatory foresight process, involving the public and private sectors, NGOs and the general public, will be used as the basis of planning and action to achieve national economic and social development over the next 20 years. (inputs will be provided to the 9th National Economic and Social Development Plan)

Main Activities of the Project:

Time Frame	Oct. 1999	Jan-Sept 2000	Oct. 2000	Oct. 2000-->
Process	Pre-foresight	Foresight	Post-foresight	Implementation & Evaluation
Objectives	Preparation and Generation of Public Awareness	Foresight and Development of National S&T Visions and Strategies	Promotion of the Result, Generation of Public Knowledge and Acceptance and Preparation for Implementation	Implementation of Strategies towards the National Visions among Organizations and Individuals, and Evaluation
Activities	Public Congress on S&T for Development	<ol style="list-style-type: none"> 1. Research on Background Information 2. Gathering of Visions of National Experts 3. Panels of Experts 4. Public Congresses throughout the Country 5. Comprehensive Surveys of Opinion 6. Summary Report 	<ol style="list-style-type: none"> 1. Dissemination of Results to the Public, and Public Hearings 2. Inputs to the 9th National Economic and Social Development Plan 	Examples: <ul style="list-style-type: none"> ▪ Revision of the Roles of MOSTE ▪ Revision of the Roles of Public R&D Agencies

A Public Congress on Science and Technology for Development (S&T2020), was held on 25-26 October 1999 in Bangkok as the first and very crucial step of the project, towards the quest for a NEW Social Contract between the people and the science and technology community. This Congress was attended by over a thousand people from all walks of life. They all shared their views in group discussion sessions, divided into 10 key topics, including Agriculture and Agro-industry; Manufacturing Industries; Services Industries; Commerce; Education and Culture; Public Health and Welfare; Environment; Energy; Management and Administration; and Communication and Information Technology. The activities of the group discussion session included identification of key issues, assessment of the current situation, visioning, and identification of actions to be taken.

Besides participating as members of the Secretariat, the Center was also involved by providing a channel to international resources valuable to the project. Both visits of Prof. Ben Martin from UK (SPRU) and Dr. Arthur Carty from Canada (NRC) to Thailand for public events in June and December 1999 were linked to the S&T2020 project (*please see section 13 and 14 for more details*). The Center arranged for Prof. Ben Martin to meet the former Deputy Prime Minister and Minister of MOSTE, H.E. Mr Suvit Khunkitti to discuss the linkage between foresight and the national innovation system and Dr. Arthur Carty had a meeting to discuss science policy and innovation with the new Minister H.E. Dr Arthit Ourairat. Possible events are also being arranged for Australia and New Zealand to link with the project in the year 2000.

12. Foresight Training

Foresight training is another crucial activity of the Center according to one the Center's objectives—*promote the adoption of technology foresight across APEC member economies*. Nevertheless, after its first APEC foresight training workshop, organized in the launching event of the Center in February 1998, the Center was not able to hold such training again at APEC level. The difficulties with the issue of financing following the recent economic downturn, limited the Center's ability to afford to organize such events.

Therefore, the Center shifted its training focus towards organizing/facilitating training at a national level. In 1999, two training courses were organized in Thailand, which included a scenario training at the Faculty of Public Health, Mahidol University, and a futures research method workshop—*Foresighting to Creating a Learning Organization* (twice) at NSTDA

■ Training on scenario planning:

The Center was invited to demonstrate how to use a scenario planning as a foresighting tool to a number of graduate students in the Nutrition Department, Faculty of Public Health, Mahidol University on 19 November 1999. The topic for demonstration was “Obesity in 2020”

■ “Foresighting to Creating a Learning Organization”: a futures research methods workshop

The Center organized a one-day foresight training workshop on the topic of “*Foresighting to Creating a Learning Organization*” on 16 December 1999. The event proved so popular that it was repeated for a new group a few days later on 20 December 1999. Professor Sohail Inayaullah, Honorary Visiting Fellow at the Communication Centre, Queensland University of Technology and Co-Director of the Noosa Institute for the Future, was the facilitator of the workshops for the Center.

The seminar was a toolbox approach to using methods from futures research, which covered an overview of approaches to the future and a range of foresighting methods. Professor Inayatullah discussed ‘paradigms’ as limitations to the acceptance of new ideas. He subsequently introduced several foresighting methods—Scenario-planning, Causal Layered Analysis, Emerging Issues Analysis, Visioning, and Backcasting. These were explained in the context of specific real world issues impacting on the economy or the daily life of a manager / government executive / professional.

Prof. Inayatullah encouraged the trainees to fully participate in the methods. Visions of Bangkok in the future were an example of the outcome of the training, created by the training participants. The views of Bangkok in 2020 from the two workshops were “Clean, Green, Caring Society” and “Consumertopia.”

There were about 20 participants in each workshop (43 in total) from the government and public sectors as well as universities.

Program:

8:30-9:00	Registration
9:00-9:30	Welcome and Introduction
9:30-10:30	Session 1 (Thinking about the future + Overview of foresight methods)
10:30-10:45	Break
10:45-12:00	Session 2 (Scenario planning - uses and limitations)
12:00-13:00	Lunch
13:00-14:15	Session 3 (Going deeper - Causal layered analysis and Transformative futures)
14:15-14:30	Break
14:30-15:45	Session 4 (Visioning and Backcasting)

Future Training Activities

The Center was approached by contacts in Mexico and Malaysia, requesting assistance in organizing a national foresight training workshop in their respective economies in 2000. These events have now been confirmed.

13. Public Lecture on “The Role of Foresight in ‘Wiring up’ the National Innovation System” 21 June 1999

The Center organized a public lecture on “*The Role of Foresight in ‘Wiring Up’ the National Innovation System*” by **Professor Ben R. Martin**, the Director of Science and Technology Policy Research (SPRU), University of Sussex. It was held at the Siam City Hotel, Bangkok on Monday 21 June 1999.

Prof. Ben R. Martin introduced technology foresight as a tool for strategic management of research and technology. He analyzed the experiences of technology foresight in various countries, especially its resurgence in the late 1980s. He also remarked on the rationale for foresight, which specifically involves the changing social contract. The driving factors for development of foresight include *increasing competition—leading to emphasis on innovation & knowledge-based industry; increased pressure on public expenditure—resulting in a need to link S&T to economic and social needs; and changing nature of knowledge production—creating a need for communication and networks*. Foresight has therefore been used as a tool for priority-setting, exploiting S&T for innovation, linking S&T opportunities to economic & social needs, as well as stimulating communication & forging partnerships among industry, government and academia, and thereby leading to *the ‘wiring up’ of the national innovation system*.

The lecture was followed by a summary report of the APEC Center for Technology Foresight’s past and on-going activities delivered by Prof. Greg Tegart, the Director of the Center and Dr. Chatri Sripaipan, the Co-Director. They highlighted the Center’s research studies on Water Supply and Management, Technology for Learning and Culture, and Megacities.

The event was well attended by about 120 participants from public and private organizations as well as universities.

Program:

- | | |
|-------------|---|
| 08.30-9:00 | Registration |
| 09.00-9:15 | Official Welcome by Prof. Pairash Thajchayapong , Director of National Science and Technology Development Agency (NSTDA) and Chair of the Steering Committee of the APEC Center for Technology Foresight |
| 09.15-9:25 | Remarks by Prof. Yongyuth Yuthavong , Director of Thailand Graduate Institute of Science and Technology (TGIST) of NSTDA, and Chair of the International Advisory Board of the APEC Center for Technology Foresight, and Dr. John Richards , Director of the British Council in Bangkok |
| 09.25-10:05 | Special Lecture “ <i>The Role of Foresight in ‘Wiring up’ the National Innovation System</i> ” by Prof. Ben R. Martin , Director of the Science and Technology Policy Research (SPRU), University of Sussex, UK |
| 10.05-10:30 | Open Discussion |
| 10.30-10:45 | Coffee Break |
| 10.45-11:10 | Report of the Activities of the APEC Center for Technology Foresight by Prof. Greg Tegart , Director, and Dr. Chatri Sripaipan , Co-Director |
| 11.10-11:30 | Open Discussion |

14. Public Seminar on “Science Policy and Innovation” 2 December 1999

Several members of the International Advisory Board spoke at a public seminar on “*Science Policy and Innovation*”, organized by the International Cooperation Department of NSTDA. It was held on Thursday 2 December 1999 at the Siam City Hotel, in Bangkok with speakers from the Center’s International Advisory Board. The opening ceremony of the seminar was presided over by *H.E. Dr. Arthit Ourairat*, the Minister of Science, Technology and Environment. The seminar highlighted the experience of science policy in Canada as well as innovation in SMEs. It was followed by a panel discussion on “How to translate Science Policy into Action,” chaired by Dr. Chatri Sripaipan, the Co-Director of Center.

The seminar attracted about 165 participants from the public and private sectors as well as academia.

Program:

8:00-9:00 h	Registration
9:00-9:05 h	Welcome Address by Professor Pairash Thajchayapong, President of NSTDA
9:05-9:15 h	Opening Address Presided over by H.E Dr. Arthit Ourairat , Minister of Science, Technology and Environment
9:15-10:15 h	Presentation I: “ <i>Science Policy in Canada</i> ” by Dr. Arthur J Carty , President, National Research Council of Canada
10:15-10:30 h	Break
10:30-11:00 h	Presentation II: “ <i>Innovation in SMEs</i> ” by Mr. Jacques Lyrette , Vice-President (Technology and Industry Support)
11:00-12:00 h	Panel Discussion: “ <i>How to Translate Science Policy into Action</i> ” Chair: Dr. Chatri Sripaipan , Co-Director, APEC Center for Technology Foresight Panelists: Professor Ron Johnston , Executive Director, Australian Centre for Innovation and International Competitiveness Limited (ACIIC) Professor Yongyuth Yuthavong , Director, Thailand Graduate Institute of Science and Technology (TGIST), NSTDA
12:00-12:30 h	Open Discussion
12:30-14:00 h	Lunch

15. Forum

The Center arranged small group forums at NSTDA with the aim of exchanging ideas and information among the Center staff and other members of NSTDA. The topics discussed were varied, including foresight, technology management and innovation as well as related social issues.

Date	Topics	Speakers
8-Jan-99	Shell's Experience in Scenario Planning	Dr. Chatri Sripaipan <i>Co-Director, APEC Center for Technology Foresight, NSTDA</i>
22-Jan-99	Managing Across Cultures: ("All people are the same. It's only their habits that are so different" Confucius)	Ms. Tamsin Jewell <i>International Coordinator, APEC Center for Technology Foresight, NSTDA</i>
12-Feb-99	Agro-Innovation System	Mr. Punarj Chairatana <i>Project Analyst, Thailand's Graduate Institute of Science and Technology, NSTDA</i>
26-Feb-99	Corporate Strategy	Mr. Rak Vorrakitpokatorn & Mr. Chayathorn Nanthapisal <i>Project Analysts, Thailand's Graduate Institute of Science and Technology, NSTDA</i>
26-Mar-99	Thai Women's Leadership in R&D Organizations	Dr. Kittiwat Uchupalanan <i>Deputy Director & Ms. Nucharin Ratchukool, Assistant Policy Researcher, Science, Technology and Innovation Policy Research Unit, NSTDA</i>
9-Apr-99	Technology Management and Industrial Development	Dr. Thanaphol Virasa <i>Researcher, Science, Technology and Innovation Policy Research Unit, NSTDA</i>
21-May-99	Some Aspects of Technology Policy in Germany	Dr. Michael Grosse <i>Expert in Production Management Technology Transfer, Industrial Consultancy Service, NSTDA (from Centrum fur Internationale Migration und Entwicklung: CIM, Germany)</i>
9-Jul-99	APEC R&D Management "Case Study in Korea"	Ms. Navarat Thamviharnkhun <i>Policy and Planning Analyst, NSTDA & Ms. Usapan Swasdio, Policy and Planning Analyst, National Electronics and Computer Technology Center (NECTEC), NSTDA</i>
30-Jul-99	The Principle of Technology Transfer	Dr. Michael Grosse <i>(same as above)</i>
9-Dec-99	Lessons from Korea's Technological Learning	Dr. Buncha Thanaboonsombat <i>Researcher, National Metal and Material Technology Center (MTEC), NSTDA</i>

16. Building International Linkages

The Center, put substantial efforts into liaising with institutions/ organizations and experts involved in foresight activities in several countries in the APEC region, and worldwide, for information exchanges and possible collaboration.

* **Membership of international associations**

In 1999, the Center became a member of two international associations:

· **European Science and Technology Observatory (ESTO)**

European Science and Technology Observatory (ESTO) is a network of European organizations that assist, inform and alert the Institute for Prospective Technological Studies (IPTS) regarding scientific or technological breakthroughs, trends and events of potential environmental and/or socio-economic importance which may call for action at a European decision-making level. ESTO members therefore have a shared responsibility to supply IPTS with up-to-date, high-quality scientific and technological information drawn from all over the world, facilitated by the network's international contacts. This information is then channelled by the IPTS to its main users, who are basically European science and technology policy-makers. In 1999, ESTO was comprised of more than 30 major European policy advising organizations and think tanks, with links to and partnerships with overseas organizations. The Center became a member of ESTO in 1999 following the Director's visit to the organization in 1998. The Center is ESTO's key link to the Asia-Pacific region.

web site of ESTO: <http://esto.jrc.es/>

web site of IPTS: <http://www.jrc.es/welcome.html>

· **International Association for Technology Assessment and Forecasting Institutions (IATAFI)**

The goal of the International Association for Technology Assessment and Forecasting Institutions is to advance international co-operation among technology assessment (TA) and forecasting institutions (TF) for the purpose of supporting sound decision-making regarding sustainable development in response to global change. IATAFI planned to establish an electronic network centre based in Bergen, Norway.

The Co-Director of the Center had attended the IATAFI's Third International Conference on "Challenges for Technology Assessment and Technology Forecasting" in India in November 1998.

web site of IATAFI: <http://www.iatafi.no>

* **Director's visit to the Organization for Economic and Cooperation Development (OECD)**

The OECD groups 29 member countries in an organization that, most importantly, provides governments a setting in which to discuss, develop and perfect economic and social policy. They compare experiences, seek answers to common problems and work to co-ordinate domestic and international policies that increasingly in today's globalized world must form a web of even practice across nations. Their exchanges may lead to agreements to act in a

formal way - for example, by establishing legally-binding codes for free flow of capital and services, agreement to crack down on bribery or to end subsidies for shipbuilding. But more often, their discussion makes for better informed work within their own governments on the spectrum of public policy and clarifies the impact of national policies on the international community. And it offers a chance to reflect and exchange perspectives with other countries similar to their own. OECD undertakes futures work.

Prof. Greg Tegart visited OECD on his trip to Europe in November 1999 to discuss the issue of futures research, and 'Learning Cities' (relevant to Megacities research.)

web site <http://www.oecd.org/>

■ **International Conference on Technology Foresight in Japan**

An International Conference on Technology Foresight, to be held in Japan in March 2000, will be organized by the National Institute of Science and Technology Policy of Japan (NISTEP) in cooperation with the Center, should provide further valuable opportunities to develop international links. The Conference will involve cooperation from experts on foresight from several countries, both within and outside the APEC region.

17. Web Site Development

<http://www.apectf.nstda.or.th>

The Center created and operated its web site, hosted on the server of National Science and Technology Agency, in October 1997. The site provided information about the Center and its activities, as well as providing some links to foresight-related web sites around the world and the APEC Industrial Science and Technology Working Group (<http://www.apecst.org>).

The web site contained the following sections: About Our Center, Our Organization, Our Activities, About Thailand's NSTDA, Calendar of Events, Our Publications, Foresight Research, Foresight Organizations and Foresight in APEC, and Discussion Forum.

In the first quarter of the web site establishment (Oct- Dec 1997), about 3,000 cybernauts visited the site. In 1998 and 1999, the number of visits was over 17,000 and 23,000 respectively.

18. Publications

Since 1998, the Center produced a number of publications and worked to market them to promote technology foresight and research activities of the Center across the region and world-wide. The lists of publications produced in 1998 and 1999 is provided below:

Publications in 1998:

- **Proceedings** of the APEC Symposium on Technology Foresight- held in Chiang Mai, Thailand in July 1997. (available in hard-copy only)
- **Book** on “Applications of Technology Foresight: Proceedings of the First Public Seminar,” held in Bangkok, Thailand in February 1998. (available in hard-copy and on the web)
- **Article** on “Technology Foresighting 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. (available on the web)
- **Article** on “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 Jewll and Dr. Chatri Sripaipan to the Third International Conference of the International Association of Technology Assessment and Forecasting Institutions, in New Delhi, India, in November 1998. (available on the web)
- **Issues Paper** for the research study on “Water Supply and Management in the APEC region to 2010,” prepared for the Center by Prof. Ron Johnston, Executive Director, ACIIC, in April 1998.
- **Information about Our Center** –Leaflet (1000 copies were distributed and it is also available on the web)

Publications in 1999:

- **Activities Report** of the APEC Center for Technology Foresight: 1998 (Summary report) (available in hard-copy and on the web)
- **Annual Report** of the APEC Center for Technology Foresight: 1998 (Full report) (available in hard-copy only)
- **Final reports:** the research study on “Water Supply and Management in the APEC region 2010” (2 volumes: the Summary and the Full volumes) (available in hard-copy and on the web)
- **Issues Paper** for the research study on “Technology for Learning and Culture in the APEC Region to 2010,” prepared for the Center by Mr. Jacques Lyrette, Vice-President, National Research Council of Canada, in November 1998. (available on the web)
- **Report** of an Experts’ Technology Foresight Workshop: Technology for Learning and Culture in the APEC Region to 2010, held in Vancouver, Canada in May 1999 (available in hard-copy and on the web)
- **Issues Paper** for the research study on “Sustainable Transport for APEC Megacities,” prepared for the Center by Mr. Ainsley Jolley, Director, Emerging Technologies and Asian Growth Project, Centre for Strategic Economic Studied, Victoria University, in May 1999 (available on the web only)
- **Report** of an Experts’ Meeting on Sustainable Transport, held in Melbourne, Australia, 27-29 July 1999 (available in hard-copy only)
- **Discussion Paper** on “Healthy Futures for APEC Megacities,” prepared for the Center by Kenan Institute of Private Enterprise, Kenan-Flager Business School, University of North Carolina at Chapel Hill, and National Centers for Environmental Health Centers for Disease Control and Prevention (CDC) (available on the web)

Expected Early 2000:

- **Final reports** of research study “Technology for Learning and Culture in the APEC region to 2010” (2 volumes: the Summary and the Full volumes)
- **Final reports** of research study “Sustainable Transport for APEC Megacities: Issues and Solutions” (2 volumes: the Summary and the Full volumes)

20. Future Plans

In 1999, the Center worked towards the arrangement of the following activities for 2000:

- International Conference on “Technology Foresight—the Approach to and the Potential for New Technology Foresight,” 7-8 March 2000, Tokyo, Japan
 - “Multi-economy Foresight- Experience of APEC Center for Technology Foresight”
 - “Multi-country Delphi Survey”
 - “Building an APEC Technology Foresight Network”
 - “Lessons Learned in Technology Foresight from Developing Country Perspectives”
 - “Authority, Legitimacy, and Credibility of Technology Foresight Studies”
- Public Lecture on “Innovation and Foresight in New Zealand: Implications for Thailand,” 13 March 2000, Bangkok, Thailand
- Side Meeting at the 18th APEC ISTWG Meeting on “APEC Technology Foresight,” 14 March 2000, Pattaya, Thailand
- Continuation of the foresight study on “Healthy Futures for APEC Megacities”
 - A Special Core Group Meeting, 2-3 February 2000, Bangkok, Thailand
 - An APEC Experts’ Meeting, 29-31 May 2000, Bangkok, Thailand
 - Final reports, expected late 2000
- Training workshop in Malaysia, 21-22 March 2000, Malaysia
- Training workshop in Mexico, July 2000, Mexico
- Post foresight activities, July 2000, Mexico

ANNEX I
Experts Meeting on “Technology for Learning and Culture”

3-6 May 1999, Vancouver

List of participants

AUSTRALIA

Cunningham, Stuart Duncan (Prof)

Head, School of Media and Journalism, Queensland University of Technology and
Deputy Director, Australian Key Centre for Cultural and Media Policy
GPO Box 2434, Brisbane, Queensland 4001, Australia
Tel: (617)-3864-2119 **Fax:** (617)-3864-1031
Email: s.cunningham@qut.edu.au

Johnston, Ron (Prof)

Executive Director
ACIIC, Faculty of Engineering, University of Sydney
NSW 2006, Australia
Tel: (612)-9351-3934 **Fax:** (612)-9351-3974
Email: rj@aciic.eng.usyd.edu.au

Tegart, Greg (Prof)

Director, APEC Center for Technology Foresight
73/1 Rama VI Road, Rajdhevee, Bangkok 10400, Thailand
Tel: (662)-644-8009 **Fax:** (662)-644-8020
Email: apectf@nstda.or.th

48 Bentham Street, Yarralumla ACT, Australia

Tel: 61-2-62853099 **Fax:** 61-2-62853099
Email: gregtegart@ozemail.com.au

CANADA

Carty, J Arthur (Dr)

President, National Research Council Canada
1500 Montreal Road, Building M-58
Ottawa, Ontario K1A 0R6 Canada
Tel: (613)-993-2024 **Fax:** (613)-957-8850
Email: Arthur.Carty@nrc.ca

Guild, Paul Douglas (Dr)

*Professor of Management Sciences and
Director of MOT @ Distance Master's Program Option*
Department of Management Sciences
Faculty of Engineering, University of Waterloo
200, University Avenue West, Waterloo, Ontario N2L 3G1 Canada
Tel: (519)-888-4802 **Fax:** (519)-888-4884
Email: guild@uwaterloo.ca

Hasnain, Sadiq (Dr)

Senior Strategy and Policy Advisor, International Relations
National Research Council Canada
M-58 Montreal Road, Ottawa
K1A 0R6 Ontario, Canada
Tel: (613)-993-6040 **Fax:** (613)-952-9907
Email: sadiq.hasnain@nrc.ca

Levi-Lloyd, Ann (Dr)

Facilitator, Advanced Skills Training
NRC Innovation Centre (Vancouver)
3250 East Mall, Vancouver, B.C., V6T 1W5 Canada
Tel: (604)-221-3047 **Fax:** (604)-221-3001
Email: ann.levi-lloyd@nrc.ca

Lyrette, Jacques (Mr)
Vice-President, Technology and Industry Support
National Research Council Canada
1500 Montreal Road, Building M-58
Ottawa, Ontario K1 0R6 Canada
Tel: (613)-998-3664 Fax: (613)-998-3839
Email: Jacques.Lyrette@nrc.ca

Manji, Irshad (Ms)
Broadcaster and Educator
City TV, 299 Queen St. West
Toronto, M5V 2Z5 Canada
Tel: (416) 591-7400 ext. 3135 **Fax:** (416) 593-6397
Email: lrshadm@citytv.com

Mullan, Desmond (Mr)
Director, NRC Innovation Centre (Vancouver)
National Research Council of Canada
3250 East Mall Vancouver B.C. V6T 1W5 Canada
Tel: (604)- 221-3012
Email: desmond.mullan@nrc.ca

Pacey, Lucille Marie (Ms)
Private consultant specializing in Distance Education policy and planning; education reform and the application of technology.
Co-chair of the Vancouver Host Committee for the first World Education Market (WEM) scheduled for May 2000 in Vancouver.
1001 – 1450 Pennyfarthing Drive, Vancouver,
British Columbia V6J 4X8 Canada
Tel: (604)-737-1843 **Fax:** (604)-737-1847
Email: Lucillep@insinc.ca

HONG KONG

Blurton, Craig George (Dr)
Associate Professor, Advisor on IT in Education, Head, IT & Teaching Group,
Centre for the Advancement of University Teaching (CAUT)
University of Hong Kong
CAUT, University of Hong Kong
Pokfulam, Hong Kong SAR
Tel: (852)-2857-8528 **Fax:** (852)-2540-9941
Email: craigb@hkucc.hku.hk

Cheun, Stephen Wah-Kwan (Dr)
General Manager, Electronics Division
Hong Kong Productivity Council
3/F., HKPC Building, 78 Tat Chee Avenue
Kowloon, Hong Kong SAR
Tel: (852)-2788-5788 **Fax:** (852)-2788-5770
Email: scheung@hkpc.org

Cubb, Orville Leverne (Mr)
Head, Division of Computer Studies
City University of Hong Kong
83 Tat Chee Avenue, Kowloon Tong
Kowloon, Hong Kong SAR
Tel: (852)-2788-8611 **Fax:** (852)-2788-9682
Email: dcclubb@cityu.edu.hk

Day, Jeffrey R. (Dr)
Associate Professor in Curriculum Studies
The University of Hong Kong, Dept. of Curriculum Studies.
Pok Fu lam Road, Hong Kong SAR, China SAR
Tel: (852) –2857-8546 **Fax:** (852)-2858-5649
Email: jrd@hku.hk

He, Zhou (Dr)
Associate Professor, Department of English, City University of Hong Kong
Department of English, City University of Hong Kong
Hong Kong SAR
Tel: (852)-2788-8217 **Fax:** (852)-2788-8894
Email: enzhouhe@cityu.edu.hk

Lee, Kar Tin (Dr)

Principal Lecturer, Information Technology in Education
Department of Curriculum and Instruction, Hong Kong Institute of Education
10 Lo Ping Road, Tai Po, N.T. Hong Kong SAR
Tel: (852)-2948-7542 **Fax:** (852)-2948-7563
Email: ktlee@ied.edu.hk

Li, Richard K. (Mr)

Director of Information Technology Services
The Hong Kong Polytechnic University
Hungghom, Kowloon, Hong Kong SAR
Tel: (852)-2766-5495 **Fax:** (852)-2362-2497
Email: itrichli@polyu.edu.hk

Ma, Siu-Leung (Mr)

Principal, Sha Tin Government Secondary School
11-17 Man Lai Road, Shatin, Hong Kong SAR
Tel: (852)-2766-5495 **Fax:** (852)-260-91456
Email: slma@hkstar.com

Tse, Nelson P.C. (Mr)

Manager, IT Training
Hong Kong Productivity Council
4/F HKPC Bldg, 78 Tat Chee Avenue
Kowloon Tong, Hong Kong SAR
Tel: (852)-2788-5883 **Fax:** (852)-2788-6260
Email: nelson@hkpc.org

INDONESIA**Enie, A Basrah (Mr)**

Director, Institute for Research and Development of Agro-based Industry (IRDABI)
Agency for Industrial & Trade Research & Development (AITRD)
J1 IR H Juanda No 11, Bogor 16122, Indonesia
Tel: 62-251-323339 (direct), 324068 **Fax:** 62-251-323339
Email: abenie@indo.net.id

JAPAN**Kuwahara, Terutaka (Mr)**

Director, Fourth Policy-oriented Research Group
National Institute of Science and Technology Policy
1-11-39, Nagata-cho, Chiyoda-ku, Tokyo 100-0014 Japan
Tel: 81-3-3581-0605 **Fax:** 81-3-3503-3996
Email: kuwahara@nistep.go.jp

KOREA**Cho, Jaeho (Mr)**

Director, Corporate Strategy Unit, DACOM Cooperation
12th Floor, DACOM Bldg, 65-228
3-Ga, Hangang-Ro, Yongsau-Ku
Seoul 140-716 South Korea
Tel: (822) 2220 1311 **Fax:** (822) 2220 0773
Email: vvcjh@chollian.net

Lee, Pil-Young (Mr)

Deputy Director, Telecommunication Business Promotion Bureau
Ministry of Information and Communication (MIC)
100, Sejong-ro, Chongro-ku
Seoul 110-777 South Korea
Tel: (822)-750-1313 **Fax:** (822)-750-1329
Email: leepy@mic.go.kr

MALAYSIA

Rahman, Abdul Hamid Abdul (Mr)

Project Head, Smart Learning Environment Program, (SLE) @ Learning, MIMOS Bhd
National IT Council (NITC) E-Learning Working Group; Malaysian Council for Computers in Education (MCCE) an ISTE
Affiliate Member;
MIMOS Bhd. Taman Teknologi Malaysia
Bukit Jalil. Kuala Lumpur 47000 Malaysia
Tel: (603)-966-5000 ext 4133 Fax: (603)-966-0529
Email: hamid@mimos.my

THE PHILIPPINES

Brawner, Filma De Guzman (Dr)

Deputy Director, Science Education Institute
3 Floor PTRI Building
Gen Santos Avenue, Bicutan, Taguig
Metro Manila, 1631 the Philippines
Tel: (632)-837-1925 Fax: (632)-837-1924/837-1925
Email: fgb@sunl.dost.gov.ph

De Vera, Ma.Lourdes Gregorio (Ms)

Director III
Office of Planning Service, Department of Education, Culture and Sports (DECS)
DECS, Complex, Meralco Avenue
Pasig City, 1600 the Philippines
Tel: (632) 633-72-16 Fax: (632) 638-86-34
Email: rsd-ops@fapenet.org or asecrgb@i-next.net

SINGAPORE

Yeo, Hong Mui (Ms)

Deputy Director, IT Training, Educational Technology Division
Ministry of Education
465B Bukit Timah Road
259767 Singapore
Tel: 65-4605406 Fax: 65-4695623
Email: yeo_hong_mui@moe.gov.sg

CHINESE TAIPEI

Hsieh, Ching Chun (Prof)

Research Fellow/Professor Institute of Information Science, Academia Sinica
Director of the Digital Museum Program, National Science Council
P.O. Box 1-7, Nankang, Taipei Taiwan Chinese Taipei
Tel: 886-2-2782-5472 Fax: 886-2-2782-4814
Email: hsieh@sinica.edu.tw

Hsieh, Ying-Chun (Prof)

Professor Department of Journalism, National Chengchi University
64, Sec.2 Chinan Rd, Taipei, Taiwan 116 Chinese Taipei
Tel: 886-2-2938-7213 Fax: 886-2-2938-2063
Email: ychsieh@nccu.edu.tw

Liu, John I-Chiang (Dr)

Senior Specialist, National Science Council
20F, No. 106, Sec. 2
Ho-Ping E. Rd., Taipei
Tel: 886-2-2733-7610 Fax: 886-2-2733-7672

Email: johnliu@nsc.gov.tw

THAILAND

Durongkaverroj, Pichet (Dr)

Advisor to National Information Technology Committee Secretariat
NECTEC, NSTDA
73/1 Rama VI Road, Rajdhevee, Bangkok 10400, Thailand
Tel: (662)-644-6644 Fax: (662)-644-6653
Email: durong@mozart.inet.co.th

Nakornthap, Amornwich (Dr)

Director, Center for Policy Research in Education, Faculty of Education
Chulalongkorn University, Wangmai, Pathumwan
Bangkok 10330, Thailand
Tel: (662)-218-2447 Fax: (662)-216-8804
Email: namornwi@chula.ac.th

Sitathani, Monthida (Ms)

Senior International Coordinator, International Cooperation Department
National Science and Technology Development Agency
73/1 Rama VI Road, Rajdhevee, Bangkok 10400, Thailand
Tel: (662)-644-8150 Ext 705 Fax: (662)-644-8027
Email: monthida@nstda.or.th

Sripaipan, Chatri (Dr)

Co-Director, APEC Center for Technology Foresight
National Science and Technology Development Agency
73/1 Rama VI Road, Rajdhevee, Bangkok 10400, Thailand
Tel: (662)-644-8009 Fax: (662)-644-8194
Email: chatri@nstda.or.th

VIETNAM

Bach, Sinh Tan (Dr)

Chief, Research Planning and International Cooperation Division
National Institute for Science and Technology Policy and Strategy Studies
Ministry of Science, Technology and Environment
38 Ngo Quyen, street Hanoi, Vietnam
Tel: (84.4)-8256511 Fax: (84.4)-8252873
Email: nistpass@hn.vnn.vn

ANNEX II
Experts Meeting on “Sustainable Transport”
27-29 July 1999, Melbourne
List of participants

AUSTRALIA

Ainsley Jolley (Mr)

Director Emerging Technologies and Asian Growth Project
Centre for Strategic Economic Studies
Footscray Campus
Victoria University
PO Box 14428
Melbourne City MC VIC 8001
AUSTRALIA
Tel. 03 9248 1004 Fax: 03 9248 1048
Ainsley.Jolley@vu.edu.au

Derek Kemp (Mr)

Transport Planner
Strategy Branch
Queensland Dept of Transport
PO Box 673
QLD 4006
AUSTRALIA
Tel. 07 3253 4397 Fax: 07 3253 4233

Greg Tegart (Professor)

Director (now Executive Advisor)
APEC Center for Technology Foresight
National Science and Technology Development Agency (NSTDA)
73/1 Rams VI Rd.
Rajdhevee, Bangkok 10400
AUSTRALIA/THAILAND
Tel. 662 6448150 Fax. 662 644 8194
gregtegart@ozemail.com.au

Jeff Kenworthy (Dr)

Senior Lecturer Urban Environments
Institute for Science and Technology Policy
Murdoch University
Murdoch WA 6150
AUSTRALIA
Tel. 08-9360-2876 (w) Fax: 08 9360 6421
Tel. 08-9335-6870 (h)
kenworth@central.murdoch.edu.au

Joe Perone (Mr)

Anne Spurrutt (Ms)

Jane Homewood (Ms)

Robin Leeson (Mr)

Economic Strategic Planning
City of Melbourne
GPO Box 1603M
Melbourne VIC 3000
AUSTRALIA
Tel. 9658 9957 Fax: 9650 3572

Tsinghua University

Beijing 100084
CHINA
Tel. 86 10 6278 7157 Fax: 86 10 6278 7157
Email: Luhp@tsinghua.edu.cn

John McKerral (Mr)

Warren Centre for Advanced Engineering
University of Sydney
Engineering Building J13
NSW 2006
AUSTRALIA
Tel. 02-9351-4048/3752 Fax: 02 9351 2012

Leigh Crutchley (Mr)

Deputy Director
International Trade and Service Team
Dept of Transport & Regional Services
GPO Box 594
Canberra ACT 2601
AUSTRALIA
Tel. 02 6274 7047 Fax: 02 6274 6739
Leigh.Crutchley@dotrs.gov.au

Mark Diesendorf (Professor) (Day 1 only)

Director
Institute for Sustainable Future
University of Technology Sydney
PO Box 123
Broadway NSW 2007
AUSTRALIA
Tel. 02-9209-4350
Mark.Diesendorf@uts.edu.au

Peter Gipps (Dr)

Manager
Transport Infrastructure
CSIRO
CSIRO BCE, PO box 12072, Elizabeth St BC
Brisbane QLD Australia 4001
AUSTRALIA
Tel. 07 3864 4135 Fax: 07 3864 4438
Peter.Gipps@dbce.csiro.au

Peter Sheehan (Professor)

Director
Centre for Strategic Economic Studies (CSES)
Victoria University
PO Box 14428
Melbourne City MC VIC 8001
AUSTRALIA
Tel. 03 9248 1031 Fax: 03 9248 1048
Peter.Sheehan@vu.edu.au

Ron Johnston (Professor)

Executive Director
Australian Centre for Innovation and International Competitiveness Ltd (ACIIC)
Faculty of Engineering
University of Sydney
NSW 2006 AUSTRALIA
Tel. 02 9351 3934 Fax: 02 9351 3974
rj@aciic.eng.usyd.edu.au

Simon Ginn (Mr)
Land Use and Transport Planner
Strategy Branch
Queensland Dept of Transport
PO Box 673
QLD 4006
AUSTRALIA
Tel. 07 3253 4397 Fax: 07 3253 4233
Simon.P.Ginn@transport.qld.gov.au

CANADA

Craig Townsend (Mr)
PhD Student
Institute for Science & Technology Policy
Murdoch University
South Street, Murdoch
Perth WA 6150
AUSTRALIA
Tel. 08 9360 6293 Fax: 08 9360 6421
townsend@central.murdoch.edu.au

CHINA

Huapu Lu (Dr)
Vice Director
Institute of Transport Engineering
Department of Civil Engineering

HONG KONG, CHINA

William Lam (Dr)
Associate Professor
Dept of Civil & Structural Engineering
Hong Kong Polytechnic University
Hung Hom, Kowloon
Hong Kong, China
Tel. 852 2766 6045 Fax: 852 2334 6389
cehlam@polyu.edu.hk

THE PHILIPPINES

Crisostomo F. Abanes (Mr)
Undersecretary & Chief of Staff
Department of Transportation & Communication
Colombia Tower
Ortigas Av
Mandaluyong City 1555
PHILIPPINES
Tel. 632 724 6465 Fax: 632 726 ?104
cabanes@pacific.net.ph

SINGAPORE

Sing Mong Kee (Mr)
Manager
Transport Technology
460 Alexandra Road
#27-00 PSA Building
SINGAPORE 119963
Tel. 65 375 7252
Fax: 65 375 7209
Mong_Kee_SING@lta.gov.sg

THAILAND

Chaiyos Chaimankong (Mr)

Inspector General
Ministry of Transport and Communications
38 Ratchadamnoen Nok
Bangkok 10100
THAILAND
Tel. 662 280 0521 Fax: 662 280 5863

Chatri Sripaipan (Dr)

Co-Director
APEC Center for Technology Foresight
National Science and Technology Development Agency (NSTDA)
73/1 Rama VI Rd.
Rajdhevee, Bangkok 10400
THAILAND
Tel. 662 6448009; 662 6448150 ext. 703 Fax. 662 6448194
chatri@nstda.or.th

ANNEX III
APEC CENTER FOR TECHNOLOGY FORESIGHT
BANGKOK, THAILAND

EVALUATION REPORT ON APEC PROJECT

BASIC INFORMATION

Date of report : November 1999

Name and number of project : Establishing the APEC Center for Technology Foresight IST 01/98

Brief description of project outputs (number of participants at workshop; number of economies covered by survey, and deliverables, where applicable) :

Information Exchanges:

- .. Web Site: www.apectf.nstda.or.th over 17,000 visitors during 1998 (and a further 28,600+ in 1999)
- .. Directors visits around APEC to Canada, Chinese Taipei, USA, Mexico and Vietnam, and to foresight institutions in Europe and India.
- .. Information provided on request to contacts in Mexico and Vietnam.

Courses and Meetings:

- .. Public Seminar: Introduction to Technology Foresight
150+ participants from 13 member economies
- .. Training Workshop: Using Technology Foresight
30 participants from 6 member economies
- .. Public Seminar: Technology for Learning and Culture
250+ participants from 6 member economies
- .. Executive Seminar with Videoconference: The Digital Economy
40 participants from 5 member economies (videoconference between USA and Thailand)

Publications in 1998:

- .. Applications of Technology Foresight (500 books)
- .. The APEC Center for Technology Foresight (1000 leaflets)
- .. Technology Foresight as a Tool for Strategic Science and Technology Planning and Policy Development. (article) Presented to the 5th ASEAN S&T week, Hanoi, Vietnam October 1998 (published on the web)
- .. Multi-Country Foresight – Issues and Challenges. (article) Presented to the 3rd International Conference of the International Association of Technology Assessment and Forecasting Institutes, New Delhi, India Nov 1998 (published on the web)

Publications in 1999, based on work undertaken in 1998:

- .. Water Supply and Management in the APEC Region: Summary Report Volume 1 (1500 booklets)
- .. Water Supply and Management in the APEC Region: Volume 2 (500 books)
- .. 1998 Activities Report (1500 booklets)
- .. 1998 Annual Report (100 books-photocopied)

Researcher Exchanges:

None

Other:

- .. Research Study: Water Supply and Management in the APEC Region
Consultants from 3 member economies / Experts attending scenario-planning workshop from 9 member economies / Experts participating in Delphi survey from 16 member economies / Publications resulting from study listed above

LESSONS LEARNED AND/OR FURTHER WORK

Originally planned completion date of project : December 1998

Actual completion date of project : December 1998 (but the work of the Center continues)

APEC projects are assessed by four categories of criteria. (Please refer to the “Criteria for Assessment of APEC Projects”.) Has the project met the following as originally planned: (Please tick either box and comment where appropriate)

If yes, please explain how

APEC Values

The activities of the APEC Technology Foresight Center served to strengthen links among technologists and among S&T policy experts in the region. The public seminars, training workshop and publications contributed to human resource development, encouraging and enabling technology foresight activities in member economies. All activities, but most directly, the executive seminar on the digital economy, assisted in the goal of harnessing technologies for the future. The research project directly addressed the aim of sustainable development and the safeguarding of quality of life through consideration of policy and technological issues re: the future of water supplies and management in the region.

Well over half of the member economies were actively involved in the Center's activities, as detailed above in the description of project outputs. While research activities were dominated by the government and academic sectors, many of those attending the public events were from the private sector and the training workshop attracted private sector trainees. The Center also linked with the private sector through the core involvement of a private-sector water expert in its research project.

Thus the APEC TF Center responded to the Blake Island vision (1993) of cooperative efforts to solve the challenges of change. The Center directly addressed one of the 3 'Osaka pillars' (1995), namely economic and technical cooperation, in particular, 3 of the 6 elements outlined in the Leaders statement (Nov 1996): developing human capital, harnessing technologies of the future and promoting environmentally sustainable growth. At Vancouver (1996), Leaders noted the benefits of electronic commerce, one of the main topics at the Center's seminar on the digital economy. Ministers also instructed all APEC economies to implement actions necessary to make the Asia Pacific information society a reality, a issue addressed by the initiation of a foresight research study on technologies for learning and culture (carried out in 1999).

Project Design

The project followed closely the objectives and methodology set out in the application for funds. Almost all planned activities were undertaken. The Center's ability to run training workshops was sadly constrained by the onset of the economic crisis that occurred at the time of the Center's launch, since potential trainees were unable to find the funds for fees and travel expenses. Therefore, only one such event took place. The Center also found that establishing a foresight database took more resources than originally anticipated, and has recently decided to pursue the idea of establishing an APEC-wide network of foresight practitioners instead. However, the Center went beyond its original commitment to initiate research, and actually carried out a complete multi-economy foresight research project on Water Supply and Management in the APEC region, in addition to initiating two further projects for 1999-2000. The progress of the Center was reported regularly to the ISTWG, not only through the required report, but also with Side Meetings at every opportunity.

Dissemination of Project Results

The project yielded a number of valuable publications, produced to a very high standard and disseminated throughout the APEC Region. These are listed above under 'project outputs' and were all funded by NSTDA not APEC. In addition, the Center's activities have been publicised through a web site which was updated regularly; the site was visited by over 17,000 cybernauts in 1998. The Director and Co-Director also made visits around the APEC region, and beyond, to promote the Center and its activities and to build links with member economies and relevant organisations.

Budget

The APEC funded part of the project followed SOM guidelines and was underspent. The Center also received funding from the host economy (Thailand) and 'in kind' contributions from many other economies far in excess of the APEC funding. Supporting economies included Australia; Canada; Chile; China; Hong Kong, China; Japan; Korea; Malaysia; Mexico; and Chinese Taipei (see Annual Report p26 and Activities Report p6 for further details).

The APEC Center would like to acknowledge that there were some minor difficulties in administering the Central Fund allocation, due to inexperience and pressures of time. The Center is grateful for the assistance of the Secretariat, especially for their prompt action to ensure that one contract was issued at very short notice. The Center regrets these problems and will make every effort to ensure that it complies with the guidelines fully in future.

If your committee or working group has used other additional criteria to evaluate this project, please briefly describe the criteria and how the project is rated against these criteria:

The training workshop (Using Technology Foresight, 4-6 Feb) was evaluated by participants. This showed that over 90% of participants approved the program content and appropriateness, and 88% felt their likelihood of using the knowledge and skills gained in their future work was good or very good (see Annual Report p20 for further details.)

To what extent the project has reached the targeted clientele, any assessment of client satisfaction in terms of accessibility, competence of service delivery, usefulness of information and contribution to trade facilitation and business performance?

The Center has been successfully established, and in its first 11 months of operation, made considerable progress towards realizing its purpose. In so doing, it has achieved some interaction with 16 of the then-18 APEC members, with significant involvement from at least 13 (attendance at an Experts Meeting or training event). Targetted clientele, according to the original application for funds, were planning divisions of S&T organizations and research centers and these were reached in most economies. The Center's public events have been extremely well attended.

Does the project complement or overlap with the work of others, was the project the most cost-effective in achieving the targeted goals, has the Committee/Working Group clearly defined and agreed upon targeted clients, the impacts to be achieved and the means of achieving them?

The Center's purpose was elaborated into 5 key objectives at the initial board meetings, and each one was pursued with concrete activities, or by initiating projects for subsequent years. In this first year of operation, the Center's work complemented, but did not overlap with, other sections of APEC. The Center is unique in APEC in promoting particular techniques for long term planning, that are widely applicable. The Center suggests that its success was achieved at relatively small cost to APEC (see 'project outputs' above and Annual Report). Of course, this was also made possible by the generous funding of the Thai government and the contributions of many APEC member economies.

How will the project, especially for database projects, maintain sustainable benefits over the longer term?

This funding contributed to the establishment of the Center, but the Center intends to continue its activities for the foreseeable future. These will include post-foresight activities to promote research outcomes, which may take place over several years. (During 1999, the research was reported at meetings in Malaysia, the Philippines, Thailand and Hong Kong, China.) On-going funding has been secured from the Thai government (the host economy), and in addition, the Center expects to receive the support of most member economies, following its efforts to build a good rapport with members. In future, the Center plans to rotate the Directorship so that different member economies become actively involved (the first Director was from Australia, and the next Director will be from Canada). The Center also appointed an International Advisory Board and part of their role was to look for opportunities within their own economies to promote the work of the Center and to encourage their economies' participation. IAB members were from Australia, Japan, Korea and Thailand. The Center held side meetings at all ISTWG meetings in order to be accountable to members, and to encourage their participation in its work. Thus the Center made sure to keep all member economies aware of and involved in its activities, so that all can potentially benefit and to maximise the chances of members contributions, which are vital to the on-going success of the Center.

Overall, has the project achieved its intended results in terms of beneficial effects in member economies?(Please circle one) Yes * / No (If no, why?)

* Interim indicators of the beneficial effects of the Center's activities were certainly apparent in 1998. For example, the Center can report the excellent attendance at its events and the widespread participation of member economies in its research project. However, the real test of the Center's success will be the increased adoption of foresight in member economies and a subsequent improvement in the quality of S&T planning. There were some signs of this during 1999. For example, the Malaysian water expert that was involved in the research study arranged a meeting within his economy where a large group of experts critiqued the project outcomes and applied them to the Malaysian water situation. In Thailand, the national foresight exercise that was initiated in September 1999 was quite clearly related to the awareness and increased skill level brought about by the Center.

The key is to convince member economies that the Center is useful to them and that they want to use the services we provide. This building up the credibility takes time, but the invitations to carry out foresight training workshops in 2000, in Malaysia and Mexico, indicate that the Center's efforts are having an effect.

Are there any lessons learned and/or future work arising from this project? If so, please describe them briefly.

Lessons learned:

- The impact of the Center's work is extremely difficult to assess, though there are some concrete indicators (as described in the section above). However, its effects are unlikely to be seen within the first year of operation.
- Training workshops may need to be held within member economies. The multi-economy attendance at the workshop made for a more stimulating discussion, promoted learning from a variety of experiences and helped to forge international links. However, the cost of sending trainees abroad was a serious impediment for most economies. Note that the Center was established in the midst of an economic crisis that affected the whole region.
- Many methodological issues arose as the research project was planned and carried out, since the Center was pioneering technology foresight research at a multinational level. For the purposes of this report, it can be noted that the pre-foresight (planning) phase of the research may need to be longer with a clearer route to implementation identified. *It is important to create a sense of ownership in each participating economy so that the results are likely to be implemented, since the Center itself does not have sufficient influence.* In future research, the Center may explore involving a few member economies that are keen to work together (say 4 or 5) instead of all 21 members. (These issues were described in more detail in the article: Multi-Country Foresight – Issues and Challenges, presented to the 3rd International Conference of the International Association of Technology Assessment and

Forecasting Institutes, New Delhi, India November 1998 and were also referred to in the Annual Report, and in Vol II of the research report.)

- Progress towards developing the Center web site with information resources was limited by the lack of staff time, despite the generous funding of the Thai government who covered all staff salaries and other running costs. Member economies made substantial contributions to the work of the Center, for example through participation of self-funded experts, but these were not 'cash' contributions. If member economies are not willing to offer 'cash' to support running costs, perhaps they should be asked to second staff.

Future Work 1999-2000:

A busy program of activities will be undertaken, including 2 major foresight research studies on Technology for Learning and Culture and Megacities. Post-foresight activities to promote research project outcomes are seen as vital and will continue. In addition, opportunities to provide training will be vigorously pursued, the web site will be developed and the Center will respond positively to APEC member requests for support with their foresight efforts. The Center also plans to network with other APEC forums and working groups.

Signed:

1) Project Overseer, Director of the National Science and Technology Development Agency, Thailand

Professor Pairash Thajchayapong date: 6.1.2000

2) Co-Director, APEC Technology Foresight Center

Dr Chatri Sripaipan date: 6.1.2000

The Small Group comments

Lead Shepherds/Chairs comments

Secretariat comments.