

FINAL REPORT

Consultancy to

Examine and Disseminate Innovative Approaches to Financing of Initiatives such as Sustainable Infrastructure and Building, Planning, Design, Construction and Operation for Asia Pacific Economic Co-operation (APEC)

by

Gary W. Heinke, Ph.D. P.Eng., FHKIE
Consultant
Principal Research Scientist, Institute for
Financial Market
Environment and Sustainable Development

John K.C. Wei, Ph.D.
Consultant
Director, Centre for Asian

Hong Kong University of Science and Technology

TABLE OF CONTENTS

	<u>Page</u>
EXECUTIVE SUMMARY	i
1. BACKGROUND INFORMATION LEADING TO THIS CONSULTANCY	1
2. OUTLINE OF METHODOLOGY AND DESIGN OF QUESTIONNAIRES	4
2.1 List of Requirements for Project and Project Schedule	4
2.2 Design of Questionnaires	5
2.2.1 <i>Description of Questionnaires</i>	5
2.2.2 <i>The Design Process</i>	6
2.2.3 <i>Distribution of the Questionnaires, Follow-up and Responses</i>	6
3. DEFINITION OF SUSTAINABILITY FOR THIS CONSULTANCY	8
3.1 Definition	8
3.2 Responses to Interim Definition and Other Aspects of Sustainability	8
3.2.1 <i>Importance of Various Factors for Definition of Sustainability</i>	9
3.2.2 <i>Agreement/Disagreement with Definitions of Sustainable Development and Sustainable Infrastructure</i>	10
3.2.3 <i>Importance of Social and Environmental Factors prior to Financing Decisions</i>	11
3.2.4 <i>Issues that may negatively impact Sustainability of Infrastructure Projects</i>	12
3.2.5 <i>Issues that may positively impact Sustainability of Infrastructure Projects</i>	13
3.2.6 <i>Financing Techniques that may enhance Sustainability of Projects</i>	14
3.2.7 <i>Non-funding of Projects due to Financial Risks</i>	16
3.2.8 <i>Features of Infrastructure Projects contributing to Sustainability</i>	17
3.3 Comments and Conclusions	18
4. LITERATURE REVIEW	20
4.1 Asia Pacific Economic Cooperation (APEC) - An Overview	20
4.2 Infrastructure Development	26
4.3 Public-Private Partnership (PPP)	27
4.3.1 <i>Public-Private Financing Structures</i>	28
4.4 Sources of Infrastructure Financing	31
4.4.1 <i>Equity</i>	31
4.4.2 <i>Debt</i>	32
4.5 Infrastructure Financing Techniques	35
4.5.1 <i>Project Bonds</i>	35
4.5.2 <i>Revenue Bonds</i>	36
4.5.3 <i>Mezzanine debt</i>	37
4.5.4 <i>Infrastructure funds</i>	37
4.5.5 <i>Off - Balance Sheet Financing</i>	37
4.5.6 <i>Refinancing</i>	37
4.5.7 <i>Catalytic Role of Multilateral Financial Institutions</i>	37
4.6 Risk Management	39
4.7 Public-Private Partnerships: Country Experience	40
4.7.1 <i>The United Kingdom's Experience</i>	40
4.7.2 <i>Canada's Experience</i>	43
4.8 Best Practices for Promoting Private Sector Investment in Infrastructure Industry	45
4.8.1 <i>Power Sector</i>	45
4.8.2 <i>Port Privatization</i>	48
4.8.3 <i>Airports and Air Traffic Control</i>	49
4.8.4 <i>Transport</i>	50
4.8.5 <i>Water Supply</i>	52
4.8.6 <i>Privatization of Landfills</i>	52

5.	ANALYSIS OF INFORMATION FROM THE PRIVATE SECTOR BUSINESSES (PSBs)	58
5.1	Analysis of information from Hong Kong, China's PSBs	58
5.1.1	<i>Project Characteristics</i>	59
5.1.2	<i>Sources of Financing</i>	61
5.1.3	<i>Financing Structure and Techniques</i>	63
5.1.4	<i>Important Factors to the Projects</i>	63
5.1.5	<i>Risk Management</i>	64
5.1.6	<i>Conclusions</i>	65
5.2	Analysis of information from other APEC Member Economies?PSBs	65
5.2.1	<i>Korea</i>	65
5.2.2	<i>The Philippines</i>	70
5.2.3	<i>Singapore</i>	73
5.3	Analysis of information from the United Kingdom PSBs	75
5.3.1	<i>Project Characteristics</i>	75
5.3.2	<i>Sources of Financing</i>	76
5.3.3	<i>Financing Structure and Techniques</i>	77
5.3.4	<i>Important Factors to Projects</i>	78
5.3.5	<i>Risk Management</i>	78
5.4	Conclusions	79
6.	ANALYSIS OF INFORMATION FROM PARTICIPATING APEC MEMBER ECONOMIES	80
6.1	Response Record	80
6.2	Analysis of APEC Member Economies Questionnaires	81
6.2.1	<i>Hong Kong, China</i>	81
6.2.2	<i>Korea</i>	85
6.2.3	<i>Singapore</i>	86
6.2.4	<i>Chinese Taipei</i>	90
6.3	Information from Site Visits	92
6.3.1	<i>Canada</i>	92
6.3.2	<i>China</i>	99
6.3.3	<i>The Philippines</i>	100
6.3.4	<i>The USA</i>	100
6.4	Conclusions	101
7.	ANALYSIS OF INFORMATION FROM FINANCIAL INSTITUTIONS	102
7.1	Information from Site Visits to the World Bank and the ADB	102
7.1.1	<i>Site Visit to the World Bank</i>	103
7.1.2	<i>Site Visit to the Asian Development Bank</i>	104
7.2	Analysis of information from the MFIs and Hong Kong, China's FIs'	106
7.2.1	<i>Project Characteristics</i>	107
7.2.2	<i>Project Financials</i>	108
7.2.3	<i>Sources of Financing</i>	108
7.2.4	<i>Financing Structure</i>	109
7.2.5	<i>Important Factors to Projects</i>	110
7.2.6	<i>Risk Management</i>	110
7.3	Analysis of information from Export Credit Agencies (ECAs)	111
7.3.1	<i>Questionnaire Analysis of Export Credit Agencies (ECAs)</i>	112
7.3.2	<i>Description of the Site Visit to Export Development Corporation (EDC) - Canada</i>	116 119
7.3.3	<i>Description of the Site Visit to Export Credit Guarantee Department (ECGD) -United Kingdom</i>	120
7.3.4	<i>Description of the Site Visit to Hermes Kreditversicherungs AG - Hamburg, Germany</i>	121
7.4	Conclusions	
8.	REVIEW OF INFORMATION FROM EUROPEAN UNION MEMBER STATES	122
8.1	Introduction	122
8.2	United Kingdom	122
8.3	Denmark	124
8.4	Germany	125
8.5	The Netherlands	126
8.6	European Union Secretariat	128

8.7	Summary of Experience from the Selected EU Member States	128
9.	SUMMARY, CONCLUSIONS AND RECOMMENDATIONS	130
9.1	Summary	130
9.1.1	<i>Sustainability</i>	130
9.1.2	<i>Results from Private Sector Businesses</i>	131
9.1.3	<i>Results from APEC Member Economies</i>	132
9.1.4	<i>Results from Financial Institutions</i>	133
9.2	Conclusions	133
9.3	Recommendations	135

APPENDICES

1	Consultancy Agreement - Annex A
2	List of Contact Persons
3	Questionnaires for APEC Member Economies, Financial Institutions, Private Sector Businesses, and European Union Member States (same as AMEs)
4	Site Visit to EU Member States

LIST OF TABLES

<u>Table no.</u>		<u>Page</u>
3.2-1	Categories of Non-Funded Projects	16
3.2-2	Financial Risks Leading to Non-Funding of Projects	16
4.2-1	Total Dollar Injected into Infrastructure Projects	27
4.5-1	Advantages and Disadvantages of Various Financing Techniques	38
4.7-1	Implementation of Private Finance Initiative	42
4.7-2	Classic Examples of Public-Private Partnership : Canada	44
4.8-1	Options for Private Sector Participation	45
4.8-2	Alternative Models of Private Sector Participation	49
4.8-3	Private Sector Participation in Transport Industry	50
5.1-1	Project Characteristics - Hong Kong, China	60
5.1-2	Sources of Financing - Hong King, China	62
5.1-3	Financing Structure and Techniques - Hong Kong, China	63

5.1-4	Important Factors to the Projects - Hong Kong, China	63
5.1-5	Risk Management: Factors considered for mitigating various risks - Hong Kong, China	64
5.2.1-1	Project Characteristics - Korea	66
5.2.1-2	Project Financials - Korea	67
5.2.1-3	Sources of Financing - Korea	68
5.2.1-4	Financing Structure - Korea	69
5.2.1-5	Importance of Factors to the Project - Korea	69
5.2.1-6	Risk Management: Factors considered for mitigating risks - Korea	70
5.2.2-1	Project Characteristics - The Philippines	71
5.2.2-2	Sources of Financing - The Philippines	72
5.2.2-3	Financing Structure and Techniques - The Philippines	73
5.2.2-4	Important Factors to the Project - The Philippines	73
5.2.3-1	Project Characteristics -Singapore	74
5.2.3-2	Important Factors to the Project - Singapore	74
5.2.3-3	Risk Management: Factors considered for mitigating risks - Singapore	75
5.3-1	Project Characteristics - UK	76
5.3-2	Sources of Financing - UK	77
5.3-3	Financing Structure and Techniques - UK	78
5.3-4	Important of Factors to the Project - UK	78
5.3-5	Risk Management: Factors considered for mitigating risks - UK	79
6.2.1-1	Project Characteristics - Hong Kong, China	82
6.2.1-2	Sources of Financing - Hong Kong, China	83
6.2.1-3	Financing Structure and Techniques - Hong Kong, China	84
6.2.1-4	Important Factors to the Project - Hong Kong, China	84
6.2.1-5	Risk Management: Factors considered for mitigating risks - Hong Kong, China	85
6.2.2-1	Risk Management: Korea	86
6.2.3-1	Project Characteristics - Singapore	87
6.2.3-2	Sources of Financing - Singapore	88
6.2.3-3	Financing Structure and Techniques - Singapore	88
6.2.3-4	Importance of Various Factors to the Project - Singapore	89
6.2.3-5	Risk Management: Factors considered for mitigating risks - Singapore	90
6.2.4-1	Project Characteristics - Chinese Taipei	91
6.2.4-2	Project Financials - Chinese Taipei	91

6.2.4-3	Important Factors for Projects - Chinese Taipei	92
7-1	Responses of Multilateral Financial Institutions (MFIs)	102
7.2-1	Project Characteristics - Financial Institutions	107
7.2-2	Project Financials - Financial Institutions	108
7.2-3	Sources of Financing - Financial Institutions	109
7.2-4	Financing Structure: Financial Institutions	110
7.2-5	Importance of Facts to the Project - Financial Institutions	110
7.2-6	Risk Management: Factors considered for mitigating risks - Financial Institutions	111
7-2	Responses of Export Credit Agencies	112
7.3.1-1	Project Characteristics - ECAs	113
7.3.1-2	Project Financials - ECAs	113
7.3.1-3	Sources of Financing - ECAs	114
7.3.1-4	Financing Structure - ECAs	114
7.3.1-5	Important Factors to the Project - ECAs	115
7.3.1-6	Risk Management: Factors considered for mitigating risks - ECAs	116

EXECUTIVE SUMMARY

At the APEC Environment Ministerial Meeting on Sustainable Development in Toronto, Canada on June 9-11, 1997, the Ministers decided to embark on a study entitled

"Examine and Disseminate Innovative Approaches to Financing of Initiatives such as Sustainable Infrastructure and Building Planning, Design, Construction and Operation" for Asia Pacific Economic Cooperation(APEC).

This consultancy project then arose as part of the Program of Action on Sustainable Cities endorsed at the Toronto meeting. Hong Kong, China agreed to take a lead role in preparing a report and identified a need for a multi-disciplinary consultant to prepare the report.

Through a 'Call for Proposals' in Hong Kong, China, the team of Professor Gary Heinke, Director, Institute for Environment and Sustainable Development and Professor John Wei, Director, Center for Asian Financial Market, Hong Kong University of Science and Technology, were chosen to carry out the study. The contract for a one-year study was signed on October 22, 1998.

The project is mainly based on a literature survey, on questionnaires and as many site visits as the budget allowed. To cater to the various institutions three types of questionnaires were designed, namely

APEC Member Economies (AMEs) Private Sector Businesses (PSBs), and Financial Institutions (FIs)

The questionnaires focus on the collection of information, such as the type of the project, the construction period, the operation period, the rate of return on the project, the source and

structure of financing, debt to equity ratio, and risk management. The consultant also asked the respondents to give their opinion on the definition of sustainability and on lessons learned from infrastructure financing.

For each questionnaire, we asked the AMEs, the PSBs, and the FIs to provide information based on the infrastructure projects that are ongoing or completed in the past five years, with a total cost of each project of more than US\$25 million. For each PSB, we asked the company to select a maximum of three projects and to provide detailed information for each project. For AMEs or FIs, we asked them to provide summary statistics based on all qualified projects.

The consultant sent one AMEs questionnaire along with three PSBs questionnaires to 17 AMEs. They include Australia; Brunei; Canada; Chile; China; Hong Kong, China; Indonesia; Japan; Korea; Malaysia; Mexico; Papua New Guinea; Philippines; Singapore; Chinese Taipei; Thailand; and USA. Since the three new member economies including Peru, Russia, and Vietnam were admitted to APEC after the commencement of this study, i.e. in November 1998, therefore the questionnaires were not sent to them. New Zealand had earlier indicated that they were not able to participate, so no questionnaires were sent to them.

Five out of 17 APEC Member Economies returned AMEs and PSBs questionnaires (Hong Kong, China; Korea; Philippines; Singapore; and Chinese Taipei), only the Hong Kong, China; and the Singapore responses were complete, as others had difficulty in collecting the necessary information for many of the questions. Several letters were received from other AMEs as to why they were unable to respond.

In case of Hong Kong, China, the consultant separately sent the questionnaires to the PSBs involved in infrastructure projects that agreed to participate in the study. They include Hopewell Holdings Limited, Airport Authority Hong Kong, MTR Corporation, CITIC Pacific Limited, China Light and Power (CLP) International, Cheung Kong Infrastructure Holdings, and New World Infrastructure. All these PSBs completed the questionnaire.

The consultant sent the FIs questionnaire to Multi-lateral Financial Institutions, namely Asian Development Bank (ADB), World Bank, International Finance Corporation, Multilateral Investment Guarantee Agency, and Overseas Private Investment Corporation. Also, the consultant mailed the FIs questionnaire to several Export Credit Agencies such as Export-Import Bank of the US, Export-Import Bank of Japan, Canada's Export Development Corporation, UK's Export Credit Guarantee Department, Coface of France and Hermes Credit Services of Germany. Among MFIs, ADB and the World Bank completed the questionnaire and among ECAs all except Coface and Hermes completed the questionnaire.

The consultant also sent the FIs questionnaire to financial institutions in Hong Kong, China including American International Group, Asian Infrastructure Fund Advisers, The Bank of East Asia Ltd., a major Infrastructure Fund, HSBC Investment Bank Asia, and Santander Investment Asia Ltd. All these Financial Institutions completed the questionnaire.

During the site visits to selected EU countries (UK, Denmark, Germany and the Netherlands) certain individuals/institutions agreed to complete the questionnaires. The consultant received completed questionnaires from the (i) UK: Treasury Department, 2 PSBs (Ove Arup Partners, The Nichols Group); (ii) Denmark: Danish National Building Research Institute; and (iii) The Netherlands: Netherlands, Institute for Environmental Studies.

Since there is no commonly accepted definition of sustainability, in this study, we started with the interim definition of 'Sustainable Development' and 'Sustainable Infrastructure'. The following definition of sustainable development has been adopted from the study on Sustainable Development for the 21st Century commissioned by the HKSAR government.

- i. *'Sustainable development balances social, economic and environmental needs, both for the present and future generations, simultaneously achieving a vibrant economy, social progress and better environmental quality, locally and internationally, through the efforts of the communities and national governments.'*
- ii. *'An infrastructure is sustainable when it is economically viable, socially acceptable and environmentally acceptable.'*

We then asked the respondents whether they agree / partially agree / disagree with these interim definitions. The responses indicate that more than 60% of the respondents agree with the definition. As a result, we recommend keeping these definitions until any extension of this study is conducted in future.

The following are the consultants' impressions of what can be learned by APEC Member Economies from the EU experience on financing of sustainable infrastructure through public/private partnerships.

- The United Kingdom is the only country in the European Union, which has made sufficient progress in the implementation of its program: Partnership for Prosperity - The Private Finance Initiative (PFI). In recent years it has set up an interdepartmental Task Force which includes several government departments, led by the Treasury Department, to implement the provision of services, previously provided by the public sector, by a partnership between the public and private sectors. Well over 100 projects, each worth over £5 million, for a total expenditure of about £2,000 million has been carried out in a wide variety of services.
- The experience in the Netherlands and in Denmark is much more limited with respect to private financing of services. However, much important work is being done to make the public services more sustainable, with particular emphasis on housing.
- In Germany, it is the Bundeslander (States) that, together with municipalities, primarily carry out public services. Based on information received at the Federal Ministry of Environment the core public services are still primarily financed by public funds. Some projects in the 'new' Bundeslander (in the former East Germany) are financed in partnership with the private sector.
- The role of the European Union on financing and sustainability of EU- wide infrastructure projects could not be sufficiently clarified during this study, as no site visit was possible. However, from the information received by mail and summarized in Section 8.6, it is clear that individual APEC Member Economies, as well as APEC as a whole, may benefit from the experience of the EU in upgrading transportation networks and environmental improvements in their regions. They may also benefit from their economic and social cohesion programmes, designed to assist less prosperous members with specific programme for transport and environmental facilities.
- The application of experiences gained in European countries to other areas of the world such as some of the less developed APEC Member Economies needs to be done very carefully. The infrastructure needs in European countries are very different from those of developing countries. Their successes may not be transferable, but one may be able to learn from their failures.
- Any APEC Member Economy who wishes to proceed with implementation of greater participation of the private sector in the provision of formerly public services would be

well advised to study the United Kingdom experience. Visits of a team of relevant specialists to the United Kingdom would be the best way to accomplish this.

From Site visits and completed / partially completed questionnaires from the PSBs, AMEs, and FIs we find that:

Conclusions

- Public funding, for infrastructure development, is becoming difficult for governments to provide. Therefore, the private sector is becoming increasingly important in providing the capital and expertise for infrastructure development due to high demand for infrastructure development.
- The United Kingdom is the leader in private sector involvement among the European Union member states. Canada is also encouraging private sector involvement in various sectors.
- Based on the analysis of the completed questionnaires and the site visits, we find that infrastructure-financing methods differ across different sectors. Through literature survey we identify 'Best Practices' for various infrastructure sectors including the power sector, port privatisation, airports and air traffic control, transport, water supply, and privatisation of landfills (please see Section 4.8 for review of these 'Best Practices'. The 'Best Practices' for one sector may not be applicable to the other sector. Hence, it is important to study infrastructure sectors separately to identify issues related to each sector and then design financing methods that can allocate risks to the parties that can bear it and provide appropriate return.
- Similarly, the 'Best Practices' cannot be simply transferred across member economies, as the macro-economic environment within each economy is different. However, the 'Principles of Finance' still apply. That is, for projects with more predictable and stable cash flows or with host government guarantees for projects such as power plants, the debt to equity ratio can be higher.
- We find that the private sector businesses financed their infrastructure projects evenly from both equity and debt. On the other hand, government financed their infrastructure projects mainly from debt.
- The required rates of return for government projects are normally lower than that for the private projects. Although, economic viability is one of the most important factors for undertaking a project for both private sector and the governments, factors such as national pride and social responsibility are very important for the government projects.
- While the private sector and financial institutions hedge all types of the risks, the governments hedge relatively less for the currency risk and interest rate risk.
- Finally, we also find that this survey covers too many types of infrastructure projects with different variables. Different types of infrastructures have different cost of investments, economic life, risk, financing methods, etc. making it hard to have a uniform cross-sectional analysis. As a result, we recommend that the research be based on single or related types of infrastructure projects to obtain meaningful results.
- The insufficient response rate by the member economies and lack of relevant data restricted the consultants from highlighting any conclusive statements about the innovative financing methods, if any. It was, therefore, inappropriate to raise policy

issues affecting the selection of financing approach for different infrastructure sectors. Hence, the Consultants did not touch upon this aspect of the study.

- Although we failed to shed light on any 'innovative' approaches to financing of sustainable infrastructure from the information collected through site visits and questionnaires, we do provide a summary of the financing methods for infrastructure projects in APEC economies. Possibly, as the meaning suggests, the respondents must have considered 'innovative' a new and creative that no one has used before. As a result, the use of 'innovative' or the objective of the study on 'innovative' financing might be too ambitious in the first place. As a result, we feel that the term 'common practice' of financing methods instead of 'innovative approaches' to financing should have been used.

Recommendations

At the early stage of this study, the APEC member economies expressed strong interest and realised the importance and relevance of the project. However, the beginning of Asian financial crisis in July 1997 might have taken too much of APEC member economies' effort to deal with the crisis, resulting in a low response rate to this study. In addition, the survey involves a number of departments within a member government complicating the inter-departmental collaboration for completing the questionnaires. Also, the project involved almost all sectors of infrastructure projects making the task for large economies such as USA; Australia; and Japan more difficult to respond to the survey. This may be the reason that a small economy such as Hong Kong, China; and Singapore could provide detailed and comprehensive completed questionnaires. As a result, if any further extension of this study is conducted, we recommend that the following steps be taken:

- STEP 1: The results of the study show that the most comprehensive and complete information at the PSBs, FIs and economy levels was collected only for Hong Kong, China. This was made possible by the joint efforts of PELB, the participants of the study, and the location of the consultant within Hong Kong, China. In view of the broad scope of this study, we realise that establishing a similar arrangement within each member economy would facilitate the data collection process and would greatly enhance the quality and quantity of data, resulting in a meaningful cross-sectional analysis at PSBs, FIs and economy levels. Hence, we recommend the following:

In case that the study is extended further, the member economy that leads the study must function as the project lead co-ordinator. All other APEC member economies must identify a representative from the appropriate government department(s) that would initiate the project within that member economy. While the project lead co-ordinator would liaise activities between the consultant in their economy and the representatives from each of the member economies, the representative from each member economy would function similar to the Study Steering Committee as seen in the case of Hong Kong, China. For instance, the representative should be responsible for (i) hiring consultant(s); (ii) assisting the consultant in establishing contact with relevant PSBs, FIs if necessary; and (iii) equipping them with necessary resources in order to carry out the study in their economy.

- STEP 2: Provide necessary resources within each APEC member economy to participate in the study. Since some economies are too large where the government agencies are structured at the Federal, State and Provincial levels, it is important to put together relevant mix of resource groups from different levels and not just one department such as Ministry of Environment, in order to enhance inter-departmental collaboration.
- STEP 3: The projects in different infrastructure sectors have different variables, such as

the cost of investment, economic life, risk, financing methods, required rate of return, stability of cash flows, etc. As a result, for a project like this aiming at all types of infrastructure projects, it is very hard to have a uniform cross-sectional analysis to draw meaningful conclusions. Therefore, it will be appropriate to group related infrastructure sectors or focus on individual sectors separately to obtain meaningful results from the projects in those sectors.

Further, for each infrastructure sector, future research be concentrated in particular areas such as to examine resource rents and rates of return on various types of infrastructure investment to assess economic and financial viability of projects. The knowledge of such variables would help in determining the extent of private sector involvement in infrastructure development for meeting the resource gap.

CHAPTER 1

BACKGROUND INFORMATION LEADING TO THIS CONSULTANCY

At the APEC Environment Ministerial Meeting on Sustainable Development in Toronto, Canada on June 9-11, 1997, the Ministers decided to embark on a study entitled

'Examine and Disseminate Innovative Approaches to Financing of Initiatives such as Sustainable Infrastructure and Building Planning, Design, Construction and Operation' for Asia Pacific Economic Cooperation (APEC).

This decision was made within the framework of the Joint Statement (June 11, 1997), excerpts of which relevant to this study are provided:

We, the Ministers responsible for Environment and Sustainable Development from the Asia Pacific Economic Cooperation (APEC) region, commit to sustainable development as a fundamental objective to achieve human prosperity and a healthy environment. Specifically, we:

***take up** APEC Leaders?call for a work program for sustainable development in APEC that includes the themes of the sustainability of the marine environment, cleaner production, and sustainable cities;*

***highlight** our determination to make cities in the region more sustainable, and commend our Program of Action to Leaders;*

***challenge**all orders of government, the private sector, local communities, and individuals to join with us in transforming sustainable development principles into meaningful practices and visible results;*

***commit** to improving integration of sustainable development considerations into all activities and decision making within APEC; and*

***agree** that APEC economies must do their part to implement regional and global commitments with full consideration of domestic priorities and conditions.*

Governments do not have all the answers. To ensure balanced policy development and results, governments must engage broader society as partners.

From young people, we have heard a call for empowerment, inclusion and a recognized role in APEC. We have also heard their willingness and enthusiasm to help us develop and implement solutions for sustainable development. We are committed to drawing on the creativity and energy of the future leaders of our region.

From the private sector and local authorities, we have heard about opportunities for collaboration and areas where we must do more to spur economic and technical cooperation. We recognize that delivery on our agenda for sustainable development requires the ingenuity and capability of the private sector and local authorities.

From other APEC fora, we have heard testimony of their strong resolve to address environmental considerations as an integral and mutually reinforcing component of their activities. Sustainable development in APEC requires a multi-disciplinary approach that emphasizes the need to care for people and the environment. To this end, we commend the results of our discussions to our colleagues participating in other APEC Ministerial meetings, in preparation for the Leaders' meeting in November.

Sustainable Cities

Sustainable development in the APEC region is fundamentally linked to the sustainability of cities. Given that the proportion of people in the region living in cities is expected to increase by 20% between now and 2015, addressing the environmental impact of urban activities is a major objective for overall quality of life and well being. All aspects of urban planning and development must therefore be people-centered and take into account environmental protection and economic and social considerations. Special emphasis should be placed on pollution prevention and control, environmentally sustainable infrastructure development, addressing the needs of urban poor settlements, and promoting their economic well being.

To improve the quality of urban environments while promoting sustainable growth, we are implementing a Program of Action on Sustainable Cities that identifies specific measures to:

- bridge the knowledge gap;*
- encourage investment;*
- integrate the agendas of the public and private sectors;*
- engage stakeholders and draw on their creativity and knowledge, especially at the community level; and*
- enhance human well being and quality of life.*

In this respect, we commit to working with others to double by the year 2003 the current number of 170 APEC communities with Local Agenda 21 plans.

We will also continue to share APEC best practices for sustainable urbanization through a compendium of member economies' examples of success.

Towards Environmentally Sustainable Growth

We call for improved coordination to link and integrate the many sustainable development initiatives within APEC. This should be done by building on the existing structure, linking APEC fora, minimizing incremental administrative burdens, and maximizing the effectiveness and efficiency with which APEC initiatives are implemented. We direct our officials to work with other APEC fora to develop appropriate means of furthering such cooperation.

This Consultancy Project then arose as a part of the Program of Action on Sustainable Cities endorsed at the Toronto meeting. The Hong Kong, China agreed to take a lead role in preparing a report and identified a need for a multi-disciplinary Consultant to prepare the report.

Through a 'Call for Proposals' in Hong Kong, China, the team of Professor Gary Heinke, Director, Institute for Environment and Sustainable Development and Professor John Wei, Director, Center for Asian Financial Market, Hong Kong University of Science and Technology, were chosen to carry out the study. The contract for a one-year study was signed on October 22, 1998.

A Study Steering Committee with representatives from the following bureaux and departments of the Government of the Hong Kong Special Administrative Region (HKSAR) supervised the study:

- Planning, Environment and Lands Bureau (PELB)
- Financial Services Bureau
- Trade and Industry Bureau
- Trade Department
- Planning Department
- Environmental Protection Department

The Consultants received comments from the Study Steering Committee on draft submissions throughout the study, which were incorporated in the final report.

CHAPTER 2

OUTLINE OF METHODOLOGY AND DESIGN OF QUESTIONNAIRES

2.1 List of Requirements for Project and Project Schedule

The work of the Hong Kong, China Study Steering Committee, together with the inputs from the Consultants has resulted in the following list of requirements for the project and its schedule.

2.1.1 Contact with Participants in this project (see Chapter 2)

APEC Member Economies (AMEs) and Private Sector Businesses (PSBs)

Hong Kong, China Private Sector Businesses (PSBs)

Multilateral Financial Institutions (MFIs)

Export Credit Agencies (ECAs)

- 2.1.2 Definition of Sustainability for this Study (see Chapter 3)
- 2.1.3 Literature Survey (see Chapter 4)
- 2.1.4 Development of Questionnaires (see Chapter 2)
- 2.1.5 Selected site visits for field testing of Questionnaires (see Chapters 2, 6 & 7)
- 2.1.6 Interviews with selected Hong Kong, China Private Sector Businesses (PSBs) (See Chapter 5)
- 2.1.7 Mailing of Questionnaires to Participants (See Chapter 2)
- 2.1.8 Site visits to selected EU countries (See Chapter 8)
- 2.1.9 Summary of all information obtained (see Chapters 5, 6, 7 & 8)
- 2.1.10 Summary, Conclusions and Recommendations (see Chapter 9)
- 2.1.11 Preparation of draft Final Report to be distributed to APEC Member Economies and other participants
for comment
- 2.1.12 Incorporation of all responses received in an addendum to the Final Report

The following section discusses points 2.1.1 and 2.1.7 listed in section 2.1 above.

1. Contact with Participants: The initial contact letter requesting APEC Member Economies' collaboration in this study was sent out by Hong Kong, China. A sample letter is attached for reference in Appendix 2-1 (for Australia). The mailing list and the Attendance List at the Toronto meeting are shown in Appendix 2-2. As the response to the initial letter was small, the consultants obtained updated mailing list from APEC Secretariat in Singapore and sent a follow-up letter to all the member economies who did not respond to the initial letter (see Appendix 2-3, a sample follow-up letter to Australia is also attached). Appendix 2-4 is the final list of APEC Member Economies (AMEs), Multilateral Financial Institutions (MIFs) and Export Credit Agencies (ECAs), to whom the Questionnaires were sent by early 1999 for completion. The list of all the respondents to the questionnaires is provided in Appendix 2-5.

The other participants in the study were selected as follows:

- Private Sector Businesses (PSBs) in APEC Member Economies were to be selected by the contact person in each member economy, as the consultant had no possibility to do so.
- Hong Kong, China Private Sector Businesses were selected by the Consultant in collaboration with PELB (see Chapter 5).
- Multilateral Financial Institutions were selected by the Consultant in collaboration with PELB (see Chapter 7).
- Export Credit Agencies were selected by the Consultant in collaboration with PELB (see Chapter 7).

2. Mailing of Questionnaires to Participants

The development of Questionnaires, the inputs from the Study Steering Committee members, the field-testing in Hong Kong, China, USA (EPA and World Bank), and Canada (several government departments and Export Development Corporation) took place from early November to end of December 1998. All mailings were accomplished in late December 1998 or early January 1999. Recipients were given until March 15, 1999 to respond which was later extended, where needed, to mid-April and finally to mid-May 1999.

2.2 Design of Questionnaires

2.2.1 Description of Questionnaires

The project is mainly based on literature survey, questionnaires and as many site visits as the budget allowed. Three types of questionnaires were designed targeting the needs of different types of institutions that participated in the study including

- APEC Member Economies (AMEs)
- Private Sector Businesses (PSBs), and
- Financial Institutions (FIs)

A copy of each questionnaire is shown in Appendix 3. The questionnaires are divided into six parts as follows:

- A. Infrastructure Projects
- B. Sustainable Development / Infrastructure
- C. Sources of Financing
- D. Financing Structure and Techniques (Parts C & D are combined for FIs Questionnaire)
- E. Risk Management
- F. Lessons Learned

The questionnaires focus on the collection of information, such as the type of the project, the construction period, the operation period, the rate of return on the project, the source and structure of financing, debt to equity ratio, and risk management. We also asked the respondents to give their opinion on the definition of sustainability and on lessons learned from infrastructure financing.

For each questionnaire, we asked the AMEs, the PSBs, and the FIs to provide information based on the infrastructure projects that are ongoing or completed in the past five years, with a total cost of each project of more than US\$25 million. For each PSB, we asked the company to provide detailed information of a maximum of three projects. For AMEs or FIs, we asked the respondents to provide summary statistics based on all qualified projects.

2.2.2 The Design Process

The consultants first designed the questionnaires with inputs from an expert in designing questionnaires. The first version of the questionnaire was field tested by representatives from one FI and one PSB in Hong Kong, China. In the field test, both representatives completed

the questionnaire followed by face-to-face interview by the consultants. The consultants also incorporated comments received from the World Bank and from the Canada's Export Credit Agency during the site visit to these institutions.

2.2.3 Distribution of the Questionnaires, Follow-up and Responses

APEC Member Economies and PSBs Outside Hong Kong, China

We sent one AMEs questionnaire along with three PSBs questionnaires to 17 AMEs. They include Australia; Brunei; Canada; Chile; China; Hong Kong, China; Indonesia; Japan; Korea; Malaysia; Mexico; Papua New Guinea; Philippines; Singapore; Chinese Taipei; Thailand; and USA. Since the three new member economies including Peru; Russia; and Vietnam were admitted to APEC after the commencement of this study, i.e. in November 1998, therefore the questionnaires were not sent to them. New Zealand had earlier indicated that they were not able to participate so no questionnaires were sent to them.

Five out of 17 APEC Member Economies returned AMEs and PSBs questionnaires (Hong Kong, China; Korea; Philippines; Singapore; and Chinese Taipei), only the Hong Kong, China, and the Singapore responses were complete, as others had difficulty in collecting the necessary information for many of the questions. Several letters were received from other AMEs as to why they were unable to respond.

PSBs in Hong Kong, China

We sent out the questionnaires to the interested companies involved in infrastructure projects. (*Refer to Appendix 2-5 for contact names and addresses of the respondents*). All these PSBs completed the questionnaire.

Financial Institutions

We sent the FIs questionnaire to several Multi-lateral Financial Institutions and Export Credit Agencies. (*Refer to Appendix 2-5 for contact names and addresses of the respondents*). Among the MFIs, the Asian Development Bank (ADB) and the World Bank completed the questionnaire and among ECAs all except Coface and Hermes completed the questionnaire.

We also sent the FIs questionnaire to financial institutions in Hong Kong, China. (*Refer to Appendix 2-5 for contact names and addresses of the respondents*).

All the listed Financial Institutions completed the questionnaire.

EU Countries

During the site visits to selected EU countries (UK, Denmark, Germany and the Netherlands) certain individuals/institutions agreed to complete questionnaires. We received completed questionnaires from the following countries: (*Refer to Appendix 2-5 for contact names and addresses of the respondents*).

UK: Treasury Department, 2 PSBs (Ove Arup Partners, The Nichols Group)

Denmark: Danish National Building Research Institute

The Netherlands: Netherlands, Institute for Environmental Studies

DEFINITION OF SUSTAINABILITY FOR THIS CONSULTANCY

3.1 Definition

The terms 'sustainability' and 'sustainable development' are of recent origin. They have come into popular use since the 1992 UNCED (United Nations Conference on Environment and Development) meeting in Rio de Janeiro. The best-known definition is the one attributed to Mrs. Gro Harlem Brundtland, Chair of the World Commission on Environment and Development:

"... to meet our own needs and aspirations in a way that does not compromise the ability of future generations to meet their own needs" (1987).

This and other general definitions need to be interpreted more precisely when considering, for example, the sustainability of cities, or the sustainability of infrastructure projects, as is the case for this project.

It is not the purpose of this project to review all aspects of sustainability or sustainable development. The following definition of sustainable development has been adopted from the study on Sustainable Development for the 21st Century commissioned by the HKSAR government.

"Sustainable development balances social, economic and environmental needs, both for the present and future generations, simultaneously achieving a vibrant economy, social progress and better environmental quality, locally and internationally, through the efforts of the communities and national governments."

Furthermore, for this project sustainable infrastructure is defined as:

"An infrastructure is sustainable when it is economically viable, socially acceptable and environmentally acceptable."

Questions in Part B of the questionnaires solicited views on the respondents' agreement with the above definitions, or asked for suggested changes (see 3.2 below).

3.2 Responses to Interim Definition and Other Aspects of Sustainability

We received 40 completed/partially-completed questionnaires including Private Sector Businesses (PSBs), Financial Institutions, and AMEs Questionnaires. The summary of the responses on sustainability of infrastructure projects is as follows.

3.2.1 Importance of Various Factors for Definition of Sustainability

The respondents to the PSBs and AMEs questionnaires were asked to identify factors for defining sustainability. Out of the 27 completed PSBs and AMEs questionnaires, 24 respondents identified various factors for defining sustainability. The numbers of respondents who consider each of the following factors important for defining sustainability are:

No. of Respondents
(out of 24)

1.1	<i>Fulfillment of Needs</i>	
1.1.1	social needs	20
1.1.2	economic needs	20
1.1.3	environmental needs	21
1.2	<i>Human Aspect</i>	
1.2.1	present generation	18
1.2.2	future generation	23
1.3	<i>Achievements</i>	
1.3.1	vibrant economy	15
1.3.2	social progress	18
1.3.3	better environmental quality	20
1.4	<i>Location</i>	
1.4.1	locally	16
1.4.2	internationally	19
1.5	<i>Efforts by different parties</i>	
1.5.1	community efforts	17
1.5.2	local government efforts	15
1.5.3	national government efforts	22
1.5.4	Private sector efforts	15
1.6	<i>Others</i>	
	<i>NGOs efforts</i>	
	<i>Financial Institutions</i>	2
		1

One response received from the EU Secretariat (DG IX Environment) commented:

- 1.1 Social, economic and environmental needs are essential.
- 1.2 Both needs of present generation (~40%) and of future generation (~60%) need to be considered.
- 1.3 Achievements of a vibrant economy, social progress and better environmental quality were not considered relevant to a definition of sustainability.
- 1.4 Local, regional national and international aspects need to be considered.
- 1.5 Efforts of the community, local governments, national government, the private sector, civil society stakeholders, and individuals need to be included.

3.2.2 Agreement/Disagreement with Definitions of Sustainable Development and Sustainable Infrastructure

In order to develop definitions for 'Sustainable Development' and 'Sustainable Infrastructure' we had asked the respondents whether they agree/disagree with the definitions tentatively used by our study. 37 out of 40 respondents reviewed the definition of sustainable development and 35 out of 40 respondents reviewed the definition of sustainable

infrastructure. The responses are as follows:

<u>Definition of:</u>	<u>Agree</u>	<u>Disagree</u>	<u>Partially Agree</u>
Sustainable Development	24	3	10
Sustainable Infrastructure	23	10	2

The reasons for either partial agreement or disagreement with the interim definition of 'Sustainable Development' included:

- i. Achieving a vibrant economy is not essential to achieve sustainable development.
- ii. Must emphasize the environmental and international dimension more than any other factors.
- iii. It is difficult to achieve a balance between social, economic and environmental needs. Also, a vibrant economy is not necessarily sustainable and may not enhance environmental quality.
- iv. Social progress needs to be assessed separately from sustainable development.
- v. The definition does not reflect the fact that sustainable development can only be achieved in presence of a stable and forward-looking government or leadership.
- vi. Definition fails to be either general (i.e. too detailed) or specific (i.e. too limited in scope).

The reasons for either partial agreement or disagreement with the interim definition of 'Sustainable Infrastructure' are:

- i. Governments need to implement projects that are socially acceptable, economically justifiable but may not be financially viable. (*The respondent does not consider financial aspect as part of economic viability*).
- ii. Should consider factors like local/international and present/ future generations.
- iii. Meaning of 'acceptable' is not clear. 'Acceptable to whom' (*4 respondents pointed this out*).
- iv. An important aspect of sustainable infrastructure is the design and construction process that minimizes waste, has low life cycle costs and uses minimal non-renewable resources.
- v. The definition does not consider long-term consequences such as the exploitation of scarce resources and impact on nature.
- vi. Should include the support of host government and of parties financing the project.
- vii. Something that is environmentally acceptable to one generation may not be sustainable in the long term.
- viii. Should cover adequate operation and maintenance of infrastructure.
- ix. Is too vague.

3.2.3 Importance of Social and Environmental Factors prior to Financing Decisions

35 out of 40 respondents expressed their views on the importance of social and environmental aspects of a project before financing decisions are made. 30 said that they consider social and environmental aspects before financing decisions, 3 said that they will not consider and 2 said that they would consider social and environmental factors to some extent. The reasons for considering social and environmental aspects prior to financial aspects are:

- Social and environmental aspects are considered as part of internal planning of the project as an initial step of the project implementation. Feasibility studies are carried out well before financing decisions are made.
- Environmental Impact Assessment (EIA) is compulsory before the project implementation and is part of the feasibility study. For instance, in Denmark it is essential to obtain an environmental compliance certificate (ECC) from the Department of Environment and Natural Resources (DENR) and endorsement from Regional Development Councils are required prior to obtaining loans for the project.
- The Export-Import Bank of Japan has its own 'Global Environment Office' for reviewing social and environmental aspects before the project implementation.
- According to the World Bank environmental and social aspects are analyzed based on internal procedures, which also include guidelines for resettlement issues. Detailed environmental assessments and resettlement programmes are created and agreed to before a project is taken to the Board for approval.
- According to Canada's Export Development Corporation (EDC) a preliminary screening of projects is done to determine if a detailed review of the potential environmental and social impact is needed. EDC seeks to identify significant environmental effects where there is potential to cause adverse environmental effects as a result of: (i) generation of significant emissions to the air, liquid effluents, wastes or noise; (ii) significant resource requirement such as land, energy, water and raw material; (iii) geographic location.
- According to UK's Export Credit Guarantee Department (ECGD) the primary responsibility of ECGD is to encourage British capital goods exports by underwriting repayment risk. Therefore ECGD takes environmental factors into account when these factors would have an impact. ECGD is also supporting moves by the OECD to establish common principles for taking account of environmental factors when export credit decisions are taken.

The five respondents who would not consider social and environmental aspects prior to financial aspects think that financing aspects must be treated independently from any other factor.

3.2.4 Issues that may negatively impact Sustainability of Infrastructure Projects

33 out of 37 respondents identified issues/characteristics/trends that may negatively impact the sustainability of infrastructure projects. These trends include:

- Socially unacceptable/unhealthy working conditions

- Financially not viable/low rate of return
- Lack of an environmental and/or strategic impact assessment
- Lack of consultation with all players
- Lack of adequate care concerning the utilization of natural resources
- Environmentally unacceptable/limitation of natural resources/usage of scarce resources/pollution
- Increasing population growth and demand
- Poverty and uneven distribution of wealth
- Inability to achieve long term objectives/short-term view of decision makers
- Cost inflation
- Low national priority
- Difficulty to value environment in economic terms
- Low priority to needs of other countries, especially poor countries
- 'Greenfield' sites often chosen for PFI are perceived to involve less risk
- Reluctance to adopt new technology/new technology can render existing technology non-sustainable
- Inappropriate risk management
- Decrease in lending by commercial banks/difficulty in raising financial funds
- Currency fluctuation and convertibility
- Inadequate maintenance
- Inadequate uses of private resources
- Complicated financial structures
- Poor demand projection/heavy competition
- Political interference/lack of political will to pursue with commitments/selection of projects based on political factors
- Social unrest/drastic economic downturn/regulatory changes
- Government intervention/increasing government unwillingness to share/assume risk
- Changes in consumption pattern/declines in demand of a particular infrastructure
- Foreign investor's safety and environmental standards if more stringent than host country.

- Increasing tension between governments and project sponsors regarding tariff adjustments
- Lack of transparency or sometimes confusion in project bidding

3.2.5 Issues that may positively impact Sustainability of Infrastructure Projects

33 respondents identified issues/characteristics/trends that may positively impact the sustainability of infrastructure projects. These trends include:

- High social demand/improving working conditions
- Financial and economic viability/high rate of return
- Environmentally friendly/increasing environmental awareness of the communities and the governments/reduce carbon dioxide emission
- Advancement in science and technology for resource conservation/new technologies for future prospects
- International collaboration
- Enhancing land value
- High national priority
- Pressure from NGOs
- Official acceptance of political objectives of sustainable development
- Long-term view of costs, risks and benefits
- Educated and aware clients/providers of fund
- Ability to consider technical issues over financial issues
- Public pressure
- Respects population growth/aspirations
- Involvement of public financing institutions to support a project
- Improvement in service provision
- Presence of risk mitigation measures that are technically and economically feasible to deal with effects on the environment
- Transparency and better regulatory framework, less volatile policies
- Government rules and procedures to meet international rules/government profit guarantee and risk sharing/stable government policies
- Maximizing private sector participation/successful privatization
- Positive growth in the local market
- Respectable and strong caliber of project sponsors and operators

- Improved economy/positive economic development
- Lower interest rates
- Change in consumption pattern/increase in demand
- National savings recycled through pension funds for the long term development
- Restoration of currency stability in host countries
- Openness of domestic markets to foreign investors
- Solid environmental/strategic impact assessment and identified mitigation measures
- Track record and comparative experience of project participants
- Local partnerships

3.2.6 Financing Techniques that may enhance Sustainability of Projects

Out of 40 respondents, 23 respondents gave their view and 14 did not provide any views on the financing techniques that are likely to enhance sustainability. 3 respondents said that the issue is not applicable for their institution.

According to those who responded, the financing techniques/characteristics that are more likely to enhance sustainability are the following:

- Public-Private Partnership (PPP): While private sector funding ensures financial viability of the project, public sector funding enhances certainty of project completion in the host country. It is important to encourage competition and openness to ownership, partnership between private and government sectors for improving efficiency of infrastructure development.
- Introduce flexible mortgage loans with provisions for changing the overall repayment period and profile to allow flexibility in annual repayments.
- Agreements on standard procedures for projects at UN or similar level to be adopted, as parameters and/or guidelines on the strategic environmental assessment.
- Public funding/self-financing through internal funds for financially viable projects/equity participation by local governments/government guarantee of minimum return for performance or supply of fuel, off-take agreements.
- Use lower discount rate in order to prioritize benefits for future generations.
- Attempt to value environmental effects in monetary terms.
- Whole life costing allows the ability to choose more sustainable solutions that may have higher capital costs but lower maintenance. Longer payback periods, acceptance of medium/long-term profits rather than short term for making projects sustainable.

- Introduce Cash Sweep provisions to ensure long-term involvement of equity providers for as long as debt is outstanding. Cash sweep provisions provide for early repayment of the debt outstanding when revenues generated exceed projections. It ensures that equity providers are not able to walk away from the project earlier having met their return on equity (ROE).
- Financing tied to procurement from a country with higher environmental standards than that of the host country results in transfer of environmentally sound goods and services to the project. If the country with high environmental standards provides funds in sufficiently large proportions so as to materially affect the project's ability to proceed empowers the financing entity with some influence over designs and specifications of the project including those pertaining to the environment.
- Involvement of Export Credit Agencies and Multilateral Institutions such as ADB and the World Bank for (i) better financial terms than commercial market; (ii) stringent evaluation/approval procedures; and (iii) long-term involvement in project operation.
- Interest swap to hedge project's exposure to interest floating risk.
- Currency swaps to hedge convertibility risk.
- Limited recourse project financing without government guarantee to decrease government intervention.
- Introduce optimum debt and equity ratio to enhance the project return with an acceptable level of risk. For example, borrowing in local currency can minimize the currency exposure and funding from state owned banks to enhance bargaining power of the project in case that negotiation with local government is required.
- Sovereign loan i.e. government-to-government loan.
- Local/domestic capital markets: as the revenues of most of the infrastructure projects are denominated in local currency, financing them locally or domestically will eliminate currency mismatch risk and would also channel idle money into productive uses.
- Introduction of covenants in financing arrangements that (i) link reward to performance; and (ii) allow compliance with environmental impact giving right to ask for remedial actions and to pass costs to government or users unless its contractors' or operators' fault.
- Long-term projects should best be financed with long-term financing facilities to reduce interest rate and refinancing risks during the project period.
- Commercial syndicated loan and shareholder loan.

3.2.7 Non-funding of Projects due to Financial Risks

Out of 40 respondents, 25 responded to the issue of non-funding of projects due to financial risks. While 9 out of 25 respondents identified projects that were not funded, 7 respondents could not identify any projects that could not be funded due to financial risks, and 9 respondents said that the issue of funding/non-funding is not applicable to their institution.

Table 3.2-1 shows categories of the non-funded projects and Table 3.2-2 identifies financial risks leading to non-funding of these projects.

Table 3.2-1: Categories of Non-Funded Projects

Project Category	No. of Respondents	Project Name(s)	Project Location
<i>Public Utilities</i>			
Power	6	Qinling Power Plant	Shanxi Province
Telecommunications	3		
Piped Water Supply/ Treatment	4		
Sewerage/Treatment	3		
Solid Waste Collection/ Disposal	4		
Piped Gas lines	3		
<i>Public Works</i>			
Urban streets	1		
Irrigation and Drainage	2		
Dam / Reservoir	2		
<i>Transport</i>			
Expressways / Highways	6		
Urban and Interurban Railways	5	CTRL Extension to Midlands	London - Birmingham
Rapid Transit/ Subways	5	Light Rail	Various location in London
Ports and Waterways	3		
Airports	4		
Others (related to the above categories)	2		

The major financial risks leading to non-funding of projects include sovereign risk, no guarantee from the host government, market risk, currency/convertibility risk, and interest rate risk. Surprisingly, the economic viability is not the major reason leading to a non-funded project.

Table 3.2-2: Financial Risks Leading to Non-Funding of Projects

Nature of Financial risk(s)	No. of Respondents
-----------------------------	--------------------

Sovereign risk	5
Project sponsors were not creditworthy	1
No guarantee/letter of support by the host government	5
Most of the completion risk was not mitigated	1
Most of the market risk was not mitigated	5
Currency/convertibility risk was not hedged	6
Interest rate risk was not hedged	4
Multilateral and/or export credit agencies did not participate in debt financing of the project(s)	1
Multilateral and/or export credit agencies did not provide commercial risk insurance	3
Others (such as project economically not viable)	3

3.2.8 Features of Infrastructure Projects contributing to Sustainability

20 out of 40 respondents identified various features of the *majority* of infrastructure projects in APEC Member Economies contributing to economic, social and environmental sustainability of the project. These features are summarized below:

(i) Economic Aspects:

- *Increase in surrounding land value, reduction of traffic congestion and travel time by increasing connectivity*
- *Higher power plant efficiency will lead to lower electricity tariff for better economic sustainability*

(ii) Environmental Aspects:

Reduction of pollution such as emission of carbon dioxide, nitrogen dioxide and sulfur dioxide

Installation of de-sulphurisation device and flue-gas precipitators would reduce environmental impact

Implement projects that help solve the serious road congestion in the city

(iii) Social Aspects

Incorporation of necessary measures to ensure current and future needs

Increase in surrounding land value, reduction of traffic congestion and travel time by increasing connectivity

Evaluation of project for its effect on employment, public expenditure and balance between short-term and long term benefits

Project implementation provides enormous job opportunities,

Projects in the transport sector are beneficial as they provide efficient mode of

transportation to general public at an affordable cost that facilitates distribution of goods and services, reducing delays and damages to goods. Toll road projects provide better and wider access to the local municipality or province. Power projects provide additional power to support economic growth. The proliferation of telecommunications allows cheap and wider use of various forms of communications.

(iv) General

- *Disciplined and systematic approach in conducting independent, detailed feasibility studies to assess financial viability, social acceptability, and environmental viability of infrastructure projects at the planning stage.*
- *Involvement of private sector financing for the construction, management, and operation of public infrastructure projects is critical to alleviate the reliance on public funding.*
- *Availability of funding to allow important projects to be implemented without delay*
- *Strategic project planning ensures well-structured programme for project implementation to meet development, social and environmental needs*
- *Timely completion of the project despite various procedural, legal and environmental constraints*
- *Availability of operations and maintenance skills*
- *APEC Member Economies should work out a standard procedure to govern infrastructure project development. Such standards should be acceptable to the parties involved in the project such as project sponsors, operators, and financiers. The standards must be close to or similar to the international standards to facilitate project execution cross border. For instance, BOT project financing rules in many of the APEC member economies are not up to the international standards.*
- *Avoid awarding projects to companies with "right" political connections to senior government officials as "pay-backs" for ensuring political life.*

3.3 Comments and Conclusions

The following conclusions can be drawn based on the survey results:

- The respondents identified various factors for defining sustainability. Some factors that are considered important by more than 80% of the respondents include (i) fulfilment of social, economic, and environmental needs; (ii) impact on future generations; (iii) better environmental quality; and (iv) national government efforts.
- A majority of the respondents to AMEs, PSBs, FIs questionnaires agreed or partially agreed with the interim definitions of Sustainable Development and Sustainable Infrastructure adopted for this study. However, only 4 of the 18 APEC Member Economies responded to this question. In view of this the Consultants recommend to keep for now the definition provided in Section 3.1. In

any future extension of this work by APEC, the definition needs to be re-examined in light of greater inputs by APEC Member Economies and other participants.

- Approximately 86% of the respondents pointed out that they consider social and environmental aspects before financing decisions, 8% said that they will not consider and 6% said that they would consider social and environmental factors to some extent. In cases where social and environmental aspects are considered before financing decisions, these factors form part of internal planning of the project and are reviewed as an initial step of project implementation.
- 89% of the respondents identified issues/characteristics/trends that may negatively and positively impact the sustainability of infrastructure projects. These issues are highlighted in Sections 3.2.4 and 3.2.5, respectively.
- Approximately 58% of the respondents provided views on financing techniques that are likely to enhance sustainability. These financing techniques are highlighted in Section 3.2.6.
- Approximately 63% of the respondents provided views on the non-funding of projects due to financial risks. About 23% of the respondents identified projects that could not be funded mainly due to the following financial risks: (i) Currency/convertibility risk was not hedged; (ii) Most of the market risk was not mitigated; (iii) No guarantee/letter of support by the host government; and (iv) Sovereign risk.
- 50% of the respondents identified various features of infrastructure projects in AMEs contributing to economic, social, and environmental sustainability of the project. These features are summarized in Section 3.2.8.

CHAPTER 4

LITERATURE REVIEW

4.1 Asia Pacific Economic Cooperation (APEC) - An Overview [1]

Asia Pacific Economic Cooperation (APEC) was formed in 1989 in response to the growing interdependence and economic growth among Asia Pacific economies. With 21 member economies, APEC has become the primary regional vehicle for promoting trade and economic cooperation. APEC is playing an increasingly important role in promoting sustainable development and in addressing urban environmental issues.

The APEC region currently accounts for over half the world's economic output. By the year 2015 the proportion of the APEC region's population living in cities would increase to 65%, with more than half the APEC economies to have about 80% urbanized. Such rapid urbanization poses environmental, social, and economic challenges to APEC cities. The expanding urban population and the rapid economic growth in many APEC cities must be

balanced with the health of local residents and ecosystems to ensure the sustainability of these communities.

With the combined efforts of the public and private sectors, APEC is uniquely positioned to employ necessary resources, knowledge, technologies, and political framework that are required to address the sustainability of cities throughout the region. The global community is moving towards implementation of commitments addressing the environmental component of sustainable urbanization. While much has been accomplished to address the urgency of sustainable urbanization, continuous effort is needed to make communities in the APEC region sustainable. Some of the pilot programs and past and ongoing studies conducted in the APEC region leading to sustainable development is summarized in the following sections.

Pilot Programs: There are several pilot programs implemented by the APEC to address different aspects of sustainability for environmental protection and for improving the quality of human life. Some of the noteworthy pilot programs are described below:

- *"Clean Cities" Internet Web Site*

One of the action plans of the "APEC Sustainable Cities Agenda for Cooperation - Program of Action" is to "Integrate the Agendas". There are 4 measures undertaken for integrating the agendas, one of which is to "Create an APEC Clean Cities Internet Web Site" to facilitate information exchange on practical solutions to urban environmental problems. Under this "Clean Cities" pilot program the APEC Telecommunications Working Group, APEC Secretariat and Canada are working together to create a demonstration web site.

The primary objective of creating such a web site is to match a member economy's needs with other economies' capabilities for forming unique and fruitful partnerships for promoting environmentally sustainable growth. The web site will act as a tool for the information exchange leading to partnerships and benefits.

This web site will include the following (i) an index of corporate solutions and links to corporate home pages; (ii) a range of communication options to allow direct interaction between public and private sector representatives throughout the region; (iii) links to other relevant web sites; (iv) information such as upcoming events and new publication; (v) a showcase of solutions based on member economies case studies; (vi) a showcase to allow environmental services and industries to demonstrate successful technology applications and environmental solutions.

- *Lead and Vehicular Emissions in the APEC Region [2]*

Vehicular traffic, particularly in urban areas, remains the largest single source of environmental lead pollution, accounting for over 90 percent of all lead emissions into the atmosphere. In addition to the immediate health risk through inhalation, vehicular lead emissions also accumulate in the soil, contaminate drinking water, and enter the food chain, thus impairing mental and physical development of children and increasing the risk of cardiovascular disease in adults.

Despite the awareness of growing pollution by lead and its negative impact on human health and natural ecosystems, many countries lack the institutional, legal, technical, and programmatic resources and expertise to begin addressing this problem. The APEC initiatives to reduce lead and other vehicular emission consist of two components:

- i. **"Decision-Makers Guide to Reduction of Lead and Other Vehicular Emissions"**: This guidebook will be used as a training tool to assist APEC member economies to develop and implement national action plans for the phase-out of leaded gasoline. This guidebook will be provided to the national and local government officials, industry leaders and representatives from environmental NGOs to enable decision-makers to launch their own national phase-out plans.
- i. **Training Workshops**: 1-2 one-week workshops will be sponsored through the U.S. Agency for International Development's Regional Urban Development Office in Jakarta and its institutional partners in both Indonesia and the Philippines. The objective of the workshop is to introduce the guide and walk participants through the key elements of a successful action plan for phasing out leaded gasoline.

- *Sustainability of the Marine Environment [1]*

APEC member economies are united by the oceans and seas in the region and have recognized that the health of the marine environment is critical for the economic and social well being of people in the region. The Marine Resource Conservation (MRC) Working Group took the lead in developing this initiative following the discussion on Sustainability of the Marine Environment in the Manila Action Programme in July 1996. An action plan for sustainability of the marine environment has been developed to identify a process and priorities for achieving measurable results:

- i. integrated approaches to coastal zone management;
- ii. prevention, reduction, and control of marine pollution;
- iii. sustainable management of marine resources.

There are several APEC initiatives proposed/under implementation that would contribute to this work including: (i) APEC Study Centre EduNet project on Coastal Zone Management; (ii) the work of the Fisheries Working Group; (iii) the initiative proposed by Japan to promote preservation of the marine environment through use of satellites for observation of the marine environment and to establish centre for the preservation of coral reefs.

- *Cleaner Production/Cleaner Technology [1]*

The Environment Ministers called for a Cleaner Production/Cleaner Technology strategy for APEC in the Manila Action Programme in July 1996. The Industrial Science and Technology (IS&T) Working Group took the lead in developing this initiative. The strategy addresses reducing the environmental impacts of various industries sectors by promoting cleaner production technologies, policies, and practices. In addition, the strategy also considers ways to achieve broader adoption of clean production methods through partnerships with institutions and the private sector.

"Cleaner Production" is defined as the continuous application of an integrated environmental strategy to processes, products, and services to increase efficiency and reduce risks to humans and the environment. APEC has a unique role to play in promoting cleaner production by helping to identify and expand best practices and establishing a strategic agenda for technical cooperation in partnership with the private sector. Key features of the strategic agenda include:

- i. Promoting the development and sharing of industry tools such as training modules, manuals, and guidelines on cleaner production methods;
- ii. Facilitation of cleaner production demonstration projects with potential for wide application in member economies;
- iii. Development of capacities for management systems that facilitate the implementation of cleaner production;
- iv. Sharing of information to assist in development of policy frameworks that facilitate the implementation of cleaner production;
- v. Sharing of best practices in use to alternative approaches to environmental protection;

Sustainable Cities Success Stories [3]

There are several examples of initiatives for sustainable infrastructure development experimented throughout the APEC region. These initiatives were implemented to meet the environmental consequences of rapid urban development and have proven to be successful. Due to scope limitations we present selective success stories below from some of the APEC member economies:

- *Realizing Sustainable Development - Shanghai, China (Ongoing)*

Shanghai is a large industrial, commercial and trade port city. Due to large industrial advancement, high population density and heavy pollution load, Shanghai is facing environmental problem. In the early 1990s, in order to develop Shanghai into a modern international city, the municipal government pursued the goal of enhancing environmental protections while accelerating economic development and urban construction. As part of its plan, the municipality has drawn-up environmental protection goals for 3, 8, and 18 years under which cross-sectoral meetings are used to put sustainable development into practice. The executive mayor assigns environmental protection duties to various subordinate departments and county governments.

Evidence of Success: In recent years, a number of environmental and pollution control projects have been initiated with promising results. Although GDP and industrial total output have been increasing by more than 14% and 17% respectively, for four successive years, industry pollutant discharge has been decreasing. Both the carbon-dioxide discharge of industrial wastewater and the sulfur dioxide concentration in the urban area account for only half of those of 1990. Further, with the completion of the first phase project of wastewater treatment of Shzhou river, the heavily polluted waters have started improving.

- *Sulphur Content Restriction in Fuel Oil - Hong Kong, China (1990 - Ongoing)*

Since the 1970s, population growth and industrial advancement have increased the

sulphur dioxide content of air resulting in air pollution. At some locations, sulphur dioxide is even five times higher than the acceptable air quality standard.

In order to control further air pollution and to improve air quality, the government developed a strategy to manage the sulphur dioxide emission. For instance, in 1980s the government banned the industrial use of solid and liquid fuels in areas where the topography inhibited air dispersion. In other areas, the government introduced controls on 1 July 1990 restricting the sulphur content in liquid and solid fuels to 0.5 percent and 1%, respectively. In addition, in April 1997 vehicle emission standards for diesel motor vehicles were restricted allowing the sulphur content in diesel fuels to less than 0.05 percent.

Evidence of Success: Following the implementation of strategy restricting the sulphur content in vehicular emissions, the ambient sulphur dioxide concentration in some areas dropped by more than 90 percent immediately after the restrictions were imposed. Further, sulphur dioxide emissions from industrial sources in the urban areas reduced by 80 percent.

- *Voluntary Improvement of Air Quality "Ube Method" - Japan (1950 - Ongoing)*

Ube is an industrial city with a 1996 population of 176,000. It is located in the southwestern part of Yamaguchi Prefecture in western Japan. The local economy expanded rapidly after the World War II when many factories used low quality coal as fuel. Fuel combustion led to emissions of large amounts of various pollutants. As a result, the city experienced serious air pollution. Flying ashes were often seen in the central area and local residents suffered from the effects of soot, dust and falling ashes.

To overcome the problem of air pollution, Ube city created the so-called "Ube Method". The method involves volunteer participation, local commitment to preventing pollution, and seeks co-operative solutions to environmental problems. Anti-pollution measures instituted under the Ube Method from 1940's to 1960's included:

1. *Research and Monitoring:* With the cooperation of manufacturing industries, Ube carried out thorough research on quality, quantity and manner of coal combustion; maintenance of dust collection machinery; height of chimneys; and other aspects of industrial production. Ube also monitored the state of air pollution.
2. *Information Disclosure:* Ube mandated public disclosure of monitoring data, and research concerning smoke emitting factories. As a result, progressive measures taken by industry have been monitored and reviewed by the city, academics and residents.
3. *Voluntary Countermeasures by Industries:* Major companies in the city made voluntary efforts to reduce coal dust emissions. Under the slogan "Dust is Money" these companies together with the city, set numerical targets for the improvement of efficiency of dust collection machinery, and levels of soot concentration and dust in fuel exhaust gas. The soot and dust collected was used as inputs for cement production, thereby increasing the amount of cement available raising company's earnings.

Evidence of Success: (i) Coal Dust Emission reduced from 55.86 ton/km²/month in 1951 to 4.7 ton/km²/month in 1993; (ii) Sulfur Dioxide Concentration reduced from 0.04 ppm in 1969 to 0.006 ppm in 1995; (iii) Nitrogen Oxides Concentration reduced from 0.063 ppm in 1968 to 0.032 ppm in 1995; (iv) Suspended Particulate Matter (SPM) Concentration reduced from 0.11 mg/m² in 1969 to 0.03 mg/m² in 1995.

- *Polluter Pays Principle, Palm Oil and Rubber Industry - Malaysia (1947-Ongoing)*

After World War II, Malaysia faced the unique task of solving the pollution problems caused by the palm oil and rubber industries. The industries accounted for approximately 90 percent of the industrial pollution load and ranked as the largest single water polluter. To control pollution licensing of “prescribed premises” on the polluter pays principle was implemented. Fees were levied for effluent discharges exceeding specified levels. Over a five to six years period the fees grew stricter with the advancement of treatment technologies, which proved to be successful for the control of effluent discharged from agro-based industries.

- *Clean Water Supply ?Singapore (1970 - Ongoing)*

In the 1970s, the impact of high population growth and rapid urbanization coupled with rising affluence and increasing pollution, made it vital for Singapore to set aside and optimize protected water catchment areas and clean up and safeguard unprotected ones. Several measures were undertaken to keep the protected and unprotected water catchment areas free of pollution including:

1. The programs to clean up the unprotected catchment areas were initiated to ensure that runoff collected in these areas met acceptable standards for raw water supply.
2. Farming activities and backyard industries were relocated or phased out, and all residential and industrial developments were provided with sewage treatment and disposal facilities.
3. An accelerated program for the provision of a comprehensive sewerage infrastructure and solid waste management system.

Evidence of Success: Rivers and riverbanks are now free of pollution and safe for people to use. Areas, which were formerly occupied by squatters, farmers and backyard traders, have been redeveloped into a viable commercial hub. Polluted riverbanks have been transformed into sandy beached, beautiful riverside walkways and landscaped parks. Aquatic life has returned to the rivers, which once had little or no marine life.

4.2 Infrastructure Development

Infrastructure can be defined as "the combination of physical plant and accompanying services of economic entities used at the macroeconomics level to enhance the productivity and quality of life for the public of a country or region" [4]. Infrastructure development increases the production and consumption possibilities of any economy and helps in diversification of rural economies by providing alternative consumption and employment opportunities.

Infrastructure industry can be categorized into various sectors. In World Development Report 1994, the World Bank classifies the infrastructure industry into:

- i. Public Utilities: includes power, telecommunications, piped water supply, sanitation and sewerage, solid waste collection and disposal, and piped gas.
- ii. Public Works: includes roads and major dam and canal works for irrigation and drainage.
- iii. Other transport: urban and interurban railways, urban transport, ports and waterways, and airports.

The infrastructure industry is undergoing rapid transformation with significant private sector participation. For instance, since 1984, 86 industrial and developing countries have privatized 547 infrastructure companies worth US\$357 billion, and at least 574 private new investment projects worth \$308 billion are under way in 82 countries [5]. The World Bank data shows that in the 1990s, 145 infrastructure companies in 30 countries were privatized which included 15 government owned entities in Asia. In addition, 146 new greenfield projects in 34 countries were implemented with significant private sector participation. Out of 146 greenfield projects, 68 projects were completed in Asia [4].

The World Bank estimate indicates that US\$1.2 ?1.5 trillion will be required in the Asia Pacific region over the 10 years period (1995 ?2004) to cope with unparalleled population growth and economic development [6]. Furthermore, the Asian Development Bank (ADB) estimated a requirement of US\$1 trillion to meet infrastructure development demand in the 1990s. Table 4.2-1 below gives the total dollar volume of funds injected into projects in various sectors in the past four years. The table shows that total funding provided for the projects sums up to US\$ 15 billion in 1995, US\$55 billion in 1996, US\$45 billion in 1997, and US\$23 billion in 1998 amounting to a total of US\$138 billion in late 1990s.

Table 4.2-1: Total Dollar Injected into Infrastructure Projects

Infrastructure Sector	1995		1996		1997		1998	
	US\$ million	Project No.	US\$ million	Project No.	US\$ million	Project No.	US\$ million	Project No.
Water	70	1	1,659	11	180	2	-	-
Transport	2,168	12	16,031	23	5,045	22	4,858	9
Telecoms	819	8	4,944	24	6,422	23	1,079	6
Energy	5,522	19	13,577	37	5,684	21	8,293	17
Other	6,837	49	18,662	147	27,986	138	8,592	29
Total	15,416	89	54,873	242	45,317	206	22,822	61

Source: Capital Data Project Financeware, from Capital Data Limited London

This indicates that the total dollar amount actually injected into infrastructure projects is far lower than that forecasted by the major financial institutions. The discrepancy between the forecast and actual expenditure can be attributed to lack of public funding. Most

infrastructure expenditures in developing countries have been funded directly from fiscal budgets. Since fiscal budgets is volatile and in many countries rarely meets crucial infrastructure expenditure in a timely and adequate manner, the amount required for infrastructure development may not be available [7].

Given the large capital requirement throughout the Asia Pacific region and difficulty insufficient available public funding to meet demand, private sector participation is an absolute necessity for infrastructure development. For instance, the World Bank's private involvement in developing infrastructure was as low as US\$9 billion in the past decade, but then the investment accelerated rapidly to over US\$27 billion in 1996 [7]. Hence, most countries worldwide are establishing public-private partnership to achieve their goals in improving infrastructure.

4.3 Public-Private Partnership (PPP)

A public-private partnership is a contractual relationship between a public and private partner in which both cooperate, each applying its particular strengths, to develop a project more quickly and more efficiently than the government could accomplish on its own. Public-private partnership arrangements vary from full private ownership (subject to government approval) to overseeing public projects in which the private partner serves as a financial contributor to the government-sponsored project. Such partnerships are not unregulated monopolies. They are governed by negotiated agreements that specify public and private responsibilities, impose public regulation of safety, require quality of service, and often restrict profitability.

Most public-private partnerships fall into one of the five categories: contract services, turnkey facility, developer financing, privatization, and merchant facility [8].

- i. **Contract Services:** in which the facility is owned by the public sector and the private sector are contracted to provide a specific service.
- ii. **Turnkey facility:** The private sector designs, constructs, and operates the facility owned by the public sector. All the financing risk is generally assumed by the public sector and performance risk for timely completion and minimum levels of service is assumed by the private sector.
- iii. **Developer Financing:** The private sector finances the construction or expansion of a facility in return for the right to build houses, stores or industrial facilities.
- iv. **Privatization:** The private sector owns, builds, and operates a facility and partially or totally finances the facility.
- v. **Merchant Facility:** This contractual arrangement is similar to privatization but allows the private sector to decide the service it wants to provide the community.

The need for private investment is rising as a result of public sector inefficiency, economic pricing and cost recovery, technological advancement, advances in regulatory framework, and need for private resources. Private partners may have better technical and design expertise for better cost-benefit assessment using advanced technologies. PPP allows cost

savings by centralizing operations with the same geographical area reducing labor and repair costs. By entering into a turnkey contract with the private partner, time associated with the procurement process is also reduced considerably, thereby reducing interest costs and time for achieving compliance goals. Further, if private equity is used for funding, reserve requirements can be met by letters of credit for reducing the debt outstanding. Private investors generally allow longer tenor to receive returns than traditional public lenders providing repayment flexibility.

4.3.1 Public-Private Financing Structures [8, 9 & 10]

A variety of public-private financing structures are being implemented for infrastructure projects. These structures differ in ways the public-sector and private-sector entities share the responsibilities, risks, and rewards associated with the projects. Some of the public-private financing structures are as follows:

- *Perpetual Franchise Model:* In perpetual franchise, private entities finance and operate the project and retain the title to the assets. While private parties provide all the financial support, the government regulates safety, quality of service, and profits of the project.
- *Design-Build-Operate (DBO) Model:* In the DBO model, the private partners design, build, and operate the project for a fixed period of time. Usually there is one private contractor who has the sole responsibility to complete the project. Having one private contractor minimizes the problems that could arise due to distribution of liabilities between more than one contractor and makes the negotiation process between various parties easy. In DBO model project funds could be obtained by both public and private sectors or solely by the public sector. Some modifications of the DBO model that takes into account the funding aspect can take one of the following forms:
 1. *Design-Build-Finance-Operate Model:* In this model the project is completely funded by both public and private sectors. For instance, the private sector can take the responsibility of financing the construction costs. Further, the private sector is contracted for services such as the design and construction of a facility.
 2. *Government Funded, separate Design-Build Model:* In this model the project is completely funded by the public sector (any government agency) and the private sector is contracted for services such as the design and construction of a facility. In this model different private contractors are responsible for the design and construction of the facility.
 3. *Government Funded, turnkey Design-Build Model:* In this model the project is completely funded by the public sector (any government agency) and the private sector is contracted for services such as the design and construction of a facility. In this model one private contractor is given the sole responsibility for the construction of a project and installation of all facilities, providing for the project to be handed over at the point where it is ready for immediate operation.
 4. *Government Funded, turnkey Design-Build-Operate Model:* In this model the project is completely funded by the public sector (any government agency) and the private sector is responsible for designing, constructing as

well as operating the facility on completion.

- *Build-Operate-Transfer (BOT) Model [10]:* In the BOT model, the project company builds and operates the project facilities for a period of 10 to 30 years known as the concession or the cooperation period. After the concession period the project's entire assets minus liabilities are transferred to the host government with or, more often, without any compensation to the project sponsors. The concession period is long enough to generate adequate revenue for the debt repayment and provide sponsors with a reasonable return for risk sharing and equity investment in the project.

The BOT model has other variants such as:

1. *Build-Own-Operate-Transfer (BOOT) Model:* BOOT model is similar to BOT model except that in BOOT structure the sponsors actually own the project facilities during the stated concession period.
2. *Build-Own-Maintain-Transfer (BOMT) Model:* BOMT model is similar to BOT model except that in BOMT structure the sponsors are responsible for the maintenance of the project facilities during the stated concession period.
3. *Build-Own-Operate (BOO) Model:* In this model the project facilities are not transferred to the host government after the completion of the project.

When the concession period of the project is completed, the BOT, BOOT, and BOMT structures look similar to the BOO model.

- *Build-Transfer-Operate (BTO) Model:* In the BTO model, the private partner designs, finances, and builds the project. It transfers legal title to the host government immediately after the project facility passes its completion tests. The private entity then leases the project facility back from the public authority for a fixed term. A long-term lease agreement gives the private partner right to operate the project facility and to collect revenues for its own account during the term of the lease. At the end of the lease term, the public authority operates the project facility itself or hires someone else to operate it. In this model, the Project Company and not the public authority has principal responsibility for the project's financial obligations.
- *Buy-Build-Operate (BBO) Model:* In the BBO model, the private partner buys an existing facility from the host government, makes changes in design or expands it, and operates it as a regulated profit-making public-use facility. Underdeveloped, deteriorating, or congested roadways, bridges, and airports are good candidates for this type of financing structure.
- *Lease-Develop-Operate (LDO) Model:* In the LDO model, a private partner leases an existing publicly owned facility and surrounding land from the host government. It then expands, develops, and operates the facility under the revenue-sharing contract with the host government for a fixed term while the host government holds the legal title. The LDO model is attractive when private entities are not able to raise the full purchase price of the existing facility. This model is also useful for public-private risk sharing when the project is currently losing money.

- *Rehabilitate-Operate-Transfer (ROT) Model:* In the ROT model, the private partner rehabilitates, operates, and maintains existing government facility. The host government retains the ownership upon expiration of contract.
- *Rehabilitate-Own-Operate (ROO) Model:* In the ROO model, the private partner rehabilitates existing government facility and operates the facility for indefinite period on the condition that it does not violate the terms of its franchise.

4.4 **Sources of Infrastructure Financing** [4, 9, 11 & 12]

The government is a major source of capital for infrastructure projects. Most infrastructure expenditures in developing countries have been funded directly from fiscal budgets. Since infrastructure accounts for 40-60 percent of public investment in developing countries, the tightening of resources in the 1980s took a heavy toll on the ability of public budgets to finance the much needed infrastructure investments. There are mainly two sources of financing ?equity and debt.

4.4.1 Equity

The investors who provide equity in a project are typically those parties who are directly benefiting from the operation of the project. These investors are the purchasers of project output, the owners of any natural resource reserves the project will utilize, and/or the suppliers of essential products and services to the project including engineering firms. Equity can be arranged from several sources such as:

- *Commercial Banks and Credit Companies:* provide equity usually for tax oriented transactions and are the frequent source of interim financing for a project. These financial institutions are often willing to take on more completion risk or greater regulatory risk than other types of prospective lenders.
- *Committed Investment Funds:* For risk diversification, fund managers form committed investment funds to make equity investments in projects belonging to certain infrastructure sectors in different countries. Committed funds enable the sophisticated investors to pool their resources and reap the benefits of diversification. Also, they benefit from the investment adviser's experience and expertise in evaluating projects of a particular type.
- *Pooled Equity Vehicles:* An existing company forms a separate company, called "Pooled Vehicle Company (PEV)", to own and manage certain specified types of projects. Forming a PEV is advantageous because it provides investors with geographic diversity and an opportunity to invest in projects of a particular type with an experienced operator. Pooling investment funds represents an efficient means of investing in a targeted class of projects, particularly when the individual projects are relatively small and the costs of obtaining information, evaluating projects, and monitoring construction and performance are high.

4.4.2 Debt

While equity is the more readily available component in the financing of infrastructure, securing large amounts of long-term debt remains the main financing challenge. High growth rates in the East Asian economies have resulted in substantial returns from equity participation in the past. As economic growth rates in the region have slowed down, the ability to maintain adequate levels of returns partially depend on the ability to leverage equity returns by utilizing long-term debt in funding structures. Despite growing demand for

infrastructure funds traditional providers of debt are reluctant to provide debt. There are four main sources of debt financing for infrastructure projects. These include domestic and international commercial banks, capital markets, the export credit agencies (ECAs) and the multilateral financial institutions (MFIs).

- *Commercial Banks:* Commercial banks were the principal source of long-term debt for project financing in the 1980s. However, stricter bank capital regulations instituted in 1989 and stalling of projects due to Asian currency crisis forced many banks to cut back on their lending commitments, thereby reducing the availability of bank financing for large projects. However, commercial banks having adjusted to the tighter capital standards have expanded their role in project financing. They are generally the first stop for capital since they typically act as advisers and arrangers in addition to providing capital for projects.

In a typical financing structure, commercial banks provide construction financing on a floating rate basis. The development of interest rate swap market has given borrowers the flexibility to recharacterize these floating-rate loans into fixed obligations. However, with the increase in demand for funds, commercial banks can no longer provide more than a small portion of total funds required for infrastructure development. In addition, banks are reluctant to provide capital due to (i) political and currency risks, (ii) unclear and untested commercial law and property rights and (iii) the bank's ability to influence enforcement of project obligations which varies inversely with the drawing down of the facility.

Four alternative types of bank credit facilities may be arranged to finance a project: (i) revolving credit, (ii) term loan, (iii) the standby letter of credit, and (iv) bridge loan. Instead of negotiating a separate loan commitment, commercial banks may propose to arrange a comprehensive credit facility covering all of a project's loan requirements. For instance, the bank can arrange a revolving credit facility during the construction period, some portion of which converts to a term loan upon completion. A portion of revolving credit facility can also be used as a standby letter of credit facility. A comprehensive credit facility can often provide greater financial flexibility both to the bank(s) and to the project.

- *International Commercial Banks:* The large commercial banks in the United Kingdom, France, Germany, Japan and Switzerland may lend to a project through their participation in one or more syndicates of bank lenders to the project, or they may facilitate the project financing by placing bonds with institutional investors. International commercial banks are the most common source of financing for the BOT power projects in China. Usually international commercial bank financing is obtained in tandem to the financing from ECA, as it is easier to arrange a syndicate of commercial banks to arrange financing if the ECA is involved. International commercial banks are, however, limited by their maturity profiles as well as country, industry, and customer risk limits.
- *Export Credit Agencies (ECAs):* ECAs are organizations designated by an exporting country's government to implement that country's official export promotion programs. The Export Credit Guarantee Department (ECGD) of the United Kingdom, established in 1919, marks the beginning of official support for export credits. Many other governments established ECAs in the late 1920s and 1930s with the objective to support industry and to meet competition. ECAs are

either government agencies (such as Canada's Export Development Corporation, the UK's Export Credits Guarantee Department, Japan Eximbank) or private sector corporations that operate under government supervision such as Coface (France), Sace (Italy) and Hermes (Germany).

ECAs have been a major source of foreign exchange financing for infrastructure investment and for providing imported capital equipment. ECAs provide pure cover and/or financing support. Pure cover refers to ECA guaranteeing the exporter or a third party lender; of repayment of a portion of the qualifying export associated debt. Under financing support, ECAs provide direct loans, refinancing mechanisms, and interest rate subsidies. For projects with mostly imported components, export credits constitute the largest and most critical source of funding that offer direct loans and loan guarantees at slightly concessionary rates. Generally, export credits are available for 85% of the cost of imported equipment for a term of up to 15 years or in many cases, up to 40% to 50% of the total investment in the project [12].

Advantages of ECA financing: Some of the advantages of ECA financing include:

- *ECA participation in infrastructure financing is a "positive signal" that enables to broaden a borrower's access to the market for larger amounts and longer tenors of debt financing.*
- *ECA financing reduces the cost of financing by providing long-term loans thereby preventing the borrower from refinancing.*
- *ECA financing provides "umbrella effect" by reducing the interference by the host country in the project*

Disadvantages of ECA financing:

- ECAs are slow in their project approval procedures and are sometimes inflexible in the way that they approach projects. They are considered highly bureaucratic and inflexible.
- They introduce additional requirements into transactions complicating the financing procedure. Since most of the large-scale projects source goods and services from several countries, integrating ECA requirements is further complicated by the need to coordinate among several ECAs.
- Integrating ECA requirements into a transaction is a complex and time consuming task, hence the borrower needs to introduce the requirements as early as possible considering the time frame of project execution.
- *Multilateral Financial Institutions (MFIs):* MFIs such as the Asian Development Bank, the World Bank and International Finance Corporation (IFC) etc. offer loans, loan guarantees and co-financing with grace periods and repayment periods far longer than commercial sources. The primary objective of these agencies is to reduce poverty through sustainable economic development in developing countries. In addition, MFI funding acts as a “positive signal” as it provides comfort to commercial banks towards the political risk issues and therefore encourages greater commercial bank interest. The total number of private projects supported by the Bank group has risen significantly in the past ten years. MFIs

participation in arranging funds for infrastructure projects is in various forms such as:

- Investment loans for physical infrastructure to play a catalytic role in the privatization of services.
- Adjustment lending, technical assistance, and policy advice to help governments build regulatory and legal frameworks that encourage the private sector growth.
- Helping to design management contracts, leases, or concessions for infrastructure services.
- Providing guarantees such as partial risk guarantee and partial credit guarantee to protect lenders against payment defaults arising from breaches of sovereign contractual obligations, transfer risks, and certain force majeure events. The partial credit guarantee protects lenders against payment defaults in certain debt service obligation cases.
- Setting up guaranteed offshore debt facility designed to allow infrastructure projects to borrow from commercial institutions reducing the risk to those of a similar project in a country with low political risk. This type of financing arrangement is known as the “Expanded Co-financing Arrangement”(ECO).
- *Capital Markets:* Capital markets are becoming increasingly popular for raising infrastructure capitals because it provides access to a wider investor base. However, the access to capital markets for infrastructure financing has been slow to develop for a number of reasons. First, investors in public debt securities usually require more comprehensive public information disclosure than bank lenders. Second, country risks such as currency, political and regulatory are always present in cross-border investments and these risks are more challenging to an investor investing in infrastructure projects. Finally, the capital market investors are relatively passive risk takers therefore they are less enthusiastic in investing. Despite these difficulties, capital markets are a popular source of funds, because (i) the capital market instruments enable borrowers to broaden the base of institutions and individuals from which they can raise funds; (ii) it provides a wider pool of available capital, longer maturity, less restrictive covenants and more rapid execution; (iii) the instruments are negotiable and can be traded easily; and (iv) the access to a wider range of investors can reduce cost to the borrower due to competition and the different risk/return ambitions of the investing institutions.

4.5 Infrastructure Financing Techniques [9 & 11]

Most of the infrastructure investments generate revenues in domestic currency but require capital investment, for projects in power and telecommunications, in foreign currency. As seen in the last two years, in the long term it is inappropriate that these investments continue to be financed primarily through foreign obligations. Since financial risks are substantially lower if domestic currency revenues can be directly utilized to service the required debt denominated in local currency, there is a need of well-developed domestic capital markets and to develop financial instruments to tap domestic capital markets for financing infrastructure projects.

In recent years, a number of economies in the Asia Pacific region have taken steps to develop innovative financing mechanisms, using a variety of financial instruments / techniques to increase the flow of long-term financing. These innovative financing techniques are discussed below:

4.5.1 Project Bonds

Historically, project bonds have represented a relatively small proportion of funding for projects in Asia due to lack of appetite in the Asian debt markets and the cautiousness of the international capital markets. The situation is changing with international investors looking outside the mainstream to secure incremental returns from more complex but well structured risks from emerging markets. There is a much wider investor base that sees project bonds as a new investment opportunity, which includes life insurance companies, mutual funds, and pension and investment funds. Project bonds offer developers some distinct advantages (listed in table 4.4 below) with manageable drawbacks. Project bonds can be issued as a limited-recourse Rule 144A offering that has the following characteristics:

Limited-recourse Rule 144A offering: Nearly all bond issues by private infrastructure projects in developing countries have taken place in the U.S. capital market under Rule 144A. The rule established a nonexclusive exemption from the registration requirements from the Securities Act so that investors can resell privately placed securities to eligible institutions such as insurance companies, investment companies, and pension funds, referred to as "Qualified Institutional Buyers" or QIBs. The approval of Rule 144A by the US Securities and Exchange Commission in April 1990 for privately placed securities can be traded between QIBs thereby increasing liquidity. Introduction of Rule 144A has allowed the availability of longer-term maturity debt usually up to 15 years and less restrictive covenants packages relative to bank loans.

Subic Power Corporation marked the first significant use of the capital markets by Subic Power issuing senior secured notes in a path breaking "Rule 144A" capital markets offering to finance a 113.4 megawatt diesel-fired "fast track" power project in the Philippines.

4.5.2 Revenue Bonds

These bonds are a slight variation of the non-recourse bonds most often used by local governments to finance infrastructure development. It usually involves the securitisation of a pool of existing and often growing local government revenues, some of which may, but need not be related to the infrastructure project to be financed. The debt issuing entity is usually a special purpose government entity established with the legal authority to collect the pool of government revenues dedicated for the financing.

In the United States, infrastructure lending tends to be divided between general obligation bonds and revenue bonds. While the general obligation bonds are secured by state revenue, revenues of a specific project secure the revenue bonds. Revenue bonds also require investment grade rating to be considered a significant alternative to commercial loans.

Bond Insurance: For Project and Revenue bonds, bond insurance can be introduced to mitigate the risk perceptions of potential bond investors. Bond insurance protects investors in

infrastructure projects from the risk of non-payment of principal and interest covering commercial and sovereign risks. ADB launched Asian Securitisation and Infrastructure Assurance Ltd. (ASIA Ltd.) that provide bond insurance making bond holding more attractive.

4.5.3 Mezzanine debt

This is a hybrid of debt and equity, structured to reflect the characteristics of both debt and equity accounting the requirements of the owners and senior creditors of a particular project. There are several advantages to arranging mezzanine debt as shown in table 4.5-1 below.

4.5.4 Infrastructure Funds

Infrastructure funds pool capital from private international investors, national governments and multilateral financial institutions. The funds are invested in a diversified portfolio of infrastructure companies and projects in different sectors across a wide range of economies resulting in risk diversification. Some of the infrastructure funds include Global Power Investments of GE Capital, the AIG Asian Infrastructure Fund, and AIA Investment Management.

4.5.5 Off - Balance Sheet Financing

Infrastructure financing can also be achieved in the following three forms in order to reduce risks: (i) non-recourse project financing where lenders are repaid only from the project's earnings or, in case of default from the project's assets; (ii) limited recourse project financing where the infrastructure project can be backed by guarantees from the project sponsors and / or the government; and (iii) corporate finance strategies - pooling of assets of different projects and developing projects in different economies that can diversify project and country risk respectively.

4.5.6 Refinancing

Refinancing provides an alternative to the lack of long-term funding through banks. Short-term funding, such as bank loans can be used to fund the early stages of a project. Once completed, the project can be refinanced through longer-term bonds. This strategy allows the banks to remain liquid so they can finance new projects and the problem of maturity transformation involving long-term exposure is passed on to the bond market. Refinancing is being employed by infrastructure funds to enhance attractiveness of such funds to investors.

4.5.7 Catalytic Role of Multilateral Financial Institutions

MFIs can act as a catalyst for private sector investors to access long-term capital from capital-surplus economies by developing financial instruments that diversify and mitigate risks and extend maturity. MFIs participate in financing by arranging equity, quasi-equity, debt, guarantees, and loans through co-financing with commercial banks.

Table 4.5-1: Advantages and Disadvantages of Various Financing Techniques

Financing Technique	Advantages	Disadvantages
Project Bonds	<ul style="list-style-type: none"> Longer Tenor: Due to longer tenors and amortization schedules, project bonds have relieved project sponsors of the 	<ul style="list-style-type: none"> Requires appropriate allocation of risks to various project participants to make

	<p>stress of high front-end debt amortization associated with commercial bank financing.</p> <ul style="list-style-type: none"> ● Attractive Pricing: Project bonds provide fixed rate funding which is generally not available from commercial banks. The fixed rate funding is based upon competitive benchmarks. The pricing is relative to available benchmarks such as sovereign bonds or equivalently rated corporate bonds. ● Substantial Availability: Project bonds bring a new investor base to the project market, giving project developers access to the deepest and most competitive pool of funds available. 	<p>the bond attractive.</p> <ul style="list-style-type: none"> ● Must have attractive pricing to bring in a large investor base. ● High transaction costs involved.
Revenue Bonds	<ul style="list-style-type: none"> ● Revenue Bond is independent of the credit risk of local government and other intervening third parties ● Credit agencies analyze and rate the dedicated pool of revenues on a stand alone basis to ensure that the pool of dedicated revenues is isolated from its source. Such analysis is important for risk management. 	<ul style="list-style-type: none"> ● In order to secure revenue bonds, strong project revenues are important. Therefore it is critical to hedge different project risks to keep the project viable in adversity also. ● Revenue bonds also require investment grade rating to be considered a significant alternative to commercial loans.
Mezzanine Debt	<ul style="list-style-type: none"> ● Mezzanine capital can have short term (e.g. 3 years) as well as long-term (e.g. 12-15 years) maturity depending on the risks involved in the project. ● Mezzanine capital can be used as subordinated debt, bridge financing as well as in direct financing with developers involved with project development. ● Investors benefit from a variety of equity "kickers" that are linked to mezzanine debt investments. The kickers include options to acquire partnership interests, subordinated debt with participating interest, common and preferred stock warrants, and convertible subordinated loans. These "kickers" enables mezzanine capital investors to participate in the equity value that they create. ● The investors are protected by suitable assignments, cross defaults, control provision and possibly security interests in other projects to protect their interests. 	<ul style="list-style-type: none"> ● Mezzanine capital is an appropriate vehicle for financing if the project participants are willing to pledge the equity interests in the project that may be successfully financed ● Typically expected range of financing temor is short-term e.g. 5-7 years. ● Requires good risk management because expected returns are subject to the inherent risks.

Infrastructure Funds	<ul style="list-style-type: none"> • The funds are invested in a diversified portfolio of infrastructure companies and projects in different sectors across a wide range of economies resulting in risk diversification 	<ul style="list-style-type: none"> • Requires specialized equity investment knowledge, skills, and experience of infrastructure fund managers to create interest of strategic and passive investors.
Off - Balance Sheet Financing	<ul style="list-style-type: none"> • There are different forms by which project can be financed off-balance sheet. • This restricts the project risk to that associated with the project only and does not require monitoring of other investments of project participants. 	<ul style="list-style-type: none"> • Project risk needs to be hedged thoroughly • Risks should be distributed between various project participants allocating risks to parties that can handle them • Requires strong contractual arrangement between risk bearers to avoid risk transfer during adversities.
Refinancing	<ul style="list-style-type: none"> • Refinancing provides an alternative to the lack of long-term funding through banks. Short-term funding, such as bank loans can be used to fund the early stages of a project. • This strategy allows the banks to remain liquid so they can finance new projects and the problem of maturity transformation involving long-term exposure is passed on to the bond market. • Refinancing is being employed by infrastructure funds to enhance attractiveness of such funds to investors. 	<ul style="list-style-type: none"> • Requires proper matching of assets and liabilities to avoid risk-associated with mismatch of the two. • Transaction costs associated with refinancing should not be too high.
Multilateral Financial Institutions and Export Credit Agencies	<ul style="list-style-type: none"> • MFIs & ECAs can act as a catalyst for private sector investors to access long-term capital from capital-surplus economies by developing financial instruments that diversify and mitigate risks and extend maturity. • MFIs participate in financing by arranging equity, quasi-equity, debt, guarantees, and loans through co-financing with commercial banks. • Participation in infrastructure financing is a “positive signal” that enables to broaden a borrower's access to the market for larger amounts and longer tenors of debt financing. • Reduces the cost of financing by providing long term loans thereby preventing the borrower from refinancing. 	<ul style="list-style-type: none"> • Slow in their project approval procedures and are sometimes inflexible in the way that they approach projects. • They introduce additional requirements into transactions complicating the financing procedure. Since most of the large-scale projects source goods and services from several countries, integrating MFIs/ECA requirements is further complicated by the need to coordinate among several institutions. • Integrating ECA requirements into a transaction is a complex and time consuming task, hence the borrower needs to

		introduce the requirements as early as possible considering the time frame of project execution.
--	--	--

4.6 Risk Management [9, 13]

Countries where the basic macroeconomic conditions such as fiscal position of the government, legal framework and regulatory system, and sectoral policies that promote competition are still in preliminary stages require a well-defined structure for risk sharing between the public and private sectors. There are several types of risks involved with infrastructure projects. These risks can be categorized as:

- *Commercial project-specific risk*: which includes construction and development risk; credit risk; market and operating risk; technological risk; and raw material supply risk.
- *Commercial non-project specific risk*: which includes financial risk arising due to fluctuations in exchange rates, increase in interest rates, inflation, and change in commodity prices.
- *Non-commercial risk*: which includes political, legal and regulatory risks, force majeure risk, and environmental risk.

In undertaking infrastructure projects, the private sector faces risks that arise from all the three types of risks. Commercial project risks arise during the project conceptualization, construction, and operation phases. In order to facilitate private sector participation, it is important to develop risk-sharing arrangements among various stakeholders such that risks are allocated to those best able to manage them. In cases where guarantee and other support mechanisms are necessary to make the projects bankable, they must be structured so as to create incentives for efficiency.

The private sector can mitigate project specific risk by undertaking cost analysis and reviews of project to avoid risks due to unexpected cost escalation. They can enter into contract with the construction contractor that incorporates performance bonds and completion guarantees, bonuses and penalties, and liquidated damages. Further, the private sector can utilize a wide range of financial instruments and techniques to deal with commercial financial risks arising due to fluctuations in interest rates, movements of major currencies, depreciation of local currency etc.

On the other hand, government is in best situation to deal with non-commercial risks since it has control over country and political risks. It is, however, important that risk sharing by governments be properly structured. For instance, government must consider guarantee accounting, guarantee pricing, and fall-away provisions. Practicing guarantee accounting allows governments to assess the cost of providing guarantees and trade-off between costs and benefits of providing guarantees. Further, by pricing government guarantees, the cost of guarantees can be passed on to the end users of the service creating incentives for the private sector to participate.

Non-project specific risks can be reduced by the intervention of MFIs and ECAs. As mentioned in Sections 3.2.2 and 3.2.3, ECAs and MFIs can assist in improving the macroeconomic and sectoral conditions and in establishing structured regulatory framework. MFIs play a significant role in arranging project financing through direct provision of debt and equity and by guaranteeing commercial debt against non-project specific risks. On the other hand, ECAs provide loans and credit insurance for goods sold on export credit terms mitigating non-project specific risks.

In conclusion, there is no universal formula or solution to the risk allocation problem ?individual tailor-made solutions must be adopted for each project as different infrastructure projects have different characteristics. Further, each risk should be the responsibility of the party with the best possibility of controlling it.

4.7 Public-Private Partnerships: Country Experience

The following sections describe public-private partnership experience from the United Kingdom and Canada. Following the site visits and available literature it is clear that the UK and Canada have taken significant measures to implement public-private partnerships in various infrastructure sectors and are good examples to learn from their experience.

4.7.1 The United Kingdom's Experience [references 14 & 15]

The UK Government is keen on achieving a better "Value for Money" by implementing a wide spectrum of partnerships that combine public and private sectors. The Government is already working together with the private sector on projects in sectors as diverse as housing, economic regeneration, transport and municipal enterprise, maintenance and refurbishment of schools and development of new hospitals.

Public Private Partnerships (PPPs) pertains to negotiating deals that are beneficial for both public and private sectors. The UK implemented "Private Finance Initiative" (PFI) as one of the main mechanisms through which the public sector can secure improved value for money in partnership with the private sector. While the private sector brings a wide range of managerial, commercial and creative skills to the provision of public services, offering huge benefits for the government, the public sector facilitates execution of a contract by providing regulatory and legal framework.

Although PFI is a positive step towards involvement of private sector in infrastructure development, it is unwise to generalise about the benefits of PFI as a solution [16]. Whether public projects are better value when they use private money depends on the circumstances and how skillfully was the deal struck. According to Jeremy Colman, Head of PFI audit at the National Audit Office, if there is a proper comparator of the cost of the public sector alternative, there is not much difference between the PFI deal and the public sector deal. Hence, it is important to analyse the deal and not assume that the PFI deal will be better because deals can change considerably during negotiation.

- *Private Finance Initiative (PFI)*: PFI refers to creating a structure in which improved value for money is achieved through private sector innovation and management skills delivering significant performance improvement and efficiency savings. For instance, the average cost saving for the first design, build,

finance, and operate (DBFO) road contracts was 15% [15].

The PFI transforms Government Departments and Agencies from being owners and operators of assets into purchasers of services from the private sector. The private sector becomes long-term providers of services, combining the responsibilities of designing, building, financing and operating the assets in order to deliver the services demanded by the public sector. The Government no longer builds roads, it purchases miles of maintained highway or the Government no longer builds prisons, it buys custodial services. Initially the primary focus of PFI activity was on services sold to the public sector, in particular, public sector purchased services from the private sector that involved upfront investment in capital assets. However, two other basic types of transaction are currently in operation including:

- *Financially free-standing projects*: where the private sector supplier designs, builds, finances, and then operates an asset, recovering costs entirely through direct charges on the private users of the asset e.g. tolling rather than from payments by the public sector. Public sector involvement is limited to enabling the project to go ahead through assistance with planning, licensing and other statutory procedures.
- *Joint ventures*: where the costs of the project are not met entirely through charges on the end users but are subsidized from public funds.

The better value for money results from (i) integration and synergies between design, build and service operation; (ii) innovative design, re-engineering, usage of new materials; (iii) more efficient management; (iv) efficient allocation of risks to the parties able to manage them at least cost; and (v) more intensive exploitation of assets.

The Public Private Partnerships Program (4Ps) was established in April 1996 by the Local Authority Associations in England and Wales. The primary objective of the 4Ps was to enhance investment in local services through PFI and other public/private partnerships. With the support of central government departments, the 4Ps is assisting in delivering “pathfinder” projects in key areas like education, social services, transport, housing and leisure which can be used as models by other local authorities. A project is a pathfinder project if it demonstrates: (i) proven needs / benefits; (ii) a thorough analysis of the funding and service options; (iii) technical feasibility; (iv) affordability; and (v) project has a capacity of being replicated. Examples of PFI projects are provided in the table below:

Table 4.7-1: Implementation of Private Finance Initiative

PFI PROJECT	PROJECT DESCRIPTION	CAPITAL COST
Docklands Light Railway Extension (DETR)	Extension by 4.2km from Island Gardens, under the Thames river to Lewisham	£200 million, Private sector - £165 million through bond issue
PFI in the Home Office	DBFO prison	£250 million
Dartford and Gravesham NHS Trust	Provision and management of a new acute general hospital in Kent	£115 million

PFI in the Department of Environment, Transport and the Regions (DETR)	DETR has introduced DBFO contracts for the provision and operation of Trunk roads	Eight contracts awarded in 1996 including construction schemes valued at over £550 million
PFI in the Department of Education and Employment	To improve the condition of schools and buildings and help in raising education standards, improve information and communication technology in schools, colleges, and universities etc.	Commitment to spend £1.3 billion
PFI in Ministry of Defense	Provision of cars, vans & minibuses to British Forces in Germany etc.	12 contracts with a total value of £424 million

Source: Treasury Taskforce Private Finance, Partnerships for Prosperity ?The Private Finance Initiative

PFI in the Department of Environment, Transport and the Regions (DETR)

The DETR is most advanced in PFI implementation, which was launched in the department in August 1994 [14]. PFI introduced Design, Build, Finance, and Operate (DBFO) contracts to procure a road service on parts of the motorway and trunk road network. . Under DBFO arrangements the private sector is responsible for the detailed design and construction of trunk road schemes and manages and maintains both this new infrastructure and associated lengths of trunk road. Up to now 8 DBFO projects have been brought successfully to financial close, 6 other DBFO projects have been announced, and 1 joint project between the Scottish office and the Highways Agency is in procurement. In total, the estimated capital value of the road schemes within the DBFO program amounts to £1.3 billion.

The DBFO contract period is for 30 years from the commencement date. The duration of contract was selected at 30 years because finance for this type of project generally has a maximum payment period of around 20 years and the payment mechanism had to be structured to allow repayment of debt over a similar timescale. Since 30 years is currently beyond the range of conventional debt, the choice of period also encouraged financial innovation, use of alternative sources of funding and the possibility of re-financing after the completion of construction, all of which can provide financial benefits to the Agency. Banks are now prepared to look at longer repayment periods and bonds may have a repayment period of up to 25 years or more.

The main risks transferred to the private sector are those involved with the design and construction, maintenance and operation, latent defects, and traffic usage.

The DETR is looking to provide a revised payment formula for future contracts, introducing less dependence on traffic related payments and placing greater emphasis on the safety of the road and availability of lanes for traffic use.

Sources of Finance: For DBFO projects sources of finance is equity and debt. All pure equity is obtained from the project sponsors and third party investors have contributed some quasi-equity in the form of subordinated debt. In future equity may come from investment funds, which have been set up to provide equity for PFI projects.

Debt finance has been raised through commercial bank debt, funding from the European Investment Bank and the proceeds of a bond issue. The bank facilities provided have had a repayment period ranging from 15 to 20 years and margin of between 120 to 140 basis points. The facilities are 'limited recourse' as the debt is serviced out of cash flow generated by the project and the banks look only to the assets of their borrower DBFO Company.

4.7.2 Canada's Experience [from references 17 & 18]

Like most of the developed countries, Canada is rapidly moving towards public-private partnerships in delivering and financing the development of infrastructure and the delivery of services to the public. However, unlike the United Kingdom, the USA, Australia and New Zealand, Canadians are retaining some role for the government such as policy setting, monitoring and oversight, or sharing financial risk instead of moving towards pure privatization.

An important Canadian initiative to encourage public-private partnership is the creation of the Canadian Council for Public-Private Partnerships, a non profit/non-partisan organization founded in 1993. The public-private partnership is concentrating in several areas, beginning with the design and construction of community facilities such as community centers, schools, libraries etc. In 1996, The Canadian Council for Public-Private Partnerships identified over 200 examples of such projects and found that 78% of governments across the country had specific projects and plans for using PPP during the next three years especially in the areas such as building roads, bridges, arenas, tourist and recreation facilities. In 1998, the Council found that the number of projects completed or underway has doubled to more than 400 with public-private partnership in 85% of the cases. Further, the partnership extended beyond the traditional infrastructure areas to diverse sectors such as information technology, airport development, environment and energy, health care, and education [17].

Canadian firms have sponsored a number of PPP projects in Canada and abroad. The major strengths of Canadian firms include technical expertise and experience as suppliers of goods and services to most attractive sectors such as energy, transportation, telecommunications and environment, and high quality of professional consulting engineering services. The weaknesses associated with these firms include their relatively small size and their limited capitalization, which prevents them from undertaking large PPP projects [18].

The models that have been developed in Canada are being applied abroad. For example, Canadian Highways International Corporation is applying its toll highway expertise in Israel. The classic examples of successful PPP projects are provided in Table 4.7-2.

Table 4.7-2: Classic Examples of Public-Private Partnership - Canada

PUBLIC-PRIVATE PARTNERSHIPS	PROJECT DESCRIPTION	ACHIEVEMENTS	FINANCING STRUCTURE
Navigation Canada (NavCanada)	NavCanada acquired the Canadian Civil Air Navigation System (ANS)	<ul style="list-style-type: none"> NavCanada became the world's first ANS 	<ul style="list-style-type: none"> Purchase Price was C\$1.5

	from the Canadian Government	<p>provider without majority government ownership or control;</p> <ul style="list-style-type: none"> with no government credit support, NavCanada achieved four AA credit ratings; 	<p>billion;</p> <ul style="list-style-type: none"> with no equity capital, the costs of funds to NavCanada is much lower than a share based private sector utility; The structure of NavCanada is a balance between public and private entity as a non-share capital corporation ?Canadian compromise between government ownership and pure privatization.
<p>Toll Highways</p> <ul style="list-style-type: none"> Highway 407 Express Toll Route (ETR) 	<ul style="list-style-type: none"> is the traditional BOT project type In February 1998, the Ontario government announced its intent to sell the highway and to extend toll road 	<ul style="list-style-type: none"> Example of developers taking the risk of toll-based revenue bonds. 	<ul style="list-style-type: none"> Fixed construction price of C\$930 million Financing arranged by the Crown Agency Ontario Transportation Capital Corp. through the sale of toll revenue bonds in world capital markets
<p>Teranet Land Information Services Inc. (Teranet)</p>	<ul style="list-style-type: none"> To computerize and operate Ontario's land registration records under the POLARIS program To enhance services, products and access to provide a cadastral or land information utility to the province To market software solutions and services to other jurisdictions. 	<ul style="list-style-type: none"> POLARIS system implemented in 8 years instead of 15 and will be completed by 2000 across Ontario; Created more than 2000 person years (new jobs); Developed of international partnerships with the Czech Republic, Puerto Rico, Shanghai, and Lebanon creating new sources of revenue. 	<ul style="list-style-type: none"> Total project cost is C\$300 million, shared 50:50 between the provincial government and the private partners; Private partners has an exclusive 10 year license to manage and provide access to the POLARIS database and to establishes the fees for the new, value-added services; Returns are divided equally between the public and private partners;

			<ul style="list-style-type: none"> • Government continues to own the land titles data to regulate the fees for searching and registering documents; • The government is receiving a royalty stream from international revenues.
--	--	--	---

4.8 **Best Practices for Promoting Private Sector Investment in Infrastructure Industry**

4.8.1 Power Sector (reference [19])

In 1990's, the excess demand for energy and problems of power cut in the Philippines, Malaysia, and China initiated a sharp increase in private sector participation in the power sector in Asia. Excess demand has been predominantly due to rapid economic growth and constrained supply and to some extent due to poor government arrangements related to power generation.

There are several ways by which the private sector can participate in infrastructure development in the power sector as shown in the table below:

Table 4.8-1: Options for Private Sector Participation

Private Sector Participation	Ownership	Financing	Management
Service Contract	Public	Public	Public/Private
Management Contract	Public	Public	Private
Lease	Public	Public	Private
Concession	Private/Public	Private	Private
BOT/BOOT/ROT	Private then Public	Private	Private
BOO/ROO	Private	Private	Private

Private sector participation (PSP) can potentially bring many benefits to the government owned segments such as higher efficiency, more consumer choices, lower wholesale and retail prices, new technologies, better management techniques, lower transaction costs, and more trained and educated workforce. However, to control abuses of PSP it is important that the government continues regulating the transmission and distribution of power.

A study was conducted by Price Waterhouse for the Asian Development Bank to identify the

best practices for encouraging PSP in both investing and competing in the power sector. The study focused on two elements of PSP: investment and competition. Investment is defined as "willingness of investors to put their time, effort and money into the purchase or development of power sector projects" Therefore the host country should create an environment that would encourage investors to come forward and bring in private sector capital. Similarly, competition is defined as "a set of conditions in which investors vie for the market as a whole, in which they are competing simultaneously against all other players in the market for the right to sell their product". The study reports best practices for PSP at different levels that are categorised as follows:

1. To attract both investment and competition in all three segments of power production including generation, transmission, and distribution. The best practices are categorised as (i) government and legislative practices; (ii) regulatory and legal practices; (iii) economic, labour and financial practices; and (iv) the privatisation process including the sale of government-owned assets or the right to develop Greenfield projects.
2. To encourage investment in the generation segment of the power project in addition to the best practices identified for category 1 above.
3. To encourage investment in transmission and distribution segments of the power project in addition to the best practices identified for category 1 above.
4. To achieve a competitive market in generation in addition to the best practices identified for category 2 above.
5. To achieve a competitive market in transmission and distribution in addition to the best practices identified for category 3 above.

Given the limited scope of this review, it is difficult to list all the best practices identified for different categories listed above. However, we highlight some of the important practices for the three segments in power sector. For detailed information, please see reference 19.

Best Practices to Support Private Sector Investment in Generation

- Set government environmental standards for power generation to allow investors to determine which types of plants should be built. Stimulate the use of domestic fuel sources if it is economical.
- Set Goals and a timetable for the use of non-conventional fuels e.g. renewable energy and energy conservation, which may be more expensive than conventional power sources and establish means of achieving those goals.
- Eliminate inconsistencies between the regional and central levels of government with regard to tariffs and investment policies.
- Develop standard contracts for IPPs that are internally consistent and which meet international standards, in implementation agreement and power purchase agreement.
- In setting purchase price the buyer should focus on the credibility of the provider and the attractiveness of the price, not the generators potential rate of return.

- Utilize a single buyer either a single utility or the transmission system with long-term contracts for the initial projects only, until a more viable investment climate and industry structure emerges.
- Use the unbundling and privatization process to sell power plants without granting them long-term contracts in order to create more opportunities for customers.
- Support the development of new capacity; make available government-owned sites with existing power plants that are zoned for power project development.
- Utilize BOO contracts for new projects, which are less complicated than BOTs and use ROOs rather than ROTs for existing ones. In case BOT is the chosen project type, then establish clear terms for transferring the plant back to the government.
- Limit financial exposures to IPP contract and facilitate the emergence of a competitive market for generation. Support inside the fence or industrial zone generation to encourage other generators to become more reliable and cost-effective with limited commitment periods. ?/LI

Transmission and Distribution (T&D)

- The government should articulate its commitment to electrification and assist in meeting the costs to expand the system to serve non-economic customers.
- Clearly define the geographic boundaries between pre-existing cooperatives and new concessions to avoid conflicts over responsibility for providing service to customers in the border areas.
- The government should support private ownership and operation of transmission as long as appropriate regulatory controls and incentives are in place.
- Regulate distribution rates with performance-based or benchmark competition, with performance bonuses to make these entities reliable and financially viable.
- Pass some efficiency gains to the consumer while maintaining the utility's incentives to increase efficiency. Establish clear regulatory rules and a process for setting T&D tariffs.
- Reduce and /or remove subsidies or cross-subsidies for specific end-user groups to the greatest extent possible in case of privatization.
- Reduce theft and lower levels of collection before privatization and legally ensure that new private owners can crack down the violators.
- Performance standards and tariff mechanisms should not require frequent regulatory approval so that investors have sufficient time to achieve performance targets.
- Train staff to ensure those good skills for grid operation is in place at the central and regional levels.
- Carry out privatization of distribution systems using a "flexible" bidding system

that accepts bids for one or more companies at the same time.

- Allow investors to provide power and other services e.g. Internet, water supply and wastewater treatment, security services within an industrial zone. Regulate these zones using the same regulator as other entities in the power sector and require the local distributor to provide fair rates for backup power.
- The government should provide financial support including the refinancing or absorption of some debt associated with the existing system.
- The decision on how to address high levels of debt in companies slated for privatization should be taken in light of the government's goals for privatization. Mutual debt cancellation may be a good way to clear the books.
- The transition from government accounting to commercial or international accounting standards should be undertaken on a defined schedule with adequate training accounting.

4.8.2 Port Privatization (reference [20])

The trend towards private operations, private ports, and port corporatization has produced a significant increase in private sector participation in the port sector throughout the world. The best strategy for port privatization depends on its current situation such as size of the port, diversity of traffic, level of competition in the logistics chain, its role in economic activity of the nation, and its medium term goals.

The best institutional structure for promoting private sector involvement in port operations and investments is the "landlord model" This model can accommodate varying types of private sector participation ranging from outsourcing of specific port activities to open competition for port services and multiple terminal concessions and to complete port concessions. The private sector assumes responsibility for the commercial interaction with the port users but the public port retains responsibility for overall port development. While the private sector earns its revenue from charges to the port users, the port obtains most of its revenue from rental and royalty payments. This model can be applied to large ports where there are a number of terminals that compete with each other and also for ports with domestic and international and trans-shipment traffic.

The landlord port does not provide a specific format for allocating responsibilities between the public and private sectors but it provides a broad framework in which the private sector can replace the public sector in the provision of cargo handling and storage services and most marine services. While the public sector retains ownership of the land and regulates its use, the capital responsibility, is shared between the public and private sectors. This structure allows for a variety of contractual arrangements between the public and private sectors and accommodates different organizational structures. The landlord port structure is used in Western Europe and the United States and is becoming increasingly popular in Asia and South America.

This structure increases operational efficiency allowing flexibility in the tripartite relationship between the government, labor and private sector management. The tripartite relationship allows a port to improve the quality of its services through a process of evolution and to accommodate changes as the shipping industry evolves. While the private sector is responsible for all commercial risks, the public sectors share financial and completion risks

and reduce the regulatory risk associated with the investments.

The involvement of the public sector is important for developing new ports or expanding basic port infrastructure since the payback period is too long to attract private investment. The public sector participates in investment by either of the three methods (i) financing through general revenues and equity; (ii) public borrowing or borrowing by corporatized public entities; and (iii) loan guarantees and tax breaks for private investors in port infrastructure.

In order to be effective, this structure requires specific objectives such as need for commercialization of management, active competition among service providers, timely and efficient investment and a strong client-orientation when considering trade-off between quality and price in the provision of port services. Further, experience shows the need to promote intermodal integration, which causes the port to lose its unique role as a gateway and to become part of the logistics chain connecting shippers and consignees.

4.8.3 Airports and Air Traffic Control (reference [21])

There are various models ranging from partial to full private sector participation in the Airports and Air traffic Control sectors. These models include full privatization and partial privatization structures. Partial privatization can have different forms (i) Build-Operate-Transfer (BOT); (ii) strategic partnership; and (iii) management contract. Statistics on the airports throughout the world indicates that the partial privatization approaches are predominant reflecting reluctance by the government to cede control of a vital national asset. The characteristics of different forms of private sector participation are shown in the table below:

Table 4.8-2: Alternative Models of Private Sector Participation

<u>Attributes</u>	Full Privatization	Partial Privatization		
		BOT/Concession	Strategic Partner	Management Contract
<u>Roles</u>				
Ownership	Private	State	State	State
Investment	Private	Private / Mixed	Mixed	State
Operation	Private	Private / Mixed	Private / Mixed	Private / Mixed
<u>Regulation</u>	Independent Regulator	Independent Regulator	Ownership	Ownership
<u>Examples</u>	<u>UK</u> <ul style="list-style-type: none"> • BAA plc • Regional airports 	<u>Colombia</u> <ul style="list-style-type: none"> • Bogota 	<u>Thailand</u>	<u>USA</u> <ul style="list-style-type: none"> • Indianapolis • Pittsburgh
	<u>Australia</u> <ul style="list-style-type: none"> • FAA airport 	<u>Philippines</u> <ul style="list-style-type: none"> • Manila 	<u>South Africa</u>	<u>Italy</u> <ul style="list-style-type: none"> • Naples

		Cambodia		Malaysia
		• Pnomh Phen		• Kuala Lumpur
		Argentina		

Source: *Developing Best Practices for promoting private sector Investment in Infrastructure: Airports and Air Traffic Control*, Report prepared by NERA

Comparison of Full and Partial Privatization

- *The social net benefit of engaging the private sector in partial privatization is less than that achievable under full privatization because for e.g. BOT project types are time limited and scope limited and strategic partnership requires control to be shared between the public and private sector partners.*
- *BOT projects are excessively dependent on external funding and on debt finance whereas full privatization is financed from retained earnings. External funding imposes excess transaction costs so private sector is more cautious about project returns while undertaking the project in partial partnership.*
- *Compared to full privatization, partial privatization may also have performance penalty such as there is less incentive to invest and innovate especially during the later stages of the concession because its time-limited nature restricts the scope of benefit capture. Also, a partial privatization framework based on formal contractual mechanisms may restrict the private sector partner's ability to respond flexibly to unexpected market developments.*

In essence, full privatization of core airport activities is likely to offer superior performance outcomes enabling more efficient capital structure. Therefore, full privatization of airports is proposed as an appropriate target model for airports sector with the condition that appropriate regulatory framework is in place.

4.8.4 Transport (reference [22])

Tollway projects are different from other infrastructure projects belonging to power, telecommunications, airports and water sectors, which have market mechanisms for charging the customer. On the other hand, toll roads when viewed as a total system involve other roads and interfaces which people regard as free services thereby creating congestion problems.

Private sector participation (PSP) is essential in order to deliver an increasing and sustainable quality and standard of life to the citizens. PSP can take various forms as shown in the table below:

Table 4.8-3: Private Sector Participation in Transport Industry

Objective	Maintenance	Turnkey	Maintain & Operate	ROT ¹	BOT	Corridor Arrangement
New Source of Funds			/	/	/	/

New Road		/			/	/
Maintenance	/		/	/		/
Rehabilitation				/		

1 Rehabilitate-Operate-Transfer (ROT)

Asia's BOT experience are poor examples of PSP because in many or most of the cases private sector funding is underwritten by the government which is not true risk capital. However, government participation is required, as demand is low so as to achieve adequate risk on capital.

Given the externalities, it is important to develop a transport policy and associated strategy. The Best Practice requires:

- i. Establishing Roads Fund from user charge (toll) incorporated in fuel price and use the toll for road improvement.
- ii. Setting Tariffs to secure Government Objectives for e.g. (a) low tariffs for buses to benefit low-income travelers; (b) low tariffs for trucks to enhance traffic; (c) high Tariffs at congested times when willingness to pay is higher.
- iii. Creating an acceptable Legal and Regulatory Framework to improve transparency and avoid delay and uncertainty. It is important to establish clear government responsibility for technical standards for design, construction, safety etc. and standards for economic matters such as toll rate and toll increases.
- iv. Allocate risks to the parties best able to manage them or protect against them. For instance, government should bear risks pertaining to land acquisition, relocation and necessary permissions and foreign exchange. Further, the private sector must bear risks due to design, construction time / cost, operations and maintenance. Traffic risk, however, is a major risk. The government and the project company must share this risk so as to share returns in upside scenario and provide guarantees for downside scenario.
- v. For financing of infrastructure projects in the transport sector it is important to access domestic capital to avoid foreign exchange risk since project revenues is in local currency. Guarantees and insurance should be used to assist in putting the financing package together.
- vi. There must be a fair and transparent procurement process with the following steps: (a) preparation of business case that provides all relevant information to the government; (b) government must seek expert advice to protect public interest and to implement an effective procurement process; (c) secure transparency and competition by marketing the project to maximize interest, allowing competitive bidding, and fostering innovation; (d) establishing a clear bidding and negotiation process
- vii. Ensure Value-for-Money: government should use a public sector comparator to establish the extent of PSP project costs compared to the best public sector alternative. Also, the government should implement before-and-after audits to

match the expectations with reality.

4.8.5 Water Supply (reference [23])

There is not a single answer or option for private sector participation in water supply sector. Private sector participation in water supply involves a continuum of options from a relatively low level of private sector participation to a high level of private asset ownership and management. The choice of the most appropriate private sector participation for a particular country depends on a number of factors such as:

- Level of government and community support for private sector involvement;
- Nature of problems at hand - the lack of investment funds, the lack of expertise etc.;
- Predictability of the regulatory regime governing project income;
- Private sector's perception of the risk associated with individual projects;
- In general Build-Operate-Transfer (BOT), Build-Own-Operate-Transfer (BOOT) and Rehabilitate-Operate-Transfer (ROT) arrangements can relatively quickly bring expertise and finance to water supply project if investments in new sources of bulk water supply are required within a tight time frame.
- Concession contracts are probably the best option if governments are committed but are not prepared to consider full divestment of water related assets. Concessions can provide incentives to expand the customer base, increase investment, maintain existing assets and reduce technical and non-technical losses within water distribution networks.
- Divestiture and BOT / BOO involve 100% private sector ownership and operation of key parts of water supply infrastructure. A government joint venture is a variation of both these arrangements. All these forms of private sector participation requires a strong commitment from the government, a well researched and negotiated contract and a strong regulatory and institutional environment.

4.8.6 Privatisation of Landfills [references 24 & 25]

Landfill is the dominant form of disposal for all municipal solid waste in most developed countries and will remain so despite upturns in the popularity of incineration in some countries. The relative shortage of disposal capacity in many countries has been aggravated by increased public sensitivities about the location and environmental impact of landfills. Given the high costs of development and operation of landfills, private sector is necessary to exploit the opportunities associated with waste disposal management. Private sector companies are playing an increasing role in the operation of waste management facilities generally, and landfill in particular. For instance, in the USA 35% of the municipal solid waste is disposed off by the private sector and the proportion is expected to reach 50% by the year 2000.

Furthermore, international evidence suggests that the involvement of private sector is the most appropriate means of providing high quality, technically sophisticated and cost effective

waste management service in the current and anticipated future circumstances. There are several advantages to the private sector involvement in operation and maintenance of landfills such as:

- Ability of the private sector to exploit opportunities in recycling and energy recovery;
- Ability to establish commercial links with industry where public bodies would have been constrained;
- Access to international expertise in landfill operations; utilisation of modern land filling techniques to minimise environmental impacts and optimise the use of available void space;
- Enforcement of contract conditions and quality of services, via financial deductions;
- Waste management contractors with experience of international operations would have multi-disciplined management expertise and would be well qualified to evaluate developments in site engineering techniques and their beneficial application to Hong Kong, China operations;
- Access to capital and a consequent ability to sustain the state-of-the art in landfill techniques;
- Ability to establish commercial links with industry for the sale of recovered materials and energy;

Landfills have been the ultimate waste disposal facility in Hong Kong, China for the past three decades. The Hong Kong SAR Government's policy of privatisation of landfills is consistent with international trends and has significant potential benefits over the traditional means of providing for waste disposal. There were thirteen "old generation" landfills with capacities varying from 1 to 5 million tonnes, collectively occupying a total area of about 300 hectares. Because of few environmental controls imposed on the initial construction and operation of these "old generation" landfills, the sites have become contaminated by the products of waste decomposition such as landfill gas and leachate continuing to discharge from them. These landfill sites have been closed and are in the process of being brought back to any productive use.

Following four separate feasibility studies, a restoration scheme was developed for each of the thirteen landfills that accounted for long-term landfill gas and leachate management systems. Based on these feasibility studies, the Environmental Protection Department (EPD) recognized the need for the restoration and the subsequent operation and maintenance of the "old generation" landfills under a series of Design-Build-Operate (DBO) contracts involving the private sector in order to bring the landfill sites back to beneficial use.

In addition, a "new generation" of three strategic landfills was developed later to provide state-of-the-art environmentally controlled waste disposal facilities for the Territory. These strategic sites were designed, constructed and operated by the private sector undertaking specific measures to control the polluting effects of waste decomposition. These sites are regionally located and have a combined capacity of about 120 million cubic meters representing a total of approximately 15 years capacity.

Waste sent to the landfills is supplied from a network of refuse transfer stations conveniently

located in the main urban areas. These stations designed, constructed and operated to high environmental standards provide an efficient means to collect, compress, contain and transfer municipal waste while minimising environmental nuisance to the community. Similar to the landfill site development, the Design-Build-Operate contract is awarded to a single private sector contractor.

Landfill Development Contracts

The landfill development contracts implemented in Hong Kong, China for the new as well as for the restoration of the old generation landfills are Design-Build-Operate (DBO) type. In DBO contract a single contractor has the responsibility for the (i) design, construction, and operation of strategic landfills and (ii) restoration and aftercare of the closed landfill sites. There are differences between the scope of the contracts for the development and operation of the "new generation" strategic landfills and those for the restoration and aftercare of the "old generation" landfills. For instance, there is no receipt of waste under the Landfill Restoration Contracts, and various after uses have been planned for these closed old landfill sites after their restoration. The contractual arrangement used for the strategic landfills, however, is also implemented for the Landfill Restoration Contracts due to the following advantages:

- The feasibility studies conducted for restoration of old landfill sites identified that the differences between the scope of the two contracts could be easily accommodated in the contract used for the strategic landfill development;
- Familiarity by the government and the tenderers of the contractual procedure used for the strategic landfills;
- Longer time required to develop any alternative contractual arrangement; and
- Possibility of delay in implementation of new contractual arrangement due to time required by the consultants and EPD staff to gain familiarity of the new contractual arrangement

Key Features of Landfill Development Contracts

After close examination of various forms of contracts implemented internationally, the contractual arrangement proposed for the development of strategic sites and for the restoration of old landfill sites has the following key features:

- The contract is a turnkey contract where the employer, HKSAR government is (i) the owner of sites; (ii) the authority responsible for providing waste; (iii) the sole source of income for the contractor and the regulatory authority. The general practice is that the client is contractually remote from the owner of the landfill site, and from the contract between the site owner and the landfill operator.
- The contractor could operate in a framework of a performance specification, or the contractor might be required to undertake works by specified methods defined partially as mandatory and partially as guidance. In addition, the contractor will be governed by statutory regulations. This type of contract was seen as most likely to give the best results in terms of cost and environmental control.
- Method of Payment: Capital costs are reimbursed in full after completion of the specified construction activities leading to a situation where government effectively owns most of the site infrastructure at any time. There is no possibility

of deferring capital expenditure, should this be of benefit to the government. This payment method precludes the need for a buy-out formula, as government would only need to reimburse the contractor his costs at the time of termination.

- A range of potential liabilities and the allocation of liabilities between parties, at all stages of development of the landfills are considered. While the three parties concerned with the implementation of the contract, the contractor, the government, and independent consultants, the basic responsibility for the design, construction, operation, restoration and aftercare is placed firmly on the contractor.
- Performance criteria to set minimum standard for the design, construction, operation, restoration and aftercare are adequately defined.
- Guidelines for the implementation of environmental monitoring scheme is outlined to confirm any quantitative predictions of environmental impact and to provide data at an early stage warning about the problem in landfill gas and leachate management systems if any.

Evidence of Success

The water quality of the Doukai Bay has vastly improved and today complies with environmental quality standards for both human health and living environment. According to a survey on aquatic life, more than 115 species have been restored and waterfowls are again living in tidelands in the Bay.

(Note: Please see references 24 and 25, for detailed description on the Contractual Framework, Tender and Tender Evaluation Procedures, and Pre-qualification Procedures for Potential Contractors)

References

1. "APEC Sustainable Cities Agenda for Cooperation" Toronto, Canada ?June 9-11, 1997, Draft for discussion as of May 22nd.
2. "Environmental Ministerial Meeting on Sustainable Development, Asia Pacific Economic Cooperation" June 9 ?11, 1997, Toronto, Canada.
3. *"Sustainable Cities Success Stories"* an APEC Report.
4. Ferrigno, W.J., 1996, "The Changing Dynamics of Private Investment in Asian Infrastructure" in *Project & Infrastructure Finance in Asia* (2nd ed.), Asia Law & Practice Publishing Ltd.
5. So, Jae and Ben Shin, 1995, "The Private Infrastructure Industry: A Global Market of \$60 Billion A Year" FPD Note 45, World Bank, Vice Presidency for Finance and Private Sector Development, Washington, D.C.
6. "Private Sector Participation and Infrastructure Investment in Asia: The Impact of the Currency Crisis" APEC Technical Working Group Meeting, Kuala Lumpur, Malaysia,

September 3-4, 1998, Tasman Asia Pacific.

7. Ferreira D. and K. Khatami, 1996, "Why Private Infrastructure?" in Financing Private Infrastructure in Developing Countries, World Bank Discussion Paper No. 343.
8. "Public Private Partnerships for Environmental Facilities" A Self- Help Guide For Local Governments, Administration and Resources Management, United States Environmental Protection Agency (EPA), July 1991.
9. Finnerty, J.D., 1996, "Chapter 10: Issues for the Host Government" in Project Financing Asset-Based Financial Engineering, John Wiley & Sons, Inc.
10. L.H.P. Lang, 1998, "Chapter 2: The Project Financing Model" in Advances in Finance, Investment and Banking, Project Finance in Asia, North-Holland.
11. Ferreira, D. and K. Khatami, 1996, "Mobilizing International Financing for Private Infrastructure" in Financing Private Infrastructure in Developing Countries, World Bank Discussion Paper No. 343.
12. Lawrence J.M., 1997, "Integrating Export Credit Agency Support into Infrastructure and Project Financing" in Project & Infrastructure Finance Handbook (Asia) 1997, Asia Law & Practice Publishing Ltd.
13. Arturo Olvera Vega, summer 1997, "Risk Allocation in Infrastructure Financing" The Journal of Project Finance, 38-42.
14. Reference UKI: Treasury Task Force - Private Finance (undated): "Partnership for Prosperity, The Private Finance Initiative"
15. Reference UK13: Highways Agency / Private Finance Panel Executive (undated): "DBFO - Value in Roads: A case study on the first eight DBFO road contracts and their development"
16. "Management Private Finance Initiative - The £84bn question" Financial Times December 12, 1999.
17. "Public-Private Partnerships: The Canadian Experience", Presentation to the Oxford School of Project Finance by Glenna Carr, The Canadian Council for Public-Private Partnerships Canada, July 9-11, 1998, Oxford, England.
18. Service Industries and Capital Projects Branch, Industry Canada, May 1998, "Winning in Global Infrastructure Markets, Solutions through partnership".
19. "Developing Best Practices for Promoting Private Sector Investment and Competition in the Power Sector" TA No. 5753 Draft Final Report - Price Waterhouse, June 1998.
20. "Best Practices in Port Privatization" Prepared by J.H. Arnold for Asian Development Bank, August 31, 1998.
21. "Developing Best Practices for Promoting Private Sector Investment in Infrastructure: Airports and Air Traffic Control", Draft Final Report for the Asian Development Bank, Prepared by National Economic Research Association, London, June 1998.
22. "Developing Best Practices for Promoting Private Sector Investment in Infrastructure: Expressways", TA No. 5733- REG, Draft Final Report for the Asian Development Bank, prepared by R.J. Allport, June 1998.

23. "Private Sector Investment in Water Supply ?Towards Best Practice" TA No. 5733-REG, Revised Draft of Final Report to the Asian Development Bank, prepared by Tasman Asia Pacific.
 24. "Restoration of Landfill Sites ?Core Consultancy" Agreement No. CE 27/93, Final Report, Prepared by Scott Wilson Kirkpatrick Consulting Engineers and other Consultants for the Hong Kong SAR Government Environmental Protection Department, July 1996.
 25. "Privatisation of Landfills - Core Consultancy" Agreement No. CE 55/90, Final Report, Prepared by Scott Wilson Kirkpatrick & Company Ltd. for the Hong Kong SAR Government Environmental Protection Department, January 1992.
-

CHAPTER 5

ANALYSIS OF INFORMATION FROM THE PRIVATE SECTOR BUSINESSES (PSBs)

Chapter 5 is divided into three main sections including sections 5.1, 5.2, and 5.3. Section 5.1 provides analysis of the projects funded by the Private Sector Businesses (PSBs) in Hong Kong, China. Section 5.2 provides analysis of the projects funded by the PSBs in APEC Member Economies other than Hong Kong, China, and section 5.3 provides analysis of the projects funded by the PSBs in the United Kingdom.

The data on the projects funded by the PSBs in Hong Kong, China was collected by face-to-face interviews as well as questionnaires. Hence, the information on the Hong Kong, China PSBs is more comprehensive and complete. On the other hand, the information obtained from other APEC member economies is based only on the PSBs questionnaires, which were partially complete in majority of the cases. In addition, we received only two PSBs questionnaires from the United Kingdom among the EU member states. Given the fact that the level of information provided by various participants is not analogous, it is inappropriate to compare and contrast the analysis of the PSBs based on various participants. Hence, we analyze the information on PSBs from different member economies and separately.

5.1 Analysis of information from Hong Kong, China's PSBs

We approached several companies in Hong Kong, China, which are involved in infrastructure project financing, to participate in our study. The companies that agreed to participate in the study are:

Airport Authority Hong Kong
Cheung Kong Infrastructure Holdings Ltd.
China Light & Power (CLP) Power International
Citic Pacific Ltd.
Hopewell Holdings Ltd.
MTR Corporation¹
New World Infrastructure Ltd.

We received completed questionnaires from all these companies. In addition, we also

interviewed Airport Authority Hong Kong, China Light & Power (CLP) Power International, Citic Pacific Ltd. and New World Infrastructure Ltd. A majority of these companies raised the issue of confidentiality and asked us not to associate the name of the projects with the company and/or disclose factual information specific to a project. Hence, to keep the facts pertaining to individual projects confidential, we present a summary statistics and analysis based on information collected on all the infrastructure projects reported by the Hong Kong, China PSBs. The information is based on several projects whose names and locations are:

1. Guangzhou - Shenzhen Superhighway East (GSZ East); China
2. Pagbilao Power Station (Pagbilao); Philippines
3. Sual Power Station (Sual); Philippines
4. Western Harbour Tunnel; Hong Kong, China
5. New Hong Kong Tunnel; Hong Kong, China
6. Ligang Power Station II, Jiangsu; China
7. Zhuhai Power Plant, Zhuhai; Guangdong Province, China
8. Nanhai Power Plant, Nanhai; Guangdong Province, China
9. Guangzhou Ring Road, Guangzhou; Guangdong Province, China
10. The Airport Railway; Hong Kong, China
11. The 'Tseung Kwan O' MTR Extension; Hong Kong, China
12. Ho Ping Power Project; Chinese Taipei
13. Mangalore Power Plant; India
14. Brasslink Transmission; Australia
15. Phase Ia - Development of Chek Lap Kok (CLK) Airport; Hong Kong, China
16. Phase 2 - Development of the second runway and the Northwest Concourse at CLK Airport; Hong Kong, China

The following Tables 5.1-1 to 5.1-5 summarize information provided by the respondents on the 16 projects mentioned above.

5.1.1 Project Characteristics

Table 5.1-1 below shows the following project characteristics:

- 50% of these 16 projects have been completed and 38% is under construction. 50% of these projects belong to the power sector and the remaining projects belong to a variety of sectors.
- 6 out of 16 projects have a total cost more than US\$1 billion and the cost of supporting infrastructure varies widely. 50% of the projects involve a third party other than the project sponsors in the development of supporting infrastructure.
- For 38% of the projects, the cost associated with environmental issues is not

identifiable. While the cost is insignificant for 25% of the projects, it lies between 0% and 2% of the project cost for the other 25% of the projects and between 15% to 20% for the remaining 12% of the projects.

- 88% of the projects have a construction phase between 2 to 4 years, and 75% of the projects have the operation phase between 20 to 30 years. 88% of the projects' revenues are denominated in the local currency.
- While 63% of the projects have the payback period between 7 to 10 years, 69% of the projects have the expected internal rate of return between 14% to 20%. Further, 88% of the projects do *not* have the rate of return guaranteed by the host government and the host government guarantees the remaining 12% of the projects in the local currency.

Table 5.1-1: Project Characteristics - Hong Kong, China

PROJECT CHARACTERISTICS	CHOICES	PROJECT NUMBER	PROJECT %					
Total Projects		16						
Project Status	Completed	8	50%					
	Under construction	6	38%					
	Arranging financing	1	6%					
	Planning stage	1	6%					
Project Category	Power	8	50%					
	Expressways / Highways	2	13%					
	Urban and Interurban Railways	1	6%					
	Rapid Transit / Subways	1	6%					
	Airports	2	13%					
	Others (Tunnel)	2	13%					
Total Project Cost	US\$100 million to US\$500 million	4	25%					
	US\$500 million to US\$1 billion	4	25%					
	More than US\$1 billion	6	38%					
	Not applicable	2	12%					
Cost of Supporting Infrastructure	None required	4	25%					
	Less than US\$50 million	3	19%					

	US\$50 million to US\$100 million	1	6%				
	US\$100 million to US\$500 million	2	13%				
	More than US\$1 billion	2	12%				
	Not applicable	4	25%				
Involvement of third party other than project sponsors in the development of supporting infrastructure	Yes	8	50%				
	No	8	50%				
% of project cost used for environmental issues	Not significant	4	25%				
	Between 0% to 2%	4	25%				
	Between 15% to 20%	2	12%				
	Not identifiable	6	38%				
Construction phase of the project (years)	2 to 4 years	14	88%				
	4 to 6 years	1	6%				
	More than 10 years	1	6%				
Operation phase of the project (years)	20 to 30 years	12	75%				
	30 to 50 years	4	25%				
Project Revenue Currency*	Local currency	14	88%				
	US\$	3	19%				
	No response	1	12%				
Payback period of the project (years)	Between 7 to 10 years	10	63%				
	More than 10 years	1	12%				
	Not available	4	25%				
	No response	1	12%				
Expected internal rate of return of the project (%)	Between 5% to 10%	4	25%				
	Between 14% to 20%	11	69%				
	No response	1	6%				
Minimum rate of return guaranteed by the host government	Yes	2	12%				
	No	14	88%				

% of rate of return guaranteed by the host government	To meet agreed IRR	2	12%				
	Not applicable	14	88				
Currency of guaranteed return by the host government	Local Currency	2	12%				
	Not applicable	14	88%				

¹Out of 3 projects, 2 have 90% of project revenue in US\$ and 10% in local currency.

²The host government guarantees return in the form of take-or-pay agreement. A minimum power off-take contract is signed with Power Bureaus, such that the agreed IRR is met.

* There can be more than one choice for this question. Therefore, project number and project percentage is more than the total number of projects and 100% respectively.

5.1.2 Sources of Financing

Table 5.1-2 below summarizes various sources of financing:

- The data indicates that for 88% of the projects, the private sector is involved in the financing of the project. The public-and-private sectors raise funds for 6 projects. The percentage of the total cost funded by the private sector varies widely with a maximum of 80-100% in 38% of the cases.
- For 82% of the projects, the debt to equity ratio lies between 0.25:1 to 4:1. In almost 95% of the cases, the project sponsors provide equity that is sourced directly from the shareholders in 88% of the cases. 55% of the projects have the commercial risk insurance only.
- The nature of contractual relationship between the public and private sectors takes only three forms: BOT, BOO, and BOOT. This type of contractual relationship takes place due to a variety of reasons, such as high efficiency, early cost recovery, host government's preference, and other reasons.
- The most preferred source of debt is commercial bank loans with the participation from domestic and international commercial banks in 81% and 75%, respectively. Besides commercial banks, the other sources of debt include Export Credit Agencies, Multilateral Financial Institutions, Investment Banks, Capital Markets, and Pension Funds/Life Insurance Companies.
- The funds are provided as term loans in 81% of the projects and through Export Credit Agencies in 38% of the projects.

Table 5.1-2: Sources of Financing - Hong Kong, China

SOURCES OF FINANCING	CHOICES	PROJECT NUMBER	PROJECT %				
Type of financing*	Public sector financing	1	6%				
	Private sector financing	8	50%				
	Public and Private sectors financing	6	38%				
	Others (by Sponsors, ECAs)	3	19%				

Total cost funded by the private sector	80-100%	6	38%				
	60-80%	4	25%				
	40-60%	1	6%				
	20-40%	2	12%				
	Less than 20%	1	6%				
	Not Applicable	2	19%				
Debt / Equity ratio of the project	All debt	1	6%				
	Between 0.25:1 to 2:1	6	38%				
	Between 2:1 to 4:1	7	44%				
	Above 4:1	1	6%				
	No response	1	6%				
Parties involved in arranging equity*	Project Sponsors	15	94%				
	Suppliers of essential products / services	1	6%				
	Not applicable	1	6%				
Equity financing is sourced through*	Directly from Shareholders	14	88%				
	Pooled equity by the above parties	1	6%				
	Not applicable	1	6%				
	No response	1	6%				
Political and / or commercial risks insurance	Commercial risk only	9	56%				
	Both political and commercial risk	2	12%				
	Not Applicable	2	12%				
	No response	3	19%				
Project Type	Build-Operate-Transfer (BOT)	6	38%				
	Build-Own-Operate (BOO)	5	31%				
	Build-Own-Operate-Transfer (BOOT)	5	31%				

Project Type was selected because*	It meets all or most of these criteria: (i) higher efficiency; (ii) technological advancement; (iii) advances in regulatory framework; (iv) commitment to private resources; and (v) early cost recovery.	5	31%				
	Host government was interested in ownership reversion from private to public sector after smooth operation of facilities	6	38%				
	Host government wanted private entity to assume principal responsibility for the project's financial obligations;	6	38%				
	Others (commercial viability, high rate of return)	5	31%				
Direct lenders to the project*	Commercial Banks	25	-				
	- Domestic	13	81%				
	- International	12	75%				
	Export Credit Agencies (ECAs)	12	-				
	- USEXIM	3	19%				
	- JEXIM	3	19%				
	-UK's ECGD	2	12%				
	- Coface (France)	2	12%				
	- Others (CESCE, Spain; KEXIM, Korea)	2	12%				
	Multilateral Financial Institutions	5	-				
	- ADB	1	6%				
	- IFC	2	12%				
	- Others: CDC	2	12%				
	Investment Banks	8					
	- American Banks	3	19%				
	- European Banks	5	31%				
	- Others: China	1	6%				
	Capital Markets e.g. Project Bonds	4	25%				
	Pension Funds / Life Insurance Companies	1	6%				
	No response	1	6%				

Financing Facilities*	Construction loan	1	6%				
	Term loan	13	81%				
	Overrun Equity	1	6%				
	Export Credit Facility	6	38%				
	Bonds	2	12%				
	Others (Revolving Credit, Sponsor loan, Equity)	4	25%				

¹The debt to equity ratio is 9:1.

² This includes projects with 100% or less commercial risk insurance.

* There can be more than one choice for this question. Therefore, project number and project percentage is more than the total number of projects and 100% respectively.

5.1.3 Financing Structure and Techniques

Table 5.1-3 below summarizes the financing structure of the projects:

- The construction financing is mainly obtained through long-term bank loans, direct loans by the project sponsors, and Export Credit Agencies. On the other hand, permanent financing is obtained mainly from the commercial banks and the Export Credit Agencies.
- Debt can either be drawn simultaneously with equity in a specific ratio or is drawn after equity injection. The debt repayment schedule follows amortization schedule in 50% of the cases or has a grace period for repayment followed by principal and interest repayment as seen in 38% of the cases. Occasionally, debt is to be paid as a bullet repayment. Debt repayment is denominated in the local currency as well as in the US dollar.

Table 5.1-3: Financing Structure and Techniques - Hong Kong, China

FINANCING STRUCTURE	CHOICES	PROJECT NUMBER	PROJECT %				
Construction financing is achieved through*	Long term bank loan	7	44%				
	Bonds	2	12%				
	Direct loans by the project sponsors	5	31%				
	Export credit agency	6	38%				
	Others (Medium term bank loan)	2	12%				
	No response	2	12%				
Permanent financing is achieved through*	Private placement of long-term (5 years) debt	2	12%				

	Borrowing through multilateral funding institutions	4	25%					
	Export credit facility	8	50%					
	Commercial banks	9	56%					
	No response	4	25%					
Drawdown schedule of various debt tranches	Equity injection followed by debt drawdown	5	31%					
	Simultaneous drawdown of equity and debt in specific ratio	5	31%					
	No restriction	2	12%					
	No response	4	25%					
Debt repayment schedule	Bullet repayment	3	19%					
	Amortization schedule (after construction period)	8	50%					
	Grace period for repayment followed by Principal + Interest repayment	6	38%					
	No response	1	6%					
Debt repayment is denominated in which currency	Local currency	7	44%					
	US\$	8	50%					
	No response	4	25%					

* There can be more than one choice for this question. Therefore, project number and project percentage is more than the total number of projects and 100% respectively.

5.1.4 Important Factors to the Projects

Table 5.1-4 below lists the importance of various factors for the projects. The result shows that the economic viability of the project and achieving the high rate of return are the most important factors for taking the projects.

Table 5.1-4: Importance of Factors to the Project (1 = most important) - Hong Kong, China

FACTORS	RANKING (MEDIAN)
Economic viability	1
Environmental viability	4
Social responsibility	3
National priority	5

High rate of return	2
---------------------	---

5.1.5 Risk Management

Table 5.1-5 below lists factors considered for mitigating different types of risks for the projects.

Table 5.1-5: Risk Management: Factors considered for mitigating various risks -Hong Kong, China

TYPES OF RISK	CHOICES	PROJECT NUMBER	PROJECT %
Construction or Completion risk	Fixed cost, date certain, turnkey Engineering, Procurement, and Construction (EPC) contract	14	88%
	Completion guarantee by party other than the EPC contractor	5	31%
	Backstop guarantee such as letter of credit, performance bond by financial institutions	4	25%
	Cost overrun facility commitment by project sponsors	6	38%
	Charging the contractor liquidated damages capped at some percent of the project cost for completion delay	11	69%
	Others (fixed price contracts with specified completion periods)	2	12%
Market risk	Government guarantee / minimum guaranteed return bearing risk of non-payment by customers	1	6%
	Take-or-pay contract with the government	4	25%
	Setting debt-service accounts to provide cushion in the event of non-payment	5	31%
	Independent appraisal from a third party about demand for project output such as electricity consumption	4	25%
	Others	1	6%
	Not Applicable	2	12%
Currency Exchange/ Convertibility risk	Indexing tariff rate to exchange rate fluctuations	4	25%
	Indexing tariff rate to interest rate changes	2	12%
	Indexing variable and fixed costs to local inflation	3	19%
	Price-cap formula linking tariffs to changes in the price level of raw material(s) for the project	3	19%
	Setting up reserve funds for devaluation risk	1	6%
	Hedging using currency forwards and futures	2	12%
	Arranging one or more currency swaps	2	12%

	Hedging using currency options	2	12%
	Others	3	19%
	Not Applicable	2	12%
Regulatory/Political risk	Establishment of an independent regulatory authority	2	12%
	Provision for tariff adjustment with changing economic conditions e.g. increase in cost of raw material.	7	44%
	Local investors / developers equity participation	8	50%
	All parties involved in the project must provide guarantee for project completion	4	25%
	Export Credit Agency and or Multilateral Agency Guarantee	4	25%
	Federal and State government commitment expressed in the form of Letter of Support or Guarantee	5	31%
	Others	2	12%
Environmental risk	Conduct Environmental Impact Assessments ("EIA" prior to funding	10	62%
	Funding projects designing projects to be inherently less damaging to the environment for e.g. using cleaner technologies	5	31%
	Introducing anti-pollution measures such as equipment to reduce power station emissions	9	56%
	Developing management systems that minimize the risk of unforeseen problems and include plans to deal with emergencies and contingencies	3	19%
	Allowing only reputable and pre-qualified tenders to bid the project	6	38%
	Others (Conduct EIA prior to development)	2	12%
Interest rate risk	Entering into an interest rate cap contract	3	19%
	Entering into an interest rate swap agreement	7	44%
	Interest rate options	2	12%
	No hedging	2	12%
	Others	3	19%

Note: The project number will add to more than the total project number because there is more than one choice relevant to each type of risk.

5.1.6 Conclusions

Based the above analysis, we find that:

- A majority of the projects implemented within or outside Hong Kong, China, in the past five years, by the Private Sector Businesses of Hong Kong, China belong to the power sector. This indicates that infrastructure development in the power sector is receiving most of the available funds from the PSBs in Hong Kong,

China.

- The mean construction phase is 4 years, while the mean operating phase is 31 years, indicating that most companies are engaging in very long-term projects.
- The private sector is the main source of financing and equity is the major form for the private sector's participation.
- The construction financing is mainly from long-term bank loans, while the permanent financing is mainly from the commercial banks and Export Credit Agencies.
- While the funds are obtained from various domestic and international sources with 50% of the debt denominated in the US dollar, project revenues is mainly generated in the local currency. This can result in high currency risk, as the debt has to be paid in the US dollar.
- The mean expected rate of return on investment is about 14% ranging from 5% to 20%. The government projects typically have the expected return at the low end, since these are non-profit projects.
- The mean debt to equity ratio is 2.3:1 ranging from 0.25:1 to 4:1 with the government projects having higher debt to equity ratio. Most of the private firms decide the debt to equity ratio at the firm level instead of the project level. This can lower the cost of capital. The use of high debt to equity ratio reflects the fact the most of the infrastructure projects (such as power plants) have some sort of guaranteed or predictable revenues.
- All companies adopt a reasonable risk management system at all stages, including interest rate swaps.

5.2 Analysis of information from other APEC Member Economies - PSBs

5.2.1 Korea

We received three PSBs questionnaires from Korea. They are:

- i. Hyundai Engineering & Construction Co., Ltd. (Hyundai)
- ii. Samsung Corporation (Samsung)
- iii. Daelim Corporation (Daelim)

Each of these companies provided information on 3 infrastructure projects. The analyses of the projects are summarized in the Tables 5.2.1-1 to 5.2.1-6 below.

5.2.1.1 Project Characteristics

Table 5.2.1-1 indicates the following project characteristics:

- 5 out of the 9 projects are still in the planning stage and the remaining is under construction. There is no third party involvement for any of the projects.
- The construction phase varies between 3 to 8.5 years with a mean of 5.7 years. The operation phase of the project varies between 30 to 50 years with a mean of

39 years.

- 6 out of 9 projects are the BTO type and 2 projects are the government funded separate design-build type and the remaining one project is the government funded turnkey design build type.

Table 5.2.1-1: Project Characteristics - Korea

PROJECT CHARACTERISTICS	HYUNDAI ¹			SAMSUNG			DAELIM		
	Project 1	Project 2	Project 3	Project 1	Project 2	Project 3	Project 1	Project 2	Project 3
Project name	Inchon International Airport Railway Link	Kyung-In Canal	Inchon International Airport Transportation Center	Inchon International Airport Expressways	Pusan New Port	Inchon South Port for multipurpose pier	West Sea (Seohae) Grand Bridge	Poryong Combined Cycle Power Station	Seoul Subway Line #7 (Kwangmyung area)
Location	Links Seoul to Youngjong Island in Kyunggi-Do	Links Han river to the east sea at Incheon	Youngjong Island in Kyunggi-Do	Seoul Incheon International Airport	Pusan (Gaduk Island)	Inchon	Asan	Poryong	Seoul
Status	Planning stage	Planning stage	Planning stage	Under Construction	Planning stage	Planning stage (under negotiation with the government)	Under Construction	Under Construction	Under Construction
Project Category	Urban and Inter-urban Railways	Ports and Waterways	Airports	Expressways/Highways	Ports and Waterways	Ports and Waterways	Expressways/Highways	Power	Rapid Transit / Subways
Third party involvement other than project sponsors	No	No	No	No	No	No	No	No	No
Construction Phase (yrs.)	7	8.5	3	5	7	5	7	3	6
Operation Phase (years)	32	40	33	30	50	50	NA	NA	NA
Project Type	BTO	BTO	BTO	BTO	BTO	BTO	Government	Government	Government

							Funded, separate Design-Build	Funded, separate Design-Build	Funded, turnkey Design-Build
Project type was selected because	i. higher efficiency; ii. technological advancement; iii. advances in regulatory framework; iv. commitment to private resources; v. early cost recovery	Others (in law)	Others (in law)	Others (in law)	NA	NA	NA		

¹ It is possible for prospective investors and financial institutions to participate in the project by either injecting equity or debt financing. As the major shareholder of the projects, Hyundai is still investigating any chance to induce foreign companies to be the project sponsors.

5.2.1.2 *Project Financials*

Table 5.2.1-2 shows that project financials have the following characteristics:

- 45% of the projects have a total cost of more than US\$1 billion, the other 45% have a cost between US\$100 million to US\$500 million. None of these projects have any cost associated with the development of supporting infrastructure. In addition, only 2 of the 9 projects allocate cost for environmental issues and the cost is less than 0.05% of the project cost.
- All 9 projects - revenues are denominated only in the local currency. Only Samsung Corporation reported data on the payback period with a mean of 11 years ranging from 8 to 15 years.
- Only 6 projects reported the internal rate of return ranging from 14% to 20% with a mean of 17%.
- 5 out of 6 projects responded have a minimum rate of return guaranteed by the host government in the local currency. All the 3 projects reported by Hyundai have 100% guaranteed return by the host government. For 2 out of the 3 projects reported by Samsung, the government guarantees 80% of the return.

Table 5.2.1-2: Project Financials - Korea

PROJECT FINANCIALS	HYUNDAI			SAMSUNG			DAELIM		
	<u>Project 1</u>	<u>Project 2</u>	<u>Project 3</u>	<u>Project 1</u>	<u>Project 2</u>	<u>Project 3</u>	<u>Project 1</u>	<u>Project 2</u>	<u>Project 3</u>
Total Project Cost	More than US\$1 billion	more than US\$1 billion	US\$100 to \$500 million	more than US\$1 billion	more than US\$1 billion	US\$100 to \$500 million	US\$100 to \$500 million	US\$100 to \$500 million	US\$50 to \$100 million
Cost of	NA	NA	NA	None	NA	NA	NA	NA	NA

Supporting Infrastructure				required					
% of project cost used for environmental issues	0.04%	0.02%	-	NA	NA	NA	NA	NA	NA
Project Revenue Currency	Local currency	Local currency	Local currency	Local currency	Local currency	Local currency	Local currency	Local currency	Local currency
Payback period (years)	-	-	-	15	8	11	-	-	-
Expected IRR (%)	18-20%	18-20%	18-20%	14.3%	16.9%	17%	-	-	-
Minimum rate of return guaranteed by the host government	Yes	Yes	Yes	Yes	Yes	No	-	-	-
% of rate of return guaranteed by the host government	18-20%	18-20%	18-20%	80%	80%	-	-	-	-
Currency of guaranteed return by the host govt.	Local currency	Local currency	Local currency	Local currency	Local currency	Others	-	-	-

5.2.1.3 Sources of Financing

Table 5.2.1-3 presents the sources of financing for the projects:

- The private sector participates in raising the funds in 67% of the cases. Out of this 67%, the private sector is the primary source of financing for 33% of the projects and the other 33% is through the partnership with the public sector. The remaining 33% of the projects are completely publicly funded.
- The total cost funded by the private sector with the public-private partnership varies between 80% to 100%. For the projects with public funds as the primary source of financing, the private sector provides less than 20% of the funds.
- The project sponsors arrange equity for all the projects. Debt is raised mainly through international and domestic commercial banks.

Table 5.2.1-3: Sources of Financing - Korea

SOURCES OF FINANCING	HYUNDAI			SAMSUNG			DAELIM		
	<u>Project 1</u>	<u>Project 2</u>	<u>Project 3</u>	<u>Project 1</u>	<u>Project 2</u>	<u>Project 3</u>	<u>Project 1</u>	<u>Project 2</u>	<u>Project 3</u>
Type of financing	Public-Private	Public-Private	Public-Private	Private sector	Private sector	Private sector	Public sector	Public sector	Public sector

	sectors	sectors	sectors						
Total cost funded by the private sector	80-100%	80-100%	80-100%	100%	100%	100%	< 20%	< 20%	< 20%
Parties involved in arranging equity	Project Sponsors & Suppliers of essential products / services	Project Sponsors	Project Sponsors	Project Sponsors	Project Sponsors	Project Sponsors	-	-	-
Direct lenders to the project	To be determined	To be determined	To be determined	Domestic Commercial banks; Pension Funds/Life Insurance Companies	Domestic Commercial banks; Others	International Commercial banks; others	-	-	-

5.2.1.4 Financing Structure

Table 5.2.1-4 presents the financing structure of 6 out of 9 projects, which is summarized below:

- The debt to equity ratio ranges between 2.33:1 and 4:1 with a mean of 3.2:1.
- The construction financing and the permanent financing are mainly achieved through long-term loan and commercial banks, respectively.
- For financing, the funds are obtained as an equity injection followed by debt draw down for 5 out of 6 projects. For the remaining 1 project debt and equity can be obtained simultaneously drawn in a specific ratio.
- There is a grace period for debt repayment followed by the principal and interest repayments for 5 out of 6 projects. Debt repayment is denominated in the local currency in most of the cases.
- Out of 6 projects that reported data, 3 projects have the commercial risk insurance and for the other 3 projects, the risk insurance is yet to be determined.

Table 5.2.1-4: Financing Structure - Korea

FINANCING STRUCTURE	HYUNDAI			SAMSUNG			DAELIM		
	Project 1	Project 2	Project 3	Project 1	Project 2	Project 3	Project 1	Project 2	Project 3
Debt / Equity ratio of the project	3:1	2.75:1	4:1	3:1	4:1	2.33:1	-	-	-
Financing facilities	To be determined	To be determined	To be determined	-	-	-	-	-	-
Construction financing is achieved through	Equity + Long term loan	Equity + Long term loan	Equity + Long term loan	Long term bank loan	Long term bank loan	Others	-	-	-

Permanent financing is achieved through	Export Credit Facility; Commercial banks	Commercial banks	Commercial banks	Commercial banks	Commercial banks	Others	-	-	-
Drawdown schedule of various debt tranches	Equity injection followed by debt drawdown	Equity injection followed by debt drawdown	Equity injection followed by debt drawdown	Equity injection followed by debt drawdown	Equity injection followed by debt drawdown	Simultaneous drawdown of equity and debt in specific ratio	-	-	-
Debt repayment schedule	Grace period for repayment followed by principal + interest repayment	Grace period for repayment followed by principal + interest repayment	Grace period for repayment followed by principal + interest repayment	Grace period for repayment followed by principal + interest repayment	Grace period for repayment followed by principal + interest repayment	Others	-	-	-
Debt repayment is denominated in which currency	Local currency and US\$	Local currency	-	Local currency and US\$	Local currency	Others	-	-	-
Political and / or commercial risks insurance	To be determined	To be determined	To be determined	Commercial risk	Commercial risk	Commercial risk	-	-	-

5.2.1.5 *Important Factors to the Projects*

Table 5.2.1-5 below shows that the economic viability and the national pride are the two most important factors for project implementation.

Table 5.2.1-5: Importance of Factors to the Project (1 = most important) - Korea

FACTORS	HYUNDAI			SAMSUNG			DAELIM			MEDIAN
	Project 1	Project 2	Project 3	Project 1	Project 2	Project 3	Project 1	Project 2	Project 3	
Economic viability	1	1	4	2	2	4	2	1	4	2
Environment viability	4	4	4	5	5	5	4	4	2	4
Social responsibility	5	5	5	4	4	3	3	5	1	4
National priority	3	3	3	1	1	2	1	2	3	2
High rate of return	2	2	2	3	3	1	5	3	5	3

5.2.1.6 Risk Management

Table 5.2.1-6 below gives the factors considered by the projects (out of the 9 projects) for risk mitigation before considering project implementation. Except for the currency risk, most companies have a good risk management system. The most important method for the risk management is through the government guarantee. For the interest rate risk, the fix interest rate borrowing is the common practice.

Table 5.2.1-6: Risk management: Factors considered for mitigating risks - Korea

TYPES OF RISK	FACTORS CONSIDERED FOR RISK MITIGATION BY THE RESPONDENTS	PROJECT NUMBER
Construction/ Completion risk	Completion guarantee by party other than the EPC contractor	2
	Pledging of contractor's capital through an equity stake in the project	3
	Not applicable	1
Market risk	Government guarantee / minimum guaranteed return bearing risk of non-payment by customers	4
	Setting debt-service accounts to provide cushion in the event of non-payment	2
Currency/ Convertibility risk	No hedging	3
Regulatory/ Political risk	Provision for tariff adjustment with changing economic conditions e.g. increase in cost of raw material.	3
	Local investors / developers equity participation	3
	Export Credit Agency and or Multilateral Agency Guarantee	1
	Federal and State government commitment expressed in the form of Letter of Support or Guarantee	3
	Others	1
	Not applicable	2
Environmental risk	Conduct Environmental Impact Assessments ("EIA") prior to funding	6
Interest rate risk	Interest rate options	2
	Others ?fixed interest rate	4

5.2.2 The Philippines

We received 2 PSB questionnaires from the Philippines. While the respondents of the questionnaire are different, namely National Power Corporation and Western Mindanao Power Corporation, both provided information based on the similar projects. These projects are:

- i. Pagbilao Coal-Fired Project (700 MW) - BOT
- ii. San Pascual Co-Generation Project - Unsolicited BOT

iii. 100 MW Zamboanga Diesel - BOO

Since Western Mindanao's response is incomplete, the analyses provided in Tables 5.2.2-1 to 5.2.2-4 below are compiled only from the questionnaire completed by the National Power Corporation.

5.2.2.1 *Project Characteristics*

Table 5.2.2-1 below shows the following project characteristics:

- All the projects belong to the power sector.
- The total project cost varies from project to project with a minimum cost of US\$50-100 million and a maximum cost of US\$0.5-1 billion. There is no cost associated with the supporting infrastructure.
- The mean construction phase for the projects is 3 years and the mean operation phase is 23 years. All three projects' revenues are in the local currency as well as the US dollar.
- The payback period and the internal rate of return are reported only for the Zamboanga diesel project, which are 12 years and 19%, respectively. Two projects have the rate of return guaranteed by the host government in the US dollar.

Table 5.2.2-1: Project Characteristics - The Philippines

Project characteristics	NATIONAL POWER CORPORATION		
	Project 1	Project 2	Project 3
Project Name	Pagbilao Coal-Fired Power Plant 700 MW	San Pascual Co-Generation Project	100 MW Zamboanga Diesel
Location	Quezon (Southern Luzon)	Batangas (Southern Luzon)	Zamboanga
Status	Completed	Arranging Financing	Completed
Project Category	Power	Power	Power
Total Project Cost	US\$500 mio to US\$1 bio	US\$100 mio to US\$500 mio	US\$50 mio to US\$100 mio
Cost of Supporting Infrastructure	None required	None required	None required
Involvement of third party other than project sponsors in the development of supporting infrastructure	No	No	No
% of Project Cost used for Environmental Issues	Information not available	Information not available	Information not available
Construction Phase of the Project (years)	5	3	1

Operation Phase of the Project (years)	25	25	18
Project Revenue Currency	US\$ and Local Currency	US\$ and Local Currency	US\$ and Local Currency
Payback period of the Project (years)	-	-	12
Expected Internal Rate of Return of the Project (%)	IRR not computed	IRR not computed	19
Minimum Rate of Return Guaranteed by the Host Government	Yes	Yes	No
% of Rate of Return Guaranteed by the Host Government	-	-	NA
Currency of Guaranteed Return by the Host Government	US\$	US\$	NA

5.2.2.2 Sources of Financing

Table 5.2.2-2 below shows the following sources of financing:

- The projects are 100% financed by the private sector. The debt to equity ratio varies between 2.33:1 to 4:1. While the project sponsors arrange the equity, debt is obtained mainly through international and domestic commercial banks, Export Credit Agencies and International Finance Corporation.
- The projects are either the BOT or BOO type. These project types were selected for various reasons such as high efficiency, or government preference.

Table 5.2.2-2: Sources of Financing - The Philippines

Sources of Financing	NATIONAL POWER CORPORATION		
	Project 1	Project 2	Project 3
Type of Financing	Private sector	Private sector	Private sector
Total cost funded by the Private Sector	100%	100%	100%
Debt/Equity Ratio of the Project	4:1	3:1	2.33:1
Parties involved in arranging equity	Project Sponsors	Project Sponsors	Project Sponsors
Equity Financing is sourced through	Shareholders; Commercial Banks and Credit Companies	Shareholders	Shareholders
Political and / or commercial risks insurance	No information	Both insured	Both insured
Project Type	BOT(solicited)	BOT (unsolicited)	BOO

Project type was selected because	Higher efficiency; (ii) technological advancement; advances in regulatory framework; (iv) commitment to private resources; and (v) early cost recovery; Host government wanted private entity to assume principal responsibility for the project's financial obligations; Host government was interested in ownership reversion from private to public sector after smooth operation of the facilities.	higher efficiency; (ii) technological advancement; advances in regulatory framework; (iv) commitment to private resources; and (v) early cost recovery; host government wanted private entity to assume principal responsibility for the project's financial obligations; Host government was interested in ownership reversion from private to public sector after smooth operation of the facilities.	Higher efficiency; (ii) technological advancement; advances in regulatory framework; (iv) commitment to private resources; and (v) early cost recovery; host government wanted private entity to assume principal responsibility for the project's financial obligations.
Direct Lenders to the Project	International Commercial Banks; IFC	International Commercial Banks, JEXIM, and OPIC	Domestic Commercial Banks
Financing Facilities	-	Construction loan	Construction loan and Term loan

5.2.2.3 *Financing Structure and Techniques*

Table 5.2.2-3 below shows the following financing structure:

- The construction phase is financed through long-term bank loans and Export Credit Agencies and Multilateral Financial Institutions, and the permanent financing is obtained through commercial banks.
- The debt is either drawn simultaneously with equity in a specific ratio or drawn after equity injection. The debt repayment schedule provides grace period for repayment followed by principal and interest repayment and is denominated in US\$ for San Pascual co-generation project and in local currency for the Zamboanga diesel project.

Table 5.2.2-3: Financing Structure and Techniques - The Philippines

Financing Structure and Techniques	NATIONAL POWER CORPORATION		
	Project 1	Project 2	Project 3
Construction Financing is achieved through	No information	Long-term bank loan, ECAs, and MFIs	ECAs
Permanent Financing is achieved through	-	Long-term loan	Commercial Banks
Drawdown Schedule of various Debt Tranches	No information	Simultaneous drawdown of debt and equity in specific ratio	Equity injection followed by debt drawdown
Debt Repayment Schedule	No information	Grace period for repayment followed by principal + interest	Grace period for repayment followed by principal + interest

		repayment and interest payment during construction	repayment
Debt Repayment is denominated in which Currency	-	US\$	Local Currency

5.2.2.4 *Important Factors to Projects*

Table 5.2.2-4 below indicates that the economic viability is the most important factor, while achieving high rate of return is the least important factor for the project consideration.

Table 5.2.2-4: Important Factors to the Project (1 = most important) - The Philippines

FACTORS	NATIONAL POWER CORPORATION			MODE
	Project 1	Project 2	Project 3	
Economic viability	3	1	1	1
Environment viability	4	4	5	4
Social responsibility	2	2	2	2
National priority	2	3	3	3
High rate of return	5	5	4	5

5.2.3 Singapore

We received one PSB questionnaire from Singapore completed by the Civil Aviation Authority of Singapore, Finance and Engineering Division. Tables 5.2.3-1 to 5.2.3-3 below summarize the information provided on the 3 infrastructure projects.

5.2.3.1 *Project Characteristics*

Table 5.2.3-1 shows the following project characteristics:

- The projects are in the airports sector and have been completed. All three projects have the total project cost of US\$50 to \$100 million. Further, there is no cost related to the supporting infrastructure. Also, the cost related to environmental issues, reported for 2 projects, is less than 1%. The mean construction and operation phases are 2.5 years and 20 years, respectively.
- All projects' revenues are denominated only in the local currency. The payback period and the internal rate of return is reported only for the Cargo Agents Building 'E' project, which is 13 years and 8%, respectively.
- All are government-funded projects, the separate Design-Build type and are self-financed. Hence, other factors related to the sources of financing and financing structure and techniques are not applicable to the respondent.

Table 5.2.3-1: Project Characteristics - Singapore

Project characteristics	CIVIL AVIATION AUTHORITY OF SINGAPORE		
	Project 1	Project 2	Project 3
Project Name	Terminal 1: Refurbishment	Cargo Agents Building 'E'	Terminal 2 Expansion
Location	Singapore Changi Airport	Singapore Changi Airport	Singapore Changi Airport
Status	Completed	Completed	Completed
Project Category	Airports	Airports	Airports
Total Project Cost	US\$50 to \$100 million	US\$50 to \$100 million	US\$50 to \$100 million
Cost of Supporting Infrastructure	None Required	None Required	None Required
Involvement of third party other than project sponsors in the development of supporting infrastructure	No	No	No
% of Project Cost used for Environmental Issues	0%	Less than 1%	Less than 1%
Construction Phase of the Project (years)	2	2	3.5
Operation Phase (years)	20	20	20
Project Revenue Currency	Local currency	Local currency	Local currency
Payback period of the Project (years)	NA	13	NA
Expected Internal Rate of Return of the Project (%)	NA	8%	NA
Minimum Rate of Return Guaranteed by the Host Government	No	No	No
% of Rate of Return Guaranteed by the Host Government	NA	NA	NA
Currency of Guaranteed Return by the Host Government	NA	NA	NA
Project Type	Government Funded, Separate Design-Build	Government Funded, Separate Design-Build	Government Funded, Separate Design-Build
Type of Financing	Self ?financing	Self - financing	Self ?financing

5.2.3.2 *Important Factors to Projects*

Table 5.2.3-2 below indicates that national priority is the most important factor and achieving high rate of return is the least important factor for the project implementation.

Table 5.2.3-2: Important Factors to the Project (1 = most important) - Singapore

FACTORS	CIVIL AVIATION AUTHORITY OF SINGAPORE			MODE
	Project 1	Project 2	Project 3	
Economic viability	4	1	4	4
Environment viability	3	5	3	3
Social responsibility	2	4	2	2
National priority	1	3	1	1
High rate of return	5	2	5	5

5.2.3.3 Risk Management

Table 5.2.3-3 below shows various factors considered for mitigating different types of risks associated with project implementation. All three projects do not report the use of risk management.

Table 5.2.3-3: Risk Management: Factors considered for mitigating risks - Singapore

TYPES OF RISKS	CIVIL AVIATION AUTHORITY OF SINGAPORE		
	Project 1	Project 2	Project 3
Construction / Completion risk	Others - No capping on liquidated damages	Others - No capping on liquidated damages	Others - No capping on liquidated damages
Market risk	NA	NA	NA
Currency Exchange / Convertibility risk	NA	NA	NA
Regulatory / political risk	NA	NA	NA
Environmental risk	Pre-qualified by contractors	NA	Pre-qualified by contractors
Interest rate risk	NA	NA	NA

5.3 Analysis of information from the United Kingdom PSBs

We received two PSB questionnaires from the United Kingdom: (i) Ove Arup & Partners and (ii) The Nichols Group. Ove Arup & Partners provided information on 2 projects and Nichols Group on 3 projects. The information on projects is summarized in the Tables 5.3-1 to 5.3-5 below. Due to complex nature of one of the projects, CTRL project, the Ove Arup & Partners could not provide complete information about this project. Hence, the Consultants did not include the available information on this project in the tables below.

5.3.1 Project Characteristics

Table 5.3-1 shows the following project characteristics:

- All projects belong to various infrastructure sectors. The projects are under construction and have a cost ranging from US\$50 million to US\$500 million. The cost of supporting infrastructure is less than US\$50 million for 2 of the 4 projects. There is no supporting cost associated for the remaining 2 projects.
- Cost related to environmental issues is reported for all the projects. The cost amounts to 15% for 1 project and is not specifically identifiable for the remaining 3 projects.
- The construction phase varies between 1.5 years to 6 years and the operation phase varies between 25 years to indefinite use.
- All projects' revenues are denominated in the local currency only. The payback period varies widely from 6 years to 22 years. IRR was not reported for any of the projects. There is no minimum rate of return guaranteed by the host government in any of the projects.

Table 5.3-1: Project Characteristics - the UK

Project characteristics	OVE ARUP & PARTNERS	THE NICHOLS GROUP		
	Project 1	Project 1	Project 2	Project 3
Project Name	Pride Park, Derby	Luton Airport Re-development	Docklands Light Railway Lewisham Extension	Northumbrian Coast Sea Outfalls
Location	Derby, England	Luton, Bedfordshire, England	South East London, England	Northumberland/ Durham Coast, England
Status	Under construction	Under construction	Under construction	Completed
Project Category	Others ?Urban Regeneration	Airports	Rapid Transit / Subways	Sewerage / Treatment
Total Project Cost	US\$50 - \$100 million	US\$100 to \$500 million	US\$100 to \$500 million	US\$50 to \$100 million
Cost of Supporting Infrastructure	< US\$50 mio	< US\$50 mio	None required	None required
Involvement of third party other than project sponsors in the development of supporting infrastructure	Yes	Yes	No	No
% Project Cost used for Environmental Issues	15%	Not specifically identifiable	Not specifically identifiable	Not specifically identifiable
Construction Phase of the Project (years)	6	1.5	3	1.5
Operation Phase of the Project (years)	25+	30	30	Indefinite

Project Revenue Currency	Local Currency	Local Currency	Local Currency	Local Currency
Payback period of the Project (years)	8	6	22	NA
Minimum Rate of Return Guaranteed by the Host Government	No	No	No	No

5.3.2 Sources of Financing

Table 5.3-2 indicates the following sources of financing:

- The private sector provides funds for all 4 projects. The private sector has funded 60% or more of the project cost. 2 of the 4 projects are completely financed by the private sector.
- The debt to equity ratio varies widely ranging from 1:8 to 9:1 for different projects.
- The equity is raised by different parties for different projects such as the project sponsors, purchasers or suppliers of the products / services.
- The contract between the public and private sector is different for different projects such as BOOT, BOT, perpetual franchise, and Private / Public Finance, Design-Build-Transfer to private sector.

Table 5.3-2: Sources of Financing - the UK

Sources of Financing	OVE ARUP & PARTNERS	THE NICHOLS GROUP		
	Project 1	Project 1	Project 2	Project 3
Type of Financing	Public-Private sectors	Private sector	Public-Private sectors	Private sector
Total cost funded by the Private Sector	60-80%	100%	60-80%	100%
Debt/Equity Ratio of the Project	1:8	9:1	9:1	NA
Parties involved in arranging equity	Project Sponsors & Purchasers of Project Output	Suppliers of essential products/ services	Suppliers of essential products/ services	Project Sponsors
Equity financing is sourced through	Commercial Banks and Credit Companies; Committed Investment Funds	Shareholders	Shareholders	Shareholders
Political and / or commercial risks insurance	75% Commercial Risk Insurance only	Commercial risk insurance only for construction risk	Commercial risk insurance only for construction risk	Commercial risk insurance only for construction risk

Project Type	Others ?Private/Public Finance, Design ?Build ?Transfer to Private Sector	BOOT	BOT	Perpetual Franchise
The above mentioned project type was selected because it met the following criteria:				
<ul style="list-style-type: none"> Host government wanted private entity to assume principal responsibility for the project's financial obligations; 	Yes	Yes	Yes	Yes
<ul style="list-style-type: none"> Private entities could not raise the full purchase price for developing the existing facility 	-	-	Yes	-
Direct Lenders to the Project	Others ?Government	Domestic and International Commercial Banks; American and European Investment Banks	Domestic and International Commercial Banks; Capital Markets e.g. Project Bonds	Domestic Commercial Banks
Financing Facilities	Others ?Receipts against Land Sales	-	-	-

5.3.3 Financing Structure and Techniques

Table 5.3-3 indicates the following financing structure:

- The project sponsors, long-term bank loans, bonds or land sale receipts and direct loans are the main sources of construction financing. Permanent financing is obtained mainly through private placement of long-term debt of more than 5 years, project bond offering, and commercial banks.
- The funds are utilized either by equity injection followed by debt drawdown or by simultaneous drawdown of equity and debt in a specific ratio.
- The debt repayment occurs by either a grace period repayment followed by principal and interest repayment or debt repayment follows amortization schedule.

Table 5.3-3: Financing Structure and Techniques: the UK

Financing Structure and Techniques	OVE ARUP & PARTNERS	THE NICHOLS GROUP		
	Project 1	Project 1	Project 2	Project 3
Construction Financing is achieved through	Direct Loans by the Project Sponsors; Land Sale Receipts	Long term bank loan; direct loans by the project sponsors	Long term bank loan; direct loans by the project	-

			sponsors; bonds	
Permanent Financing is achieved through	Private placement of Long Term (5 yrs.) debt	Private placement of long term (5 yrs.) debt; Commercial banks	Private placement of long term (5 yrs.) debt; Project bond offering; Commercial banks	-
Drawdown Schedule of various Debt Tranches	Equity injection followed by debt drawdown	Equity injection followed by debt drawdown	Simultaneous drawdown of equity and debt in specific ratio	-
Debt Repayment Schedule	Grace period for repayment followed by principal + interest repayment	Grace period for repayment followed by principal + interest repayment	Amortization Schedule	-
Debt Repayment is denominated in which Currency	Local Currency	Local Currency	Local Currency	-

5.3.4 Important Factors to Projects

Table 5.3-4 below indicates that the economic viability is the most important factor for project implementation.

Table 5.3-4: Importance of Factors to the Project (1 = most important): the UK

Project characteristics	OVE ARUP & PARTNERS	THE NICHOLS GROUP			MODE
	Project 1	Project 1	Project 2	Project 3	
Economic viability	2	1	1	4	1
Environment viability	3	3	4	1	3
Social responsibility	1	4	3	3	3
National priority	4	5	5	2	5
High rate of return	5	2	2	5	-

5.3.5 Risk Management

Table 5.3-5 below shows various instruments considered for mitigating different types of risks associated with project implementation. All projects do not hedge the currency risk or the interest rate risk.

Table 5.3-5: Risk Management: Factors considered for mitigating risks: the UK

Risk Mitigation	OVE ARUP & PARTNERS	THE NICHOLS GROUP		
	Project 1	Project 1	Project 2	Project 3
Construction/ Completion risk	Charging the contractor liquidated damages capped at some percent of the project	For all 3 Projects: fixed cost, date certain, turnkey EPC contract; For project 1 only: pledging of contractor's capital		

	cost for completion delay.	through an equity stake in the project		
Market risk	Government guarantee / minimum guaranteed return bearing risk of non-payment by customers; independent appraisal from a third party about demand for project output such as electricity consumption; project bundling such as combining water treatment and sewage disposal utilities.	Project 3: project bundling such as combining water treatment and sewage disposal utilities.		
Currency exchange / Convertibility risk	NA	For all 3 Projects: NA		
Regulatory / Political risk	Establishment of an independent regulatory authority; all parties involved in the project must provide guarantee for project completion	For all 3 Projects: NA		
Environmental risk	Conduct Environmental Impact Assessments ('EIA') prior to funding; funding project designs that are inherently less damaging to the environment e.g. using cleaner technologies; developing management systems that minimize the risk of unforeseen problems and include plans to deal with emergencies and contingencies; allowing only reputable and pre-qualified tenders to bid the project	<p>For all 3 Projects: conduct Environmental Impact Assessments ('EIA') prior to funding; developing management systems that minimize the risk of unforeseen problems and include plans to deal with emergencies and contingencies; allowing only reputable and pre-qualified tenders to bid the project.</p> <p>For Projects 1 & 2: contractual measures to allocate risks between various parties involved in the deal.</p> <p>For Projects 2 & 3: introducing anti-pollution measures such as equipment to reduce power station emissions.</p> <p>For Project 3 only: funding project designing that are inherently less damaging to the environment e.g. using cleaner technologies</p>		
Interest rate risk	NA	No Hedging	No Hedging	NA

5.4 Conclusions

In this chapter, we analyze the infrastructure projects from the private sector businesses from Hong Kong, China; Korea; Singapore; the Philippines; and the U.K. We find that the majority of the projects from the East Asia companies are in the power sector, while the projects from the UK companies spread out to different sectors. Almost all projects rely on the private sector financing. The financing method is very traditional, namely, the commercial bank loans and the equity issuing.

Although the expected rate of return depends on whether it is a private project or a government project, the mean expected rate of return for the private projects is around 15%. Most companies use debt as the major source of funds. This may reflect the nature of the projects, which provide predictable stable cash flows. In addition, most of the projects have the host government providing some form of guarantee in the local currency. In addition, most projects rate the economic viability and achieving high rate of return as the major factors for the participation of the projects.

Finally, except for the UK PSBs, almost all companies implement a reasonable risk

management system to hedge risk at all stages. Interest rate swaps and fixed rate borrowings are commonly used to hedge the interest rate risk. All Asian companies have some form of currency risk management.

CHAPTER 6

ANALYSIS OF INFORMATION FROM THE PARTICIPATING APEC MEMBER ECONOMIES

In this chapter, we summarize the response record in section 6.1, analyze the data collected from the APEC member economies in section 6.2, provide site visits information in section 6.3, and conclude the chapter in section 6.4.

6.1 Response Record

The response rate by APEC member economies is not high as we originally expected. Specifically, we find:

- Only 4 member economies completed the APEC member economies questionnaire, namely Hong Kong, China; Singapore; Korea; and Chinese Taipei.
- Only 3 APEC member economies (Korea; Philippines; and Singapore) returned the completed PSBs questionnaires.
- Canada, China and USA were site-visited for the purpose of field-testing of the questionnaires, and to gain personal contacts in anticipation of attracting their participation.
- Some economies indicated their intention to participate, but did not send a response in the end.
- Some economies indicated early that they could not participate due to resource constraints.
- Some economies did not respond at all.

We attribute the following reasons to the overall poor response rate:

- The Asian financial crisis starting in July 1997 made the economies busy in solving the crisis as *their* first priority. As a result, the economies did not have time to participate in this study.
- Contacting the Ministries of Environment in each Member Economy as the lead government department made sense because the study was set up by the initiative of the respective Ministers of Environment. The responses to this study, however, require participation of several government departments?(Environment, Finance,

Public Works, Transport and possibly others) making the effort to participate complex.

- The large extent of work that many officials felt would be required on their part in order to provide a useful response. The Consultant's suggestion that "the Questionnaire should be completed by a group of knowledgeable people in each of the relevant departments, jointly or individually, based on their existing knowledge", only worked in the case of Hong Kong, China; Singapore; and Korea.
- For large and medium-sized Member Economies, the additional problem of divided responsibilities for infrastructure provision between the federal government, the state or provincial governments, and the city governments made the task very difficult. For example, in the case of the USA, the response indicated: "Because the United States is such a large economy with such a wide array of public and private organizations involved in various facets of infrastructure development (much of which occurs at the State and local level), providing a credible profile of what is going on in this country through your survey is a significant and complex task. We are simply unable to commit the level of funding and staff time to such an undertaking, given our current budget situation" (a letter from the Office of International Activities, US Environmental Protection Agency, April 28, 1999).

6.2 Analysis of APEC Member Economies Questionnaires

6.2.1 Hong Kong, China

Unlike other APEC Member Economies, the HKSAR government was requested to complete only the AMEs questionnaire. Several Private Sector Businesses (PSBs) and the Financial Institutions (FIs) were approached separately to participate in the study. The information collected from the Hong Kong, China PSBs and FIs is analyzed in Chapters 5 and 7, respectively.

The AMEs questionnaire for Hong Kong, China was completed by the combined efforts of several departments including (i) Finance Bureau; (ii) Transport Bureau; (iii) Works Bureau; (iv) Drainage Services Department; and (v) Environmental Protection Department. The results are summarized in Tables 6.2.1-1 to 6.2.1-6.

6.2.1.1 Project Characteristics

Table 6.2.1-1 below summarizes project characteristics:

- The respondents reported 105 projects with 53% of the projects belonging to the Expressways/Highways sector. Most of these projects have a total cost of either less than US\$50 million or between US\$100 million to US\$500 million.
- The construction phase lies between 2 to 5 years for more than 54% of the projects. The operation phase is more than 20 years for about 77% of the projects.
- Project revenues are denominated in the local currency and the payback period is more than 20 years for those responded. The IRR for those 12 projects with a report ranges from 5% to 17% with a mean of 10%. The response rate is very low; therefore we cannot give any conclusive statement.

Table 6.2.1-1: Project Characteristics - Hong Kong, China

PROJECT CHARACTERISTICS	CHOICES	PROJECT NUMBER			
Total Projects		105			
Project Category	Expressways / Highways	56			
	Urban and Interurban Railways	6			
	Airports	1			
	Others ?Reclamation and new town development	3			
	Rapid Transit / Subways	3			
	Sewerage / Treatment	Yes			
	Irrigation and Drainage	Yes			
	Solid waste collection / Disposal	19			
Total Project Cost	Less than US\$50 million	22+			
	US\$50million to US\$100 million	19+			
	US\$100 million to US\$500 million	29+			
	US\$500 million to US\$1 billion	4			
	More than US\$1 billion	14			
Construction phase of the project (years)	Less than 2 years	16			
	2 to 5 years	57+			
	More than 5 years	15+			
Operation phase of the project (years)	Up to 5 years	17			
	10 to 20 years	7			
	More than 20 years	81			
Project Revenue Currency*	Local currency	12			
	US\$	-			
	No response	57			
	Not Applicable	36			

Payback period of the project (years)	More than 20 years	12			
	Not Applicable	36			
	No response	57			
Expected internal rate of return of the project (%)	Mean ?9.94%	12			
	Range ?5% to 17%	12			
	No response	57			
	Not Applicable	36			
Minimum rate of return guaranteed by the host government	Yes	-			
	No	12			
	No response	57			
	Not Applicable	36			
% of rate of return guaranteed by the host government	Not Applicable	48			
	No response	57			
Currency of guaranteed return by the host government	Local Currency	-			
	Not applicable	48			
	No response	57			

1 In case the respondent has ticked the choice and did not provide project number, the response is filled as Yes.

2 If the respondent has ticked a category but did not provide project number, we put '+' sign indicating there are more projects than the number listed.

* There can be more than one choice for this question. Therefore, project number and project percentage is more than the total number of projects and 100% respectively.

6.2.1.2 Sources of Financing

Table 6.2.1-2 below summarizes various sources of financing. Since the majority of projects do not respond the various questions, conclusive statements cannot be made.

- The projects are mainly funded by the public sector. 25 out of 48 projects are Government funded, the separate Design-Build type and 19 of Government-funded, turnkey Design-Build type implemented to improve efficiency, better technology and regulatory framework, commitment to private resources and earlier cost recovery.

Table 6.2.1-2: Sources of Financing - Hong Kong, China

CHOICES	PROJECT NUMBER
---------	----------------

	Public sector financing	87+		
	Private sector financing	Yes		
	Public and Private sectors financing	Yes		
	80-100%	1		
	60-80%	-		
	40-60%	-		
	20-40%	2		
	Less than 20%	17		
	Not Applicable	19		
	No response	66		
	80-100%	1		
	60-80%	-		
	40-60%	-		
	20-40%	3		
	Less than 20%	-		
	No response	65		
	Not Applicable	36		
	Others - Government	3		
	No response	66		
	Not Applicable	36		
	Others ?Government	3		
	No response	66		
	Not Applicable	36		
Insurance	Commercial risk only	-		
	Both political and commercial risk	17 ³		
	Not Applicable	31		

No response	57		
Build-Operate-Transfer (BOT)1	1		
Build-Own-Operate (BOO)	-		
Build-Own-Operate-Transfer (BOOT)	-		
Government Funded, separate Design-Build	25		
Government Funded, turnkey Design-Build-Operate	19 ⁴		
Others - owned and operated by public operations	3		
No response	57		
It meets all or most of these criteria: (i) higher efficiency; (ii) technological advancement; (iii) advances in regulatory framework; (iv) commitment to private resources; and (v) early cost recovery.	31		
No response	57		
Not Applicable	17		
Commercial Banks			
- Domestic	Yes		
- International	Yes		
Investment Banks			
- American Banks	Yes		
- European Banks	Yes		
- Others: China			
Capital Markets e.g. Project Bonds	Yes		
Pension Funds / Life Insurance Companies			
No Applicable	36		
Construction loan	-		
Term loan	Yes		
Overrun Equity	-		

Export Credit Facility	-		
Bonds	Yes		
No response	57		
Not Applicable	36		

* There can be more than one choice for this question. Therefore, project number and project percentage is more than the total number of projects and 100% respectively.

3 Under government works contracts, the responsibility for buying insurance for the works lies with contractors.

4 In these projects the contractors are required to raise funds to complete construction. Once the construction is completed, the contractors are paid for the capital works and the government on a monthly basis will pay the operation. There is no information available on the contractor sources of financing during the construction stage of the project.

6.2.1.3 *Financing Structure and Techniques*

Table 6.2.1-3 below summarizes the financing structure of the projects. Since the majority of projects do not respond the various questions, conclusive statements cannot be made.

- The construction financing and the permanent financing are mainly government funded. The debt draw down has no restriction.

Table 6.2.1-3: Financing Structure and Techniques - Hong Kong, China

FINANCING STRUCTURE	CHOICES	PROJECT NUMBER			
Construction financing is achieved through*	Others (Government Funded)	17			
	No response	69			
	Not Applicable	19			
Permanent financing is achieved through*	Others (Government equity in public corporations)	20			
	No response	66			
	Not Applicable	19			
Drawdown schedule of various debt tranches	No restriction	12			
	No response	57			
	No Applicable	36			
Debt repayment schedule	Others (Determined by commercial terms)	3			
	No response	66			
	Not Applicable	36			

Debt repayment is denominated in which currency	No response	69			
	Not Applicable	36			

6.2.1.4 Importance of Various Factors to Projects

Table 6.2.1-4 below shows that the economic progress and the national priority are the most important factors in considering the projects, while achieving high internal rate of return is the least important.

Table 6.2.1-4: Important Factors to the Project (1 = most important) - Hong Kong, China

FACTORS	FINANCE BUREAU	TRANSPORT	ENVIRONMENTAL PROTECTION	DRAINAGE SERVICES	MEDIA N
Economic progress of the economy	1	1	4	1	1
Social progress of the economy	2	2	3	2	2
Environmental viability of the project	-	3	1	2	2
Social acceptability of the project	4	-	2	2	2
Economic viability of the project	3	5	3	2	3
High internal rate of return of the project	5	4	5	5	5
National priority	-	-	1	1	1

6.2.1.5 Risk Management

Table 6.2.1-5 below shows various factors considered for mitigating risks associated with project implementation. Most projects do hedge the construction or completion risk and the environmental risk. On the other hand, no currency risk is hedged. Some projects hedge the interest risk using fixed price lump sum construction contracts.

Table 6.2.1-5: Risk Management: Factors considered for mitigating risks - Hong Kong, China

TYPES OF RISK	CHOICES	PROJECT NUMBER
Construction or Completion risk	Fixed cost, date certain, turnkey Engineering, Procurement, and Construction (EPC) contract	36
	Backstop guarantee such as letter of credit, performance bond by financial institutions	12
	Charging the contractor liquidated damages capped at some percent of the project cost for completion delay	29

	Others ?capital payment upon completion of construction	19
Market risk	Not Applicable	48
Currency Exchange/ Convertibility risk	Not Applicable	48
Regulatory/Political risk	Hong Kong SAR government commitment expressed in the form of Letter of Support or Guarantee	12
	Not Applicable	36
Environmental risk	Conduct Environmental Impact Assessments ("EIA") prior to funding	48
	Funding projects designing projects to be inherently less damaging to the environment for e.g. using cleaner technologies	36
	Introducing anti-pollution measures such as equipment to reduce power station emissions	36
	Developing management systems that minimize the risk of unforeseen problems and include plans to deal with emergencies and contingencies	36
	Contractual measures to allocate risks between various parties involved in the deal	36
	Include environmental performance related payments in the contract	19
	Allowing only reputable and pre-qualified tenderers to bid the project	19
Interest Rate risk	Not Applicable	29
	Others ?fixed price lump sum construction contract	19

6.2.2 Korea

We received 1 AMEs questionnaire and 3 PSBs questionnaires from Korea. The analysis of the PSBs questionnaires is reported in Chapter 5 Section 5.2.1. The International Economy Department, Environment and Science Division completed the AMEs questionnaire. The respondent completed only Part E of the questionnaire summarized in table 6.2.2-1 below.

- All projects hedge risks at all stages.
- Government guarantee is used to hedge the market risk. Currencies swaps, futures and forwards are the means for hedging currency risk, while the interest rate cap contract is the way to hedge the interest rate risk.

Table 6.2.2-1: Risk Management - Korea

Types of Risks	Factors considered to mitigate the risks
Construction/completion	Entering in fixed cost, date certain, turnkey EPC contract

Market	Government guarantee / minimum guaranteed return bearing risk of non-payment by customers
Currency exchange/ Convertibility	Hedging using currency forwards and futures Arranging one or more currency swaps
Regulatory/ political	Establishment of an independent regulatory authority
Environmental	Conducting Environmental Impact Assessments ('EIA') prior to funding
Interest rate	Entering into an interest rate cap contract

6.2.3 Singapore

We received 5 questionnaires from Singapore, 4 AMEs questionnaires and 1 PSBs questionnaire. The member questionnaires were completed by 4 different departments including (i) Sewerage, Ministry of Environment; (ii) Public Utilities Board, Water Department; (iii) Drainage, Ministry of Environment; and (iv) Contracts, Land Transport Authority. The analysis of the PSBs questionnaire is summarized in Chapter 5 Section 5.2.3.

Tables 6.2.3-1 to 6.2.3-6 below summarize the information provided in the member questionnaires.

6.2.3.1 Project Characteristics

Table 6.2.3-1 below summarizes project characteristics:

- The respondents reported 53 projects with 53% of the projects belonging to the Rapid Transit/Subways sector and 47% of the projects have a total cost of less than US\$50 million.
- The construction phase lies between 2 to 5 years for 72% of the projects. The operation phase is more than 20 years for majority of projects for which the data is reported.
- Project revenues are denominated mainly in the local currency.

Table 6.2.3-1: Project Characteristics - Singapore

PROJECT CHARACTERISTICS	CHOICES	PROJECT NUMBER			
Total Projects		53			
Project Category	Expressways / Highways	6			
	Telecommunications	1			
	Rapid Transit / Subways	28			

	Sewerage / Treatment	13			
	Irrigation and Drainage	4			
	Others	1			
Total Project Cost	Less than US\$50 million	25			
	US\$50million to US\$100 million	10			
	US\$100 million to US\$500 million	18			

Less than 2 years

62.5 years

Table 6.2.3-2: Sources of Financing - Singapore

SOURCES OF FINANCING	CHOICES	PROJECT NUMBER			
Type of financing*	Public sector financing	52			
	Others - Internal funding	1			
Total cost funded by the private sector	Not Applicable	53			
Debt Financing (%)	Not Applicable	53			
Parties involved in arranging equity ³	Not Applicable	53			
Political and / or commercial risks insurance	Commercial risk only	35			
	Not Applicable	18			
Project Type	Build-Own-Operate (BOO)	1			
	Government Funded, separate Design-Build	14			
	Government Funded, turnkey Design-Build	25			
	Others	13			
Project Type was selected because*	It meets all or most of these criteria: (i) higher efficiency; (ii) technological advancement; (iii) advances in regulatory framework; (iv) commitment to private resources; and (v) early cost recovery.	35			
	BOO ?to have full ownership	1			
	Others <ul style="list-style-type: none"> ● to support land development, alleviate flooding and to improve environment ● provision of public sewerage infrastructure to serve the nation 	4 13			
Direct lenders to the project*	Not Applicable	53			
Financing Facilities*	Others ?internal funding	1			
	Not Applicable	52			

6.2.3.3 Financing Structure and Techniques

Table 6.2.3-3 below summarizes the financing structure of the projects. Since the majority of projects do not respond the various questions, conclusive statements cannot be made. Construction financing and permanent financing are either government funded or obtained

through internal funding.

Table 6.2.3-3: Financing Structure and Techniques - Singapore

FINANCING STRUCTURE	CHOICES	PROJECT NUMBER			
Construction financing is achieved through*	Others - Government Funded	17			
	Others - internal funding	1			
	Not Applicable	35			
Permanent financing is achieved through*	Others ?internal funding	1			
	Not Applicable	52			
Drawdown schedule of various debt tranches	No Applicable	53			
Debt repayment schedule	Not Applicable	53			
Debt repayment is denominated in which currency	Not Applicable	53			

6.2.3.4 Important Factors to Projects

Table 6.2.3-4 below shows that the economic progress, environmental viability, social acceptability, and national priority are the most important factors for the project. On the other hand, achieving high rate of return is not as important while considering projects.

Table 6.2.3-4: Importance of Various Factors to the Project (1 = most important) - Singapore

FACTORS	SEWERAGE	PUBLIC UTILITIES BOARD	DRAINAGE	CONTRACTS	MEDIAN
Economic progress of the economy	-	1	1	2	1
Social progress of the economy	-	-	1	4	-
Environmental viability of the project	1	-	1	5	1
Social acceptability of the project	1	-	1	-	1
Economic viability of the project	1	2	5	1	2
High internal rate of return of the project	-	-	5	-	5
National priority	-	1	1	3	1

Other factors (e.g. Aesthetics)	-	-	3	-	3
---------------------------------	---	---	---	---	---

6.2.3.5 Risk Management

Table 6.2.3-5 below shows the factors considered for mitigating risk before funding a project.

- All projects use different methods to reduce the risks at all stages.
- The Monetary Authority of Singapore mainly hedges the currency risk.
- The environmental risk is mitigated through a variety of means.

Table 6.2.3-5: Risk Management: Factors considered for mitigating risks - Singapore

TYPES OF RISK	CHOICES	PROJECT NUMBER
Construction / Completion risk	fixed cost, date certain, turnkey Engineering, Procurement, and Construction (EPC) contract	25
	completion guarantee by party other than the EPC contractor	25
	backstop guarantee such as letter of credit, performance bond by financial institutions	26
	charging the contractor liquidated damages capped at some percent of the project cost for completion delay	6
	others ?charging the contractor liquidated damages without a cap charged on a per day basis.	36
Market risk	not applicable	41
Currency Exchange/ Convertibility risk	hedging using currency forwards and futures	1
	others ?hedging by Monetary Authority of Singapore	35
	not applicable	5
Regulatory/Political risk	others	1
	not applicable	40
Environmental risk	conduct Environmental Impact Assessments (“EIA” prior to funding	1
	introducing anti-pollution measures such as equipment to reduce power station emissions	36
	developing management systems that minimize the risk of unforeseen problems and include plans to deal with emergencies and contingencies	35
	contractual measures to allocate risks between various parties involved in the deal	35
	include environmental performance related payments in the contract	35

	allowing only reputable and pre-qualified tenderers to bid the project	35
	Others ?only companies registered with the Construction Industry Development Board can bid for projects.	5
Interest rate risk	Not Applicable	41
	No response	12

6.2.4 Chinese Taipei

The Council for Economic Planning & Development Department of Urban and Housing Development division responded to the questionnaire. The respondent completed Parts A and B of the questionnaire partially. The analysis of the questionnaire is summarized below:

6.2.4.1 *Project Characteristics*

As shown in Table 6.2.4-1 below, most of the projects funded in Chinese Taipei belong to Sewerage/Treatment, Expressways/Highways, and Urban and Interurban Railways.

Table 6.2.4-1: Project Characteristics - Chinese Taipei

PROJECT CATEGORY		PROJECT NUMBER	PROJECT %
<i>Public Utilities</i>			
1.1	Power	1	0.7%
1.2	Telecommunications	6	4%
1.3	Piped Water Supply / Treatment	2	1.4%
1.4	Sewerage / Treatment	22	15.5%
1.5	Solid Waste Collection / Disposal	10	7%
1.6	Piped Gas lines	0	0%
<i>Public Works</i>			
2.1	Urban streets	1	0.7%
2.2	Irrigation and Drainage	4	3%
2.3	Dam / Reservoir	7	5%
<i>Transport</i>			
3.1	Expressways / Highways	26	18%
3.2	Urban and Interurban Railways	15	10.5%
3.3	Rapid Transit / Subways	6	4%

3.4	Ports and Waterways	7	5%
3.5	Airports	3	2%
<i>others (related to the above categories)</i>		32	23%
Total Projects		<u>142</u>	

6.2.4.2 *Project Financials*

Table 6.2.4-2 below indicates that:

- The project cost varies widely among the projects. While most of the projects have a total cost in the range between US\$100 million and US\$500 million, there are 28 projects with cost higher than US\$1 billion.
- Most of the projects have the construction phase between 2 to 5 years or more than 5 years.

Table 6.2.4-2: Project Financials - Chinese Taipei

Project Cost	Total Projects
less than US\$50 million	22
US\$50 million to US\$100 million	31
US\$100 million to US\$500 million	45
US\$500 million to US\$1billion	17
more than US\$1 billion	28
Construction Phase	Total Projects
less than 2 years	1
2 to 5 years	75
more than 5 years	66

6.2.4.3 *Important Factors to the Projects*

Table 6.2.4-3 reveals that the most important factors are the economic progress, the social responsibility, economic viability and national priority, while the least important factors are environmental viability and high return.

Table 6.2.4-3: Important Factors for Projects - Chinese Taipei

FACTORS		
Most Important	Less Important	Least Important
Economic progress of the economy	Social progress of the economy	Environmental viability of the project and
Social acceptability of the project		High internal rate of return of the project.

Economic viability of the project		
National priority		

6.3 Information from Site Visits

6.3.1 Canada

A combined visit to the USEPA (Washington), World Bank (Washington) and Canada (Ottawa ?Hull) from November 23 to 27, 1998 was carried out for the purpose of introducing and explaining this Consultancy project to the relevant agencies and specific people, and to field test drafts of the Questionnaires.

6.3.1.1 Ottawa - Hull, Canada (Nov. 26 and 27)

Extensive meetings were set up, coordinated by Environment Canada, Office of Mr. Jean Bilodeau, Director General, Administration Environment Canada. The following people were met in several meetings:

at Environment Canada Offices:

- i. *Ms. Renetta Siemens, Senior Policy Advisor, Sustainable Government Operations, Environment Canada (key organizer and person for follow-up)*
- ii. *Mr. P.K. Leung, Int. Relations Branch, Policy and Communications, Environment Canada*
- iii. *Mr. C. David Crenna, President of the Bayswater Consulting Group Inc., a Consultant to Environment Canada on Sustainable Development*
- iv. *Mr. John Brennan, Office of Energy Efficiency, Natural Resources Canada*

Environment Canada is involved in a study of currently available Web sites and "decision-support" tools for supporting municipal and other decision-makers toward more sustainable infrastructure and cities. This work is being done under the APEC infrastructure work and so relates well to the Hong Kong, China led study. Environment Canada is also involved in a research project on current practices and methodologies employed in the construction industry for the management of construction renovation and demolition of non-hazardous wastes within the context of sustainable development.

The November 26 (morning) meeting at Environment Canada was very productive:

- Renetta Siemens agreed to be the coordinator for distribution and collection of all questionnaires that may be completed by the various offices visited.
- P.K. Leung will assist Renetta Siemens. He is coordinator on APEC issues for Environment Canada.
- John Brennan's main responsibility is in energy efficiency, and is trying to implement federal government initiatives to meet promises made by Canada at the Rio and Kyoto meetings with respect to reductions in greenhouse gases from 1990 values.

- Green Building Challenge (Vancouver International meeting earlier in 1998) initiated by Canada. Will provide material from that meeting.
- David Crenna, a private consultant, works for Environment Canada on development of Proposed APEC Web site for urban decision makers focussed on environmental management.
- Two documents were provided:
 - i. Jean Bilodeau, Director General, Environment Canada: "Reducing Environmental Impacts of Cities while saving money through energy performance contracting" presented at Budapest meeting Sept. 1998.
 - ii. Bayswater Consulting Group Inc., Ottawa: "Sources and Methods of Financing for Programs and Projects leading to Sustainable Cities: A preliminary review"
- Recommendation to visit Ms. Glenna Carr, President, the Canadian Council for Public-Private Partnerships, 48th Floor, Box 48 Toronto-Dominion Bank Tower, Toronto, Ont., Tel: (416) 601-8333, Fax: (416) 868- 0673, Email: partners@pppcouncil.ca.

at Offices of Canadian International Development Agency (CIDA)

- i. Mr. Peter Paproski, Senior Urban Development Specialist, Policy Branch
- ii. Mr. Kent Smith, Chief of Operations, China Division, Asia Bank
- iii. Ms. Josee Fluet, Energy Specialist, China Division, Asia Bank

CIDA, among many other things, provides for services of environmental/economic nature needed by other countries. However APEC region is not really a priority for CIDA, except for certain Southeast Asian countries.

at Offices of Industry Canada

- i. Mr. Karl Knechtel, International Capital Projects/Service Industries

Their major focus is on industry - export business in the areas of water and wastewater and solid waste. Reviewed the Questionnaire and made several good suggestions for improvement. Did not feel that this group could complete the Questionnaire.

at Canada's Export Development Corporation (EDC)

- i. Ms. Allison Nankivell, Regional Manager for China
- ii. Mr. Mark Bolger, Regional Manager for Asia Pacific
- iii. Mr. Rob Kengis, Engineering and Professional Services
- iv. Three additional people attended (cards unavailable)

A very thoughtful three-page memorandum with suggestions for revisions to the Questionnaire for financial institutions was received December 8, 1998 from Mr. Bolger and

mostly incorporated. Willingness to complete a questionnaire by EDC staff jointly was expressed. See Chapter 7 for write-up on EDC.

Department of Foreign Affairs and International Trade

Mr. Dan Ciuriak, Senior Economic Advisor, Trade and Economics Analysis Division (EET) could not be met, as he and most of his staff attended the APEC Meeting in Singapore. As was experienced also in USA, personnel in Ministries of Foreign Affairs are not directly involved with matters relevant to this study, but may need to be informed through provision of covering letters in all follow-up correspondence regarding this project with each of the APEC Member Economies.

Overall, Canada is doing a number of interesting projects, which would be useful to this APEC Consultancy. At least two groups, Environment Canada and Canada's Export Development Cooperation, were likely to provide input through completion of Questionnaires.

6.3.1.2 Follow-up after site visit

The relevant Questionnaires were sent on January 5, 1999 to Renetta Siemens for distribution. For the response received from Canada's Export Development Corporation, see Chapter 7.

6.3.1.3 Site Visit - Canada, Feb. 3, 1999

Ms. Glenna Carr, President
The Canadian Council for Public-Private Partnerships
Toronto-Dominion Bank Tower, 48th Floor, Box 48, Toronto, M5K 1E6
Tel: (416) 601-8333 Fax: (416) 868-0673 Email: partners@pppcouncil.ca
Also Chief Executive Officer, Carr-Gordon Limited
180 Bloor St. W, Suite 803, Toronto, Ont. M5S 2V6
Tel: (416) 968-9100 Fax: (416)966-7563 Email: carrgord@istar.ca

The meeting took place at the Carr-Gordon Ltd. Offices.

Ms. Carr outlined the development of the Canadian Council for Public-Private Partnerships, which was founded in 1993. The Council's vision is to influence the way in which public services are financed and delivered in Canada, by:

- encouraging public-private partnerships
- providing information on public-private partnerships
- sponsoring conferences and seminars on partnerships
- stimulating dialogue between public and private sector decision makers on the financing and delivery of public services
- educating the public
- doing research on key issues affecting the effective use of partnerships

It is financed through membership fees and sponsors. The Council is lead by a Board of

Directors elected by the membership and managed by a small group of officers appointed by the Board. The Executive Director is Jane Peach. Leadership came from the private sector initially, in response to the devolution of responsibility from the Federal Government to Provincial Governments to Municipal Governments.

Initially typically "hard" infrastructures, such as Toronto's new bypass, Highway 407 Toll road, the fixed link to Prince Edward Island, and toll roads in Nova Scotia. Now the emphasis is also shifting to IT infrastructure, and even to health and education facilities, and to jails. Capital projects appear to be easier to finance than operational projects.

6.3.1.4 Comparison with Britain's PFI

Canada is not yet as organized as Britain's Private Finance Initiative (PFI) but the momentum is growing in Canada; 1996-200 projects, 1998-400 projects. The Atlantic Provinces have been leading, because their provincial governments simply did not have the financial capacity to provide for urgently needed projects. For example 33 schools or community service facilities have been built through PPF (Public-Private Financing).

Sustainability issues are only considered if it is really an important part of a project. Economic issues are prominent, but the project also must have social acceptance in the community. There has been some resistance to PPF from labour unions. Must try hard to "win over labour" which has been achieved through careful human resource negotiations. Main reasons for continuing growth of PPF:

- Governments at all levels do not have enough funds
- Governments are interested in downsizing
- Private financing is available under the right conditions

6.3.1.5 Material Received

Building Effective Partnerships ?Results of a National Survey prepared for the Canadian Council for Public-Private Partnerships and the Canadian Chamber of Commerce September 1998.

Glena Carr, Public-Private Partnerships: The Canadian Experience, Presentation to the Oxford School of Project Finance, July 9-11, 1998.

This visit was highly productive. Ms. Carr indicated that they would be unable to complete a Questionnaire because of resource constraints.

6.3.1.6 Questionnaires Received

The Consultants received partially completed member economy's questionnaires from the Canadian International Development Agency (CIDA) and Environment Canada. Mr. Jean Bilodeau, Director General Administration Directorate and Environmental Operations for Government, forwarded the questionnaires to the Consultants. Mr. Bilodeau pointed that CIDA's response focuses upon the nature of donor assistance in the APEC region and Environment Canada's response pertains to their internal operations.

Canadian International Development Agency (CIDA): CIDA completed Part A and Part B of the questionnaire. The respondent provided reasons that greatly limited their ability to answer

the questionnaire fully. These reasons are:

1. "The data that we received from our corporate memory division consisted 183 projects which were classified as infrastructure investments in APEC region implemented in the past five years, of which 6 projects were over \$15 million in value. Most projects consisted largely of services - technical assistance including training, feasibility studies, design etc., rather than financing execution of physical construction."
2. "We have not provided you comments on questions concerning appraisal, conditions of execution, financing structures, and lessons learned since none of our projects passed the threshold of the survey."

6.3.1.7 Summary of Questionnaire

- All CIDA financing is in the form of 100% grants. There are some projects where projects are associated with larger infrastructure development financed through international arrangement.
- Most projects consist largely of technical assistance services, related design / studies, or training. These projects have contributed to human resource development, institutional strengthening and environmental conservation through the transfer of knowledge and skills.
- Projects funded by CIDA are typically of 5-year duration.

Environment Canada: completed only Part B on sustainability because other parts of the questionnaire were not applicable. The response on Part B is included in Chapter 3 of the report.

6.3.1.8 Appendix

Canada - Questionnaire packages through Renetta Siemens

1) to 7) are people met during site visit on November 26 and 27, 1998

- 1) Ms. Renetta Siemens
Senior Policy Advisory
International Greening Government
renetta.siemens@ec.gc.ca
Administration Directorate - Corporate Services
10 Wellington Street, 4th Floor
Environment Canada
Les Terrasses de la Chaudiere
HULL, Quebec
CANADA K1A 0H3
Tel: (819)997 9807
Fax: (819)953 8040
E-mail:
- 2) Mr. P.K. Leung
International Relations Directorate
Policy and Communications Division
Environment Canada
Tel: (819)953 5802
Fax: (819)953 7025
E-mail: pk.leung@ec.gc.ca

10 Wellington Street
HULL, Quebec
CANADA K1A 0H3

- 3) Mr. C. David Crenna
The Bayswater Consulting Group Inc.
82 Bayswater Avenue
OTTAWA, Ontario
CANADA K1Y 2E9
Tel: (613)728 7813
Fax: (613)728 3650
E-mail: bayswatr@istar.ca
- 4) Mr. John Brennan, Chief
Federal Building Initiative
Office of Energy Efficiency
jobrenna@nrcan.gc.ca
Natural Resources Canada
580 Booth Street, 18th Floor
OTTAWA, Ontario
CANADA K1A 0E4
Tel: (613)947 0380
Fax: (613)947 4121
E-mail:
- 5) Mr. Mark Bolger
Regional Mgr. for Asia Pacific
Export Development Corporation
(general)
151 O'Connor St., 11th Floor
OTTAWA, Ontario
CANADA
(five other people met at the same meeting)
Tel: (613)598 2508
Fax: (613)598 2503
E-mail: export@edc.ca
- 6) Canada International Development Agency
200 Promenade du Portage
HULL, Quebec
CANADA K1A 0G4
Mr. Peter Paproski
Senior Specialist
Urban Development Policy Branch E-mail: peter_paproski@acdi-cida.gc.ca
and
Mr. John Kozig, Infrastructure Specialist
and
Mr. Kent Smith, Chief of Operations
China Division, Asia Branch
Tel: (819)997 0888
Fax: (819)953 3348
Tel: (819)997 4744
and
Ms. Josee Fluet, Energy Specialist (7th Floor)
China Division, Asia Branch
Tel: (819)997 3477
- 7) Mr. Karl J. Knechtel
International Capital Projects
Service Industries and Capital Projects
Industry Canada
235 Queen Street
OTTAWA, Ontario
Tel: (613)952 0205
Fax: (613)952 9054
E-mail: knechtel.karl@ic.gc.ca

CANADA, K1A 0H5

People contacted but out of town during site visit on Nov. 26 and 27. Questionnaires and supporting material sent separately to them.

Mr. Dan Ciuriak
Senior Economic Advisor
Trade and Economic Analysis Division (EET)
Department of Foreign Affairs and International Trade
125 Sussex Dr.
OTTAWA, Ontario
CANADA, K1A 0G2

Tel: (613)995 8619
Fax: (613)992 4695

6.3.2 China

Dates of visits: December 10, 1998 by Prof. G.W. Heinke
March 15, 1999 by Prof. G.W. Heinke

6.3.2.1 The December 10, 1998 meeting

Meeting with Mr. Tang Dingding

Director, Engineer, Division of General Affairs

Department of International Cooperation
State Environmental Protection Administration (SEPA)
115 Xizhimennei Nanxiaojie
Beijing 100035, P.R.China
Tel.: (86-10)6616 5635 Ext. 5536
Fax: (86-10)6615 1762
E-mail: dtang@public.east.cn.net

and Ms. Guo Hao, Program Officer

The purpose of the meeting was to explain the project and seek the assistance of SEPA. Because of the importance of China to APEC, it was considered essential to make a special effort to obtain a good response to the Questionnaire.

6.3.2.2 The March 15, 1999 meeting

Meeting with Mr. Zhang Yutian, Director
Division of International Cooperation and Development
Chinese Research Academy of Environmental Sciences (CRAES)
Beiyuan, Anwai
Beijing, 100012, P.R. China
Tel.: (86-10)6498 7134
Fax: (86-10)6498 6015

and Ms. Guo Hao, Program Officer, SEPA

Mr. Tang was engaged in an international meeting. All items of the questionnaire were discussed in detail. Mr. Zhang indicated that he understood what needed to be done and hoped it could be completed by April 15. Mr. Zhang was concerned about the resources needed to complete the questionnaires, which required substantial collation of dispersed information.

As no response had been received by April 14, 1999, Heinke sent an inquiry on progress to Zhang. Responses were received on April 27 and 28, indicating that Mr. Zhang and colleagues attempted to complete the Questionnaire on behalf of China, but were unable to find the necessary information.

6.3.3 The Philippines

The Consultant visited Mr. Rubin S. Reinoso, Jr., Director, the National Economic and Development Authority Infrastructure Staff on 29 January, in the afternoon. Mr. Reinoso explained the difficulties that his department encountered in collecting information from other departments for this project. This difficulty would probably apply to all other APEC Member Economies.

We received 2 PSBs questionnaires from Philippines through Mr. Reinoso's office. The information provided in the questionnaires is summarized in Chapter 5 Section 5.2.2.

6.3.4 The USA

A combined visit to the USEPA (Washington), World Bank (Washington) and Canada (Ottawa ?Hull) from November 23 to 27 was carried out for the purpose of introducing and explaining this Consultancy project to the relevant agencies and specific people, and to field test drafts of the Questionnaires.

The following people were met:

- i. Dr. Alan D. Hecht, Principal Deputy Assistant Administrator, Office of International Activities, USEPA (most senior person)
- ii. Ms. Sarita Hoyt, US Asian Env. Partnership Program Manager at USEPA. Office of International Activities (follow-up person)
- iii. Dr. Gordon Bender at AQUA (Private Sector Business ?Water) (not met, but will be asked to complete all or parts of questionnaire)

The meeting was informative. No specific suggestions for changes to the draft Questionnaires were provided. It was commented that this is a very ambitious undertaking and may take considerable resources to be able to respond effectively.

In response to the request for inclusion of several Private Sector Business to complete the PSBs Questionnaire, AQUA was suggested as one possible company, with possibly others to be selected.

The Questionnaires were sent to Dr. Hecht on January 4, 1999. As no response was received follow-up letters were sent on February 25, March 18 and April 26, 1999. This resulted in a

response on April 28, 1999, which is attached. It explains better than any other letter received by the Consultants why APEC Member Economies, particularly large ones, have difficulties in participating in this study.

The offer to provide case studies and other background material on public-private partnerships for environmental services and infrastructure was taken up. These materials will be included in the report at a later date after receiving them.

6.4 Conclusions

- In this chapter, we analyze the infrastructure projects for 4 APEC member economies, namely, Hong Kong, China; Korea; Singapore; and Chinese Taipei. Since the response rate from the economies was low we cannot provide conclusive statements. Based on the available responses we find that:
 1. Most of the projects are in the Expressways/Highways sector.
 2. About 80% of the projects have the construction phase of 2-5 years and the operation phase of more than 20 years.
 3. The mean rate of return is 10% with the range of 5%-17%.
 4. Public funding is the major source of financing.
 5. The economic progress and the national pride are the two most important factors for undertaking the projects.
 6. For risk management, the member economies do hedge the construction/completion risk and the environmental risk, but seldom hedge the currency risk and have only a minimum hedge for the interest rate risk.
 - Canada is encouraging public-private partnerships to promote private sector participation in infrastructure development. Canadian Council for Public-Private Partnerships, a non-profit/non-partisan organization was founded in 1993 to initiate cooperative ventures combining the strengths of the public and private sectors. While initially the focus was on the development of 'hard infrastructure' such a toll roads, now the primary focus is shifting towards the development of IT infrastructure, health and education facilities, and jails.
-

CHAPTER 7

ANALYSIS OF INFORMATION FROM FINANCIAL INSTITUTIONS

In this chapter, in section 7.1, we present the information collected during site visits from the multilateral financial institutions including the World Bank and the Asian Development Bank (ADB). Section 7.2 presents the analysis of the information provided in the FIs questionnaire by the World Bank, the ADB, and the financial institutions in Hong Kong, China. The analysis of information provided by the Export Credit Agencies is reported in section 7.3 and finally, section 7.4 concludes the chapter.

7.1 Information from Site Visits to the World Bank and the ADB

Multilateral Financial Institutions (MFIs) are finance institutions that fund projects regionally, sub-regionally, and national projects and programs usually in developing and poor countries. MFIs not only finance infrastructure projects but also perform other functions such as providing technical assistance for the preparation and execution of projects and programs, providing advisory services, promoting and facilitating investment of public and private capital for development purposes.

We approached several MFIs requesting them to participate in our study. A list of all the MFIs contacted is shown below:

1. Asian Development Bank (ADB)
2. International Finance Corporation (IFC)
3. Multilateral Investment Guarantee Agency (MIGA)
4. Overseas Private Investment Corporation (OPIC)
5. The World Bank

Table 7-1 below provides a response record for MFIs. We received partially completed MFIs questionnaire from the World Bank and the ADB, which are analysed in section 7.2.

Table 7-1: Responses of Multilateral Financial Institutions (MFIs)

MFIs	Initial PELB-HK Letter	Response to Initial Letter	Consultants Follow-up Letter	Mailing of Questionnaires by Consultant	Response by MFI	Reminder Letters by Consultant	Return of Completed Questionnaire
ADB	-	-	27-30 January Site Visit	30/12/98	-	-	March end
IFC	13/11/98	No	-	30/12/98	-	3/2/99	-
MIGA ¹	13/11/98	Yes 24/11/98 14/1/99	-		-	-	-
OPIC	13/11/98	No	-	30/12/98	-	3/2/99	-
World Bank	2/11/98	16/11/98 Site visit arranged	23-24/11/98	4/1/99	Several	Several	26/4/99

¹ MIGA sent an email message to the consultant saying that MIGA provide political risk insurance and do not finance projects. Hence,

MIGA would not be able to fill out the questionnaire.

7.1.1 Site Visit to the World Bank

The site visit was carried out during the period November 23 and 24 together with site visits to USEPA (Nov. 24) and Canada (Ottawa-Hull) on November 26 and 27, 1998.

The following people were met:

1. Mr. Robert Goodland, Senior Environment Consultant
2. Mr. Paul Cadario, Operations Advisor, formerly East Asia and Pacific Manager
3. Mrs. Kristallina Georgieva, Manager, Env. Sector Unit, East Asia and Pacific Region, and colleagues Heinz K. Unger and Jack Fritz
4. Mr. Richard U. Ackerman (not available for meeting, but agreed to complete the questionnaire, based on his previous experience as Manager of East Asia and Pacific Region (Environment Sector))
5. Mr. Aldo Baietti, Senior Private Sector Business Finance Specialist, East Asia and Pacific Region

Some initial feedback on the draft FIs questionnaire was received at the meetings and those suggestions were incorporated.

The individual meetings were productive. It was clear that the various people had a strong interest in the potential results of this study. It was concluded that Mrs. Georgieva's group would be the main responder to complete the FIs Questionnaire, with possible input from others. A further response from Mr. Baietti, Mr. Ackerman and Mr. Goodland was desirable, but they expressed concerns about the time needed to do so.

By mid-March no response was obtained and follow-up letters were written. The completed questionnaire from Mrs. Georgieva's group was received in mid-April.

Material Obtained

- World Bank Group Directory 1998
- *Ashoka Mody, Infrastructure Delivery 1996*
- Bartone et al, *Toward Environmental Strategies for Cities*, 1994
- Ismail Serageldin and Alfredo Sfeir-Younis, *Effective Financing of Environmentally Sustainable Development*.
Questionnaires for Financial Institutions (World Bank) were mailed on December 31, 1998 to the following people:

Mr. Robert Goodland
Advisor
Environmental Assessment Unit
Environment Department
The World Bank
1818 H Street, N.W.
Washington, DC 20433, USA
Tel.: (202)473-3203
Fax: (202)477-0565
Email: rgoodland@worldbank.org

Ms. Kristallina Georgieva
Manager
Environment Sector Unit
East Asia and Pacific Region
The World Bank
1818 H Street, N.W.
Washington, DC 20433, USA
Tel.: (202)472-0397
Fax: (202)522-1666
Email: kgeorgieva@worldbank.org

Mr. Aldo Baietti
Senior PSD Finance Specialist
Private Sector Participation in
Infrastructure
Private Sector Development Unit
East Asia and Pacific Region
The World Bank
1818 H Street, N.W.
Washington, DC 20433, USA
Tel.: (202)473-2750
Fax: (202)522-3454

Mr. Richard U. Ackerman
Manager, South Asia Region
Formerly Manager, Environment
East Asia and Pacific Region
The World Bank
1818 H Street, N.W.
Washington, DC 20433, USA
Fax: (202)522-1664

7.1.2 Site Visit to the Asian Development Bank

The site visit to the ADB was carried out from 28 January to 29 January. Various people related to infrastructure projects at ADB were interviewed. The people interviewed are:

1. Mr. Eric Thorn: Director (Australia; Cambodia; Hong Kong, China; China; Kiribati; Micronesia; Nauru; Solomon Islands; Tuvalu)
2. Dr. S. Ghon Rhee: Resident Scholar (Economics & Development Research Center)
3. Mr. Jin-Koo Lee: Manager (Transport & Communication Division (East))
4. Dr. Gunter Hecker: Manager (Transport & Communication Division (West))
5. Mr. Paolo Lombardo: Senior Investment Officer (Private Sector Group)
6. David Edwards: Assistant Chief Economist
7. Ms. Rita Ravi Nangia: Senior Economist
8. Mr. Sean M. O'Sullivan: Senior Public / Private Sector Specialist (Office of the Director, Infrastructure, Energy & Financial Sectors Department (East))
9. Mr. Ramesh Subramaniam: Financial Economist (Financial sector & Industry Division, Infrastructure, Energy & Financial Sectors Department (East))

The lessons learned from the meetings are:

Public Sector vs. Private Sector

About 95% of the capital sponsored by ADB goes to the public sector, and the remaining 5% goes to the private sector.

For the public sector, the loans can be divided into (1) program loans (very general, not project specific), (2) project loans (project specific), and (3) sector development loans (a combination of project loan plus policy loans). All three types of loans are straight loans. ADB loans the money only to less-developed countries. They evaluate the project based on: (1) policy, (2) improvement of the country's living standard, and (3) economic viability. The interest rate charged by ADB for public sector loans is very low, but the countries guarantee the loans. The objective is not to make money from the loans, but to help the countries improve their living standard.

Private sector loans are package loans. The package includes venture capitals, government, ADB, and other funds. The ADB involvement in private sector loans serves two purposes: (1) guarantee facility, and (2) signaling. With the ADB's involvement, a project can attract more private money, since it signals that the project has been evaluated by ADB and that ADB is willing to put its own money into it. ADB provides funding in the form of (1) equity investment, (2) loans and (3) guarantee. The objective is to make profits. This part of the business is very similar to that of investment banks. As a result, ADB needs to evaluate the project to see whether the project is economically viable and also sustainable.

ADB's Experience from the Asian Financial Crisis

Some projects sponsored by ADB before the financial crisis is in retrospect not economically sustainable. Especially, the risk allocation was not sustainable. All the risks were borne by government, but all rewards went to private investors. That is, the nature of liability was borne by the government and the consumers. For example, the ex ante cost distribution of the previous government sponsored projects put the government, its citizens and consumers in a disadvantage. Specifically, all cost disadvantages were borne by consumers. In addition, most of the infrastructure projects were not carefully evaluated.

As a result, ADB suggested that in the future, the country should do economic and sensitivity analysis. These include:

1. If the economy were to slow down, will we become over-invested?
2. Do we really need this project?
3. How do we get money and what is the cost?
4. Is the benefit greater than the cost?

In addition, in the future, the government should improve the efficiency of the infrastructure projects. In particular, they should attempt to lower the cost of financing.

The selection of a project should be carefully evaluated. If it is not an economically sustainable project, it should be rejected. A good project should make sure that (1) there is enough demand, and (2) there is a good economic value.

How Financing Techniques Enhance Economic Sustainability of Infrastructure Projects

To reduce the financing cost for future infrastructure projects, the risk should be reduced. The risk of an investment in infrastructure projects includes:

1. common factor risk, such as the global recession
2. country risk including economic risk and political risk
3. construction and demand risk for individual project, and
4. other unpredictable idiosyncratic risk

As a result, multi-lateral financial institutions such as ADB, World Bank, and IMF, or other private investment banks such as Goldman Sachs can securitize the infrastructure projects. That is, they bundle different infrastructure projects from different countries and different sectors. By doing this, the risk can be substantially reduced. But the disadvantage is that it is very hard for investors to analyze the risk and return. Therefore, some guarantee from multi-lateral financial institutions or private investment banks is needed. The advantage for securitisation is that the money can be recycled back to these financial institutions and then back to the countries.

7.2 Analysis of information from the MFIs' and Hong Kong, China's FIs?/P

In addition to the World Bank and the ADB, we also approached the following financial institutions in Hong Kong, China to participate in the study:

1. American International Group
2. Asian Infrastructure Fund Advisers
3. The Bank of East Asia, Limited
4. A Major Infrastructure Fund (*We were asked to keep the name confidential*)
5. HSBC Investment Bank Asia, Limited
6. Santander Investment Asia, Limited

Face-to-face interviews were conducted with most of these financial institutions. In addition, very useful information was obtained from the UK Treasury Department, particularly on their programs: Partnerships for Prosperity - the Private Finance Initiative (PFI), which is reviewed in Chapters 4 and 8. Another similar program, but not as advanced as the UK's, PFI program is Canada's Public-Private Partnerships (PPPs), which is reviewed in Chapter 6.

Project Characteristics

Table 7.2.1-1 below summarizes project characteristics of 198 projects from the World Bank, ADB, "HM Treasury, UK" and the financial institutions in Hong Kong, China:

- 22% of the projects belong to the Power sector and 32% to the Expressways/Highways sectors indicating that the funds have been predominantly directed for infrastructure development in these two sectors.
- 41% of the projects have the construction phase of over 5 years and more than 43% of the projects have the operation phase of more than 20 years.

Table 7.2-1: Project Characteristics - Financial Institutions

PROJECT CHARACTERISTICS	CHOICES	PROJECT NUMBER				TOTAL PROJECTS	PROJECT %
		WORLD BANK	ADB	HM TREASURY (UK)	HK FIs		
Total Projects		81	8	15	94	198	
Project Category	Power	25	4	1	14	44	22%
	Telecommunications	3	-	-	21	24	12%
	Piped Water Supply/ Treatment	6	-	-	9	15	8%
	Sewerage/Treatment	1	-	-	-	1	0.5%
	Solid Waste Collection / Disposal	3	-	3	-	6	3%
	Urban Streets	-	-	1	-	1	0.5%
	Irrigation & Drainage	14	-	-	-	14	7%
	Expressways/ Highways	25	1	2	35	63	32%
	Urban and Interurban Railways	-	-	5	2	7	3.5%
	Rapid Transit/ Subways	-	-	2	6	8	4%
	Ports & Waterways	4	-	-	3	7	3.5%

	Airports	-	-	1	1	2	1%
	Others	-	2		3	5	2.5%
Construction Phase (yrs.)	less than 2 years	-	2	15	31	48	12%
	2-5 years	-	6	-	38	44	22%
	more than 5 years	81	-	-	-	81	41%
	already operational	-	-	-	23	23	12%
Operation Phase (yrs.)	up to 5 years	16	-	-		16	8%
	5 to 10 years	65	-	-	-	65	33%
	10 to 20 years	-	2	-	more than 22	more than 24	12%
	more than 20 years	-	6	15	more than 64	more than 85	43%

7.2.2 Project Financials

Table 7.2-2 below summarizes project financials:

- For 52% of the projects, the total cost varies between US\$100 million and US\$500 million. The projects' revenues are denominated in the US dollar as well as the local currency, but most of the revenues are obtained in the local currency.
- For 41% of the projects, the payback period is between 5 to 10 years. The mean internal rate of return varies from 17.5% to 20% and has a range of 13.5% to 22%.
- About 35% to 60% of the projects funded by the HK FIs and 80% funded by ADB are guaranteed by the host government. The return is guaranteed in the US dollar and has a mean of 17% for HK FIs, and of 16% for ADB with a range of 14% to 20% for HK FIs and of 13% to 19% for ADB.

Table 7.2-2: Project Financials - Financial Institutions

PROJECT FINANCIALS	CHOICES	PROJECT NUMBER				TOTAL PROJECTS	PROJECT
		WO RLD BANK	ADB	HM Treasury (UK)	HK FIs		
Total Project Cost	less than US\$50 million	2	-	2	15	19	9.6%
	US\$50 to US\$100 million	4	-	3	3	10	5%
	US\$100 to US\$500 million	40	8	6	49	103	52%

	US\$0.5 to US\$1 billion	27	-	3	7	37	19%
	more than US\$1 billion	10	-	1	3	14	7%
Project Revenue Currency	Local currency	-	95%	100%	90-100%	-	-
	US\$	100%	5%	-	10%	-	-
Payback period (years)	Less than 5 years	-	-	-	4	4	2%
	5 to 10 years	-	1	-	80	81	41%
	10 to 20 years	16	7	-	2	25	13%
	more than 20 years	65	-	-	-	65	33%
	Others	-	-	-	-	-	-
IRR (Mean 'M' Range 'R')		-	M = 20%; R = 18% ?2%	Not known	M = 17.5% R = 13.5% - 22%	-	-
% of total projects guaranteed by the host government		-	80%	0%	35% to 60%	-	-
Mean and range of IRR for guaranteed projects		-	M = 16%; R = 13% ?9%	NA	M=17%,	-	-
Currency in which return is guaranteed	US\$	-	8	NA	15	-	-
	Local Currency				12	-	-

7.2.3 Sources of Financing

Table 7.2-3 below summarizes sources of financing:

- The table lists various reasons for institutions to finance projects and different sources used by the FIs to fund projects. Since all the respondents did not give

project numbers in most cases, results cannot be interpreted in project numbers for all factors.

- For 37% of the projects, the total cost funded by the FIs is only 20-40% and for 23% cases it is more than 80%. While the source of funding varies widely, the funding is in the form of investment loans for 58% of the projects.
- FIs provide 25% to 50% of financing for the private sector. 54% of the projects have partial credit guarantee and 40% of the projects have no guarantee.

Table 7.2-3: Sources of Financing - Financial Institutions

SOURCES OF FINANCING	CHOICES	PROJECT NUMBER				TOTAL PROJECTS	PROJECT %
		WORLD BANK	ADB	HMTREASURY (UK)	HK FIs		
Institution finances projects because	the borrowing economy needs capital on terms that would bear less heavily on their balance of payments than with other financial institutions	Yes	-	-	Yes	-	-
	To promote growth in the private sector of the economy	-	-	-	Yes	-	-
	To mobilize domestic and foreign capital in the economy	-	-	-	Yes	-	-
	To encourage direct foreign investment by protecting investors from non commercial risk	-	Yes			-	-
	Others			Yes (to make a profit)	Yes	-	-
% of total project cost financed	more than 80%	16	-	15	10	41	21%
	60-80%	13	-		Yes	13	7%
	40-60%	21	-		Yes (more than 2)	more than 23 projects	12%
	20-40%	26	2		38	66	33%
	less than 20%	5	6		23	34	17%

Source of Funding	medium and long term borrowings in the capital markets of developed countries such as USA, Japan, and Europe	NA		Not known	9	9	4.5%
	using paid-in-capital from its retained earnings	-	-	-	Yes	-	-
	borrowing from World's financial markets	-	-	-	Yes (more than 1)	-	-
	Contributions from its richer members		8	-	-	8	4%
	Others	-	-	-	Yes (Pension Funds, Endowments of Universities, Financial Institutions)	-	-
Form of Funding	Investment loans	81	Yes	15	2	98	49.5%
	Advance funding in the form of Bank's Project Preparation Facility	-	-	-	1	1	0.5%
	financial intermediation loan	-	-	-	Yes	-	-
	credit lines	-	-	-	Yes (more than 10)	10	5%
	Equity investment		Yes		Yes (more than 60)	60	30%
% of financing for the private sector					50% and		
		-	up to 25 %	Not known		-	-

Loans are disbursed for how many years	less than 5 years	-	-	-	72	72	36%
	5 - 10 years	16	-	-	1	17	9%
	10 - 15 years	65	8	-	Yes	73	37%
	15 - 20 years	-	-	-	Yes	-	-
	more than 20 years	-	-	15	-	15	8%
Loan are disbursed on what terms	Host government borrow money for funding a project	81	-	-	Yes	81	41%
	long term debt repayment schedule	-	8	15	21	44	22%
	Others (interest and repayment)	-	-	-	8	8	4%
	NA	-	-	-	60	60	30%
Debt repayment schedule	Bullet payment	-	-	-	Yes	-	-
	amortization schedule	Yes	-	Yes	Yes	-	-
	Grace period for repayment followed by principal and interest repayment	-	Yes	-	Yes	-	-

					Yes		
	Others	-	-	-		-	-
Debt repayment is denominated in which currency	US\$	Yes	Yes	-	Yes	-	-
	Others	Yes		Yes (Pound Sterling)	Yes (HK\$, local currency of borrower)	-	-

7.2.5 Important Factors to Projects

Table 7.2-5 below lists the importance of various factors for the projects. The table shows that the economic progress, environmental viability, economic viability and achieving high internal rate of return are the most important factors, while the social progress of the economy is less important.

Table 7.2-5: Importance of Factors to the Project (H = High, M = Medium, L = Low) - Financial Institutions

FACTORS	WORLD BANK	ADB	HM Treasury (UK)	HK FIs (MEDIAN)	MEDIAN
Economic progress of the economy	H	H	L	H	H
Social progress of the economy	H	M	L	M	M
Environmental viability of the project	H	H	L	M	H
Social acceptability of the project	H	H	M	M	-
Economic viability of the project	H	H	H	H	H
High internal rate of return	H	M	L	H	H
Other factors (prestige, strength of sponsorship, available finance)	L	-	-	H	-

7.2.6 Risk Management

Table 7.2-6 below lists various factors considered for mitigating risks for the project implementation. All FIs use all instruments to mitigate all risks involved, including the construction/completion risk, market risk, currency risk, and interest rate risk.

Table 7.2-6: Risk Management: Factors considered for mitigating risks - Financial Institutions

TYPES OF RISK	CHOICES	WORLD BANK	ADB	HM Treasury (UK)	HK FIs
Construction or Completion risk	fixed cost, date certain, turnkey Engineering, Procurement, and Construction (EPC) contract	-	Yes	Yes	Yes
	completion guarantee by party other than the EPC contractor	-	Yes	-	Yes
	backstop guarantee such as letter of credit, performance bond by financial institutions	-	Yes	-	Yes
	pledging of contractor's capital through an equity stake in the project	-	Yes	Yes	

	cost overrun facility commitment by project sponsors	-	Yes	Yes	Yes
	charging the contractor liquidated damages capped at some percent of the project cost for completion delay	-	Yes	Yes	Yes
	others	-		-	Yes
Market risk	government guarantee / minimum guaranteed return bearing risk of non-payment by customers	-	Yes	Yes	Yes
	take-or-pay contract with the government	-	Yes	Yes	Yes
	setting debt-service accounts to provide cushion in the event of non-payment	-	Yes	-	Yes
	independent appraisal from a third party about demand for project output such as electricity consumption	-		Yes	Yes
	project bundling such as combining water treatment and sewage disposal utilities			Yes	
	hedging by forwards and futures enabling project sponsors to sell their output for future delivery	-		-	
	Others				Yes
Currency Exchange/ Convertibility risk	indexing tariff rate to exchange rate fluctuations	-		NA	Yes
	indexing tariff rate to interest rate changes	-		NA	Yes
	indexing variable and fixed costs to local inflation	-		NA	Yes
	price-cap formula linking tariffs to changes in the price level of raw material(s) for the project	-		NA	Yes
	setting up reserve funds for devaluation risk	-		NA	Yes
	hedging using currency forwards and futures	-		NA	Yes
	arranging one or more currency swaps	-		NA	Yes
	hedging using currency options	-		NA	Yes
	No hedging				Yes
Regulatory/ Political risk	establishment of an independent regulatory authority	-	Yes	-	Yes
	Provision for tariff adjustment with changing economic conditions e.g. increase in cost of raw material.	-	-	Yes	Yes
	local investors / developers equity participation	-	Yes	-	Yes
	all parties involved in the project must provide guarantee for project completion	-	-	-	Yes

	Export Credit Agency and or Multilateral Agency Guarantee	-	-	-	Yes
	Federal and State government commitment expressed in the form of Letter of Support or Guarantee	-	Yes	-	Yes
Environmental risk	conduct Environmental Impact Assessments ('EIA') prior to funding	-	Yes	-	Yes
	funding projects designing projects to be inherently less damaging to the environment for e.g. using cleaner technologies	-	Yes	-	Yes
	introducing anti-pollution measures such as equipment to reduce power station emissions	-	Yes	-	Yes
	developing management systems that minimize the risk of unforeseen problems and include plans to deal with emergencies and contingencies	-	Yes	-	
	contractual measures to allocate risks between various parties involved in the deal	-		Yes	Yes
	include environmental performance related payments in the contract	-		-	Yes
	allowing only reputable and pre-qualified tenderers to bid the project	-		-	Yes
Interest rate risk	entering into an interest rate swap agreement	-	Yes	Yes	Yes
	entering into an interest rate cap contract	-	Yes	-	Yes
	interest rate futures				Yes
	interest rate options	-		-	Yes
	Others	-		-	Yes

7.3 Analysis of information from Export Credit Agencies (ECAs)

Export Credit Agencies (ECAs) are the export-import banks established by the major developed nations to promote the export of equipment manufactured within that country. In order to promote manufacture of goods or provision of services, ECAs provide credit to the supplier as well as the buyer of goods and services. When providing credit to an overseas borrower for the export of goods and services, an ECA guarantees a national exporter or banker against risks of nonpayment. In some cases, ECA guarantees only against sovereign risks and not commercial risks leaving the financier responsible for the nonpayment.

We approached several ECAs requesting them to participate in our study. A list of all the ECAs contacted is shown below:

1. Coface (France)
2. Export Credit Guarantee Department (ECGD of United Kingdom)
3. Export Development Corporation (EDC of Canada)
4. The Export-Import bank of Japan (JEXIM)

5. The Export-Import bank of United States (US EXIM)

6. Hermes (Germany)

Out of the 6 ECAs, Coface and US EXIM did not participate in the study. While Hermes agreed to participate in the study at the site visit, we are awaiting their response. We received completed questionnaires from JEXIM, EDC and ECGD. Their response is summarized in the tables below.

Table 7-2: Responses of Export Credit Agencies

EXPORT	Initial	Response to Initial Letter	Consultants Follow-up Letter	Mailing of Questionnaires by Consultant	Response by ECA	Reminder Letters by Consultant	Return of Completed Questionnaire
Coface FRANCE	13/11/98	No		30/12/98	No	3/2/99	No
ECGD ?UK	13/11/98	No	Site Visit	30/12/98	NA	NA	12/1/99
EDC - CANADA	13/11/98	No	Site Visit	5/1/99	NA	NA	21/4/99
JEXIM	13/11/98	No	-	30/12/98	Yes	-	24/3/99
US EXIM	13/11/98	No	-	30/12/98	No	3/2/99	No
Hermes - GERMANY	13/11/98	No	Site Visit	30/12/98	NA	6/2/99	Expected

--	--	--	--	--	--	--	--

The questionnaire analysis is provide in Section 7.3.1, while the discussion for site visit to EDC of Canada, ECGD of the UK, and Hermes of Germany is presented in Sections 7.3.2 ?7.3.4.

7.3.1 Questionnaire Analysis of Export Credit Agencies (ECAs)

7.3.1.1 Project Characteristics

Table 7.3.1-1 below summarizes project characteristics:

- There are a total of 86 projects with 62% of the projects belonging to 'others' category, 37% in power sector and 29% in telecommunications sector.
- 67 projects have the construction phase of 2 to 5 years. 62 projects have the operation phase between 10 to 20 years.

Table 7.3.1-1: Project Characteristics - ECAs

PROJECT CHARACTERISTICS	CHOICES	PROJECT NUMBER			TOTAL PROJECTS	PROJECT %
		ECGD	EDC	JEXIM		
Total Projects		62	19	5	86	
Project Category	Power	8	19	5	32	37%
	Telecommunications	6	19		25	29%
	Piped Gas Lines	-	2	-	2	2%
	Others - Mining, Pulp paper	48	5	-	53	62%
Construction Phase (years)	2-5 years	62	-	5	67	78%
	Others	-	Varies widely	-	19	22%
Operation Phase (years)	up to 5 years	-	-	5	5	6%
	5 to 10 years	-	19	-	19	22%
	10 to 20 years	62	-	-	62	72%
	more than 20 years	-	-	5	5	6%

7.3.1.2 *Project Financials*

Table 7.3.1-2 below summarizes project financials:

- The total cost of projects varies widely. 34% have cost less than US\$50 million and 22% with cost between US\$50 to US\$100 million. Further, 94% have 30% to 90% revenues denominated in the local currency and all 86 projects have 10% to 100% revenue denominated in the US dollar.
- Only the Export-Import Bank of Japan provided the internal rate of return with a mean of 14% and a range of 10% to 17%. For 6 out of 24 projects, the host government guarantees the rate of return.

Table 7.3.1-2: Project Financials - ECAs

PROJECT FINANCIALS	CHOICES	PROJECT NUMBER			TOTAL PROJECTS	PROJECT %
		ECGD	EDC	JEXIM		
Total Project Cost	less than US\$50 million	29	-	-	29	34%
	US\$50 to \$100 million	19	-	-	19	22%
	US\$100 to \$500 million	12	-	4	16	19%
	US\$0.5 to \$1 billion	2	10	1	13	15%
	more than US\$1 billion	-	9	-	9	10.5%
Project Revenue Currency	Local currency	90%	30%	-	81	94%
	US\$	10%	70%	100%	86	100%
Payback period (years)	5 to 10 years	-	Yes	-	19	22%
	10 to 20 years	62	Yes	5	67	78%
IRR		NA	Varies widely	Mean = 14%; Range = 10% to 17%	-	-
% of total projects guaranteed by the host government		NA	20% of 19 projects	40% of 5 projects	6	7%
Mean and range of IRR for guaranteed projects		NA	Varies widely	-	-	-
Currency in which		NA	US\$	-	4	5%

return is guaranteed						
----------------------	--	--	--	--	--	--

7.3.1.3 Sources of Financing

Table 7.3.1-3 below summarizes sources of financing:

- For 19 out of 86 projects, the total project cost funded by ECAs varies between 20% to 40%. ECGD provides 10% of financing for the private sector. While ECD and JEXIM provide partial risk and/or partial credit guarantee, ECGD and EDC provide commercial and political risk insurance.

Table 7.3.1-3: Sources of Financing: ECAs

SOURCES OF FINANCING	CHOICES	PROJECT NUMBER			TOTAL PROJECTS	PROJECT %
		ECGD	EDC	JEXIM		
Institution finances projects because	To promote growth in the private sector of the economy	-	Yes	Yes	24	28%
	To mobilize domestic and foreign capital in the economy	-	-	Yes	5	6%
	To encourage direct foreign investment by protecting investors from non commercial risk	-	Yes	-	24	28%
	Others - To encourage British capital goods exports	Yes	-	-	62	72%
% of total project cost financed	20-40%	NA	Yes	-	19	22%
Source of Funding	medium and long term borrowings in the capital markets of developed countries such as USA, Japan, and Europe	NA	Yes	Yes	24	28%
	Borrowing funds at market based rates from central bank and / or other government institutions	-	-	Yes	5	6%
	Flow of repayment on its loans	-	-	Yes	5	6%
Form of Funding	Investment loans	-	-	Yes	5	6%
	Others	NA	Yes	-	19	22%
% of financing for the private sector		10%	NA	-	-	-

Type of guarantee	partial risk guarantee	NA	Yes	Yes	24	28%
	partial credit guarantee	-	-	Yes	5	6%
Political and / or commercial risks insurance		both political and commercial risks	both political and commercial risks 95%	-	81	94%

7.3.1.4 Financing Structure

Table 7.3.1-4 below summarizes the financing structure:

- For all 86 projects, loans provided by the ECAs mature within 5 years and are disbursed on various terms. The debt repayment schedule has grace period repayment followed by principal and interest repayment for 78% of the projects. Debt repayment is denominated mainly in the US dollar but also in the Deutsche Mark and other currencies.

Table 7.3.1-4: Financing Structure - ECAs

FINANCING STRUCTURE	CHOICES	PROJECT NUMBER			TOTAL PROJECTS	PROJECT %
		ECGD	EDC	JEXIM		
Loans are disbursed for how many years	less than 5 years	Yes	Yes	Yes	86	100%
Loan are disbursed on what terms	Host government borrow money for funding a project	62	-	-	62	72%
	long term debt repayment schedule	62	19	-	81	94%
	Borrower has to pay annual service charge on the disbursed amount of each credit	-	-	5	5	6%
Debt repayment schedule	amortization schedule	-	19	-	19	22%
	Grace period for repayment followed by principal and interest repayment	62	-	5	67	78%
Debt repayment is denominated in which currency	US\$	65%	95%	100%	86	100%
	Deutsche Mark (DM)	5%	-	-	62	72%
	Others	30%	-	-	62	72%

7.3.1.5 Important Factors to Projects

Table 7.3.1-5 below summarizes the importance of various factors in considering the project:

- The economic progress, national priority, and credit worthiness of the borrower/buyer are the most important factors. Social progress of the economy, social acceptability of the project and achieving high internal rate of return are less important.

Table 7.3.1-5: Important Factors to the Project (H = High, M = Medium, L = Low) - ECAs

FACTORS	ECGD	EDC	JEXIM	MEDIAN
Economic progress of the economy	-	H	H	H
Social progress of the economy	-	M	M	M
Environmental viability of the project	-	M	H	-
Social acceptability of the project	-	M	M	M
Economic viability of the project	-	M	H	-
High internal rate of return of the project	-	M	M	M
Other factors	H Credit-worthiness of borrower/buyer	-	H National Priority	H

7.3.1.6 Risk Management

Table 7.3.1-6 below summarizes various factors considered for mitigating different risks. All ECAs use all instruments to mitigate all risks involved, including the construction/completion risk, market risk, currency risk, and interest rate risk.

Table 7.3.1-6: Risk Management: Factors considered for mitigating risks - ECAs

TYPES OF RISK	CHOICES	PROJECT NUMBER			TOTAL PROJEC TS	PROJE CT %
		ECG D	EDC	JEXI M		
Construction or Completion risk	fixed cost, date certain, turnkey Engineering, Procurement, and Construction (EPC) contract	Yes	Yes	Yes	86	100%
	completion guarantee by party other than the EPC contractor	Yes	Yes	Yes	86	100%
	backstop guarantee such as letter of credit, performance bond by financial institutions	Yes	Yes	Yes	86	100%
	pledging of contractor's capital through an equity stake in the project	No	Yes	Yes	86	100%

	cost overrun facility commitment by project sponsors	Yes	Yes	Yes	86	100%
	charging the contractor liquidated damages capped at some percent of the project cost for completion delay	Yes	Yes	Yes	86	100%
	others		Yes		19	22%
Market risk	government guarantee / minimum guaranteed return bearing risk of non-payment by customers	Yes	Yes	Yes	86	100%
	take-or-pay contract with the government	Yes	Yes	Yes	86	100%
	setting debt-service accounts to provide cushion in the event of non-payment	Yes	Yes	Yes	86	100%
	independent appraisal from a third party about demand for project output such as electricity consumption	Yes	Yes	Yes	86	100%
	hedging by forwards and futures enabling project sponsors to sell their output for future delivery		Yes		19	22%
Currency Exchange/ Convertibility risk	indexing tariff rate to exchange rate fluctuations	Yes		Yes	67	78%
	indexing tariff rate to interest rate changes	Yes	Yes	Yes	86	100%
	indexing variable and fixed costs to local inflation	Yes	Yes	Yes	86	100%
	price-cap formula linking tariffs to changes in the price level of raw material(s) for the project	Yes	Yes	Yes	86	100%
	setting up reserve funds for devaluation risk	Yes	Yes	Yes	86	100%
	hedging using currency forwards and futures		Yes	Yes	24	28%
	arranging one or more currency swaps		Yes	Yes	24	28%
	hedging using currency options		Yes	Yes	24	28%
Regulatory/ Political risk	establishment of an independent regulatory authority	Yes	Yes	Yes	86	100%
	Provision for tariff adjustment with changing economic conditions e.g. increase in cost of raw material.	Yes	Yes	Yes	86	100%
	local investors / developers equity participation	Yes	Yes	Yes	86	100%
	all parties involved in the project must provide guarantee for project completion	Yes	-	Yes	86	100%
	Export Credit Agency and or Multilateral Agency Guarantee		Yes	Yes	24	28%

	Federal and State government commitment expressed in the form of Letter of Support or Guarantee	Yes	Yes		81	94%
Environmental risk	conduct Environmental Impact Assessments ('EIA') prior to funding	Yes	Yes	Yes	86	100%
	funding projects designing projects to be inherently less damaging to the environment for e.g. using cleaner technologies	Yes	Yes	Yes	86	100%
	introducing anti-pollution measures such as equipment to reduce power station emissions	Yes	Yes	Yes	86	100%
	developing management systems that minimize the risk of unforeseen problems and include plans to deal with emergencies and contingencies	Yes	Yes		81	94%
	contractual measures to allocate risks between various parties involved in the deal		Yes	Yes	24	28%
	include environmental performance related payments in the contract		Yes		19	22%
	allowing only reputable and pre-qualified tenderers to bid the project		Yes		19	22%
Interest rate risk	entering into an interest rate swap agreement		Yes	Yes	24	28%
	entering into an interest rate cap contract		Yes		19	22%
	interest rate options		Yes		19	22%
	not applicable	Yes			62	72%

7.3.2 Description of the Site Visit to Export Development Corporation (EDC) - Canada Canada's EDC was visited on November 26, 1998. This visit was part of site visits to several departments of the Government of Canada, the World Bank in Washington, and the USEPA offices in Washington from November 23 to 27, 1998.

The following people attended the meeting:

- i) Ms. Allison Nankivell, Regional Manager for China
- ii) Mr. Mark Bolger, Regional Manager for Asia Pacific
- iii) Mr. Rob Kengis, Engineering and Professional Services
- iv) Ms. Bonita Williams, Advisor, International Relations
- v) Mr. Richard Whitty, Corporation Policy Officer, President's office
- vi) Mr. Jonathan R. Robinson, Project Finance

Attending with the Consultant, Prof. G. Heinke, was also Mr. P.K. Leung of Environment Canada for liaison purposes.

Overall Result of Meeting

- EDC staff had all read the material on the project sent to them by the Consultants. This led to a very informative meeting.
- EDC is very interested to participate in this project.
- EDC will have several people review the draft questionnaires and comment on possible improvement of the Financial Institution and PSBs Questionnaires.
- Bonita Williams recommended to contact also the following people:
 - Ms. Janet West, Head OECD Secretariat, Export Credit Agency Group, Paris, France
 - EBRD (European Bank for Reconstruction & Development), London
 - Mr. Steve Tuardyk, US Treasury Department, Washington
- Several people raised the situation that often what is funded by ECD (or other similar agencies) for one country may not be funded for another country, based on experience with previous projects. Lack of maintenance and operation in Asian countries is a major reason for not funding certain projects. Also often the lack of willingness to pay for water and sewage treatment in Asia makes certain projects economically unfeasible under those conditions.
- When dealing with commercial banks for infrastructure loans one has to recognize their differing attitudes on donor versus host country financing.

Follow-up after Meeting

A very useful three-page memorandum with suggestions for revisions to the Questionnaire for financial institutions, as well as for the other two Questionnaires, was received December 8, 1998 from Mr. Bolger and mostly incorporated.

The Questionnaires were sent on January 5, 1999, as arranged, through Ms. Renetta Siemens of Environment Canada for distribution. Unfortunately, this did not happen, and another Questionnaire was sent to Mr. Bolger on March 17. The completed Questionnaire was received in mid-April and is reviewed below.

OECD contact

Ms. Janet West was contacted and agreed to meet with Prof. Heinke in April 1999. However this trip to France (as one of the five selected EU countries) did not come about, and no meeting with OECD was possible.

List of People and Address - Canada's EDC

Ms. Alison Nankivell
 Regional Manager - China
 Export Development Corporation - Canada (EDC)
 151 O'Connor, Ottawa
 Canada K1A 1K3

Tel.: (613)597-8657 / Fax: (613)598-2503
Email: nankal@edc1.edc.ca

Mr. J. Mark Bolger
Regional Manager - Asia Pacific
Export Development Corporation - Canada (EDC)
151 O'Connor, Ottawa
Canada K1A 1K3
Tel.: (613)598-2508 / Fax: (613)598-2503
Email: bolgma@edc1.edc.ca

Ms. Bonita Williams
Advisor, International Relations
Export Development Corporation - Canada (EDC)
151 O'Connor, Ottawa
Canada K1A 1K3
Tel.: (613)598-2928 / Fax: (613)597-8522
Email: willbo@edc1.edc.ca

Mr. Robert Kengis
Team Leader
Civil Works and Professional Services
Export Development Corporation - Canada (EDC)
151 O'Connor, Ottawa
Canada K1A 1K3
Tel.: (613)598-2812 / Fax: (613)598-3167
Email: kengro@edc1.edc.ca

Mr. Jonathan R. Robinson
Project Finance Team
Export Development Corporation - Canada (EDC)
151 O'Connor, Ottawa
Canada K1A 1K3
Tel.: (613)598-2708 / Fax: (613)597-8506
Email: robijo@edc1.edc.ca

Mr. Richard Whitty
Corporate Policy Officer
Government Relations and Corporate Policy
President's Office
Export Development Corporation - Canada (EDC)
151 O'Connor, Ottawa
Canada K1A 1K3
Tel.: (613)598-2721 / Fax: (613)598-2827
Email: whitri@edc1.edc.ca

7.3.3 Description of the Site Visit to Export Credit Guarantee Department (ECGD) ?United Kingdom

UK's - ECGD was visited on January 12, 1999 by the Consultant, Prof. G. Heinke, as part of a European tour of four countries (see Chapter 8). The people met were:

- Ms. Nancie Cowie

Underwriting Manager, Asia-Pacific
2 Exchange Tower, Harbour Exchange Square
London E14 9GS
Tel.: 44-171-512-7620 / Fax: 44-171-512-7962

Mr. Simon Chater

External Relations Division
2 Exchange Tower, Harbour Exchange Square
London E14 9GS
Tel.: 44-171-512-7214 / Fax: 44-171-512-7930
E-mail: schater@ecgd.gov.uk

ECGD-UK exists to support exports from the UK. To do this effectively, ECGD needs to ensure that it can meet the needs of those, who will be importing British goods and services. In so doing it provides confidence for foreign organization, that British leased exporters, when making use of ECGD's export credit facilities, will be able to offer attractive payment terms or finance packages. ECGD employs about 400 staff.

The prime areas for ECGD are:

- EU countries
- North America
- Brazil, Chile, Venezuela
- Russia
- China
- India
- Japan and Korea
- Australia, New Zealand
- Indonesia, Malaysia, Thailand
- Saudi Arabia and Gulf States

The services include the following categories:

- insurance to British exporters of goods and services against non-payment.
- financing facilities for the foreign buyer to spread payments of major capital goods and projects over a number of years.
- project financing, where the revenues generated are paying for the loan.
- lines of credit for smaller projects.

Ms. Cowie indicated that she thought that many parts of the Questionnaire for Financial Institutions did not apply to ECGD. However, she did complete certain parts before and at the interview and that information is compiled below in Section 7.2.4 as part of summary of questionnaires.

7.3.4 Description of the Site Visit to Hermes Kreditversicherungs AG ?Hambury, Germany

The site visit took place on January 21. It was part of the visit to four EU countries, - UK, Denmark, Germany and the Netherlands -, from January 11 to 29, 1999.

The following people were met:

- Mr. Wolf-Bernhard Kersten, Diplom-Kaufmann

Member of the Executive Management
Hermes Kreditversicherungs - AG
International Consulting
Friedensallee 254
D-22763 Hamburg, Germany
Tel.: (49-40)8834-2882
Fax: (49-40)8834-2888
Internet: <http://www/hermes-kredit.com>

- Dr. jur Susanne Bennert

Directionsbevollmachtigte
Vorstandssekretariat
Tel.: (49-40)8834-1004
Fax: (49-40)8834-1015
E-mail: susanne.bennert@hermes-kredit.com

It was a very informative meeting of about three hours. A presentation on Hermes provided the following information:

Hermes is the oldest credit agency in the world, founded in 1917. It is the largest in Germany and one of the largest credit insurers in the world, second only to an Italian group. Since 1997, Hermes is part of the Allianz Group of insurance companies, which also includes the French Coface group. Hermes head office is in Hamburg with a staff of 2000. It has offices in 17 European countries and has recently expanded to other parts of the world. In Asia, offices have recently been opened in Hong Kong, China and Singapore.

Within Germany Hermes has 50% of the German market. Of interest to this consultancy project is Hermes lead role in a consortium as the 'state' insurer for the Federal Republic of Germany. It was commissioned to handle export credit guarantees on a mandatory basis. Where projects require insurance for commercial/financial risk only, Hermes

provides this as a private company. When political risks are also involved Hermes work as an advisor to the Government for a fee. If the Government decides to go ahead with a project, then under this export credit insurance scheme the Government bears both the political and the commercial risk. This scheme has become known in the industry as the "Hermes cover".

Overall the Hermes range of services includes information management, insurance management and consulting management. To provide this range requires experienced personnel with banking knowledge, legal knowledge and financial/economic knowledge. Their staffs also need to know the various industries in order to assess risks. At least 10-15 years of experience are needed for a competent insurance person. Without credit insurance banks are unwilling to make loans for a project.

The Questionnaire for Financial Institutions was discussed in detail. Although not all questions are relevant to Hermes, it was agreed that they would complete the Questionnaire.

Follow-up letters were written on February 25 and April 14 1999 inquiring about progress on the completion of the Questionnaire, however, Hermes did not send any response.

7.4 Conclusions

In this chapter, we analyze the infrastructure projects from 9 financial institutions, namely, the World Bank, ADB, "HM Treasury, UK", and 6 financial institutions from Hong Kong, China.

- We find that most of the projects belong to the Power, and Expressways/Highways.
- About one-third of the projects have the construction phase of 2-5 years and the operation phase of more than 20 years.
- The mean rate of return is 16% with a range of 12% - 19%.
- About one-third of the funds are in the form of investment funds and are mainly disbursed for less than 5 years.
- The economic progress and the economic viability are the two most important factors for funding the projects.
- All financial institutions use all available methods to reduce various types of risks, including construction/completion risk, market risk, currency risk, and interest rate risk.

REVIEW OF INFORMATION FROM EUROPEAN UNION MEMBER STATES

8.1 Introduction

This consultancy contract required conducting "site visits to some EU countries with outstanding environmental records (candidates could be Germany, Austria, Sweden, and United Kingdom). The benefit of direct contact with knowledgeable people in these countries is likely to be of great value to the study."

After investigation by the consultant and with collaboration of Hong Kong, China Consulates, the following countries were chosen for site visit:

- United Kingdom (8.2)
- Denmark (8.3)
- Germany (8.4)
- The Netherlands (8.5)
- France (not carried out)
- EU Secretariat (Brussels) (8.6) (by correspondence only)

With the assistance of the Hong Kong, China, Consulates of these five countries, arrangements were made for appointments for Professor Heinke with relevant institutions/individuals during January 1999. It was not possible to complete such arrangements for France or the EU Secretariat in time. It was intended to visit France and Brussels in April 1999 together with a planned trip by Prof. Heinke on other business. However, this trip was postponed to late 1999, and there were insufficient funds and time to make another special trip for this consultancy only.

The record of the visits is presented in Appendix 4. A summary of the experience gained through the site visits and review of materials received is briefly presented in sections 8.2 to 8.6 below and summarized in section 8.7.

8.2 United Kingdom

Dates of visits: January 11-15, 1999

Meetings: 7

Government Departments: - Treasury Department
- Department of Environment, Transport and the Regions
(DETR)

- Department of Trade and Industry (DTI)

Financial Institutions: - UK's Export Credit Guarantee Department

Consultants/PSBs: - London Economics, Cons. Economists
- The Nichols Group, Management Consultants
- Ove Arup & Partners, Cons. Engineers

Details on people met are in Appendix 4-1 (UK-1).

Reference Materials received are listed in Appendix 4-1 (UK-2).

Summary

The above meetings with three government departments provided a good and up-to-date overview of the government's "Partnership for Prosperity - The Private Finance Initiative (PFI)" in the United Kingdom. There is no doubt that the UK is the most advanced country in carrying out the provision of services, previously provided by the public sector, by a partnership between the public and private sectors. The key meetings were those with the Treasury Department and the recently formed Department of Environment, Transport and the Regions (DETR). Most of the important reference materials were obtained from these two groups. As of November 20, 1998, 100 projects (each worth over £5 million) for a total expenditure of £11,271 million have been underway (see Appendix 4-1 Table UK-1). Since then additional 21 local government PFI schemes have got the go-ahead, including schools, housing, transport, old people's centres and electronic information network. DETR itself handles about 20 large projects worth over £6,600 million. These projects were very different from each other.

In addition, three private firms and the UK Export Credit Guarantee Department were visited. These meetings provided very useful additional information, as well as a perspective somewhat different than the governments.

The reference material provided, particularly UK 1 to 5, give policy and procedures of how PFI works. An analysis of the UK's PFI programme is presented in Chapter 4, Section 4.7.1. The completed Financial Institutions Questionnaire by Mr. Prynne on behalf of the Treasury Department is analyzed in Chapter 7.

The PSBs questionnaires submitted by Ove Arup & Partners and by the Nichols Group (Table UK-2 in Appendix 4-1) is analyzed in Chapter 5, Section 5.3. The response of United Kingdom's Export Credit Guarantee Department (ECGD) is analyzed in Chapter 7. Other countries wishing to move in the direction of greater private sector participation in the provision of infrastructure and services would do well by learning from the UK experience.

8.3 Denmark

Dates of visits: January 18-19, 1999

Meetings: 5

Government Departments:

Ministry of Environment and Energy
Ministry of Housing and Urban Affairs
National Building Research Institute
Institute of Local Government Studies
Forest and Landscape Research Centre

Details of the departments and people met are in Appendix 4-2.

Summary

The Scandinavian countries, Sweden, Norway and Denmark, have a high reputation for environmental consciousness and action. Only one could be visited because of time and resource constraints, and Denmark was chosen; however some contrasting information on the other two countries was also obtained.

All five meetings were with government departments in the areas of environment, transport, housing, forestation and local government administration.

The meetings with the several Ministries officials provided a good overview of the situation with respect to infrastructure provision, especially housing, and the roles of the public and private sectors. So far there has been very little participation of the private sector in financing or managing of public infrastructure. There were discussion about two projects (Oresund Bridge between Sweden and Denmark, and the Great Belt bridge between two major islands) to be built by a public/private consortium. The Great Belt Bridge has been in operation since 1998 and is fully financed by toll charges to pay back various loan arrangements over 30 years period. The Oresund Bridge between Denmark and Sweden will be operational from July 2000 and is to be financed by toll charges during the next decade. Both traffic systems are organised as independent public organisations. There was considerable public opposition to the building of new bridges in Denmark believing that they will benefit more the inter-European transport, rather than benefiting Denmark.

The several agencies involved in public housing have technically and socially well advanced programmes, which may be of interest to APEC Member Economies.

8.4 Germany

Dates of visits: January 20-22, 1999

Meetings: 2

Government Department: Federal Ministry of Environment, Nature Protection and
Reactor Safety
(BMW), Bonn

Insurance Group: Hermes Kreditversicherungs AG, Hamburg

Details on people met and reference materials received are in Appendix 4-3.
Details of the people met are in Appendix 4-3 for Government and in Chapter 7 for
Hermes Kreditversicherungs AG.

Summary

Germany is a federal state with 16 Lander (Provinces). The role of provision of infrastructure services is divided between the federal government and the Lander, but with the major responsibility resting with the Lander. It is this fact that made it difficult to arrange appropriate meetings at the federal level. Fortunately, the one meeting in Bonn with Ministerialrat Dr. Alfred Walter, Leader of the Economic Section of the Federal Ministry of Environment (BMU), was very productive as he was able to explain the German experience very well because of his background in economics and environment, and his long service.

For roads the Federal Government only deals with the development of the major countrywide road network (Bundestrassen). The Lander deals with the provincial road net and the "Gemeinde" deals with the local community/city road system. There are no toll roads at this time in Germany. There is discussion to introduce some in the former East Germany, where major rebuilding is needed.

Railroads are fully privatized under the name "Deutsche Bahn".

In environment, the Federal Government sets laws for waste management, air pollution control and noise abatement and on some other environmental matters. It is the "Lander" and/or the local communities that must legislate, implement, enforce and operate the necessary facilities.

Energy production is mostly in private hands but some "Lander" have share in them. Deregulation throughout Europe may bring international competition. Other public facilities such as airports, postal services, telecommunication, and natural gas are maintained more by the private sector.

Overall it is more difficult to obtain concrete information about infrastructure and financing, as Germany is a very decentralized country in this respect. The financing of infrastructures is still mostly from the several levels of government, with additional funding through banks, insurance companies and other financial institutions.

The Federal Government has been very active internationally on environmental issues. Sustainability (Nachhaltigkeit) in Germany is defined as "requiring the inextricable linkage of ecology, economy and social security. Sustainable development requires that improvements in economic and social living conditions accord with the long-term process of securing the natural foundations of life".

APEC Member Economies can certainly learn from the German experience, but the task of doing so would be much more time consuming as for example in Britain, because of the highly decentralized situation in Germany.

8.5 The Netherlands

Dates of visits: January 25-29, 1999

Meetings: 7

Government Departments:

Ministry of Housing, Spatial Planning and Environment

Ministry of Public Works

Ministry of Finance (by correspondence only)

Ministry of Economic Affairs (by correspondence only)

Universities:

Vrije Universiteit Amsterdam

Technical University of Delft

Consultants:

Bugel Hajema Adviseurs BV, Assen

Details of the people and reference material received are provided in Appendix 4-4.

Summary

Issues on Sustainability and Infrastructure Development involve at least six Ministries in the Netherlands Government. They are:

1. Ministry of Housing, Spatial Planning and the Environment

2. Ministry of Economic Affairs
3. Ministry of Agriculture, Nature Management and Fisheries
4. Ministry of Transport, Public Works and Water Management
5. Ministry of Finance
6. Ministry of Foreign Affairs

It was possible to arrange meetings with officials of two Ministries (1, 4) and through correspondence with another two (2, 5). Further information was sought but not received. In addition, meetings with relevant institutes at two universities and with one consulting company were held. Overall this provided a good overview of the situation in the Netherlands, including review of the relevant material obtained (Appendix 4-4 (N-2)).

The Netherlands is a small and densely populated country of 15 million people. Its economy depends on industry, particularly chemicals and metal processing, intensive agriculture and horticulture and on the country's geographical position at the heart of Europe's transportation network. These factors have led to major pressures on the environment.

In the mid-1980's, it was concluded that traditional environmental protection measures, based on regulation of substances or processes, which posed a risk to human health, had largely failed. In most respects, the quality of the Dutch environment was deteriorating and would continue to deteriorate unless radical changes were made. (Excerpt from Ref. N2, 6)

The National Environmental Policy Plan (NEPP), 1989 was drawn up. It is a national strategy for the environment, which aims to achieve sustainable development in the Netherlands within one generation. It establishes key environmental quality objectives and sets out a long-term programme of actions to ensure that objectives are achieved. The plan is characterized by a management approach to environmental problems. (Excerpt from N1 Ref.)

The meetings with government, university and consultants officials were very informative. Unfortunately, no meetings could be arranged with officials of the Ministry of Finance and Ministry of Economic Affairs. Subsequent efforts to arrange for input from them through correspondence did not result in useful additions to the material obtained during the site visit.

There is no question that the Netherlands has accomplished a great deal of quality environmental management in spite of its very high density of population. Its people are well educated in environmental matters and support the government's effort toward sustainable development.

There is considerable cooperation between government and industry on environmental issues. However, with respect to public-private financing of infrastructure, there is as yet little use of it. Telecommunication is entirely in private hands ?a new industry that did not need to be transferred to the private sector. The railroads were partly privatized a few years ago, but the government is still the largest shareholder. Roads are mostly publicly financed, only a few toll roads tunnels and bridges exist, but they are government built and operated. Again the airport at Amsterdam, and the national airline, KLM has been

privatized, but the government is still the largest shareholder. For water supply, wastewater and solid waste management local, but public boards are managing them.

APEC Member Economies may be able to learn a lot from the Netherlands experience of how to provide for sustainable development and a clean environment in a dense industrial country. However, there is as yet little experience on the issue of financing infrastructure through private or public/private means.

8.6 European Union Secretariat

Although no site visit was possible, it was mentioned by all four of the EU countries visited, that an approach to Brussels may produce important information for our study, particularly in the area of trans-European transport network, and how to finance it.

An approach was made to several EU Directorates with the assistance of Mr. Etienne Reuter, Head of the Office of the European Commission in Hong Kong, China. Eventually DG VII (Transport), DG XI (Environment, Nuclear Safety and Civil Protection), DG XIII (Telecommunications), DG XVI (Regional Policy and Cohesion), and DG XVII (Energy) were contacted. A review of selected reports is presented in Appendix 4-5. DG XI (Environment) completed the section on Sustainability (Part B) of the AMEs questionnaire. Their response is included in Appendix 4-5, and also presented in Chapter 3.

Individual APEC Member Economies, as well as APEC as a whole, may benefit from the experience of the European Union in upgrading transportation networks, rebuilding of cities and environmental performance of the region. They may also benefit from their economic and social cohesion programme, designed to assist less prosperous members of the EU with specific programmes for transport and environment facilities.

Unfortunately the contact by the Consultants with the EU Secretariat was too small to draw any further conclusions relevant to this study.

8.7 Summary of Experience from the Selected EU Member States

The following are the consultant's impressions of what can be learned by APEC Member Economies from the EU experience on financing of sustainable infrastructure through public/private partnerships:

- i. The United Kingdom is the only country in the European Union, which has made sufficient progress in the implementation of its program: Partnership for Prosperity - The Private Finance Initiative (PFI). In recent years it has set up an interdepartmental Task Force which includes several government departments, led by the Treasury Department, to implement the provision of services, previously provided by the public sector, by a partnership between the public and private sectors. Well over 100 projects, each worth over £5 million, for a total expenditure of about £12,000 million has been carried out in a wide variety of services.

- ii. The experience in the Netherlands and in Denmark is much more limited with respect to private financing of services. However, much important work is being done to make the public services more sustainable, with particular emphasis on housing.
 - i. In Germany, it is the Bundeslander (States), which together with municipalities, primarily carry out public services. Based on information received at the Federal Ministry of Environment the core public services are still primarily financed by public funds. Some projects in the "new" Bundeslander (in the former East Germany) are financed in partnership with the private sector.
 - i. The role of the European Union on financing and sustainability of EU- wide infrastructure projects could not be sufficiently clarified during this study, as no site visit was possible. However, from the information received by mail and summarized in Section 8.6, it is clear that individual APEC Member Economies, as well as APEC as a whole, may benefit from the experience of the EU in upgrading transportation networks and environmental improvements in their regions. They may also benefit from their economic and social cohesion programmes, designed to assist less prosperous members with specific programme for transport and environmental facilities.
 - i. The application of experiences gained in European countries to other areas of the world such as some of the less developed APEC Member Economies needs to be very carefully done. The infrastructure needs of European countries are very different from those of developing countries. Their successes may not be transferable, but one may be able to learn from their failures.
 - i. Any APEC Member Economy, which wishes to proceed with implementation of greater participation of the private sector in the provision of formerly public services, would be well advised to study the United Kingdom experience. Visits of a team of relevant specialists to the United Kingdom would be the best way to accomplish this.
-

CHAPTER 9

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

9.1 Summary

In this study, we use literature survey, questionnaires and site visits to selected AMEs, PSBs, FIs, and EU member states to understand their practices on innovative approaches to financing of initiatives such as sustainable infrastructure and building, planning, design, construction and operation. Based on the completed and partially completed questionnaires from 4 AMEs, 14 PSBs, 9 FIs including World Bank and ADB, and 3 ECAs, and the site-visits to 4 AMEs, 4 EU member states, and 2 MFIs, we find the following:

9.1.1 Sustainability

Since there is no common accepted definition of sustainability, in this study, we started with the interim definition of "Sustainable Development" and "Sustainable Infrastructure". The following definition of sustainable development has been adopted from the study on Sustainable Development for the 21st Century commissioned by the HKSAR government.

- i. *"Sustainable development balances social, economic and environmental needs, both for the present and future generations, simultaneously achieving a vibrant economy, social progress and better environmental quality, locally and internationally, through the efforts of the communities and national governments."*
- ii. *"An infrastructure is sustainable when it is economically viable, socially acceptable and environmentally acceptable."*

We then asked the respondents if they agreed with these interim definitions or not. The responses indicate that more than 60% of respondents agree with the definition. As a result, we recommend keeping these definitions until any extension of this study is conducted in future.

In addition, all the people we interviewed considered the economic viability as the most important factor contributing to sustainability of the project. They argued that once the project is regarded as economically viable, feasibility studies are conducted to study the environmental, social and other aspects of the project.

9.1.2 Results from Private Sector Businesses

From the interviews and PSBs questionnaires, we find that:

A. *Nature of the projects*

- Most of the projects belong to the Power sector.
- 75% of the total projects have the construction phase between 2 to 5 years.
- 70% of the total projects have the operation phase of more than 20 years.
- The project type varies widely depicting different types of public-private partnerships such as BOT, BOOT etc.
- Most projects fall in the BOT project type.

B. *Project cost and Rate of return*

- The project cost varies widely between less than US\$50 million and more than US\$1 billion.
- 31% of the projects have a total cost between US\$50 million and US\$100 million.
- The payback period for most of the projects is between 5 to 10 years.
- The mean internal rate of return (IRR) of the projects is 12%.

C. Financing methods

- About half of the projects, obtained funds from the private sector.
- For about 40% of the cases, the total cost funded by the private sector was 80-100%.
- Funds were obtained directly from the shareholders for one-third of the projects.
- The debt to equity of the projects lies between 2:1 to 4:1 in 50% of the cases.
- The debt repayment schedule allows grace period of repayment followed by principal and interest repayment for 42% of the projects.
- The debt is denominated in local currency for 42% of the projects.
- The financing methods used by PSBs are very traditional, such as equity financing and commercial bank loans. These companies have used no innovative financing methods for the projects discussed in this study.

D. Factors for undertaking the projects

- A majority of private sector businesses rank economic viability as the most important factor and national pride as the least important factor.

E. Risk management

- Almost all PSBs hedge various types of the risks at all stages of the project.
- Interest rate swaps and fixed rate borrowings are the most popular method for reducing the interest rate risk.
- All Asian PSBs adopt some form of currency risk management.

9.1.3 Results from APEC Member Economies

From the APEC member economies questionnaires, we find that:

A. Nature of the projects

- Most of the projects belong to the Expressways/Highways sector.
- 82% of the total projects have the construction phase between 2 to 5 years
- 78% of the total projects have the operation phase of more than 20 years
- Project type varies widely depicting different types of public-private partnerships.

B. Project cost and Rate of return

- Project cost varies widely between less than US\$50 million and more than US\$1 billion.
- 46% of the projects have a total cost between US\$100 million and US\$500 million.
- The payback period of the projects is more than 20 years.
- The mean internal rate of return (IRR) is 10% and the range of IRR is 5% to 17%.

C. Financing methods

- All projects obtained some public funding.
- Only 14% of the projects have less than 20% of the total cost funded by the private sector.
- The government uses debt as the major source of financing for the projects.
- The APEC members have used no innovative financing methods for the projects listed in the questionnaires.

D. Factors for undertaking the projects

- Economic progress and national pride are the two most important factors for undertaking the projects.

E. Risk management

- The member economies do hedge the construction/completion risk and the environmental risk.
- The currency risk is rarely hedged.
- The interest rate risk is always hedged.

9.1.4 Results from Financial Institutions

From the FIs questionnaires, we find that:

A. *Nature of the projects*

- Most of the projects belong to the Power, Expressways/Highways, and 'Others' categories.
- 40% of the total projects have construction phase between 2 to 5 years.
- 32% of the total projects have operation phase of more than 20 years.

B. *Project cost and Rate of return*

- Project cost varies widely between less than US\$50 million and more than US\$1 billion.
- 42% of the projects have a total cost between US\$100 million and US\$500 million.
- The payback period of most of the projects is between 5 to 10 years.
- The mean internal rate of return (IRR) of the projects is 16% with a range of 12% - 19%.

C. *Financing methods*

- For 12% of the projects, funds are obtained by medium and long-term borrowings in the capital markets of developed countries such as USA, Japan, and Europe.
- 36% of these funds are in the form of investment funds and are disbursed for less than 5 years for 57% of the projects.
- The debt repayment schedule allows grace period of repayment followed by principal and interest repayment for 24% of the projects.
- The debt is denominated in the local currency for 30% of the projects.

D. Factors for undertaking the project

- Economic progress and economic viability are the two most important factors for funding the projects.

E. Risk management

- All financial institutions use all available methods to reducing various types of risks, including construction/completion risk, market risk, currency risk, and interest rate risk.

9.2 Conclusions

- Public funding, for infrastructure development, is becoming difficult for governments to provide. Therefore, the private sector is becoming increasingly important in providing the capital and expertise for infrastructure development due to high demand for infrastructure development.
- The United Kingdom is the leader in private sector involvement among the European Union member states. Canada is also encouraging private sector involvement in various sectors.
- Based on the analysis of the completed questionnaires and the site visits, we find that infrastructure-financing methods differ across different sectors. Through literature survey we identify "Best Practices" for various infrastructure sectors including the power sector, port privatisation, airports and air traffic control, transport, water supply, and privatisation of landfills (please see Section 4.8 for review of these "Best Practices". The "Best Practices" for one sector may not be applicable to the other sector. Hence, it is important to study infrastructure sectors separately to identify issues related to each sector and then design financing methods that can allocate risks to the parties that can bear it and provide appropriate return.
- Similarly, the "Best Practices" cannot be simply transferred across member economies, as the macro-economic environment within each economy is different. However, the "Principles of Finance" still apply. That is, for projects with more predictable and stable cash flows or with host government guarantees for projects such as power plants, the debt to equity ratio can be higher.
- We find that the private sector businesses financed their infrastructure projects evenly from both equity and debt. On the other hand, government financed their infrastructure projects mainly from debt.
- The required rates of return for government projects are normally lower than that for the private projects. Although, economic viability is one of the most important factors for undertaking a project for both private sector and the governments, factors such as national pride and social responsibility are very important for the government projects.
- While the private sector and financial institutions hedge all types of the risks, the

governments hedge relatively less for the currency risk and interest rate risk.

- Finally, we also find that this survey covers too many types of infrastructure projects with different variables. Different types of infrastructures have different cost of investments, economic life, risk, financing methods, etc. making it hard to have a uniform cross-sectional analysis. As a result, we recommend that the research be based on single or related types of infrastructure projects to obtain meaningful results.
- The insufficient response rate by the member economies and lack of relevant data restricted the consultants from highlighting any conclusive statements about the innovative financing methods, if any. It was, therefore, inappropriate to raise policy issues affecting the selection of financing approach for different infrastructure sectors. Hence, the Consultants did not touch upon this aspect of the study.
- Although we failed to shed light on any "innovative" approaches to financing of sustainable infrastructure from the information collected through site visits and questionnaires, we do provide a summary of the financing methods for infrastructure projects in APEC economies. Possibly, as the meaning suggests, the respondents must have considered "innovative" as new and creative that no one has used before. As a result, the use of "innovative" or the objective of the study on "innovative" financing might be too ambitious in the first place. As a result, we feel that the term "common practice" of financing methods instead of "innovative approaches" to financing should have been used.

9.3 Recommendations

At the early stage of this study, the APEC member economies expressed strong interest and realised the importance and relevance of the project. However, the beginning of Asian financial crisis in July 1997 might have taken too much of APEC member economies' effort to deal with the crisis, resulting in a low response rate to this study. In addition, the survey involves a number of departments within a member government complicating the inter-departmental collaboration for completing the questionnaires. Also, the project involved almost all sectors of infrastructure projects making the task for large economies such as USA; Australia; and Japan more difficult to respond to the survey. This may be the reason that a small economy such as Hong Kong, China; and Singapore could provide detailed and comprehensive completed questionnaires. As a result, if any further extension of this study is conducted, we recommend that the following steps be taken:

- **STEP 1:** The results of the study show that the most comprehensive and complete information at the PSBs, FIs and economy levels was collected only for Hong Kong, China. This was made possible by the joint efforts of PELB, the participants of the study, and the location of the consultant within Hong Kong, China. In view of the broad scope of this study, we realise that establishing a similar arrangement within each member economy would facilitate the data collection process and would greatly enhance the quality and quantity of data, resulting in a meaningful cross-sectional analysis at PSBs, FIs and economy levels. Hence, we recommend the following:

In case that the study is extended further, the member economy that leads the study must function as the project lead co-ordinator. All other APEC member

economies must identify a representative from the appropriate government department(s) that would initiate the project within that member economy. While the project lead co-ordinator would liaise activities between the consultant in their economy and the representatives from each of the member economies, the representative from each member economy would function similar to the Study Steering Committee as seen in the case of Hong Kong, China. For instance, the representative should be responsible for (i) hiring consultant(s); (ii) assisting the consultant in establishing contact with relevant PSBs, FIs if necessary; and (iii) equipping them with necessary resources in order to carry out the study in their economy.

- STEP 2: Provide necessary resources within each APEC member economy to participate in the study. Since some economies are too large where the government agencies are structured at the Federal, State and Provincial levels, it is important to put together relevant mix of resource groups from different levels and not just one department such as Ministry of Environment, in order to enhance inter-departmental collaboration.
- STEP 3: The projects in different infrastructure sectors have different variables, such as the cost of investment, economic life, risk, financing methods, required rate of return, stability of cash flows, etc. As a result, for a project like this aiming at all types of infrastructure projects, it is very hard to have a uniform cross-sectional analysis to draw meaningful conclusions. Therefore, it will be appropriate to group related infrastructure sectors or focus on individual sectors separately to obtain meaningful results from the projects in those sectors.

Further, for each infrastructure sector, future research be concentrated in particular areas such as to examine resource rents and rates of return on various types of infrastructure investment to assess economic and financial viability of projects. The knowledge of such variables would help in determining the extent of private sector involvement in infrastructure development for meeting the resource gap.