



Cover: Chijin, Kaohsiung,
Chinese Taipei.
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The Fifth APEC Roundtable Meeting on the Involvement of the Business/Private Sector in the Sustainability of the Marine Environment

APEC Bulletin on Marine Resource Conservation and Fisheries

October 2004 VOL. VI No. 3

Publisher

Dr. Juu-en Chang, Minister
Environmental Protection Administration
Chinese Taipei

Supervisor

Dr. Gwo-Dong Roam, Director General
Office of Science and Technology Advisors
Environmental Protection Administration
Chinese Taipei

Editor-in-Chief

Dr. Wen-Yan Chiau
Department of Marine Environment and
Engineering
National Sun Yat-sen University
Chinese Taipei

Assistant to the Editor

Yu-Yang Lin,
The Foundation of Ocean Taiwan
Chinese Taipei

This Bulletin on APEC MRC and Fisheries is
available on the Website,
<http://enix.epa.gov.tw/aboutvc.htm>
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please contact:

APEC Bulletin on Marine Resource Conservation and Fisheries

Environmental Protection Administration
Office of Science and Technology Advisors
41, Sec.1, Chung-Hwa Road, Taipei, Taiwan
Tel: +886-2-2311-7722 ext. 2203
Fax: +886-2-2311-5486
Email: shiuian@sun.epa.gov.tw

Printed By

The Foundation of Ocean Taiwan
301-1 Pei-Ning Road, Keelung 202
Taiwan
Tel: +886-7-525-5166
Fax: +886-7-525-5167
Email: chiauyw@mail.nsysu.edu.tw

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**November 4-6, 2004
Kaohsiung, Chinese Taipei**

Meeting Report

The 5th APEC Roundtable Meeting on the Involvement of the Business/Private Sector in the Sustainability of the Marine Environment was held from 4-6 Nov. 2004, in Kaohsiung, Chinese Taipei, and attended by representatives from the business sector (petroleum, tourism, training/planning managers, consultants), academia, government and non-governmental organizations of Australia; Canada; Chile; Hong Kong, China; Japan; Singapore; and Chinese Taipei. The list of participants is attached as Annex 1.

Opening

Dr. Y.F. Liang of the Environmental Protection Administration, Chinese Taipei opened the meeting and welcomed the participants. He encouraged the private sector to play a more active role in environmental protection and conservation. He also emphasized that establishment of a sustainable long-term strategy is important in mariculture development.

Dr. Chung-Cheng Chang (President of National Sun Yat-sen University,

Chinese Taipei) welcomed the participants and stated that he was glad that the University and the Environmental Protection Agency were co-organizing and hosting this meeting in Kaohsiung. He mentioned that the University should continue to make a significant input in managing our marine environment.

Background Briefing

Dr. Wen-Yan Chiau, Chinese Taipei, provided the background of the Marine Resources Conservation (MRC) Working Group roundtable meeting. This meeting of the series is organized as a continued effort after the 1997 "APEC Action Plan on Sustainability of the Marine Environment", the 2000 "Action Strategies and Work Programs" and the 2002 Seoul Declaration of APEC Ocean-related Ministerial Meetings. The MRC meeting provides a forum for stakeholders from government agencies, academia, business sector, and NGOs to examine how to best foster partnership between public and private sectors, in a concerted effort towards the sustainable use of the marine environment, and more

importantly, to develop concrete project proposals for putting forward for the consideration by APEC.

Session I - Economic Value Resources

Chaired by: Dr. Robert R. HWANG, Chinese Taipei and Dr. Chiu L. CHOU, CANADA

International Marine Science Observation in Spratly: TaiPen Reef Island (Dr. Chao-Shing LEE, CHINESE TAIPEI)

Dr. Lee highlighted that corals serve as useful indicators for climatic changes such as temperature, salinity, storm events and El Nino. He pointed out that the establishment of an international marine science observatory in Spratly would benefit collaboration between scientists from the APEC region. The potential oil and fisheries resources would also attract future development. He also cautioned that coral reefs in Spratly are ecologically important and sensitive.

Green GDP on Fisheries - Chinese Taipei's Approach (Dr. I-Hsun NI, CHINESE TAIPEI)

Prof. Ni gave a summary on recent development of Green GDP for fisheries in Chinese Taipei. He pointed out that fisheries production in Chinese Taipei is important not only to Chinese Taipei, but also on a global scale. He brought up green GDP and "System of Environmental and Economic Accounting for Fisheries" (SEEAF) as important concepts in modern fisheries management. He further provided an overview on the use of fisheries accounts in various countries, and outlined Chinese Taipei's approach in Green GDP and the implementation of SEEAF.

Sustainable Development of Cold, Deep Seawater: A Natural Renewable Resource (Dr. Gwo-Ching GONG, CHINESE TAIPEI)



*The 5th APEC Roundtable Meeting, Chinese Taipei.
Photo: H.C. Huang*

Dr. Gong advocated cold deep seawater as a natural renewable resource. He cited successful examples from Japan and Hawaii including power generation and production of a wide range of commercial products. He also introduced trials from Taitung and Hualian in Chinese Taipei. However, it appears that the current technology for using this resource, although promising, may still require further development to overcome a number of technical difficulties, and current success is largely restricted to use in air conditioning.

**Session II – Oil Spill
Chairs: Dr. Arthur C.T. CHEN, CHINESE TAIPEI; Dr. Robert KAY, AUSTRALIA**

Sakhalin's Oil: Outline of World Biggest Energy Developing Projects - (Dr. Nobuhiro SAWANO, JAPAN)

Dr. Sawano gave an introduction to the exploration and production of offshore oil and gas on the Sakhalin shelf and sea of Okhotsk: a multi-billion dollar project. The economic and environmental impact as well as possible threat to fisheries was considered. Dr. Sawano outlined the useful contribution that regional cooperation had made in supporting local initiatives to manage potential marine and coastal impacts of oil and gas development.

The Role of EARL as a Tier 3 Centre in Regional Industry Government Cooperation (Mr. Declan O'Driscoll, SINGAPORE)

Mr. O'Driscoll gave a brief introduction on the three tiers' approach to oil spillages. He emphasizes that any course of action should be based on the use of NEBA (Net Environmental Benefit Analysis). He further gave an overview on the Tier 3 response center,



*A Temple in Donggang, Chinese Taipei.
Photo: W.Y. Chiau*

focusing on its capability, training, international collaborations and the development of contingency plans. Looking forward, he was of the view that (a) greater ratification of OPRC convention; (b) continued emphasis on developing a national oil spill response capability and (c) close collaboration between industry and government work are key elements to success.

The M/V Amorgos Oil Spill Incident: Chinese Taipei's Compensation Claim for Ecosystem Damage and Economic Loss (Yann-Huei SONG, CHINESE TAIPEI)

Dr. Song provided an interesting case study on legal issues and problems of legal claims arising from the M/V Amorgos Oil Spill Incident, which occurred in Chinese Taipei in 2001. This highlighted the current problem that there are no objective criteria to measure ecosystem damages. The incident also emphasized the importance of having ecological and fisheries baseline data in economic assessment.

Taiwan Association of Marine Pollution

Control Status Report (Mr. Eilif T.C. WANG, CHINESE TAIPEI)

Mr. Wang introduced the mission and goals of the Taiwan Association of Marine Pollution Control, a cross-nation professional association. The organization provides a platform of communication among interested groups as well as international communication, taking advantage of the unique location of the island of Taiwan. The mission of the association is to promote education, research and development new technologies on marine pollution control, actively participate in international organizations and programs to promote international co-operation and experience sharing. He noted that membership is made up of (i) industry (63%), (ii) academic (27%), (iii) government (10%). He introduced some of the recent activities of the association.

Developing a Regional Oil Spill Response Training Center (Mr. Mark WEST, CANADA)

Mr. West discussed the needs and possibility of establishing a self-managed regional training center for oil spill response in Chinese Taipei. Details were given regarding resources requirements, training programs, training targets and important factors to be considered in setting up a training centre.

Oil Spill Simulation in Southern Chinese Taipei (Dr. Kuo-Tung CHANG, CHINESE TAIPEI)

Dr. Chang illustrated the usefulness of using OILMAP (a numerical simulation software) to predict the trajectory and environmental fate of oil during spillages. OILMAP provides a very powerful tool for oil pollution control and helps to reduce environmental impact. This software was successfully used in hindcasting the Kaohsiung oil spill event (in Oct, 1997) and the Amorgos oil spill event (in Jan. 2004).

**Session III - Marine Aquaculture
Chairs: Mr. Dah-Wen SHIEH,
CHINESE TAIPEI; Dr. Nobuhiro
SAWANO, JAPAN**

Planning and Management of Mariculture: A Hong Kong Perspective (Dr. Doris Wai-Ting AU, Hong-Kong, CHINA)

Dr. Au provided an overview on the legal framework and regulation the mariculture industry in Hong Kong. The major problems facing the industry were highlighted: i) fish feed, ii) unstable supply of fry, iii) harmful algal blooms (HAB), and iv) unacceptable environmental impacts. The corresponding management strategies were discussed i.e. artificial feed, contingency plan to tackle HAB, control of HAB by clay application, a 3-D hydrodynamic model developed to predict HAB movements. Moreover, water quality modeling was shown to provide a powerful tool in mariculture management. With this tool, carrying capacity could be estimated and impact minimized

Development of an APEC Action Strategy on Sustainable Aquaculture (Dr. Alex BROWN, CHILE)

Dr. Brown presented some relevant elements on APEC aquaculture, which produces some 90% of worldwide production (US\$56 billion in 2002). He pointed out the current problems and future challenges of aquaculture, and discussed about the urgency to develop an APEC Strategy on Sustainable Aquaculture, including 1) elements for environmentally sound aquaculture, employment opportunities, product quality and safety assurances, and promotion of high aquatic animal health and welfare standards; 2) creation of web-based information network and database on sustainable aquaculture for improving stakeholder and information exchanges; 3) undertake capacity building (training) for policy-makers to enhance sustainable aquaculture development and policies in the Asia

Pacific Region; 4) foster collaborative regional research on sustainable aquaculture, leveraging regional expertise towards mutual recognition or equivalency of standards for production and other processes linked to trade and strengthening consumer acceptance and confidence in aquaculture food products.

Status of Marine Aquaculture in Chinese Taipei and An APEC Pilot Study for Assessment of Environmental Carrying Capacity and Development of Risk Assessment Methodologies and Guidelines for Use in Sustainable Marine Aquaculture (Dr. Wen-Yan, CHIAU, CHINESE TAIPEI)

Prof. Chiau gave a brief on marine aquaculture in Chinese Taipei and a pilot study for assessing the environmental carrying capacity, using the Penghu archipelago in the southwestern area of Taiwan and Shiauo Liu Chiu as examples. He emphasized that it is important to develop guidelines, which should provide an accountable direction for responsible authorities and predictability for industry. Transparent and accountable regulations are important for decision making processes in marine aquaculture

development.

A Regression Model Using Sediment Chemistry for Evaluating Near-Field Effects Associated with Salmon Aquaculture Cage Wastes (Dr. Chiu L. CHOU, CANADA)

Dr. Chou introduced a regression model based on changes of metal composition of sediment (Cu, Al, Fe, Li, Mn, Zn, and organic carbon) to detect and assess the cumulative effects from aquaculture wastes to the marine environment. The model shows promise for evaluating environmental impact associated with salmon aquaculture cage wastes. The approach provides an effective means for assessing the environmental conditions and consequently in establishing regulatory guidelines, such as marine environmental quality relevant to aquaculture operations.

Responsible Stock Enhancement and Sea Ranching (Dr. Mao-Sen SU, CHINESE TAIPEI)

Dr. Su introduced a wide range of factors determining the success of stock enhancement and sea ranching programs. These include: protection of nursery grounds, improvement of habitats (e.g. seagrass, mangroves),



Photo: W.Y. Chiau

deployment of Artificial Reefs, and release methods (number, time, site etc.). He also pointed out that it would be important to regulate the harvest (especially trawling) and evaluate the results of these initiatives. In particular, evaluation should focus on the socioeconomic objective of the program. He suggested that marine cage farming could be integrated with stock enhancement and ranching.

Why Cobia? Choice of Chinese Taipei Marine Cage Farmers (Mr. Chen-Yu, Steven HSU, CHINESE TAIPEI)

Mr. Hsu provided an overview of marine cage culture industry and production of cobia in Chinese Taipei, noting that cobia culture contributed to some 52% of total marine cage farming in 2003. Natural challenges mainly include typhoons and cold fronts, while technical challenges rest with breeding and fish diseases. Marine cage culture of Cobia is supported by the government both with grants and research support and a strong feed industry.

Marine Aquaculture in the Penghu Archipelago (Mr. Lien-Hseng CHEN, CHINESE TAIPEI)

Lunch hosted by Dr. Y.Y. Chang, Dean of School of Marine Science, National Sun Yat-sen University
Photo: W.Y. Chiau





*Pingtung, Chinese Taipei
Photo: Y.Y. Lin*

Mr. Chen provided a brief profile on marine aquaculture in the Penghu Archipelago. Problems encountered by family-owned marine culture businesses include disease, limited culture area (3 ha/site), poor water quality and low profit. Rotational culture techniques were used to minimize impact on fish culture.

Session IV – Useful Models/Coastal Zone Management
Chairs: Dr. Alex BROWN, CHILE; Dr. Eric Chia-Ei TSAI, CHINESE TAIPEI

Private Sector Engagement in Coastal Zone Management: Models and Practical Examples from Australia (Dr. Robert KAY, AUSTRALIA)

Dr. Kay emphasized the crucial role of the private sectors in coastal zone management. The government should set appropriate strategies to get the private sector engaged in CZM and infrastructure development. The advantages and disadvantages of five engagement models were discussed and illustrated with Australian experience. Despite limited analyses to date from these models, these serve as a useful starting point for

enhancing this important area of CZM in the future to the benefit of regional governments, private sector and citizens. Further focused research in the APEC region was recommended to assess this important issue.

Characterization of Coastal Ecology in Chinese Taipei with Mass Data Analysis (Dr. Lee-Shing FANG, CHINESE TAIPEI)

Dr. Fang made use of data accumulated from environmental impact assessment studies to conduct mass data analysis for the detection of marine coastal community change in southwestern Taiwan (using examples of lagoon and sludge dispersal area). The findings will be useful for the government to take appropriate management actions so as to minimize ecological impact.

Marine Environmental Research and Innovative Technology: An Area of Excellence in Hong Kong (Dr. Rudolf WU, Hong-Kong, CHINA)

Prof. Wu introduced the background of the Area of Excellence (AoE) scheme in Hong Kong, the mission and unique features of MERIT, an AoE in HK on Marine Environmental Research and Innovative Technology. The MERIT will develop environmental research relevant not only to environmental protection and management but also to social and economic development of Hong Kong. Research activities of MERIT are organized under four task teams, which are inter-related : 1) novel technologies for environmental diagnosis ; 2) field studies and validation; 3) impact and risk assessment ; 4) control and bioremediation. A range of innovative and marketable technologies will be developed for monitoring, control and management of the marine environment.

Constructed Wetlands for Sustainable Management of Water and Wastewater in a Recirculating Aquaculture System for Shrimp

Production (Dr. Ying-Feng LIN, CHINESE TAIPEI)

Dr. Lin pointed out pond aquaculture resulting in over withdrawal of groundwater and highlighted the need for recirculating aquaculture system (RAS) in aquaculture. Existing RAS is ineffective and costly. Two types of constructed wetland, the free water surface (FWS) system and the subsurface flow (SF) system, for management of wastewater and shrimp production were discussed. Comparing with mechanical treatment process, the constructed wetlands offer higher removal performance.

Session V – Relevant APEC Projects
Chairs: Dr. I-Hsun NI, CHINESE TAIPEI; Dr. Rudolf WU, Hong-Kong, CHINA

A Review of Some Current APEC Projects on Marine Conservation (Dr. Alex BROWN, CHILE)

Dr. Brown reviewed the six APEC-funded projects on marine conservation in 2004. The approved projects include: 1) APEC Integrated Oceans Management (Forum III); 2) Workshop on the modern approach to link to toxic compounds and biological effects; 3) Comparative assessment of the institutional response to the incorporation of ENSO in fisheries management within APEC economies; 4) Ocean models and information system for APEC region (OMISAR); 5) Economic value of the marine sector across APEC member economies; 6) Workshop on environmental principles and policies in aquaculture administration. The objectives and purposes of each project were highlighted.

A Comparative Assessment of the Institutional Response to the Incorporation of the ENSO Signal in Fisheries Management within APEC Economies (Mr. Hernan L. VILLAGRAN, CHILE)

Mr. Villagran introduced the project on comparative analysis of the current situation concerning the integration of ENSO signal in fisheries management. He reported the current status of the phase I study (diagnosis) of the ENSO project. The expected outcomes relevant to policy-makers, scientists and stakeholders in promoting an ENSO ecosystem-based approach to marine (pelagic) resources management were discussed. In this regard, it was pointed out that major participation of Japan, Korea and Chinese Taipei as information providers during Phase I was expected. Phase II (synthesis) would be conducted in year 2006. He also emphasized that Japan, Korea, and Chinese Taipei should be fully engaged in Phase II.

General Discussion

A wide variety of issues were discussed including:

- Suggestions on more concrete projects for APEC's consideration.
- The need to get the private sector to participate in aquaculture, fisheries management, and

conservation of marine environment.

- The roundtable meeting involved only a limited number of representatives; thus, the need of more international co-operation is encouraged.
- Recommendation for the urgent development of an APEC Strategy on Sustainable Aquaculture.
- The five engagement models (Australian experience) could be tested through regional analyses and comparison.
- Recommendation on inviting NGOs shall be part of the Roundtable Program.
- Problem of poor communication between NGO and private sector in some APEC economies should be improved.
- Participants should learn from each other on the development of environmental research and management (for example, the Hong Kong AoE MERIT program).

Haiko, Pingtung, Chinese Taipei
Photo: W.Y. Chiau



Dongsha (Pratas) Island, Chinese Taipei
Photo: W.Y. Chiau

- Recommendation to governments for setting up fund to encourage industry, business partners and academia to work together and come up with a research/business plan to develop innovative products on environmental protection and foster good practices in ocean-related industries.
- El Nino-Southern Oscillation (ENSO) and the Green GDP may be a topic for possible collaboration in developing a concrete agenda of projects aimed at fostering private participation in economic valuation of ocean resources and economic activities depending upon them.

The meeting concluded with the potential for a number of techniques for engaging the private sector. Nevertheless, these techniques will need further regional analyses and validation before their widespread adoption by APEC members. Further meetings and discussion should focus on helping NGOs and private sectors to learn more about APEC and how to get involved.

Private Sector Engagement in Coastal Zone Management: Models and Practical Examples from Australia

Robert Kay¹ & Greg Fisk²

1 Principal, Coastal Zone Management (Pty) Ltd
PO BOX 191, Mosman Park, Perth, Western Australia, 6012, Australia
Email: robert@coastalmanagement.com

2 Manager, Resource Assessment, Queensland Environmental Protection Agency
160 Ann Street, Brisbane Queensland 4000, Australia
Email: greg.fisk@epa.qld.gov.au

Abstract

Coastal zone management attempts to view the natural resources, urban centers and industrial uses on coastal lands and waters as an integrated whole. In this integrated view, the goal is to engage all interested parties with a stake in the use, management and benefits realization of coastal resources. However, much of the emphasis on stakeholder engagement in coastal zone management programmes has been on community-level engagement, either through direct community-resident interaction or through special interest non-governmental groups. While this has been a necessary priority in many coastal nations given the direct subsistence economies that operate in these coastal zones, this has often been at the detriment of private sector engagement.

Private sector engagement is an important challenge for coastal

management programmes as the ownership of and compliance with coastal management principles and outcomes by the private sector is essential to the success of coastal management programmes in the long term. However, coastal management programmes are nearly always government-led. Consequently, there are necessarily probity, transparency and accountability issues when governments interact with private businesses. This sensitivity is heightened by the dual role that coastal management programmes often play: both to stimulate stakeholder engagement and also to regulate. There is often a balancing act required. This paper explores models of private sector engagement in coastal management based on models in current literature as well as actual examples from Australia; with a focus on Queensland. The relationship between the model and real-world practice are critically analyzed. Lessons learned for coastal zone management in the Asia-Pacific are drawn from this analysis.

Engagement in Coastal Zone Management

The often stated aim of integrated coastal zone management (CZM) is to consider the use of natural resources, urban centers and industrial uses on coastal lands and waters as an integrated whole. In this integrated view, the goal of CZM is to engage all interested parties with a stake in the use, management and benefits realization of coastal resources. Indeed, there are numerous well-documented cases of community-level engagement in CZM around the world, either through direct community-resident interaction or through special interest non-governmental groups. The literature of community-based CZM (often called participatory CZM) in APEC economies is extensive through textbooks, individual papers or in conference proceedings – most recently the Coastal Zone Asia Pacific Conference held in Brisbane in September 2004. Models of citizen



Figure 1. Arnstein's Ladder of Citizen Participation in Decision making Arnstein (1969)

participation in CZM decision-making processes are, as a result, very well described, such as spectrum of citizen participation developed by (Arnstein 1969). Arnstein drew the analogy of a ladder of citizen participation, as shown in Fig.

In Arnstein's model the top two rungs of the ladder are considered 'rubber stamp committees' where the community's opportunity to participate is allowed only if there is agreement with those in power (Kay and Alder In Press). The degree of interaction between decision makers and citizens increases down the next three rungs of the ladder. 'Informing' identifies citizen's rights and options, while 'consultation' allows for citizens to express their concerns. 'Placation' allows for citizens to advise on management decisions, but decision makers do not necessarily act on these concerns. These three levels described above are characterized by people being tolerated by those in power. At the 'partnership' level, citizens participate actively in decision making through negotiations or 'trade-offs' with managers. On next

rung, 'delegated power', citizens are given management power for selected parts of a program. In the last rung of the ladder citizens have total control of the decision making process.

In contrast, models for analyzing private sector engagement in CZM are much less mature. To a large extent the focus of stakeholder engagement in CZM programs has been on community-level and direct citizen engagement, either through direct community-resident interaction or through special interest non-governmental groups. While this has been a necessary priority in many coastal nations given the direct subsistence economies that operate in these coastal zones, this has often been at the detriment of private sector engagement. As such, there has been markedly less consideration of private sector engagement in CZM. This is despite the increasing key role private industries are playing in supporting the development and implementation of coastal initiatives. Clearly private companies, which depend on coastal resources for their operation have a keen interest in how the coast is

managed and planned. However, there are encouraging signs that the traditional adversarial role between government and industry is breaking broken down in some parts of the world, with government and industry forming partnerships for coastal management initiatives (Kay and Alder In Press).

Coastal Zone Management and the Private Sector

Here the private sector is defined very broadly to include all commercial entities operating for a profit. This definition includes all publicly listed or privately held companies operating either within a single nation or in many nations (as multi-national corporations). Consequently, all non-profit organizations, private citizens and governments are not considered here as part of the private sector for the purposes of this analysis.

Private sector organizations provide a commercial return to its owners – be they private owners or through shareholder ownership of public limited companies. For many years this has often been characterized as 'profit at all costs'. That is, in the traditional view of business as rapacious and unfettered users of natural resources, business must be tightly controlled by government regulation. This view has essentially been in place since the beginning of the industrial revolution. In broader terms the role of government in this view is to exert the following influences on the private sector, to:

Compel – through legislation, regulation and policy;

Induce – through financial incentives (taxation, financial instruments) or through non-binding policy measures; and

Facilitate – through demonstrating best practice, promotion and incentive schemes.

To a large extent the three categories of approach outlined above remain at the core of government engagement with the private sector in CZM. Importantly, when the approaches outlined above, when placed in a holistic view of private sector engagement, will almost certainly continue to play an important role. For example, even in the most enlightened government-private sector engagement approaches the ability to regulate non-performing private companies will remain important.

Critically, many private sector organizations have changed substantially in recent years as the broader sustainability debate has emerged. While this evolution to 'sustainable businesses' remains patchy (with much of its focus in Europe), it is an important trend that is likely to increase both within the businesses who have adopted its principals and as a vehicle for governments to encourage businesses operating within its borders to consider such approaches.

The first wave of private sector engagement in the sustainability debate occurred in the 1990s, broadly in line with the overall rise in interest in sustainable development. The 1992 Rio Earth Summit was a key milestone in this development – including the formation of the Business Council for Sustainable Development (subsequently renamed to the World Business Council for Sustainable Development (WBCSD 2004)). The focus of this first wave was the development of sustainable components of industries with a focus on the micro-level assessment of improving environmental outcomes through essentially process engineering considerations including Total Quality Management (TQM) (Wever 1996; Dresner 2002). Through tools including sustainability analysis, risk-benefit and business-process modeling many businesses have been able to

contribute both to cost savings and improved environmental outcomes – so called 'win-win' outcomes. The most common examples of such benefits include reducing pollutants from industrial production through recycling of waste products or through process improvements that reduce by products (Townsend 1998). There is no doubt that these measures have contributed significantly to improved environmental outcomes in coastal zones; albeit in limited areas mostly in the developed world (Agardy and Alder in press).

In recent years this process-focused view in the private sector has evolved into more complex understandings of sustainability and sustainable development. This is evidenced by the increasing sophistication of the support for businesses choosing to consider sustainability issues. This trend has been supported by the increasing realization that there are long-term business benefits from 'thinking sustainability'. Increasingly, there is also the visibility for business in being included in market sustainability indices, such as the Dow Jones Sustainability World Index that includes over 300 companies from 24 countries that lead their industries in terms of corporate sustainability (Dow Jones 2004).

While these overall trends in the private sector moving towards sustainable development practices is encouraging, their specific engagement in CZM remains more subtle. One key reason is the lack of a specific business sector that parallels CZM. Of course, this is the very broad and integrative aim of CZM in that it is not intended that any single business sector such as: mining, ports, fisheries, oil/gas, residential development, would dominate. In this sense the multi sector problem that does not have a readily defined business group to target that has clearly the most to gain from involvement in CZM. Consequently, this issue of the benefits for business to engage in

CZM is discussed in the next section.

What does the private industry gain from involvement in CZM?

The move of private sector organizations towards becoming involved in CZM is evolving from the traditional consultation models because of a mix of tangible and intangible business benefits. This section outlines some of the key benefits.

Building working relationships with regulatory entities – moving from antagonist to protagonist

As stakeholders in the use of coastal resources, the private sector is looking to improve its influence and claim to utilize coastal resources through building effective relationships with regulatory agencies. From a regulatory agency's perspective, the presentation of a well researched and legally justified private sector position on coastal management issues carries significantly more weight than the more traditional approaches to engagement that have been based on rhetoric and the employment of political influence to achieve the desired outcome. The benefits of a positive working relationship with regulatory agencies can translate into real economic benefits for the private sector - less stringent information requests (that cost the private sector time and resources to acquire), more streamlined assessment and approval processes time frames, preferential consideration over other competing stakeholders, and in some cases, greater development rights through resource allocation processes.

The use of environmental compensation and mitigation is another tool that has been employed between government and the private sector to achieve balanced coastal management outcomes. Often in the case of granting development rights, the employment of mitigation by the private sector in the form of

establishing compensatory habitat or dedication of land for conservation purposes can turn adversarial and politically contentious decisions into win-win scenarios. Interestingly, the use of mitigation techniques in Australia has been far less widespread than in North America, Europe. This is an area that requires more systematic analysis to the causes and effects including its influence on broader private sector engagement in CZM.

Branding and marketing

Not unlike the move to organically produced crops in the global agricultural industry, industrial and commercial interests in coastal and marine areas are beginning to realize the economic benefits of portraying a clean and green image. In Australia, traditional urban subdivision on the coast is increasingly embracing sustainable building and water use design and actively marketing new developments on that basis. The approach leads to three-fold benefits – it is more marketable to regulatory agencies in the process of obtaining approvals; it can be cost effective for the operation of the development through re-use of water and savings in electricity; and it can be used as a marketing tool to engage more environmentally-conscious consumers to invest in the properties.

The tourism and eco-tourism industries in coastal and marine areas of Australia has become similarly positioned, recognizing the values of the environment are intrinsically linked to ensuring a sustainable economic future for their industries. A good example of how this position has translated into policy is the Australian and Queensland Government Reef Water Quality Protection Plan signed in 2002 which seeks to improve the quality of water from catchment areas into the Great Barrier Reef region (Australian and Queensland Governments 2002). While the Great Barrier Reef is one of the most important areas of marine biodiversity

in the world it is also quantitatively critical to Australia's tourism industry as well as a range of emerging industries such as marine biotechnology – all of which were essential considerations in developing and implementing the plan.

Incentives

A fundamental tool for Government to engage the private sector is the creation of incentives. This can take the form of new programs, such as grants and subsidies as well the removal or review of current programs and projects that historically have been geared or designed for resource consumption and economic growth rather than within a sustainable development framework. Incentives can include funding but also can relate to technical assistance and information.

In Australia, the National Action Plan for Salinity and Water Quality (Australian Government) and the National Heritage Trust Extension (Australian Government) programs both allocate significant funding for the private sector (through regional bodies made up of a range of stakeholders but generally excluding government) to invest in natural resource management. The programs are Australia-wide and include investment in the nation's coastal and marine areas out to the three nautical mile limit of State waters.

A major challenge with incentive programs is uptake and interest. If the private sector is going to invest in an incentive program, it will be looking for value for money as well as long-term certainty of the continuation of the program that can be incorporated into its regular business cycles. However, often these aspirations do not align well with government incentive programs, which tend instead to be short term, single issue based and aligned with political election commitments. Aligning these apparently competing agendas of

government and business is worthy of further analysis.

Perhaps a more fundamental consideration to that of alignment is the need to integrate various funding and incentive programs together and to examine the overall suite of incentive packages across government before private sector engagement. It is not uncommon, particularly in the agricultural sector, to have one agency or sector of government continuing to subsidize poor management practice, while another arm or level of government is seeking to engage the same group of stakeholders to improve environmental practices through additional grants and subsidies. In these scenarios, the choice of securing funding without the need to change or improve current practice will always be the more profitable and sensible option for the private sector.

Figure 2 is an initial summary of the issues outlined above. That is the key drivers that bring government and the private sector to the table to engage in CZM under the watchful gaze of citizens and non-profit organizations.

An initial suite of engagement models for private sector involvement in coastal zone management drawn from the above analysis is presented in Appendix-1 (please see CD Appendix-1). These models provide a useful initial discussion framework for addressing the advantages (pros) and disadvantages (cons) of each engagement model within the context of the issues facing government and the private sector. In addition, examples are drawn from Australia of the use of each engagement model. This provides important context for the potential application of each model more broadly in the region.

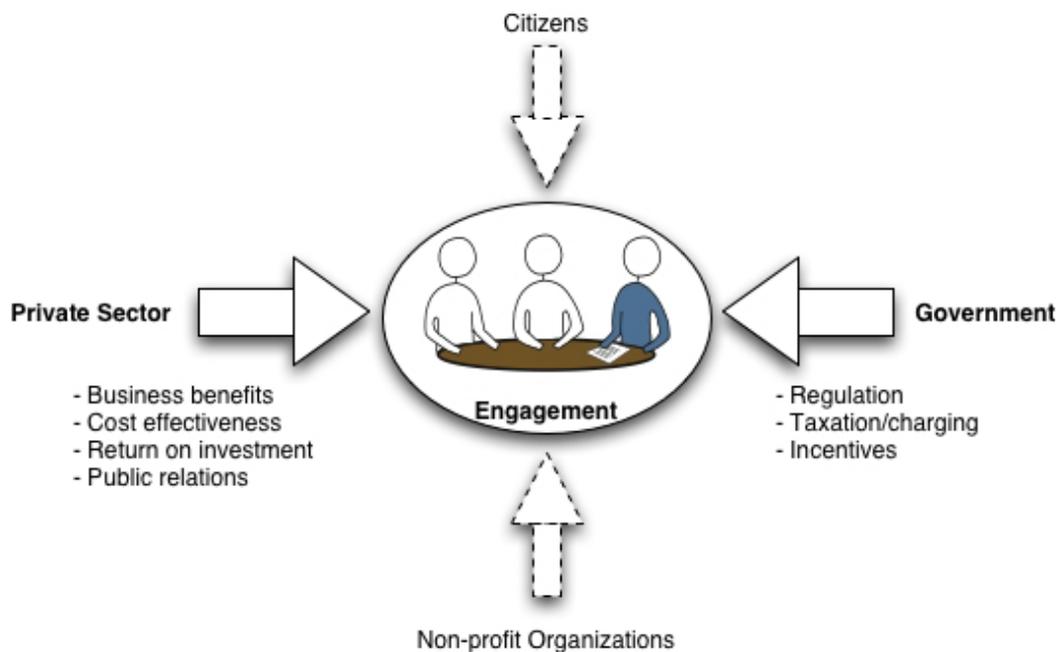


Figure 2. Private Sector / Government Engagement

Conclusions and future directions

The private sector plays a critical role in CZM in APEC economies. Yet the analysis of this role has been the focus of much less critical analysis than community-level, citizen-based participation. As such, the models for private sector engagement put forward in this paper based on Australian experience are preliminary in nature and will require further analysis. Nevertheless, they provide a useful starting point for enhancing this important area of CZM in the future to the benefit of regional governments, private sector organizations and its citizens.

References

Agardy, T. and J. Alder (in press). Coastal Ecosystems and Coastal Communities. Millennium Ecosystem Assessment: Condition and Trends Working Group Report. R. Hassan and N. Ash. Washington, Island Press.

Arnstein, S. (1969). "A Ladder of Citizen Participation." American Institute of Planners 35: 216-224.

Australian and Queensland Governments (2002). Reef Water Quality Protection Plan. Accessed: 8 October 2004. <http://www.deh.gov.au/coasts/pollution/reef/>

Australian Government (2001). National Action Plan for Salinity and Water Quality. Accessed: 8 October 2004. <http://www.napswq.gov.au/>

Australian Government (2002). National Heritage Trust. Accessed: 8 October 2004. <http://www.nht.gov.au/>

Dow Jones (2004). Dow Jones Sustainability World Index (DJSI WORLD). Accessed: 8 October. <http://www.sustainability-indexes.com/>

Dresner, S. (2002). The Principles of Sustainability. London, Earthscan.

Harvey, N. and B. Caton (2003). Coastal Management in Australia. Oxford, Oxford University Press.

Kay, R. C. and J. Alder (In Press). Coastal Planning and Management. London, E & F Spon.

Moreton Bay Partnership (2000). Moreton Bay Waterways and Catchments Partnership. Accessed: 8 October 2004. <http://www.healthywaterways.env.qld.gov.au>

Queensland Government (2004). Public Private Partnerships. Accessed: 8 October 2004. http://www.qtc.qld.gov.au/internet/pub.nsf/Content/Public_Private_Partnerships_1

Townsend, M. (1998). Making things greener : motivations and influences in the greening of manufacturing. Aldershot, England, Ashgate Pub.

WBCSD (2004). World Business Council for Sustainable Development. Accessed: 8 October 2004. <http://www.wbcsd.ch>

Wever, G. (1996). Strategic environmental management : using TQEM and ISO 14000 for competitive advantage. New York, John Wiley and Sons.

Sakhalin's Oil: Outline of World's Biggest Energy Development Projects

Nobuhiro Sawano, Kunihisa Sao*, Kazuko Sao¹, Shintaro Goto** and Masumi Yazaki²

Seiryō Women's Junior College,
1Ocean Engineering Research Ltd.,
2Risho University

Introduction

Exploration and production for multibillion-dollar offshore oil and gas developing projects have started on the Sakhalin shelf and the sea of Okhotsk. The price tag of these projects is said to be \$100 billion over the next forty years, doubtlessly one of the world biggest development projects. Some observers believe that these projects will have positive economic effect on Sakhalin and the far eastern area of Russia; others pointed out concerns about environmental impacts, threats to the fisheries industry as well as the risk of oil spill.

Background

The area of Russian Far East (RFE) and eastern Siberia have a wealth of oil and natural gas. Most promising is the offshore of eastern part of Sakhalin Island. In recent years, promising offshore oil fields have been discovered, and already several

development plans are being fleshed out. It is said that there are a total of nine projects around this area and they are called Sakhalin I (one) to IX (nine). In these development projects, Sakhalin I and II have almost completed their "Phase I" project and partly started exporting their products to neighbor countries such as Korea and Japan. The projects of Sakhalin III to VI are at the stages of contract, agreement or facility design. Projects beyond Sakhalin VII are still ambiguous (see Figure 1).

According to the huge amount of promising reserves, total scale of the projects are said to be the world's biggest. For example, estimated recoverable reserves in the Sakhalin II Project, which has received investment from Mitsui & Co., Ltd. and Mitsubishi Corporation, are 140 million tons of oil and 494 billion m³ of natural gas, thereby holding great promise for a stable supply of energy to Japan and neighbor countries (Newell, 2004).

Owing to the current international

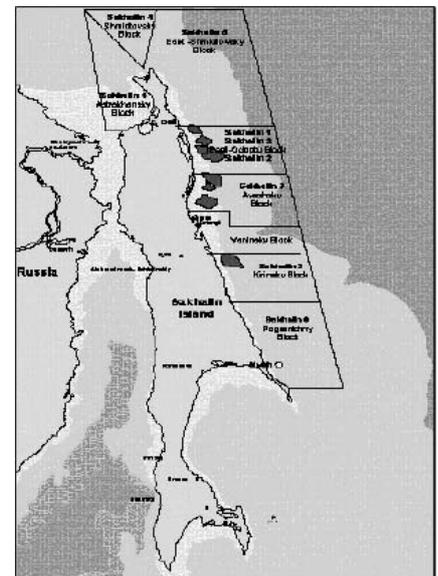


Figure 1. Project areas of Sakhalin Offshore Area (Wordrop, 2004)

recent situation, the heavy dependence of Japan and most ASEAN countries on Middle East oil is encouraging the rapid development of energy resources around Sakhalin and in the RFE. In February and March of 2003, Tokyo Gas, Osaka Gas, Nippon Oil Corporation and other Japanese energy companies announced that

they would purchase natural gas and oil produced in the Sakhalin offshore area (Japan Environmental Council, 2003).

Details of each development project of Sakhalin Oblast

Almost all development projects have been progressed under the formation of international “company cooperative” or “company consortium” like Sakhalin II. However, comparing with Sakhalin I and II, Sakhalin I has been developed by a typical “company cooperative” of Exxon Mobil, SODECO and Oil and Gas Corporation of India. Exxon Mobil has been leading this project as an operator. On the other hand, Sakhalin II has been developed by the “company consortium” established by the investment of Royal Dutch Shell and Mitsui and Mitsubishi. In this case, “company consortium” means a new independent company. Sakhalin Energy Investment Company (SEIC) was established under this scheme in 1994.

For most Sakhalin energy development projects, either cooperative or consortium, their composition and/or ratio of investment from their parent companies have changed from time to time. Latest data can be referred by Newell (2004) and Murakami (2003) as of August 2004.

Sakhalin I

Project Summary:

Project partners: Exxon Negtegas Ltd. (Exxon Mobil, 30%), SODECO (Japanese National Company, 30%), Oil and Natural Gas Corporation Ltd. (India, 30%), Rosneft-Sakhalin (11.5%), and Sakhalinmorneftegaz-Shelf (Rosneft subsidiary, 8.5%)

Area: Three fields: Arkutun-Dagi, Chivo, Odoptu.

Estimated reserves: 325 million tons of oil and condensate; 425 billion m³ of gas.

Expected project cost: \$12 billion.

The “company cooperative” was formed in June (June is based on Newell, 2004. But Murakimi 2003 stated it is May) 1995 and signed a Production Sharing Agreement (PSA) in 1996. Exxon Mobil is the key operator of this project. In 1999, Exxon had to stop drilling because they failed to obtain permission for discharging cuttings (drilling wastes) at sea. After that, Exxon tried to receive approval from the federal government by lobbying, and finally agreed to reinject the drilling waste, at an extra cost of \$3 million. These activities were severely criticized by environmental groups and local fishing companies.

In 2002, Exxon Mobil was scheduled to begin the \$3.5 to 4.5 billion Phase I development (2001-2006), including early oil extraction from Chaivo area using directional drilling from onshore, followed by the construction of a drilling rig, or CIDS (Concrete Island Development System). This “slantwise” drilling from onshore to offshore technology is one of the key characteristics of this project. However, drilling at Chaivo area depends on obtaining permission from federal government.

Construction of an onshore pipeline is planned to transport oil across the Tatar Strait to DeKastri Port in Khabarovsk Krai, from where crude oil can be exported to China, Japan, and South Korea. The cost of this pipeline is said to be \$400 million and in 1995, Exxon Mobil has organized Japanese companies (Japan Energy Resource Development Ltd., Itochu Ltd. and Marubeni Ltd.) created Japan Sakhalin Pipeline Feasibility Study Co. Ltd. This company has conducted a feasibility study for an undersea pipeline from Sakhalin to Hokkaido, and two routes from Hokkaido to Osaka and Tokyo: one is along the Sea of Japan and the other is along the Pacific seaside from 1999 to 2000.

But the government of Farkhutdinov and the Ministry of Energy strongly oppose these plans, and would prefer Sakhalin I and II to collaborate on joint infrastructure construction because transporting oil to Khabarovsk Krai means that the Sakhalin Oblast will get no export revenues from it. Sakhalin government is also against the construction of two long distance pipelines; one connects north and south and the other east and west. Because of the terms of PSA, the government has to reimburse the cost of both pipelines to investors.

In February 2001, the European Bank for Reconstruction and Development (EBRD) gave initial approval to a \$90 million loan to Sakhalinmorneftegaz to upgrade oil collectors, reconstruct oil pipelines to Komsomolsk-on-Amr and Okha, and to drill seven new slant wells at the Odoptu site.

This project has raised environmental problems and been criticized by local and international NGOs. Not only in 1999, but in summer of 2001, Exxon Mobil conducted seismic testing as grey whales were feeding off the northeastern coast of the island and severely blamed by these groups.

Sakhalin II

Project partners: Sakhalin Energy Investment Company Ltd. (SEIC), this consortium consists of Royal Dutch Shell (Operator, 55%), Mitsui Sakhalin Holdings B.V. (25%), Diamond Gas Sakhalin B.V. (Mitsubishi, 20%)

Area: Two fields – Piltun-Astorkhskoe and Lunsokoe.

Estimated reserves: 140 million tons of oil, 494 billion m³ of natural gas.

Expected project cost: \$10 billion, the northeastern coast of the island, and severe criticism by these groups.

The new company SEIC was established in April 1994 and signed



Figure 2. Molikpaq offshore platform (<http://www.offshore-technology.com>)

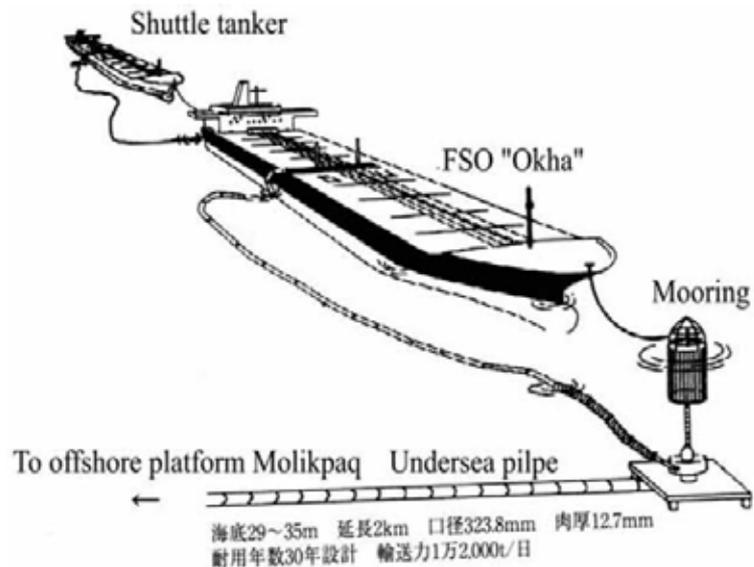


Figure 3. Sketch of Sakhalin II offshore oil loading unit (Murakami, 2003)

its PS agreement on June 22nd of this year. On June 15th, 1996, SEIC declared this date as "Commencement Date" (starting day of the project). Sakhalin II project is governed by "Supervisory Board" composed of the same number of representatives from Russia and foreign investors.

The oil production of the offshore projects started in July 1999 at the level of 20,000 barrels per day. In 2001, Sakhalin II completed its third season of oil production, increasing production to about 2.1 million tons for the year. In December 2000, Shell acquired Marathon's 37.5% share of SEIC in exchange for other assets, and Mitsubishi bought an additional 7.5% share from Shell.

In September 1999, during off-loading from the Molikpaq platform in heavy winds, about half a ton of crude oil was spilled, and raised world-wide attention and local concern about the environmental safety of the offshore

production (Lawn, et. al, 1998). Oil production of Sakhalin II is done by the off-shore platform Molikpaq. Oil is conveyed and stored temporarily in a "Floating Storage and Offloading (FSO)", a double hulled tanker named Okha, and reloads to the "shuttle tankers". After reloading, oil is conveyed to places of consumption such as Japan and Korea (see figure 2 and 3). This offloading method is dangerous due to the oscillation of the tankers under heavy wind conditions.

Shell is planning to invest \$5 billion from 2002 to 2006 to develop a 600 km gas-oil pipeline from offshore platforms to a 9.6 million-tons-per-year liquefied natural gas (LNG) plant and oil export terminal in the south of Prigorodnoe. Capacity of this LNG plant is world's largest class and investment is the biggest among the developing project.

In June 2000, SEIC moved their main officers from Moscow to the island. In

September 2000, SEIC announced that a U.S.-Russian-Japanese consortium had won the \$10 million tender to develop technical specifications for a feasibility study for the Prigorodnoe LNG plant. In December 2000, approximately \$100 million in major contracts were awarded to, among other companies, the Russian-French joint venture Startory for pipeline and terminal design, AMEC Service Ltd. (U.K.) for offshore platform design, and Parsons Engineering (U.S.) for design of onshore infrastructure. Startory got the contracts after Russians drew attention to the fact that there were low levels of Russian content in the Sakhalin II project (70% is required by the PSA over the lifetime of the project).

As of August 2004, EBRD (European Bank for Reconstruction and Development), Japan Bank for International Cooperation (JBIC) and some international finance

organization plans to invest in the Sakhalin Phase II project, but they have not arrived at a conclusion yet.

Sakhalin III

Project partners: Exxon Mobil (operator), Texaco, Rosneft, Skhalinmorneftegaz (SMNG) (partners formed the company "Pegaster Neftegaz").

Area: Kirinsky, Ayashsky, and Eastern Odoptinsky blocks.

Estimated reserves: Kirinsky – 687 million tons of oil and condensate and 873 billion m³ of natural gas and 687 million tons of gas condensate (this figure is based on the web pages of the Sakhalin local government. According to the web page of Rosneft, this figure is 624 million tons). Ayashsky and Eastern Odoptinsky --- 114 million tons of oil and condensate and 513 billion m³ of natural gas. Veninsky --- 51 million tons of oil and 37 million tons of condensate. 578 billion m³ of natural gas.

In July 1993, the Russian government put this block out to tender, and then the company union of Mobil and Texaco won the rights to explore and develop in December. There were no bidders for the Veinisky block as of this moment. Mobil and Texaco were also awarded for Ayashsky and Eastern Odoptinsky block. According to the latest web pages of Rosneft, for Veinisky block, a draft cooperation contract with Sakhalin Oil Company State Unitary Enterprise was prepared. A draft plan and a budget for 2003/2004 have also been elaborated. They announced that they won the 5-year license for the geological survey of this block (http://www.rosneft.ru/english/projects/sakhalin3_2.html).

Sakhalin III was originally started by the company union of Mobil and Texaco, but August 1998, they ceded one third of their developing rights for the Kirinsky block to Rosneft,

Skhalinmorneftegaz (SMNG) by strong pressures of Russian government, and then the share was changed to Mobil and Texaco 66.7% (33.35% respectively) and Rosneft and SMNG 33.3% (16.65% respectively). Prior to this ceding, Exxon Mobil and Texaco established a new company "Pegaster Neftegaz" for the operator of Kirinsky. The share of Pegaster was transferred to Rosneft and SMNG. At this moment, the Russian government initiated to establish Sakhalin Oil Company State Unitary Enterprise.

Kirinsky: Estimated oil and gas reserve of Kirinsky is the largest in all Sakhalin developing projects and the most promising area is southern part of Kirinsky. Commercial production is planned to start in 2006, and peak annual oil production is expected at 24.4 million tons. It will take \$135 million investment to develop the whole area, and \$200 billion annual income is expected. But this area is placed 50km off from the shoreline, and water depth is 140 to 300m. This project must be prepared to face risks of heavy sea conditions.

Sakhalin IV

Project partners: Rosneft, SMNG.

Area: Astakhanovsky block, Shmidtovsky block. (both areas are placed northern part of the Island)

Estimated reserves: 123 million tons of oil and condensate and 540 billion m³ of gas.

An international tender was opened in Denver in September 1994, only Exxon submitted the bid, but contract agreement was not completed.

A letter of intent was signed between Rosneft-Sakhalin-morneftegaz and Atlantic Richfield Co. (ARCO) in 1997, and a cooperation agreement signed in 1998, but ARCO withdrew from the project in February 2000. There were two reasons for this withdrawal: From 1998 to 1999, international oil prices

remained low, and ARCO was forced to undergo "belt-tightening" management, then they had to leave as the project was economically unfeasible (Murakami, 2003). Another reason was due to concern about the lack of a Production Sharing Agreement (PSA), and requirements voiced by indigenous peoples about the environmental threats to the northwest region of the island posed by the project (Newell, 2004).

British Petroleum (BP) absorbed ARCO, and then tried to enter this project, and in December 2001, they concluded a cooperative agreement between Rosneft and SMNG. Investment ratio at that moment was 49% of BP and 51% of Russia.

For the Astakhanovsky block, a three-dimensional seismic survey was conducted in 1999 and 2,500m-appraisal-drilling was done in 2000, but these surveys were finished only to prove to be empty. One more appraisal drilling is required to bring forward this project.

Sakhalin V

Project partners: British Petroleum (BP), Rosneft, SMNG

Estimated reserves: 154 million tons of oil and condensate and 450 billion m³ of gas

Eastern Shmidtovsky block is situated on the northern shelf of the Island, which occupies 25,000 km², and maximum water depth of this block is 140m. Commercial production is expected to start in 2010.

In February 1998, Russia and BP signed a memorandum on a geological survey and concluded a cooperation agreement. Investment ratio was 49% BP and 41% Russia, same as the project of Sakhalin IV. The Russian government refused to receive the list of reserves because this project contains areas that are "too large." The Ministry of Natural Resources wanted



Figure 4. Gray whale in Sakhalin
(<http://www.pacificenvironment.com>)

to divide this area into small parts and contemplated getting more advantage by bidding small areas one after another in the international market.

ARCO merged with BP Amoco in January 2000. The local BP office in Yuzhno-Sakhalinsk is being reregistered as BP Exploration Operating Company Sakhalin Inc. BP and Rosneft-SMNG now has an alliance agreement to explore opportunities for developing the Sakhalin V block. Sakhalin V has not yet come up for tender, but it is likely that BP and Rosneft-SMNG will make a joint bid. The block is not yet included in the federal list of fields that can be developed under a PSA.

Sakhalin VI

In September 2000, the Al'fa Group (Russia) bought 95% of the shares of a small local oil company, Petrosakh, from Nimir Petroleum (Saudi Arabia). Petrosakh's field refinery, with a capacity of 200,000 tons per year and onshore fields are adjacent to the Sakhalin VI offshore block. Al'fa Group announced it would develop the field without a foreign partner or a PSA. Petrosakh will spend \$13 million on seismic studies in the Sakhalin VI project this summer. After completion of these studies, the company plans to

drill a slant well to estimate the hydrocarbon reserves which may yield 600,000 tons of oil annually. Potentially 1 million metric tons annually may be possible as new wells are put on line.

Sakhalin VII or higher

Each project is unclear and reliable information cannot be obtained as of August 2004.

Environmental Concerns

This area, especially offshore of Sakhalin, is well known as wildlife habitat for 25 marine mammal species, including 11 endangered ones. The eastern coast of the island, where the first well was drilled, provides the only summer grounds for two of the world's most critically endangered populations of whales, the western grey and right whales. Sakhalin's marshes and wetlands provide critical breeding grounds for large numbers of migratory waterfowl and are a stopover point along the migratory route followed by many of the endangered birds of Asia, including cranes, osprey and Steller's sea eagle (see figure. 4).

The Sea of Okhotsk off the coast of Sakhalin is one of the most productive fisheries in the world, providing over 60% of Russian total annual catch. The fishing industry dominates the island's economy, employing over 50,000 of the island's 700,000 residents. In the shelf waters alone there are 70 different species of fish; in the Sea of Kiosk, more than 300 (Zarsky, 2002). This "fisheries condition" is also true to Japan. According to the Hokkaido Educational Fishery Union, total fish catch along the coastline of the Sea of Okhotsk, from Wakkanai to Shiretoko, is more than 4 times as much as whole coastline of the Sea of Japan. The annual total sum is close to 300 billion JPY (about \$2.5 billion) and this only represents the economic benefit of fish production. The direct income from the fishery also sustains numerous seafood fabricating companies and thus the total income that also includes the companion industries should be twice or more that of the fishery itself. Just like Sakhalin Island, the Hokkaido local economy is sustained by the fishery of the Sea of Okhotsk.

A few scientific aspects of the Sea of Okhotsk also need to be reviewed. As it has already noted that the Sea of Okhotsk is an 'Affluent Ocean' producing hundreds and thousands of tons of seafood. This affluence is fueled by the fresh water supplied by the River Amur. This river also conveys tremendous amount of nutrient salts such as nitrogen and phosphorus. These nutrients fuel the 'burst' of phytoplankton in the water column every spring. The salinity of this area is a slightly less than that of the open ocean because this vast amount of fresh water is supplied by the River Amur. This area is well known for ice-cover-ocean or sea ice (Ryuhyo in Japanese) in winter, and this area is the southern limit of ice-cover-ocean in the world. Recently, scientists at Hokkaido University advocate another important 'function' for the global climate of the Sea of Okhotsk. Owing to the surface ice,

most solar radiation energy is reflected to the atmosphere through the ice covered season. If this area 'absorbs' solar energy in winter, global temperature should become higher. Based on this perspective, the Sea of Okhotsk is a 'radiator' of the earth. And this 'radiator' keeps functioning under very fragile environmental basis. It must be noted that the environment of the Sea of Okhotsk, and particularly mass balance between fresh water, saline water and nutrient salts, dictates an energy balance between absorption and reflection of solar radiation. Once this stable relationship is disrupted, the influence will surely be felt at a global scale.

Concerns for developing projects

Oil spill are always a big issue for every oil development project. In March 2004, Japanese research group held an international workshop focused on oil spill response and environmental protection in Kanazawa, Japan. In the workshop, present problems of spill preparedness and response had been pointed out by experts from Korea, Chinese Taipei, Russia, U.S. and Japan. Moreover, examples of advanced Alaska's activities for environmental protection in the vicinity of oil production areas had been reported. Main issues were as follows:

Preparedness for "transboundary" oil spill

Once a large scale oil spill occurs, oil will spread and come ashore. Manual removal is the best choice for collecting and cleaning up an oiled shoreline. This work is extremely hard and "recovering oil while it is floating on sea" is a key for spill response. Some kind of equipments, such as oil booms, and skimmers including a special type of vessel and solvent are commonly used to recover floating oil. Every oil production facility should prepare sufficient quantity of equipment and material, but considering required reserves for large-scale oil spill, this idea is not very realistic. Then, this equipment and materials have to be shared between response groups.

At this moment, there are obstacles to transferring oil combating equipment between Russia and Japan. Concerned people will be required to hold visas to pass borders and custom clearance will take long time. A treaty or agreement for oil spill response has to be concluded between Russia, Japan and neighbor counties.

Introducing the world's best standard and criteria for environmental protection

The Russian, Japan and neighbor countries joint research committee should commission a revised Environmental Impact Assessment (EIA) for the entire coastline of

Sakhalin, supervised by reputable, independent scientists and including a detailed biological database, intensive monitoring, annual surveys and consistent methodology to ensure comparability of data. The EIA should seek to include and co-ordinate the various studies done to date by public and private agencies.

The program of offshore seismic prospecting should be modified, on the precautionary principle, taking into account what is known about the effects of seismic explosions and other submarine industrial noise pollution on migration, feeding and social behavior of whales, dolphins, fish and, indirectly, on feeding seabirds. Wherever practicable, seismic shots within 10 km of cetaceans and large shoals of fish should be avoided.

Weather and visibility limits for operating at oil terminals and other offshore loading facilities should be made compulsory rather than discretionary as stipulated at present in the Terminal Operating Plan. And the world highest Standards of Training, Certification and Watch-keeping (STCW) must be enforced. As most marine collisions, groundings and accidental oil spills are caused by human error, it is essential to ensure that all staff at the offshore terminals and aboard the shuttle tankers and support vessels comply with the latest International Maritime Organization standards for staff training, certification and watch-keeping. Double-hulled tankers should be exempted from some of the escort provisions and also allowed a discount on fees charged for vessel traffic services and pollution prevention.

Enhancing information disclosure

Present developing projects that are planned Sakhalin and its shelf are one of the world biggest scales but existing information is quite limited. Every company and concerned authorities should enhance information disclosure



*Welcome Banquet hosted by Ms. L. T. Lin, President of Foundation of Ocean Taiwan.
Photo: W. Y. Chiau*



The 5th APEC Roundtable Meeting, Chinese Taipei.
Photo: W.Y. Chiau

and spend more money to translate information into, at least, English.

Encourage local stakeholders' involvement

After Exxon Valdez oil spill in 1989, Prince William Sound Regional Citizen's Advisory Council (PWSRCAC) was founded. This council performs in a variety of areas aimed at reducing pollution from crude oil transportation through Prince William Sound and the Gulf of Alaska. They also monitor Alyeska Pipeline's Valdez marine terminal and tanker operations, conducts independent research, and advises industry and government on ways to prevent oil spills and respond effectively if spills do occur. They increase public awareness of these areas and various other aspects of Alyeska's operations, including environmental protection capabilities and actual and potential environmental impacts of the terminal and tanker operations. This council is sustained by oil companies financially, and this style of independent organization should be established on both sides of Sakhalin and Japan.

Acknowledgements

This research has been promoted under the "Social Technology Program" sponsored by Japan Science and Technology Agency (JST).

Some key importations of this paper were given by Professor Takashi Murakami in Hokkaido University. He has been a leader of economic and environment research for REF and Sakhalin energy development projects for a long time, but to our great regret, he passed away on July 13th, 2004. We pray sincerely for the repose of his soul, and decide to succeed his achievements.

Reference

Japan Environmental Council (ed.): White paper of Asian Environment 2003/2004, Toyo Keizai Shinpo-sha, 446pp, 2003. ISBN4-492-44306-1 English version will be published in 2004.

Lawn, D., Steiner, R. and Wills, J: Sakhalin's oil: Doing it right -Applying Global Standards to Public Participation, Environmental Monitoring, Oil Spill Prevention & Response and Liability Standards in the Sakhalin Oblast of the Russian Federation-, A publication of Sakhalin Environment Watch and the Pacific Environment & Resources Center, 1999.

Murakami, M. (ed.): Sakhalin offshore oil and gas development and environmental Protection, 428pp, Hokkaido University Press, 2003. ISBN 4-8329-6371-6

Newell, J. (ed.): The Russian Far East - A reference guide for conservation and development-, 466pp, Daniel & Daniel, Publishers and FoE Japan, 2004. ISBN 1880284-75-8

Sakhalin Energy Investment Company: Environmental, Social and Health Impact Assessment, whole documents can be downloaded from <http://www.sakhalinenergy.com/>

Sakhalin Energy Investment Company: Oil spill response plans for Sakhalin II project, document CD-ROM can be obtained directly from the company.

Wordrop, J.: Issues to be addressed in transboundary spill response, this is a workshop material presented in "The first professional meeting on the oil spill preparedness and environmental protection in Okhotsk Sea", held in Kanazawa, Japan in March 2004.

Zarsky, L.(ed.): Human rights and the environment –Conflicts and Norms in a Globalizing World-, Earthcan Publications Ltd., 281pp, 2002. ISBN 1-85383-815-2

Conservation News



Whale Watching in Moreton Bay,
Queensland, Australia.
Photo: Y.Y. Lin

“10th Symposium on Cetacean Ecology and Conservation” closed after the final roundtable meeting, looking for a sustainable future of whale watching in Chinese Taipei

After two days of seminar presentations and a three day field trip, the “10th Symposium on Cetacean Ecology and Conservation - Toward A Sustainable Future of Whale Watching” closed when a roundtable meeting finalized the “Action Plan for Whale Watching in Chinese Taipei (2005~2008).” The international experts recognized the great potential of whale watching in Chinese Taipei, but also indicated that the industry is facing a desperate crisis according to declining whale watchers and intense price competition between operators. To protect cetaceans as well as the industry, the experts suggested that the Government formulate more enforceable regulations to manage the industry, to support research, and to emphasize educational program. Furthermore, they recommended that operators form a self-regulating alliance to work together for a valuable industry.

“Whale watching in Chinese Taipei is

in trouble,” said Erich Hoyt, the senior researcher from WDCS, after a trip to East Chinese Taipei. Whale watching in Chinese Taipei has entered its eighth year. During these years, Chinese Taipei has been the fastest growing member economy in whale watching. At the same time, Chinese Taipei has the lowest fare prices. Cheap prices cannot afford high quality whale watching. Pre-trip briefings have been eliminated to cope with too many tourists; cetaceans are posed under greater threat when too many vessels approach them. All the experts agreed: “there is an urgent need to regulate the number of vessels, cruises, tourists, and to mitigate impact to animals.

Experts also indicated that research is critically important. Detailed research can guide management and back up educational programs. “An interface of knowledge from research into education is essential. Particularly cetacean behavior and potential impact of whale watching” Bernd Wursig, professor from Texas A & M University, pointed out. Finally, the experts urged operators to form a whale-watching alliance. The alliance can set the price, share the capacity,

and deal with all the problems to enhance tour quality and sustain the future development of whale watching.

Action Plan for Whale Watching in Chinese Taipei (2005~2008)

Socioeconomic aspect

- Different stakeholders should have better communication with each other.
- The Government should integrate the management of whale watching.
- Diversification is critical for the continuation of a sustainable industry.
- Operational and vessel safety should be carefully reviewed.
- Souvenirs selling would generate considerable additional income to operators.
- Ecotourism at Shitih could be used as an example of high quality sustainable ecotourism.
- The power and responsibilities of NGOs should be highlighted and clarified.

Educational aspect

- Chinese Taipei needs to develop a



*Easter Island, Chile.
Photo: Alex Brown*

sound education program fed by sufficient research.

- The quality of education materials needs improvement.

Ecological aspect

- Chinese Taipei needs to establish fundamental research of the cetacean populations in its own waters, especially behaviour and impacts of whale watching.
- Research results should return to the Government and operators.

Management aspect

- There is an urgent need for regulation for both the protection of cetaceans and protection of the Industry.
- There is a desperate need for operators to form a national association.
- Setting industry standards can ensure that industry operates at the highest possible level.
- A good, well-targeted marketing program is essential for maintenance and growth of the Industry.

More information

<http://www.whale.org.tw/>

Arctic Wildlife May Not Survive Global Warming

Nov. 12, 2004 — Rising temperatures in the Arctic will likely increase the region's biodiversity as new species are drawn to the extreme north, but in a dramatic paradox many animals unique to the region — such as polar bears — risk extinction.

Polar bears are seen as facing the biggest threat from the melting of the Arctic ice cap by the end of the century, as their hunting grounds are expected to literally slip away from underneath them, Arctic researchers meeting in Reykjavik this week warned.

Some 20,000 to 30,000 of the hulking white animals roam large expanses of ice to hunt their prey, breaking through the ice with their massive paws to catch seals and fish.

"The polar bear is the species that has the most frightening future if the sea ice disappears," said Harald Loeng, a researcher at the Bergen Institute of Marine Research in Norway.

When they come out of hibernation, the bears would be surprised to see the ice receding earlier in the season every year. Their dilemma would be to remain on land where they risk dying of starvation, or to swim increasing distances to reach the ice to hunt for food. The greater distances mean the polar bears would lose a lot of weight, which could affect their reproductive systems, and also implies that females would have to leave their young behind to face a certain death.

The Arctic region is warming at twice the rate of the rest of the planet, and its ice cap could melt away entirely during the milder summer months by the year 2100, according to the conclusions of an Arctic climate research team.

The process is inevitable unless there

is a massive reduction of carbon dioxide emissions and other greenhouse gases, researchers warn.

The death knell could also be sounded for other species dependent on the ice, such as the ringed seal, bearded seal and little auk.

The little auk, a diving seabird that breeds in the cold Arctic climate and which nests on the shores of Greenland, Iceland, the Russian archipelago of Novaya Zemlya and northern Scandinavia, hunts for food at the edge of the ice, explained Terry Callaghan of the Sheffield Center for Arctic Ecology.

"If that ice edge moves some hundreds of kilometers away from the cliffs, they simply won't get access to the food," he said.

As global warming increases, forests will increasingly sprout up in the southern parts of the Arctic, pushing the frozen tundra landscape and its native wildlife — including caribou, arctic fox, ptarmigan and insects — further north.

"What we predict is that the biodiversity will increase," said Callaghan, "but the species that are extremely well adapted to an Arctic environment are vulnerable."

For those species that do manage to survive the changes of global warming, their way of life will undergo drastic changes as the arrival of new rival species and parasites will create a new hierarchy in the animal kingdom.

Reindeer or caribou herds will lose their natural grazing grounds and herders will need to find new routes between seasonal pasture areas.

Birds' migration routes and cycles are also likely to be affected by climate change, as they will have to fly greater distances. Their migration could even affect the ecosystem thousands of kilometers away.

A case in point is the arctic tern, a marine bird related to gulls that spends its summers in Scandinavia but winters in more southerly regions.

"The arctic species are in the hundreds of thousands and we probably do not know all of them," said Michael Usher of the environmental studies department at Stirling University in Scotland.

"We're going to see changes. The response of each species will be individualistic," he said.

More Information

<http://animal.discovery.com/news/afp/20041108/globalwarming.html>

Spectacular Reefs Destroyed by Sludge

Sept. 20, 2004 — Two-thirds of the spectacular coral reefs ringing Thailand's top holiday island have been destroyed because of overzealous development.

Officials said large sections of the 14.4 square kilometers (5.6 square miles) of colorful reefs off the tropical resort of Phuket in the Andaman Sea have been killed and less than one-fifth remain in acceptable condition.

Sludge and debris washed into the sea from building work across the island was the main factor responsible for the reef destruction, according to Nipon Pongsuwan of the Phuket Marine Biological Center.

Three episodes of coral bleaching in the 1990s — an environmental phenomenon blamed on rising water temperature and pollution — were also responsible for the reef's demise, he said. "Sludge from construction and coral bleaching are the main reasons which have destroyed coral reef along the island," he said.

Nets from fishing boats and tourists

who sign up with the host of diving schools on the island were also blamed for a less significant part of the damage. Phuket, famed for its white sands and seafood, is Thailand's biggest tourist draw. It attracted four million visitors last year, an increase of 1.5 percent from 2002.

Tourist officials are aggressively promoting the so-called "Andaman Triangle" that includes up-and-coming resorts in nearby provinces of Krabi and Phang Nga, as a marine tourism hotspot on the economy's western coast.

The government has set an ambitious target of 20 million annual arrivals by 2008, more than doubling the figure from 2003, to help keep the fast-growing economy on track.

Tourism currently accounts for more than six percent of the country's gross domestic product and the government said it is on target for 12 million arrivals this year.

More Information

<http://animal.discovery.com/news/afp/20040920/coralreefs.html>

Group Wants Freedom for Captive Dolphins

Oct. 26, 2004 — An animal rights group accused the Solomon Islands recently of capturing and cruelly mistreating dolphins by keeping them in overcrowded, polluted and shallow pens to be auctioned to the highest bidder.

The World Society for the Protection of Animals (WSPA) called on the government of the South Pacific island nation to immediately stop what it called an "animal welfare tragedy" and take steps to rehabilitate and release the captive dolphins.

The dolphins' capture, which the society said was in response to a \$260 U.S. bounty for each dolphin taken

from the wild, was first highlighted by the WSPA a year ago.

"One year after the WSPA first exposed the cruel and illegal dolphin trade in the Solomon Islands, new investigations reveal that 44 dolphins are still being held in the most appalling conditions in overcrowded, polluted and shallow sea pens off the island of Gavutu," the organization said.

The society said its investigators have observed wounded dolphins with injuries consistent with fighting for space, and that several dolphins have died since being taken from the wild.

"The condition of these dolphins is shocking and we are extremely concerned for their welfare," said WSPA regional campaigns manager Heather Potter.

She said the scheme is believed to have been initiated by foreign business interests, whom she named as Marine Exports Ltd. and Solomon Island Marine Mammal Education Center Ltd.

The society believes the people responsible for catching the dolphins want to sell them overseas to resorts and aquariums, which would train them to perform tricks.

About 30 were shipped from the Solomon Islands to a tourist resort in Mexico last year. One died on the way and several others have died subsequently.

"Time is running out if we are to prevent these animals from being sold to the highest bidder and having to spend their entire lives in captivity," she said.

"This is a classic example of foreign business interests exploiting the natural resources of a native people, with no regard for the welfare of the animals that they hope to profit from.

"These dolphins are displaying obvious signs of physical and psychological distress. Many of them have cuts and scratches on their backs and are suffering from sunburn."

The society called for an international campaign against the trade, and urged people to begin protesting to the Solomon Islands Minister for Fisheries Paul Maenu'u in Honiara.

More Information

<http://animal.discovery.com/news/afp/20041025/solomondolphins.html>

Arctic to Melt in Summer

Nov. 3, 2004 — The Arctic ice cover will completely disappear in summer by the end of this century unless carbon dioxide emissions are significantly reduced, according to a scientific study released recently.

"The big melt has begun," said Jennifer Morgan, director of the Climate Change Campaign for the environmental organization WWF, which published excerpts of the upcoming Arctic Climate Impact Assessment (ACIA) report.

The Arctic ice melt will cause sea levels to rise and could lead to the extinction of some species, such as polar bears, it said.

Commissioned by the Arctic Council and compiled by more than 250 scientists, the report concludes that "climate change is happening in the Arctic and that it will get worse unless emissions of carbon dioxide are cut."

"Industrial countries are carrying out an uncontrolled experiment to study the effects of climate change and the Arctic is their first guinea pig. This is unethical and wrong. They must cut emissions of CO₂ now," Morgan said.

The report presents several potential scenarios which would occur if the Arctic ice were to disappear in



*Beach cleaning-up in Chijin, Kaohsiung, Chinese Taipei.
Photo: W.Y. Chiau*

summertime by the end of the 21st century.

It said sea levels could rise by one meter (3.3 feet), noting that there are currently 17 million people living less than one meter above sea level in Bangladesh. It said places like Florida and Louisiana in the United States, and the Asian cities of Bangkok, Calcutta, Dhaka and Manila were also at risk.

The melting of the Greenland ice sheet, which is expected to take hundreds of years, could ultimately lead to a seven-meter rise in sea levels, it said.

Several fish and mammal species could also succumb to climate change.

"Polar bears could become extinct by the end of this century. They are unlikely to survive as a species if there is an almost complete loss of summer sea ice cover," the WWF said.

Polar bears feed mainly off of seals living under the ice, which the large mammals break to catch their prey. The ACIA report is to published in its entirety on Nov. 8.

The WWF welcomed the report, but stressed the "hypocrisy" of the eight members of the Arctic Council — the United States, Canada, Russia, Japan, Finland, Sweden, Iceland and Norway — which sponsored it, noting that they emit more than 30 percent of global carbon dioxide emissions.

While Russia decided last month to ratify the Kyoto Protocol, which commits industrialized countries to trim output of six greenhouse gases, the United States, the world's largest polluter, still refuses to do so.

More information

<http://animal.discovery.com/news/afp/20041101/arctic.html>

Table 1 Models for private sector (industry and commercial) engagement

Engagement model	Description	Pros	Cons	Australian Examples
Traditional consultation on coastal management plans and strategies	<p>Involves multiple rounds; information sessions followed by more two way consultation and negotiation.</p> <p>Generally consists of a process of informal meetings, invitation for written submissions, and finishing with more formal (one on one) meetings with stakeholder groups</p> <p>Generally overseen by a Coordinating Committee. Committee has an advisory role to the decision maker.</p>	<p>Cost efficient by virtue of involving private stakeholders on a needs basis to achieve a particular outcome</p>	<p>No on-going relationship between private sector and government – difficult to build trust.</p> <p>Governments forget previous poor consultation programs, don't recognize linkages between parallel planning processes or blame previous governments for their poor engagement processes – industry wants a fair and level playing field and have baggage before engagement begins.</p>	<p>Majority of government plan-based coastal and marine planning (Harvey and Caton 2003)</p>
Involvement and consultation on major infrastructure projects	<p>May be preceded by a tender process between competing private sector interests and can involve formal contractual partnerships between government and the private sector.</p> <p>Involves preparation of an environmental impact assessment (EIA).</p> <p>Involves a round or multiple rounds of formal public notification and stakeholder consultation (often required under legislation) undertaken by the applicant (with or without Government technical and/or financial support).</p>	<p>Government facilitating development of infrastructure that meets its triple bottom line needs – partnership approach.</p> <p>Applicant does most of the work – negotiating with key stakeholders – dealing with submissions.</p> <p>In some partnership arrangements the private sector role extends beyond the project approval stage and includes construction and on-going maintenance of the infrastructure – good value for money for Government and good long term planning.</p>	<p>Often comes down to the skills of the consultant and availability of data to underpin project going ahead – EIAs.</p> <p>No accreditation process for consultants – get into expensive fights about modelling rather than relying on planning frameworks to make hard decisions.</p> <p>Can be expensive and conflict-ridden if public private partnerships breakdown or where through the process (after a lot of money already spent) the Government can reject a project for other reasons.</p>	<p>Queensland Government Public-Private Partnerships Program (Queensland Government)</p> <p>Most State large development impact assessment processes</p>

Engagement model	Description	Pros	Cons	Australian Examples
Coordinating committees for ongoing coastal zone management programmes	Can be employed separately or to complement the 'traditional consultation' approach above. Involves setting up a committee made up of peak interest groups including a range of private and community interests.	Very cost efficient – brings the stakeholders to you. Can be effective in playing stakeholders off one another to obtain a more balanced view.	Significant pressure on representatives to speak for/represent sometimes enormous groups of stakeholders with different or competing interests – particularly difficult with indigenous people. Can stifle open consultation and debate about issues as various groups grandstand to each other about particular issues. Often extremely confrontational for industry – blamed for the ills of previous poor governance. Often leads to least common denominator approaches to planning and decision making as an 'open' consensus process.	Government coastal and marine planning (Harvey and Caton 2003)
Single issue based partnerships	Involves the setting up of partnership arrangements (contractual and otherwise) to address a single issue that is recognised as requiring intervention (can be improved) but affects more than one group.	Builds capacity and ownership of the solution by virtue of the nature of the arrangement. Assists in coming to more workable/creative solutions to problems. Can bring outlying interests under the tent through peer pressure applied by other industry affiliation. Often non-statutory – operating in a no-regrets environment.	Can be costly to run depending on the complexity of the partnership arrangement. Administration costs keeping everyone in the loop and engaged. Difficult to derivate/quantify utility of participation for industry – strong media presence and branding allows industry to make most of public relations opportunities. May also facilitate future compliance issues if industry is seen as a proactive and cooperative corporate player. Timing – consensus can take enormous amount of time to reach.	Moreton Bay Partnership (Moreton Bay Partnership)
Geographic (multi-issue) based partnership	Similar to the above but rather than a single issue, this model seeks to engage private involvement in an area for the full range of coastal and marine issues	Similar to the above, plus – Allows for the capacity for coordinated and integrated management of the area – better understanding of linkages between programs	Similar to the above, plus – Complexity reduces effectiveness. Too many competing interests leads to inability to make decisions. Increases the number of players involved by virtue of all issues attempting to be addressed – can weaken industry involvement as their issues are lost in the broader aims of the program in the region.	National Action Plan for Salinity/National Heritage Trust II