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Background

The project **Futures of Low Carbon Society: Climate Change and Strategies for Economies in APEC Beyond 2050** was proposed to The Industrial Science and Technology Working Group (ISTWG) of APEC by APEC Center for Technology Foresight, Thailand and co-sponsored by Hong Kong, China; Japan; P.R. China; Viet Nam; Philippines; Brunei Darussalam; Chinese Taipei; USA; and Korea. The purpose of this project is to conduct a region-wide foresight research on the future society where low carbon economy and adaptive lifestyle becomes the principal driver governing trade and development. Future scenarios for the ASAIa-Pacific region illustrate social, economical and political demand under such constraints. Science and technology development, including technology transfer, that responds to such demand is also considered through a series of workshop. The future scenarios and policy recommendations developed from this project should reflect differences in economic and social conditions among economies and be consistent with our common but differentiated responsibilities and capabilities.

Further information: [APEC Center for Technology Foresight](#).

Foresight methodology

Scoping project activities

The *scoping workshop* was organized in collaboration with the University of Hong Kong in Hong Kong, China during August 13 -14, 2008. The workshop has been arranged in roundtable-style meeting between key members and an observer from APEC economies (P.R. China; Hong Kong, China; Japan; Republic of Korea; Malaysia; New Zealand; Philippines; Chinese Taipei; Thailand; Vietnam; and Macao, China). The meeting was organized to discuss the project strategies and to set the scope for the subsequent activities. The participants agreed with the keyword **?Low Carbon Society or LCS?** and focus on personal lifestyle and social systems, international trade, economic systems, effective governance (political stability and international cohesion), furthermore adaptation include not only science and technology but also social and economic or socioeconomic adaptation.

Real-time Delphi Survey

A *Delphi survey* (more on Delphi Survey [here](#)) and workshops are adopted to formulate future scenarios for the Asia-Pacific region that illustrate social, economical and political demand. Science and technology developments, including technology transfer, that respond to such demand will be discussed in the subsequent workshop. The expected outcome includes short, middle, and long term strategies for the region in technological development.

The *International Working Group Meeting* was organized in Bangkok, Thailand during October 13-14, 2008 with the active contribution from working group members. There were altogether 40 participants representing key members from APEC economies (Chinese Taipei; P.R. China; Macao, China; Republic of Korea; Russia; Viet Nam; Hong Kong, China; Philippines; and Thailand). The survey statements were classified into 5 core categories, namely, *Climate change & its impacts, Migration, rural life & natural resources, Society/health, Trade of goods & services and Housing & construction/urban life/transportation*. Under each category there were 4-9 Delphi statements and each statement had its own sub-questions. This is a significant progress towards the completion of Real-Time (RT) Delphi survey.

Five *Thai Working Group Roundtable Meetings* were held to make further structural adjustment and detailed refinement on Delphi statements and their questions. Each meeting was a brainstorming session with 10-15 representatives from Thai governmental organizations concerning climate change corresponding to the 5 core categories. The process took a few months of discussions and deliberations to complete the RT Delphi statements. Then we were ready to launch the survey online during June 15 - August 30, 2009.

RT Delphi Survey was to gather opinions from a wide range of experts in the APEC region to provide initial inputs for the future scenarios. RT-Delphi Survey is *roundless*. Participated experts can answer the questions as many times as they like and can observe the results so far as well as comments from other participants in real time. Anonymity is maintained in the sense that no one knows who else is participating and who gave which answers. The reasons given for extreme opinions are synthesized by the survey system to give them all equal "weight" by allowing the respondents to see other people's responses without knowing the owners of the opinions. The RT Delphi Survey was officially launched for the period of two and a half months. The results from RT Delphi survey analysis were used as an input in the *Low Carbon Society Scenario Workshop*.

Scenario Planning

(more on Scenario Planning [here](#))

The Low Carbon Society Scenario Workshop aims to identify main socio-economic drivers relevant and derived from climate change. It is to establish the likelihood of low-carbon society and generate momentous essences for possible scenarios of adaptive lifestyle beyond 2050 in the 5 areas as mentioned above. The workshop brought together 50 Asia Pacific's key experts from a variety of disciplines to take part in a three-day exercise in Phuket from 2-4 November 2009.

In the workshop, the participants were divided into 5 groups to discuss the 5 aspects of LCS identified via the RT Delphi survey.

	Climate change & its impacts ? The world becomes more predictable as advances in climate modeling technology provide greater certainty when projecting climate trends and their impacts. By 2050, modeling accuracy increases to 98-100% due to a 10,000-fold expansion in computer processing power. More accurate and reliable forecasting information allows policy makers and the public to better prepare for the longer-term changes caused by the changing climate. ?
	Housing and construction/urban lifestyle/transportation ? Technological advances are critical drivers to low-carbon solutions for urban areas. Artificial intelligence grows in importance allowing computers to manager a greater percentage of complex task. The use of nanotechnology fo manufacturing of personal goos like clothing, and for air and water filtration, will become widespread contributing to reductions in emissions related to transportation logistics. Technological advances will also continue to fuel improved wellness ans healthcare, and growth in personalized medicine. ?
	Migration, rural life and natural resources ? Land zoning plays a critical role in assuring the rural communities maintain a compeititive land advantage for food production. Sustainable agricultural productivity becomes the norm, enhanced by a high level of education among farmers, and their commitment to "computerized farming" and other technological advances. ?
	Society and health ? National governments have limited success in demonstrating an ability to react quickly to critical issuesaffecting the planet. Instead, significant social and economic transformation towards a LCS occurs at sub-national levels because of initiatives undertaken by individuals, communities, villages, businesses (small and medium) and even actions from the street. ?
	Trading of goods and services ? Ninety percent of Asia Pacific's energy needs are fed by renewable sources such as solar, algae and geothermal. Nuclear fusin has become a realistic energy sources. Providers of goods and services stress their commitment to green production techniques, energy efficiency and clean transportation. Their is a decoupling of economic growth from environmental impacts. APEC citizens now require the environment tp become a beneficiary, not a casualty, of economic growth.

The participants also recommended several other possible mechanisms for regional linkages e.g. climate modeling data sharing and transferring, a regional network of "Center of R&D Excellence" etc.

Technology Foresight Symposium

A technology foresight symposium on ***Towards Low-Carbon Society in Asia-Pacific Beyond 2050***, held in Bangkok, Thailand during January 27-28, 2010, was the final stage of the project.

The symposium aimed to build on 2-year long intensive studies and discussed longer-term perspective to enhance the region's capacity in development and utilization of resources as well as technologies and innovation that contribute to successful transition to the forthcoming low-carbon society. A number of selected experts, scientists, technologists, foresight specialists as well as policy and decision makers in the Asia-Pacific region were invited to participate in this symposium to share their expertise and cooperate in developing the regional low-carbon future.

Lesson Learnt form the Project

- The design of Delphi Survey has to be done carefully from the begining - from the scope of the project to the sturcture of the survey. The Delphi statements have to be clearly defined. Some of the statements and their quesitons need further adjustment and detailed refinement.
- A diveristy of participants were invited in the scenario workshop, i.e. climate changes cientist, modelers, educators, meteorologists, epidemiologists, engineers, economists, industrialists, environmentalists, agriculturalists, technologists, government planners and foresight specialist. This is a key factor for the success of the workshop since there ideas were generated to cover 5 aspects of LCS.
- The "ice breaking" exercises was a technique used to get participants to feel more comfortable with one another and the need to think differently.
- Participants were encouraged to draw and cut pictures from magazines to aid them in expressing their ideas as pictures expand imagination.

Main Difficulties Encountered

- The RT-Delphi Survey's weakness due to small number of participated experts (23-28 from 78 invited experts). The response rate of the survey was 28.2 - 35.9 %. The rate varied among regions/economies, i.e. 21.8 - 28.9 % for Asia, 5.1 - 6.4 % for Europe, 1.3 - 2.6 % for America respectively. Low response made it almost impossible to make any statistical conclusions. Fortunately, the most of respondents (18-23 persons) are in APEC economies.
- For most of the participants, the scenario planning is a novel exercise. The task of imagining a future 40 years from now is seen as incredibly demanding by many participants. However, all know that the importance of making choices now to minimize the problems handed down to the future generations, and that a low-carbon society in 2050 is unlikely to materialize unless key choices are identified and acted upon today.

Conclusions

- Low carbon society could be reachable within our lifetime.
- Community networking is the key. Community-driven initiatives drive the changes the world requires in pursuit of the low-carbon development path.
- Emergence of computerized farming and other advanced technological.
- Carbon accounting becomes so dominant it replaces USD as the global currency.

External links

- [Low Carbon Society Beyond 2050](#) home page