

FORUM REPORT 004

Energy Security and Energy Transition: Part II

Reexamining Japan in Global Context Forum, Tokyo, Japan, November 1, 2013

Security in a Changing Energy Landscape

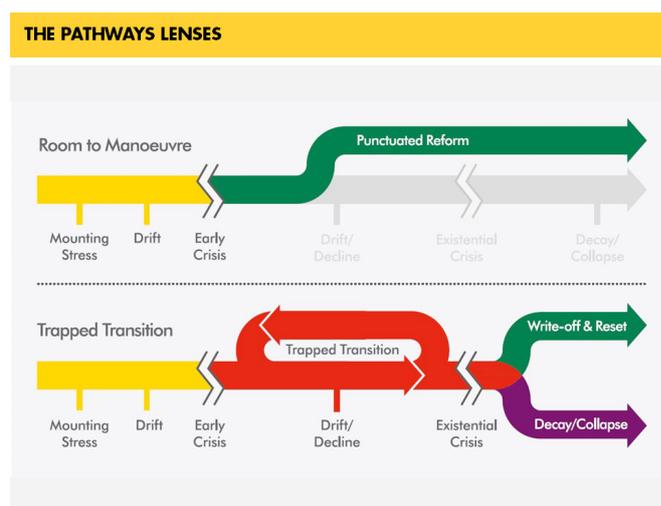
Cho-Oon Khong

Shell Strategy and Scenarios Team

The fourth Suntory Foundation Reexamining Japan in Global Context forum—a sequel to our initial forum on “Energy Security and Energy Transition”—was held at Keio University, Tokyo, on November 1st, 2013. Our speaker, Dr. Cho-Oon Khong, Chief Political Analyst of Shell’s Strategy and Business Environment Team, gave a presentation titled “Security in a Changing Energy Landscape,” drawing on scenarios he and his colleagues developed.

Dr. Khong began his presentation by pointing out that scenarios are not predictions but sets of possibilities. Shell’s global scenarios set out long-term trends in the economy, in politics, and in the supply and demand of energy, and explore their possible consequences. Shell’s latest scenarios suggest that the world is entering an era of critical geopolitical, economic, and energy transitions. Ever since the early 20th century, oil has had a dominant influence on global geopolitical dynamics. However, the 1970s, when oil began to experience dramatic price volatility, brought energy security concerns to the fore, and we began to explore other (sometimes very costly) energy sources.

There are two ways in which countries respond to challenges, which the Shell team label “Room to Maneuver” and “Trapped Transition.” In the former, when stresses mount we move quickly to make reforms, as China did in the 1990s after the Tiananmen Square incident when it reformed its economy and opened up space for growth in what was in effect, if not in name, a private sector. “Trapped Transition,” on the other hand, is a response characterized by the attempts of vested interests to resist change, which is maladaptive and

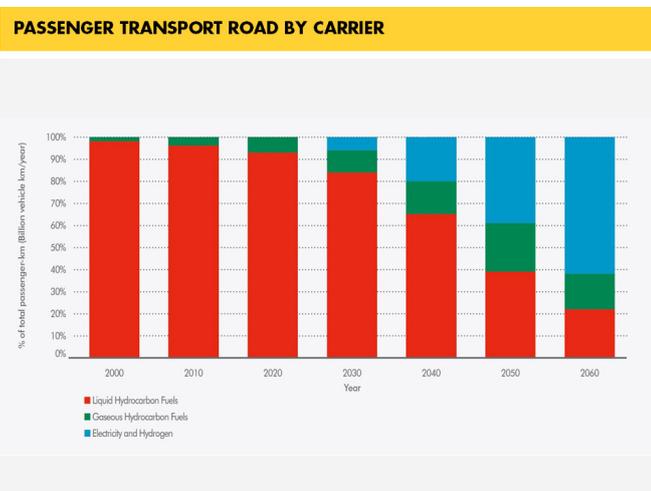


risks sending countries into a downward spiral that can cause the governance system to collapse. Trapped Transition eventually requires a comprehensive reset after a traumatic break in order to establish a new governance order. The Shell team used these two possible patterns of response, or “pathway lenses,” to explore the implications of two specific scenarios, which they call “Mountains” and “Oceans.”

A “Mountains” scenario is one in which top-down, state-directed change dominates a response to shock. This leads to an energy mix and an energy policy shaped by governments with energy security as one of their primary goals. In the context of a world dealing with climate change, a “Mountains” response might result, for example, in shifting from oil to gas and attempting to roll out carbon capture and sequestration



(CCS). Governments take the lead to push investment in large-scale energy projects with significant up-front costs and with long time horizons. Under this scenario, governments would pursue energy efficiency gains through infrastructure investment—for instance, promoting urban planning to create compact efficient cities. As a result, towards the end of this century, in a “Mountains” scenario, liquid fuels would be phased out completely in land passenger transport. By 2100, petrol and diesel (liquid fuels) would be completely replaced by either electricity or hydrogen. Dr. Khong suggested that in Japan the transformation could occur even faster and that by 2060, Japan in a “Mountains” scenario would basically become a non-liquid hydrocarbon fuel economy for passenger transport. The transition for freight would, of course, be a little slower than for passenger transport, but the trend would nonetheless be clear.



The “Oceans” scenario assumes bottom-up, people-driven rapid change and an even more globalized world. The energy story here is shaped by surging demand and rising prices, with market forces leading to a relentless drive for energy efficiency and the eventual dominance of solar and renewables in the decade of the 2060s. Solar power is especially suited to this world, as it can be rolled out through local cooperative solutions. This helps energy supply keep up with demand, which ramps up across the developing world. Dr. Khong suggested that in Japan solar power can approach green parity quite soon, ahead of other countries. In terms of transportation infrastructure, the change happens more slowly in the “Oceans” scenario due to the lack of government-led urban planning.

It should be noted that the projected security environment would be very different in the two scenarios. The “Mountains” world is a world of national competition, whereas the “Oceans” world is one characterized by a higher degree of international cooperation driven by mutual common interests among peoples. Since Asia is a volatile, conflict-prone region,

an “Oceans” scenario is both more attractive and more challenging.

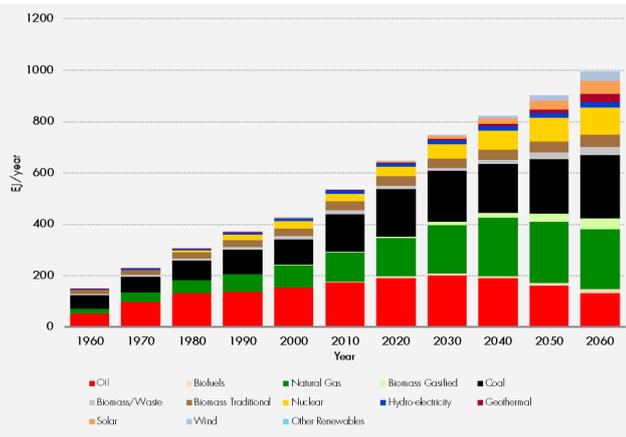
In the longer term, the increasing awareness of impending climate change adds a new dimension to energy security concerns. The issue here is less that of a gradually warming planet than that of climate variability, given that the impact of greater weather extremes will be what the world experiences first. Climate volatility will also affect food production, causing drought in some places and flooding in others. Thus, energy security is interlinked with food and water security concerns.

The contrast between the two scenarios—“Mountains” and “Oceans”—can help us think through possible policy responses from China, Europe, the United States, and Japan over the next thirty-five years. When we think about energy security and about where countries that need energy are located, it is in the large developing countries that we will see energy demand rising. In China, for instance, Shell expects to see a steep rise in energy demand all the way up to 2030, which will start to taper off as society ages dramatically. After that, Chinese energy demand will become more balanced, less dependent on coal, and more dependent on a range of energy sources, in particular renewables. Other developing countries such as India and Brazil will follow a similar pattern of energy demand as China. The energy profiles of developed countries would be quite different from this, but similar to each other’s. In the EU, the United States, and Japan, energy demand will continue to flat-line, with a diverse range of energy sources (including renewables and nuclear). Of course, the mix of each source will vary from country to country depending on local contexts and conditions. This does not mean that Shell expects the developed world not to grow; instead, Shell expects the developed world not to use more energy in absolute terms but to use energy more efficiently. Energy security will increasingly be a concern for all the large developing countries as the shift in energy demand moves from West to East.

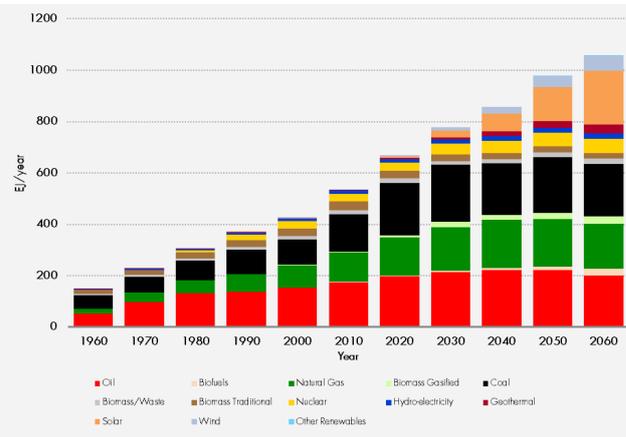
Looking more closely at China, its solution to its energy security concerns depends heavily on how it chooses to deal with the rising urban middle class’s concerns over local environmental pollution. Thus China needs to transition to a new growth model and a more balanced economy with more emphasis on domestic demand oriented industry. It remains to be seen if China will display “Room to Maneuver” or “Trapped Transition,” but the Chinese government will have to respond before its capabilities start to be questioned by the urban middle class. Also, Beijing appears to be taking a more prominent role in geopolitical competition with the United States.

European policy, on the other hand, is likely to reflect a struggle between environmental groups and those more concerned with reviving growth and recovering from the current

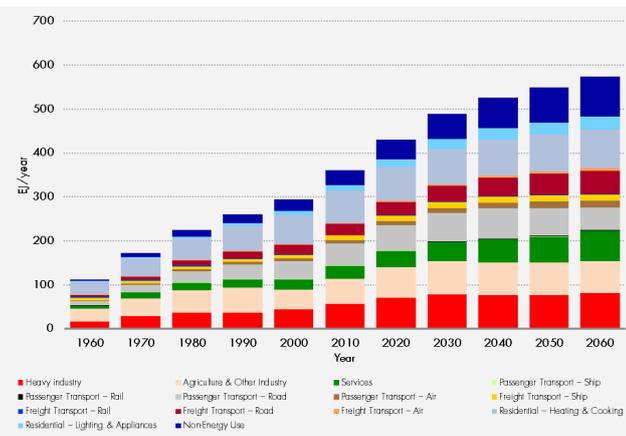
MOUNTAINS TOTAL PRIMARY ENERGY BY SOURCE



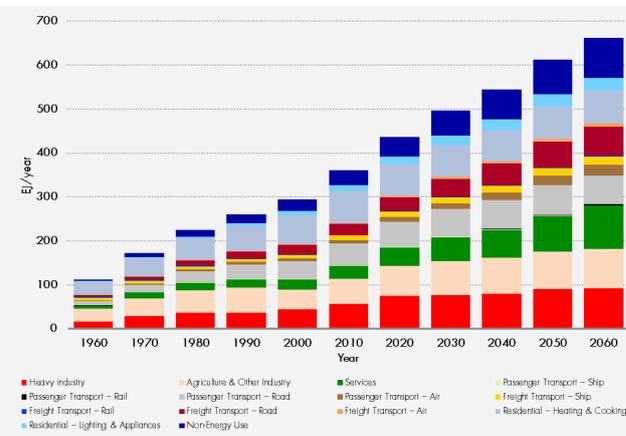
OCEANS TOTAL PRIMARY ENERGY BY SOURCE



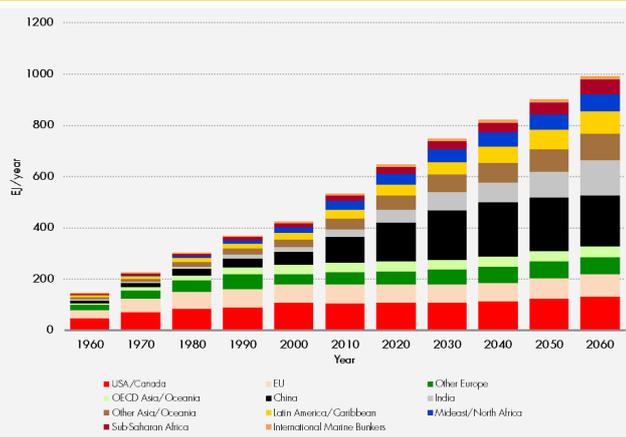
MOUNTAINS PRIMARY ENERGY CONSUMPTION



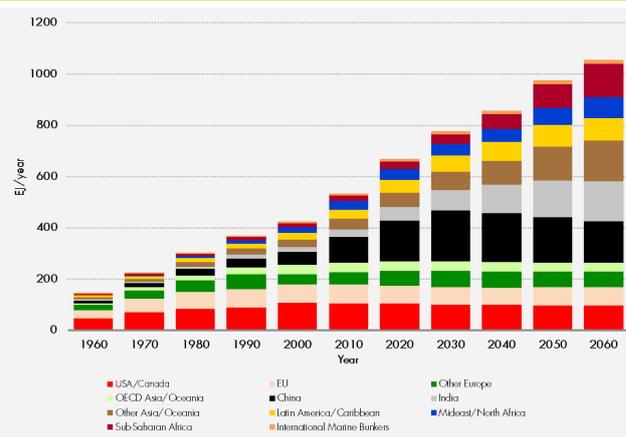
OCEANS PRIMARY ENERGY CONSUMPTION



MOUNTAINS PRIMARY ENERGY DEMAND BY REGION



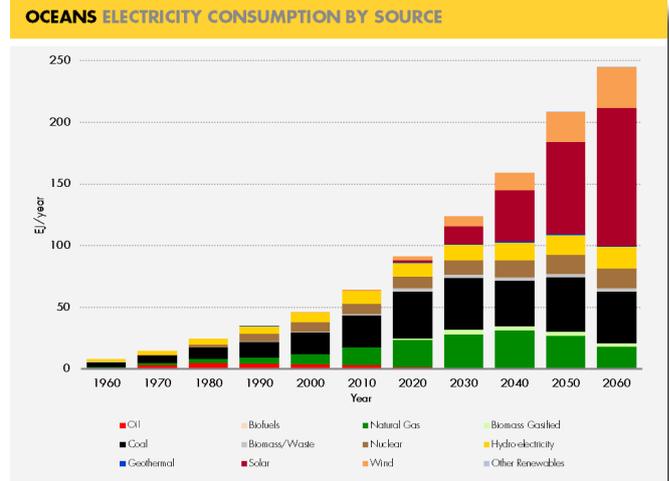
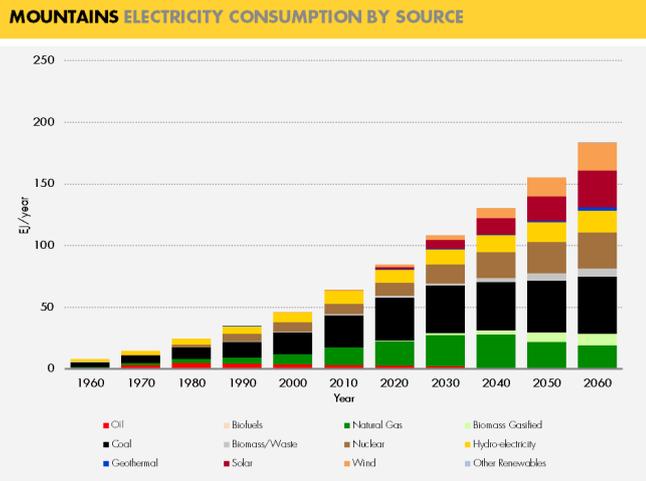
OCEANS PRIMARY ENERGY DEMAND BY REGION



recession. The problem is that the politics of dealing with recession is not about distributing the gains and dividends from growth, but about sharing the burden of adjustment with a shrinking economic pie. Growing social inequality is a further cause of political unrest and of a shift to political extremes, particularly to the far right. While a long-term shift in geopolitical power from West to East is already under-

way, how European countries respond to recession will affect its trajectory and pace. Should European economies exhibit “Trapped Transition,” this would only speed the power shift from West to East. Europe will need a “Room to Maneuver” response.

The United States’ energy security concerns have been dramatically transformed by the shale gas revolution and rising



domestic production. American dependence on imported energy has been reversed and low gas prices have revitalized the U.S. industry, bringing much in the way of technological development. More significantly for geopolitics, energy security is losing strength in the United States as a policy justification. Since oil markets are interconnected, Americans cannot be indifferent to the stability and security of global markets. However, there is a possibility that they take a much more pragmatic view towards dealing jointly with their allies with global problems. Meanwhile, the role of the United States in maintaining the global order has started to be questioned. It will increasingly have to build coalitions of support, rather than seek to act unilaterally.

The revolutionary development of shale gas in the United States raises expectations for the same transformation to occur in other parts of the world. In China, the potential unconventional gas reserves are significant from a geological perspective, and the Chinese are very active. However, the conditions for success seem to be somewhat different from the case of the United States and it may take some time for the realization of shale gas production in China. As far as Europe is concerned, shale gas is also promising, but there are significant environmental concerns. Eastern Europe in particular is interested in developing its unconventional gas reserves for obvious security reasons. Those countries are sandwiched between a great power to the East and the European Union.

These scenarios are especially useful for speculating on the future energy direction of Japan, particularly given the current debate in Japan on nuclear energy. Advocates of nuclear power argue that there is no viable alternative, but citizens are generally in a distinctly anti-nuclear mood. Dr. Khong suggested that it seemed likely that the Japanese government will have to restart a number of its nuclear power plants, and that it will be very difficult over the years ahead to actually phase out nuclear power for economic reasons. Japan may also want to maintain the nuclear sector for security reasons.

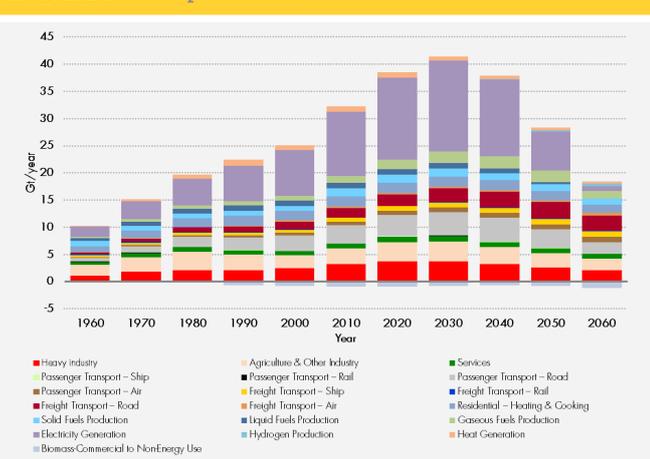
Japan is what is called a nuclear “capable” power; it would not take long to move towards a nuclear capability if a threat requiring it should arise. Having said that, Japan in “Oceans” succeeds in phasing out nuclear power in favour of renewables and a major improvement in energy efficiency use, though Japan in “Mountains” retains a significant nuclear component in its total energy mix. The Japanese government is now making all sorts of efforts to increase the share of renewables in the energy mix, and this share is indeed growing quite rapidly. A major growth in renewables can be expected, particularly in the “Oceans” scenario. This renewable energy growth will be both wind and solar, rather than being focused on solar, as there is less room for solar energy growth in Japan compared to some other countries, owing to geographical and meteorological considerations.



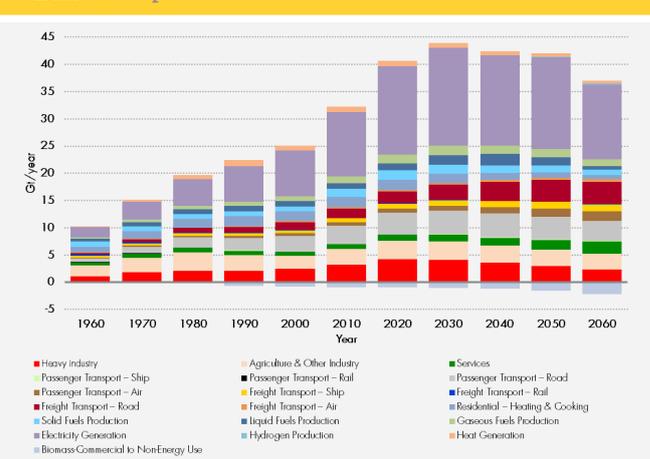
In response to a question about the impact of the shale gas revolution on energy transport, Dr. Khong argued that the path from production to consumption would be shortened in the “Oceans” scenario, since renewables are very location-specific and as a result people will tend to consume energy closer to the site of production. In a “Mountains” scenario, characterized by larger scale energy infrastructure projects and a greater reliance on gas, energy would travel further from site of production to site of consumption, with attendant implications for the importance of energy security in international politics.

In response to a question about Shell’s assumptions about technological innovation, Dr. Khong made clear that the Shell team factored different rates of innovation into its two scenarios. The “Oceans” scenario implies a much faster rate not only because it unleashes the creative powers of a broader range of actors on a wider variety of scales, but also because it is more open to the spread of new technologies (though, of course, every new technology requires some form of govern-

MOUNTAINS NET CO₂ EMISSIONS



OCEANS NET CO₂ EMISSIONS



ment support). Dr. Khong noted that there are fundamental technological issues related to renewables—particularly with respect to storage—that need to be resolved. We may have to wait until 2060-2070 before renewables become the largest primary energy source. In terms of gas, we have to postulate quite a rapid expansion in CCS deployment to bring down carbon emissions, but the cost is very high and the technology challenging.

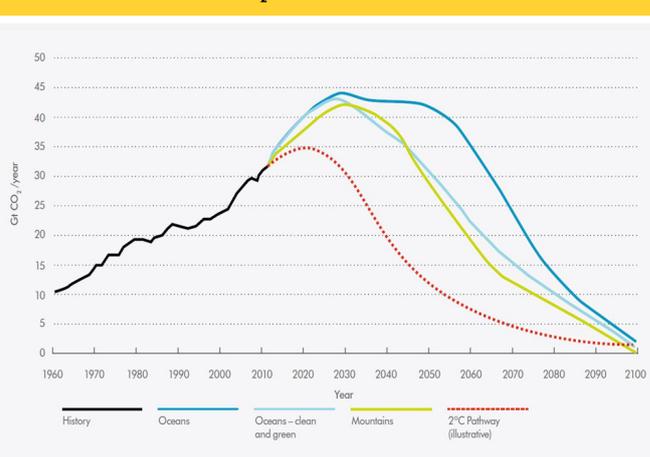
One participant asked about the political dimension of energy issues, particularly about how political institutions make energy policy choices. The rise of an environmentally sensitive middle class in China may have some political impact on the governments' attitude, but its impact may be quite different from that of the middle class in India, whose political institutions are democratic. In response to this question, Dr. Khong argued that the significant question is not whether the regime is democratic or authoritarian, but how the regime responds to popular demand. An authoritarian regime that is responsive can act more swiftly and more effectively than a less responsive democratic government. The Chinese regime has survived for many decades because it has been very sensitive to public demand.

Regarding the political dimension of energy issues, Dr. Khong pointed out that Americans, who have a politically prominent climate change denial lobby, have actually been reducing their carbon emissions, through substituting shale gas for coal in power generation. American coal is now exported, leading to Europeans, who are politically more environmentally conscious, actually increasing their carbon emis-

sions, through burning imported coal. Thus the dramatic decrease in greenhouse gas emissions that we are witnessing in the United States is not the result of heightened environmental awareness but of the cost-effectiveness of shale gas.

At the end of the session, Dr. Khong raised the possibility of yet another scenario in which the present trends of the United States and China are reversed. In this world, China becomes less dynamic because of its aging population and its economy shifts emphasis towards consumption and services, while the United States is empowered by its newfound riches in cheap energy (primarily shale gas) and its economy revitalizes. Conceivably, the United States might once again become the world's manufacturing powerhouse, even exporting to an aging and slowing China.

GLOBAL ENERGY-RELATED CO₂ EMISSIONS



The charts and diagrams used in this report draw from *The New Lens Scenarios: A Shift in Perspective for a World in Transition* (2013), <http://www.shell.com/global/future-energy/scenarios/new-lens-scenarios.html>, and are used courtesy of Shell International BV.

Reexamining Japan in Global Context

Energy Security and Energy Transition: Part II

Friday, November 1, 2013, Keio University, Tokyo, Japan

Keynote Speaker

- Dr. Cho-Oon KHONG, *Chief Political Analyst, Shell Strategy and Scenarios Team*

Project Directors

- Professor Masayuki TADOKORO, *Professor, Faculty of Law, Keio University (International Politics)*
- Professor David A. Welch, *CIGI Chair of Global Security, Balsillie School of International Affairs; Professor of Political Science, University of Waterloo (International Politics)*

Project Core Member

- Professor Fumiaki KUBO, *Professor, Faculty of Law, Tokyo University (History of American Politics, Foreign Diplomacy)*

Project Members

- Mr. Takashi HOSHINO, *Secretary for Policy/Legislative Affairs to Mr. Shouji Maitachi, Member of the House of Councillors, Japan*
- Mr. Takaaki KAWASHIMA, *Managing Partner, Kaleido Holdings, Inc.*
- Dr. Masato KIMURA, *Director, Research Department, Shibusawa Eiichi Memorial Foundation*
- Mr. Masashi MIURA, *Literary Critic*
- Mr. Hiroyuki TEZUKA, *General Manager, Climate Change Policy Group, JFE Steel Corporation*
- Mr. Tatsuhiko YOSHIZAKI, *Executive Vice President, Sojitz Research Institute, Ltd.*

Project Assistant

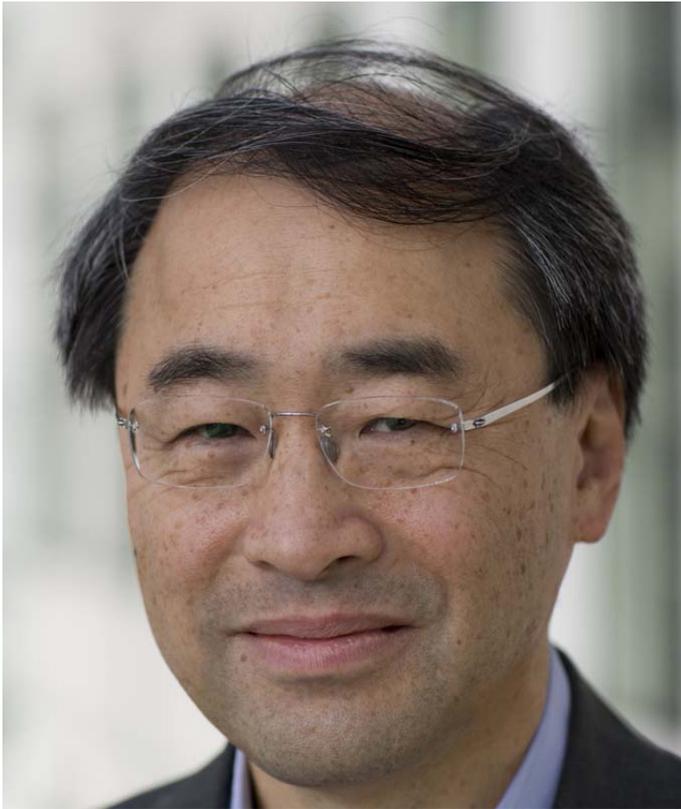
- Mr. Seiichi HAYASHI, *Keio University Graduate School*

Suntory Foundation

- Mr. Wataru IMAI, *Executive Director*
- Mr. Gen HAMAHASHI, *Secretary General*
- Ms. Noriko YAMAUCHI, *Program Officer*

Suntory Foundation Torii Fellows

- Dr. Sung Eun CHO, *Tokyo University Graduate School*
- Dr. Rentaro IIDA, *Project Research Associate, University of Tokyo*
- Ms. Shoko IMAI, *Ph.D. Student, University of Tokyo*
- Mr. Tomoyuki MIYATA, *Torii Fellow, Suntory Foundation*
- Dr. Andrea PRESSELLO, *Visiting Researcher, Sophia University*
- Dr. Junichiro SHIRATORI, *Research Associate, Keio University Graduate School*



Dr. Cho-Oon Khong is Chief Political Analyst in the Global Business Environment team, Shell International, with 20 years of experience in leading and participating in country scenario projects. Dr. Khong advises on political trends and political risk for the Shell Group, and leads the external environment assessments for Shell's country reviews. He was actively involved in developing the 1995, 1998, 2001 and 2005 sets of Shell Global Scenarios, the 2008 Shell Energy Scenarios, and the 2013 New Lens Scenarios.

Dr. Khong is an active scenarios practitioner, focusing on using scenarios in futures thinking. He has worked on a range of scenario projects with international organizations, governments, universities, research institutions and business companies in Asia, Europe, the United States and Africa. He is a member of the advisory panel of the Evian Group based at IMD, Lausanne, a member of the UK government's Asia Task Force, and he teaches on the Oxford Scenarios Programme at the Saïd Business School, University of Oxford.

Dr. Khong is particularly interested in issues of political development in East Asia and the Middle East. He previously taught Politics and International Political Economy at the University of Bath and the National University of Singapore, and was Laski Scholar at St John's College, Cambridge. He graduated from the University of Singapore, and received his M.Sc. and Ph.D. from the London School of Economics.



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