Supplement on Energy
54th Japan-U.S. Business Conference
The U.S.-Japan Business Council / Japan-U.S. Business Council
November 3, 2017

Current Situation and Common Challenges Related to Energy

1. The U.S.-Japan Business Council and the Japan-U.S. Business Council (hereafter referred to as "the Councils") agree that recent cooperation and dialogue between Japan and the U.S. has made significant progress. Not only has cooperation intensified in oil and natural gas, power-generation systems and nuclear policies, it has converged in the areas of cyber security, basic research in energy and the environment, energy efficiency and micro-grids. This cooperation lays the foundation for facing challenges such as global warming while contributing to a prosperous, peaceful and safe Asia-Pacific region.

2. The Councils aim to discover new opportunities for business cooperation between Japan and the U.S. by understanding and assessing the potential direction of both countries' energy policies through Private-Private and Public-Private dialogue. The Councils applaud the meeting between Mr. Rick Perry, United States Secretary of Energy and the Japan-U.S. Business Council in June as a successful example of this Public-Private dialogue and fully agree with his remarks emphasizing the importance of the U.S. - Japan cooperation in the energy field. Furthermore, the Councils believe that energy and environmental challenges are closely linked to the national security of both nations, and that identifying resolutions to these problems now will enhance the economic relationship between Japan and the U.S.

3. A revolution in U.S. shale and Liquefied Natural Gas (LNG) production is a recent, significant change to the global energy environment and has transformed the U.S. from a net-importer of energy resources to a net-exporter. This revolution has the potential to yield important opportunities for Japan, which does not have enough energy resources to meet domestic demand, by providing access to additional energy sources and diversifying its energy mix. There are also important opportunities for the U.S. as well, such as the jobs created from continued investment by Japanese companies in industrial infrastructure including LNG liquefaction and storage facilities, and LNG carriers. The Councils agree that further cooperation in developing the Asian LNG market by both countries will lead to expanded business activities and contribute to strengthening energy security in the region.

4. The Councils recognize that there is a growing awareness and desire among both countries' populations for a sustainable society capable of growth and consumption that minimizes harm to the environment. The historical leap in economic productivity

and growth that accompanied the Industrial Revolution was powered by an accelerating cycle of fossil fuel production and consumption, especially in oil and coal. However, more efficient consumption of these fossil resources, as well as further innovation in renewable energy technologies, will be required to mitigate the economic impacts of future price fluctuations, resource depletion and global warming.

5. Both countries' Governments and private sectors recognized early on the need for economically and environmentally sustainable energy sources, and enthusiastically promoted nuclear power as a low emitter of green-house gases, as well as carbon-reduction technologies for the use of coal and oil. Both countries have cooperated in research of renewable energy sources and energy conservation, and led technological innovation of high efficiency power systems utilizing natural gas, the cleanest of the fossil fuels. The U.S. continues to lead innovation in shale gas and oil drilling technologies, which provides an important opportunity to diversify Japan's energy sources which remain largely dependent on Middle Eastern exports. It also provides an opportunity to provide cheaper gas to emerging Asian countries, and reduce resource volatility.

Mutual Cooperation for Energy Diversification

6. The Councils agree that a balanced energy allocation (energy mix) is an important component of both Japanese and the U.S. energy security, and encourages both governments to promote policies aimed at achieving a sustainable, stable and reliable energy portfolio.

7. For Japan, imported energy choices, diversification of sources, technological innovation and security of maritime transportation routes are important factors for achieving economic goals. These goals, as articulated in Abenomics, keep growth strategies on track and are essential for contributing to international countermeasures against global warming.

8. The Councils agree that natural gas will remain an important energy resource for Japan and the U.S., but for different domestic reasons. Investment by both countries in large infrastructure projects for natural gas production, storage and shipping will create additional employment opportunities in the U.S. while providing valuable experience to the professional workforces of both countries as this field is pioneered.

9. As a result of continued shale gas development in the U.S., Japanese companies are investing heavily in the infrastructure required to transport LNG to Japan and the Asia region, including construction of production-bases, transportation and storage facilities. These investments have made remarkable contributions to the U.S. economy in terms of growth and employment, and have further promoted the benefits of Japan-U.S. cooperation in energy infrastructure development.

Mutual Cooperation in Nuclear Energy

10. The Councils acknowledge that the Great East Japan earthquake in March, 2011 was a historical turning point for Japanese energy policy as it brought to the national consciousness the need to mitigate future vulnerabilities in power generation infrastructure.

11. The Councils observed that shale gas development in the U.S. and the falling costs of renewable energy sources have resulted in a current decline in demand for new nuclear power generation plant construction. With fewer nuclear power generation facilities coming on-line, there is a lower demand for highly skilled, competent technicians, engineers and other professionals entering the workforce. Fewer professionals entering the field of nuclear energy technology risks loss of institutional knowledge, decline of the nuclear energy industry writ large, and the ultimate loss of an economically viable source of low-emission energy.

12. The Councils agree that the governments and private-sectors of the U.S. and Japan must engage in regular dialogue to ensure mutual understanding of each other's security and economic environments. The Councils are in agreement that a mutual cooperation system would facilitate the development and exchange of nuclear energy generation technology and contribute to both countries' energy security. The Councils also agree that commercialization and research of advanced nuclear reactors (including small modular reactors or SMRs) is worth noting as a potentially safer and lower-cost nuclear reactor.

13. The Councils agree that the Japan-United States Agreement for Peaceful Nuclear Cooperation is the bedrock for continued cooperation and technological exchange between the U.S. and Japan in the nuclear energy industry. The Councils welcome the Statement of Intent signed by both governments which desire to strengthen the special bond between two nations through greater industrial cooperation. The Councils encourage both governments to continue to cooperate in important projects such as decommissioning work in Fukushima Daiichi.

Challenges to U.S.-Japan Energy Cooperation

14. **Oil.** Although the U.S. energy industry has benefited from public-private cooperation and innovation in oil shale, there is concern on the Councils that the consequent reduction in oil prices will discourage future investment in U.S. energy development.

15. **Coal.** The U.S. government has recently supported attempts to revive the declining coal industry by promoting it as an abundant, cheap energy source that has lower environmental impacts than in the past due to clean-coal technologies such as Carbon

Capture and Storage (CCS).

16. In the states of Alabama and Texas, Japanese and U.S. companies are cooperating on ventures to store carbon harvested from CCS deep underground rather than the atmosphere. However, the cheap cost of coal as an energy source is offset by the high capital costs associated with CCS, making large-scale use of clean-coal technology currently viable in the U.S. market. Despite these high barrier costs to using CCS for coal-fired energy, the Councils believe the U.S. and Japan should continue development of this technology to make it more cost-effective and practical for large-scale use in Asia and beyond.

17. **Renewable Energy.** The Councils have identified several barriers to more wide-spread adoption of renewable energy technologies and techniques: (1) wide variance in types of renewable power sources; (2) cost competitiveness of development and use as compared to cheaper (fossil) sources; (3) geographical and social conditions of different nations/ societies. The Councils emphasize the importance of government's role in crafting appropriate legislation and educating consumers on the benefits of clean energy to encourage its acceptance.

18. Japan is readily adopting more renewable energy technologies and policies to achieve internationally recognized CO2 emission goals. The Council encourages further cooperation between the public and private sectors on energy transportation, storage, smart-grid technologies and management of energy demand/response to reduce investment risks for banks and developers.

Benefits and Challenges of Innovative Technologies

19. The Councils agree that Artificial Intelligence (AI) and the Internet of Things (IoT) pose both significant opportunities and security challenges for energy collaboration between the U.S. and Japan. These technologies have spurred innovation in environmental friendly technologies while also reducing their implementation costs, making them more practical than ever for wide-spread, common use.

20. The Councils agree that anticipated leaps in innovation of AI and IoT technology, enabled by the digital economy, will make global warming countermeasures such as the Paris Agreement practical and achievable in the near future. The IoT, which networks physical devices to people and programs, will play an especially important role in eliminating excess CO2 emissions and wasteful power consumption by vastly improving the efficient management of equipment use, electricity demand-supply functions and transportation.

21. Before 2014, use of fossil fuel in global and personal transportation remained one of the most difficult challenges in reducing global warming CO2 emissions. The Councils agree that zero-emission vehicles such as electric cars, driverless vehicle technologies and an emergent sharing-economy (such as car sharing) hold great

potential for dramatically reducing environmental waste.

22. The Councils acknowledge that public-private collaboration for the achievement of a "hydrogen society", which primarily focuses on fuel cell technology, has accelerated in Japan as a result of the approaching 2020 Tokyo Olympics. The Councils agree that successful cooperation between Japan and the U.S. is important to promote further innovation and investment in hydrogen energy so as to rapidly realize the economic benefits of this technology.

23. The Councils encourage the governments of both countries to support continued investment, research, development and integration of these technologies, to include required infrastructure, so that they can be leveraged in high-end manufacturing, robotics, big-data, energy network security and the efficient management of electrical grids and energy consumption.

Mutual Cooperation in Energy Conservation

24. The Councils acknowledge that energy conservation policies, and the degree to which they are implemented in our two countries, depends on the unique national character, social circumstances, cultural background and resources of each. Because Japan has managed a shortage of energy sources for decades, the Japanese society, government and economy place a high value on Conservation practices, technologies and innovation. The Councils agree that there are opportunities for the U.S.-Japan public and private sectors to exchange best-practices in Conservation standards, public relations and implementation, and thus encourage the U.S. and Japanese governments to support continued dialogue promoting Energy Conservation policies that support sustainable economic growth.

25. The Councils agree that energy efficiency standards should be an integral part of new commercial and residential building and appliance design to ensure resources are used in a sustainable way. Improved standards for commercial and residential structures will not only promote a high quality of life, but will reduce overall energy consumption in absolute terms, reduce the environmental impact of fossil consumption from CO2 emissions, and improve the energy security for both countries. The Councils also agree that policies must balance the medium and long-term operational costs of higher efficiency standards with appropriate investment incentives to make them practical and scalable.