

A NEW ROADMAP TO A POST-FUKUSHIMA RENEWABLE ENERGY FUTURE

JREF LAUNCHING EXPERTS' MEETING

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Opening Plenary: Visions for Renewable Energy After 3.11

Private Sector Leadership to Transform Energy Delivery and Use

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Introduction

Good morning ladies and gentlemen, and distinguished co-speakers for this plenary session. It is indeed an honor to be invited to attend the Launching Experts' Meeting of the Japan Renewable Energy Foundation, and I thank our host – Mr. Masayoshi Son, the founder of the Foundation – for giving me this opportunity.

Yesterday we received an excellent insight to where the Foundation is heading and the vision that will drive the Foundation forward. I compliment Mr. Son for the task he has taken on, and the Institute of Sustainable Energy Policies for the preparatory work for this Experts' Meeting and the establishment of the Foundation. I am particularly struck by one sentence in the invitation letter signed by Mr. Son, and I quote "*I am strongly convinced that renewable energy is our energy future, as they are the only energy sources which provide safe and sustainable energy to us and our future generations*", unquote. Renewable energy ought to have become the mantra as soon as we learnt about the global warming effects of carbon dioxide but it is still not so.

The tragedy in Fukushima on 3.11 took many lives. It also significantly set back nuclear power as a key zero-carbon energy technology, and brought renewable energy into clearer focus. I surely look forward to the Foundation achieving its goal of large scale use of renewable energy in Japan and promoting renewables to Asia and the world.

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Today and tomorrow there will be several sessions to discuss policies, finance, technology, partnerships, business models, electricity markets and power grids. For now, I will limit myself to mentioning four factors that require a shift in the way energy services are delivered and used

- (i) carbon emissions need to peak sooner rather than later so the need to act is urgent,
- (ii) millions of people cannot realize their economic and social potential as they lack access to modern energy and instead rely on low intensity energy sources,
- (iii) the added problems of the nuclear option, and
- (iv) the power industry structure that has deterred the level of investment needed for its sustainable growth.

Urgency

The experts in the room understand clearly the urgent need to lower energy-related carbon emissions. Unabated, the temperature rise will lead to irreversible changes in the ecosystem and coming generations – those born in the 21st century – will need to adapt to a very different world. According to the International Energy Agency's 2010 World Energy Outlook, energy-related CO₂ emissions are projected to reach 31.9 Gt in 2020. In order get to a trajectory that is compatible with long-term stabilization of 450 ppm CO₂-eq, emissions need to fall to 21.7 Gt by 2035, or by 32% in 15 years. Notwithstanding the development needs of billions of people around the world, the use of fossil fuels has to start coming down very soon in absolute terms. At stake is the immense size of the fossil fuel industry; using back-of-the-envelope calculations based on current costs and the world's consumption of coal, oil and natural gas, the industry makes over \$3.4 trillion annually, and is projected to invest another \$15.8 trillion by 2035. This industry, together with its supply chains, ancillaries and the markets, that grew rapidly during the 20th century, needs to give way to the development of alternative and sustainable energy sources during the next 25 years. While considerable attention is being given to decarbonizing power generation, the more serious concern is the growing demand of oil for transport, mainly the large number of passenger vehicles that will be purchased as GDP per capita increases in the populous developing countries – China, India, Indonesia etc. The shift to electric vehicles will increase the demand for electricity and provide new opportunities for the introduction of storage in the network. Engineers joining the workforce now will witness a sea change in the power industry.

Access

For the sake of argument, even if we disregard the climate change impact, it is difficult to conclude that the fossil fuel industry has been successful in meeting the needs of the society. About 10% of world's primary energy needs are met by bioenergy, that is, about 2.7 billion people today still rely on traditional biomass. Supply chains of fossil fuel have not extended to cover everyone's needs, affordability is an issue and so we still face energy poverty. Consequently, people in large parts of the developing world are unable to use modern appliances and equipment that help improve quality of life; cannot access proper social services like education, health and entertainment; have few means to increase their household incomes and continue to live in or near poverty. Admittedly, the energy sector should not be singled out; there are many other infrastructure development issues – lack of potable water, inadequate transport services, poor access to capital, etc. However, the centralized structure and capital intensive nature of the energy industry make it difficult to support inclusive development without a large subsidy, which in turn has become a hurdle for introducing alternate energy technologies.

Nuclear

Though nuclear energy contributes only 2% of the world's primary energy demand, it had been seeing a resurgence because it generates no carbon emissions. By 2009, another 60 countries had approached the International Atomic Energy Agency seeking advice on including the nuclear power in their energy development plans. Economical and technological considerations were favoring nuclear power but many governments did not have a sure strategy for building a consensus on its use. The Fukushima nuclear tragedy has significantly increased the barrier. Skepticism over nuclear safety cannot be easily overcome in any country. The oversight regimes and public disclosure standards for nuclear facilities are also being questioned. While existing nuclear power plants may be allowed to continue operations for their remaining lives, it may take considerable time and effort in most countries to get new licenses for greenfield projects or to extend the license of existing plants. With such a high level of uncertainty, the nuclear equipment industry is likely to slow research and development, and loans may require a high risk premium. In the WEO 2010, IEA's forecast was that nuclear power addition by 2035 would be 524 GW, or 8.2% of the total power generation capacity addition; I would not be surprised if the WEO 2011 scales this back.

Industry Structure

I commented on the industry structure when I mentioned that energy poverty is an issue. The lack of a demonstrable shift towards a low-carbon economy suggests to me that the industry structure may itself be an issue, and unless it is changed it may be difficult to introduce new zero carbon technologies or quickly scale up use of existing technologies for power generation in the time that is available, and for the benefit of those billions who lack modern energy services.

If we were to list three key features of the existing power supply industry, it would be (i) the capital intensive nature that favors large corporations with robust balance sheets, (ii) the regulatory and oversight needs for looking after the interests of consumers because markets are distorted, and (iii) a single product industry, which offers the same basic commodity to all customers with little differentiation in quality.

By contrast, if we look ahead and visualize what will be conducive for renewable energy being dominant in the power supply industry, the three key features would be

- (i) Entities with far fewer resources will be able to implement and operate renewable energy-based power plants. Once implemented, these have little need for working capital to buy fuels, other than biomass-based power projects. Renewable energy projects can be in sizes starting from a couple of hundred kW to about 100 MW; the capital requirement will be smaller and the technologies will be simple so require fewer people to operate. Lenders would find many suitable clients that can develop the projects; they would, however, need to revise the risk assessment models that currently favor large asset-based companies.
- (ii) Renewable energy power plants will be widely dispersed according to the availability of local renewable resources. Smaller-sized units will be used for households or small communities. The large numbers will be suitable for market-based pricing – customers will have access to information and will be able to choose the local service provider. One clearly identifies automobiles with a free market structure requiring minimal regulation; well a small-sized 140 hp sedan parked in the front drive has the equivalent of 104 kW of electricity source, enough to power 15 very large homes. The renewable energy industry can well develop on similar lines and ultimately replace the large centralized utilities of

today. It will need encouragement only during the initial stages while supporting supply chains are being developed, and extended use and innovations lower the costs.

- (iii) Renewable energy will allow a certain amount of customization according to need. If we consider the household and commercial sectors that mostly use electricity in buildings, a range of energy services is possible. The first approach would be energy conservation, i.e., limiting the energy needs to the amount of renewable energy available – we already read about zero energy buildings. Different forms of energy may be better for meeting different types of demand, an office building can meet the hot water needs using solar thermal; waste heat in commercial complexes can be diverted to provide air conditioning. Depending on time of use, innovative approaches are possible for energy storage. Several countries have solar panels installed on residential roofs, mostly through fiscal incentives offered by the government. ADB, for example, has implemented household and community biogas projects that meet the energy needs of rural households in a cleaner and more efficient way.

No doubt there are other factors for comparing the existing power supply industry with one dominated by renewable energy; I cannot cover all this in the time I have available today. However, the main point is that the private sector is very well placed to capitalize on the opportunity and seek a bigger role in the power supply industry. An investor will not need deep pockets. Oversight will become lower eventually, and differentiation in service will become possible with distributed renewable energy power generation. There is a very powerful market signal for the first movers given the fact that a \$3.4 trillion fossil fuel supply industry needs to be replaced. Rapid expansion during the past 2 years, even as the global economies struggled, has lowered the cost of renewable energy. Entry of more players will provide positive momentum and make the renewable energy competitive very soon. Once policy makers see more players in the renewable energy industry, they will be inclined to tax carbon use which will further shift the balance toward renewables. Notably, global leaders in the G 20 and APEC have already committed to phase out fossil fuel subsidies – these are the large markets for energy, accounting for over 70% of the world's energy use.

Conclusion

I cannot avoid the temptation to draw a comparison with the telecommunication industry, especially because Softbank is behind the Foundation. When I entered the power sector over 35 years back, both power and telecom industries were dominated by large corporations, heavy

regulation, and the need to keep growing infinitely. Now, the telecom industry has adopted an avatar. It has introduced what Brian Arthur in his recent book – *The Nature of Technology* called a new “technology species. Communication is so much improved that it allows us to avoid travel and therefore avoid carbon emissions. There is little doubt that the new telecom industry is well positioned to meet the needs of the future generations. I expect the Japan Renewable Energy Foundation to bring about a similar transformation in the power supply industry and prepare us to sustainably meet the power needs of future generations.

Before I finish, I want to briefly describe the Asian Development Bank. ADB’s mission is to help its developing member countries reduce poverty and improve the quality of life of their people. Despite the region’s many successes, it remains home to two-thirds of the world’s poor: 1.8 billion people who live on less than \$2 a day, with 903 million struggling on less than \$1.25 a day. ADB is committed to reducing poverty through inclusive economic growth, environmentally sustainable growth, and regional integration. Clean, renewable energy is key to all this.

For that reason, we have set up a Clean Energy Program which enables lending of over \$1 billion annually for renewable energy, energy efficiency and fuel switching. We have raised the target has to \$2 billion from 2013. And that’s why we are here today.

I look forward to more fruitful discussions with you in the coming sessions.

Thank you.