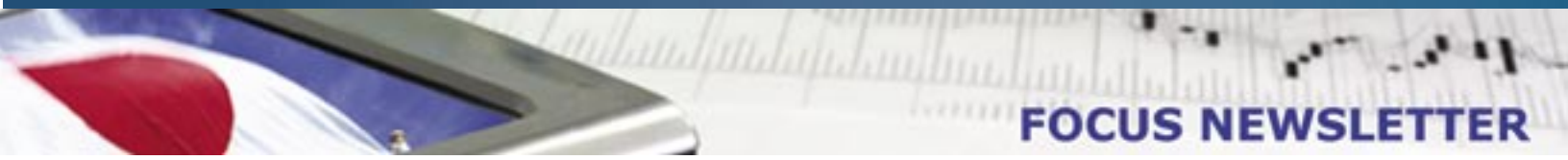


JAPAN VIEWS GREEN ENERGY AS ESSENTIAL FOR GLOBAL ECONOMIC RECOVERY

MARCH 2009

While analysts look for signs of global economic recovery -- the world is undergoing a paradigm shift in corporate and government behavior. The outcome is still to be determined – yet sure to challenge many of the assumptions, strategies and policies that guided growth and consensus opinion over the past few decades.

In addition to cleaning-up the US and other financial systems, this transformation is almost sure to require a shift in demand from mature economies such as the US, Western Europe and Japan to China, India and other emerging economies who previously achieved growth through exports to the developed world.

Some two-thirds of demand growth in natural resources is now directly attributable to developing economies -- but meeting their growing needs using the traditional carbon-based fuel model is simply not sustainable.

IN THIS ISSUE:

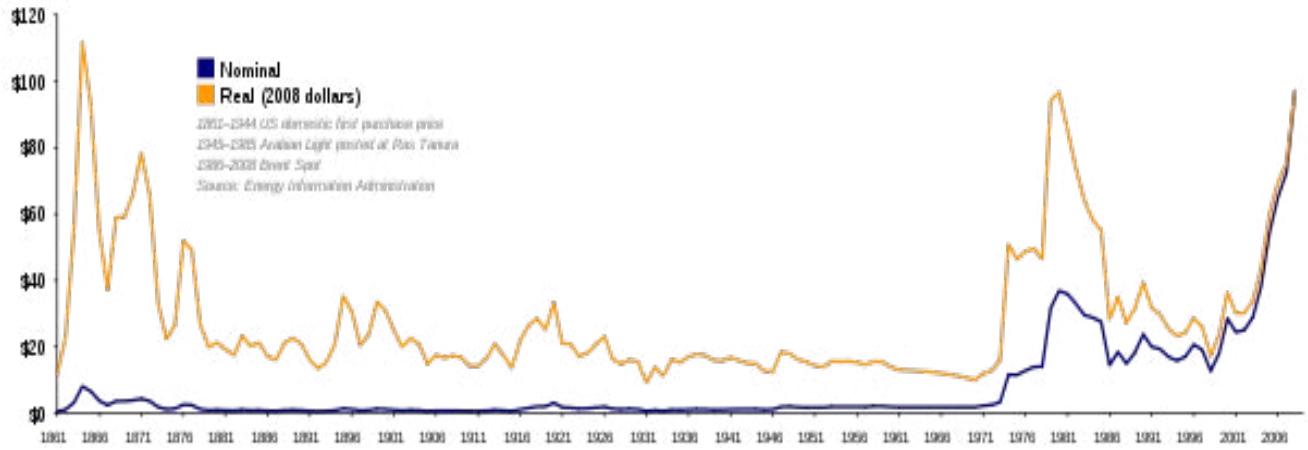
Consequently, the development of new alternative energy sources, efficiencies and environmentally-friendly technologies, guided by uniform standards and complementary regulations and policies, is absolutely essential.

Green Economy Not Question of Cost, Security or Innovation but One of Survival

For many decades interest in non-traditional energy sources has been highly correlated to petrochemical prices and concerns over energy security. Interest soared when prices and concerns

were high -- and then was largely forgotten as costs and fear dissipated. Barack Obama highlighted this phenomenon shortly before assuming the presidency stating "For over three decades we've listened to a growing chorus of warnings about our energy dependence ….. We've heard president after president promise to chart a new course…yet our dependence on foreign oil has only grown even as the world's resources are disappearing."

Part of the problem has been the complexity and high capital costs of developing non-carbon based technologies combined with the interest of traditional energy suppliers in keeping prices at levels that maintain steady demand for their own output. This has made it difficult to justify most renewable energy sources on economic factors alone.



Over the past few decades, recognition of the long-term implications of global warming and environmental degradation has provided additional impetus for alternative energy development. Reducing carbon emissions is critical as many scientists estimate by the year 2100 the average global temperature will increase by approximately 2.5 to 10.5 degrees Fahrenheit. This significant acceleration reflects the cumulative effects of more than a century of global industrialization and factors such as overpopulation, deforestation and the use of petroleum products to run factories, vehicles and machines around the world.

Rising living standards in China, India and other emerging economies are placing further strains on energy and natural resource supplies. That is because emerging economies possess younger populations, higher levels of savings and greater potential demand for cars, homes, consumer goods,

telecom and other possessions that have already been accumulated in more mature markets.

The global financial crisis is almost certain to accelerate this trend. Economic growth will be increasingly dependent on the ability of these new markets to shift from a model that relies on exports to advanced economies – which are now seeking to reduce debt and prepare for the retirement and health care needs of rapidly aging populations – toward greater domestic consumption on their own.

The problem, however, as described by Andrew Neff, director of the New Economics Foundation think-tank in London is "If everyone in the world had the same consumption rates as in the United States it would take 5.3 planet earths to support them". He added that people in other parts of the world are consuming natural resources and polluting at different levels, with the figure calculated at 3.1 for France and Britain, 2.5 for Germany and 2.4 for Japan.

Given there is only one planet earth, continuing development in these markets allows insufficient supply of the resources required to sustain this expansion. Furthermore, many experts, such as Matthew Simmons, believe we are approaching the point of peak oil, a time when the maximum petroleum resource extraction is reached and after which production enters terminal decline. This is complicated by the substantial cuts oil and natural gas companies are making to their exploration activities as capital becomes harder to access and decreased economic activity creates a product surplus in the current environment.

As a result, in addition to climate change and environmental consequences, rising demand in emerging markets – without dealing with supply issues -- will simply result in ongoing volatility and a huge de-facto "tax" in the form of accelerating energy and commodity prices. This will choke off growth as it occurs both in the developing as well as the developed world.

Economic Turmoil Facilitating Paradigm Shift Toward New Energy Policies

While unfortunate and painful, in some ways current economic problems are proving to be a positive to the development of a green economy.

For example, the slowdown has diminished economic activity, moderating demand. This alleviates

price and supply pressures, allowing more time to address these problems. In the past this would also have lowered demand for alternative energy, which only becomes cost effective at higher prices. Now it appears increasing environmental consciousness and the desire to minimize future supply constraints – as well as the realization renewable energy is likely to constitute the next major area of innovation and growth is keeping governments, industry, investors and academia focused on this sector.

Secondly, weakness in housing, retail, financial services, automobiles and many of other sectors is fueling worldwide government efforts to stimulate domestic economies through public works, infrastructure and other projects.

As highlighted in the last edition of this Focus newsletter series, these efforts seek to build on Japan's own experience managing stimulus programs in the 1990's as it attempted to move past the collapse of its "bubble economy". Many believe too much of that spending was allocated to projects that lacked long-term benefit, rather than investment in new technologies or conservation projects.

"It is not enough just to hire workers to dig holes and then fill them in again," Toshihiro Ihori, an economics professor at the University of Tokyo said in a recent interview with the New York Times. "One lesson from Japan is that public works get the best results when they create something useful for the future."

As a result, in the US the $787 billion American Recovery and Reinvestment Act provides for $463 billion in spending and $324 billion in tax cuts. It includes $16.8 billion for energy efficiency and renewable energy projects and technologies, including $4.5 billion for energy research and development. It provides $4.5 billion for energy research and development projects nationwide.

Japan and Other Nations Also Stimulate Alternative Energy Development

Many other nations have also moved to implement stimulus programs and Japan has pledged its own package. It includes up to $850 billion in spending with a strong focus on renewable energy. Having already re-enacted incentives for home solar heating, Japan is now looking at incentives for eco-friendly cars, wind power, efficient appliances and expansion of high-speed rail. That would be in line

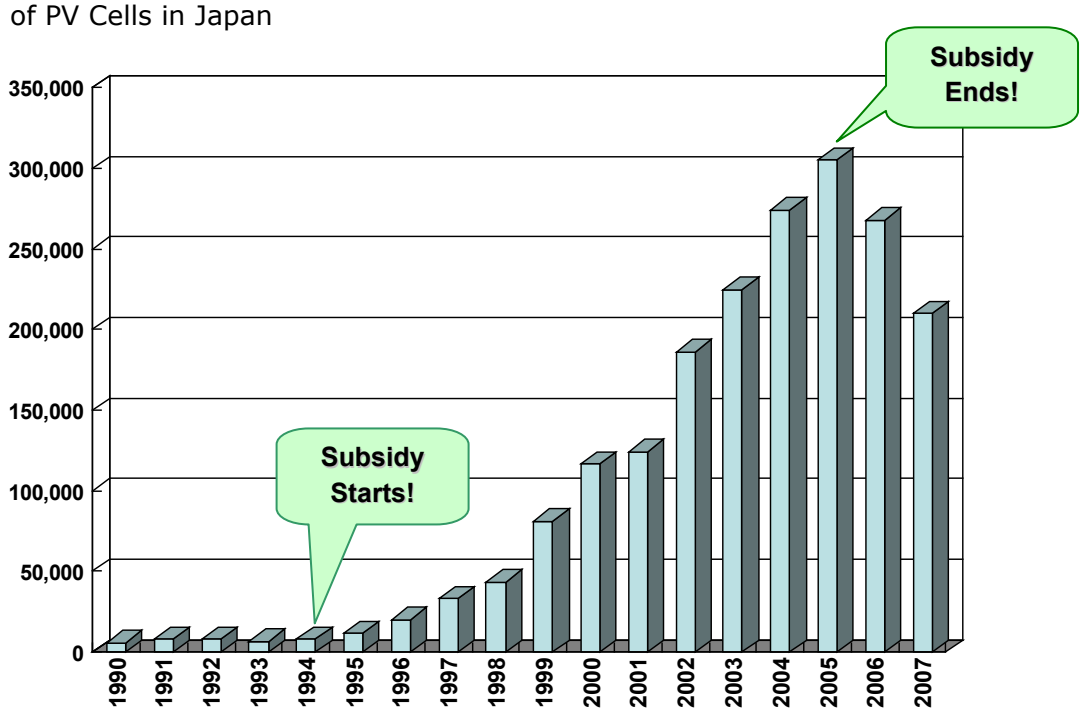
with Prime Minister Taro Aso's announcement this year to set mid-term goals to reach the goal of reducing carbon dioxide emissions by 50% by the year 2050.

There are also strong "green" components of spending stimulus plans by other governments including Korea, Germany, the United Kingdom, Singapore and China, which is developing a stimulus package that includes significant spending on its energy grid.

This expanded global emphasis and sense of mission will help to overcome one of the main barriers to developing green and alternative energy. This is their dependence on incentives and higher initial utilization costs until the processes can be refined to achieve necessary economies of scale. To cite one example reflecting the present importance of incentives, when Japan eliminated solar subsides in 2006, domestic sales declined. These incentives were recently reinstated by Japan's Ministry of Economy, Trade and Industry (METI) through newly-authorized government expenditures of more than $300 million to restore solar subsidies during the first half of 2009.

Japan aims to use this new "feed-in" tariff to guarantee prices for surplus electricity from solar power generation for about 10 years. These incentives will encourage homeowners to feed excess power back in to the electricity grid. In the press conference announcing this measure, Minister of Economy, Trade and Industry Toshihiro Nikai stated "We are setting up a new system for solar power that is unique to Japan". The guaranteed price would start at about twice the rate (about 24-25 cents) per kilowatt-hour that utility firms now pay for voluntarily supplied surplus electricity from renewable energy sources. The cost of introducing the system would be passed on to consumers evenly. It would result in a rise in electricity fees per family of up to about $1 a month.

Domestic Sales of PV Cells in Japan



Source: Japan Photovoltaic Energy Association

While solar and other renewable technologies must ultimately stand on their own, the ability of governments to channel stimulus into areas that ultimately constitute the next cycle of growth is vital – rather than simply to alleviate the current pain and stimulate consumption and economic activity without any eventual return. This is important not only to overcome present economic weakness, but to establish a long-term foundation for global competitiveness.

Support Can Yield Unexpected Benefits as Space Program did in 1960-70s

In some ways these support programs can be compared to the space race in which Russia and the US competed to land on the moon in the 1960-70s. While this activity also could not be justified in purely economic terms, it advanced science in a number of important areas. This led to dramatic innovation in medicine, information technology, industrial productivity and transportation.

Examples are practically endless, and many green and renewable energy technologies even got

their start, or were significantly advanced, as part of this activity. This includes solar energy itself, which was pioneered by NASA photovoltaic systems. Lasers, robotics, video games, aerodynamics, magnetics, virtual reality, air-quality monitoring, processed foods, air and water purification, scratch-resistant lenses, flat-panel televisions, trash compactors, composite metals, man-made textiles, athletic shoes, environmental and pollution controls, insulation, earthquake prediction, ultrasound, pacemakers, engine and manufacturing design are a few of many beneficiaries of space research.

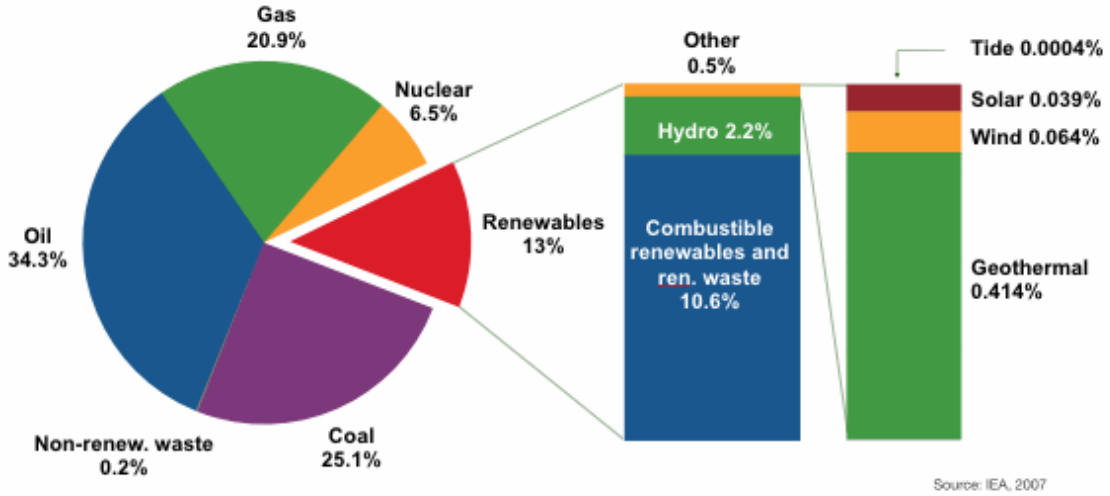
Green Energy Requires Integrating a Range of Sources and Technologies

Many of the major innovations of the 20th century were based on the use of hydro-carbons for electricity generation or fuel. The twenty-first century is likely to be far more varied, with a range of new energy sources both complimenting and competing for maximum utility and minimum environmental footprint. These will then be integrated and utilized within a seamless super grid and localized micro-grids, which like the Internet, will extend beyond borders and government control.

Given current technologies, the most prevalent alternative energy sources are:

- Solar—Energy collected from sunlight is used to generate electricity through photovoltaic installations.
- Wind—Naturally occurring wind currents are used to spin turbines to generate power.
- Hydro—Flowing water is used to spin turbines connected to generators.
- Geothermal—Power fueled by heat located deep within the earth's core.
- Biomass—Energy created by burning wood, wood waste, pants, animal or other organic waste and methane gas generated from landfills.

Nuclear energy also warrants attention. It is not usually classified a renewable energy source, despite its lower carbon footprint, due to concerns over safety and the disposal of radioactive waste. However, growing concerns about climate change as well as improved safety and the understanding nuclear at present delivers far more capacity with lower subsidies than other alternative energy applications has caused nations such as Japan and France to rely on nuclear power. Even activists such as Patrick Moore, a co-founder of Greenpeace and Stewart Brand, founder of "The Whole Earth Catalog" now advocate nuclear as part of a multi-faceted plan to reduce dependence on hydrocarbon products.



Fuel Share of World Primary Energy Supply

Development of "Smart Grid" Vital to Effective Alternative Energy Management

The current transmission system for electricity—called "the grid"—dates back to the time of Thomas Edison and evolved with little overall planning. It is based on a system where the point of generation, usually a fossil fuel facility, is located near the population center it is designed to serve.

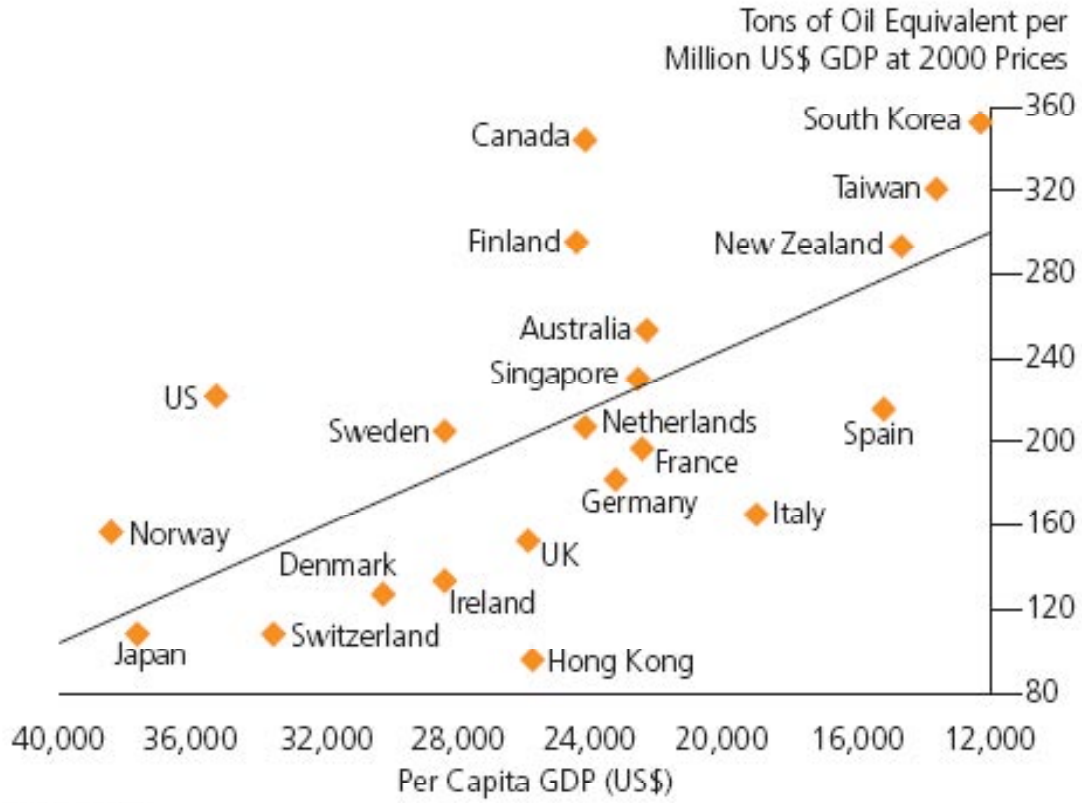
Because alternative energy production often depends on the availability of natural resources, which can be far from the site of eventual use – it must be transported from the point of generation to end users. In addition, excess energy must be stored for use during off-peak periods and excess capacity absorbed from small-scale energy generation within "microgrids". These are then combined with energy from larger-scale renewable and fossil energy generators to deliver electricity wherever it is needed. This will require that multiple points of generation communicate with each other and efficiently allocate resources to many points of consumption. It will require what is called a "Smart Grid."

The Smart Grid is envisioned as a means to provide affordable, clean, efficient and abundant electric power through integration of a range of emerging power distribution technologies. Some experts

estimate the cost of re-wiring the total US into a smart grid could be over $3 trillion. Many believe it constitutes the ultimate stimulus-spending program.

Larger-scale storage is essential to wide-scale use of renewable energy and the development of the smart grid. Although hydro, biomass and geothermal energy tend to deliver a consistent flow of energy -- wind and solar generate power only when the wind blows or sun shines. This necessitates storing energy for use when generation is not taking place. Exactly the best way to do this has not been determined, and most likely a mix of different technologies will be used.

ENERGY INTENSITY AND PER CAPITA GDP, 2003
[Exhibit 2]



Source: IEA

With its' decades-old head start in managing energy efficiency and renewable energy applications Japan is one of the lowest consumers of energy capita, and has already developed much of the technology for a smart grid and the appliances needed to work within such a system. It is also considered a leader in fuel cell development and many other technologies in electronics and metering devices that are essential to the grid.

Japan Believes Renewable Technologies Will Drive its Competitiveness

In both the private and public sectors, Japan is taking a leading role in many fields related to alternative energy and the environment. This work is being undertaken not only out of concern for the global good, but due to a realization success in these areas is key to maintaining its national competitiveness.

"We want to take the initiative and build a leading low-carbon society by stepping out of recession before anyone else in the world," said Ichiro Sumikura of Japan's Environment Ministry in a recent interview. This view was reflected in a recent survey by Nikkei Business Publications of engineers in Japan's manufacturing industry. It showed nearly 27% believed Japan would be the first country to recover from the recession with breakthrough technology in solar cells, electric vehicles and rechargeable batteries leading the way.

To achieve this goal, Japan's New Energy and Industrial Technology Development Organization (NEDO) promotes research and development by facilitating activity and collaboration between industry, universities and public organizations. In 2009, NEDO plans to spend $73.7 billion yen on fuel cell and hydrogen-utilization photovoltaic, biomass and energy conservation technologies.

Additional steps have been taking by institutions such as METI, which recently released a report prepared by a Study Group on PV System Industry Strategy. The report aims to reduce power generation costs in solar power generation systems to about half the current level by implementing "supply-side efforts," "demand-side efforts," and efforts to "improve the institutional environment." This is expected to introduce economies of scale and technology innovation and over time to create an economic effect in Japan worth up to about ten trillion yen as well as employment for up to about 110,000 people.

On the corporate side, more than 25% of global solar cell production takes place in Japan. The nation has long been active in the industry and the Japanese firm Kyocera for example, entered the market in 1975 and is now one of the world's leading manufacturers of solar panels. The company sells globally and is planning additional manufacturing plants in Japan as well as expanding its facilities in Mexico.

Sanyo, another leader in solar cells and modules, has opened a new $80 million US plant in Salem, OR. Sanyo sees the North American market as largely undeveloped and anticipates growth with the new US residential and commercial tax credits passed late last year. Other significant solar manufacturers are Kaneka, Panasonic, and Shoa Shell Sekiyu.

Japan is also taking a leadership role in batteries and energy storage. For example, Toyota, partnering with Panasonic, will invest nearly $700 million to make advanced lithium-ion batteries. Nissan and Japanese electronics giant NEC plan to invest $115 million over the next three years to do the same.

In respect to nuclear, Japan Steel Works is currently the world's sole supplier of the ultra-heavy large forgings, which are essential in most commercial reactors. Mitsubishi Heavy Industries is also a leading player in nuclear plant construction. Furthermore, Westinghouse, now a group company of Toshiba Corporation, is a leading supplier of nuclear plant products and technologies.

Japanese Firms Integrate Green Priorities into their Strategies and Product Lines

The dedication of Japanese firms to green products extends far beyond equipment and the components that allow alternative energy generation. For example, to emphasize the importance of the green economy, leading Japanese corporations moved to establish the "Japanese Business Alliance for Smart Energy Worldwide" in October, 2008 with support from METI. One of its first efforts was the publication of "Japanese State-of-the-Art Smart Energy Products & Technologies" a compilation of 162 of the newest Japanese energy efficient products, technologies, and methodologies, owned by 70 member companies. The publication classifies these products and technologies into seven sectors including Residential, Commercial, Industrial, Construction &

Transportation, Electricity, Iron & Steel, Petrochemical and provides contact points for further information.

In respect to specific corporations, Panasonic (which had been known as Matsushita until changing its name in October 2008), has long been an environmental pioneer. A 2003 Japan for Sustainability newsletter notes it "has been working not only to reduce environmental impacts throughout the product life cycle, but also to facilitate the realization of sustainable society through the development of and communication about environment-friendly products. Matsushita's goal cannot be more clear and ambitious; it is 'to make every product a Green Product'."

A recent Associated Press article highlighted this commitment stating "The ability to acquire Sanyo's two green-energy pillars, solar cell technology and rechargeable batteries, are what drove Panasonic to announce this month it would negotiate a deal with Sanyo's main stockholders…" The article went on to quote Panasonic President Fumio Ohtsubo, who acknowledged plunging gadget prices were eating away at electronics profits, commenting "We need another pillar for far greater growth. And Sanyo was that best partner."

Hitachi is another firm committed to the green economy. In a recent *EETimes Asia* interview, Shinichi Yamamoto, senior manager for Hitachi Global Storage Systems noted "… we are committed to reducing greenhouse gas emissions through …. efficient energy consumption in business operations, and … energy-efficient products. … cost savings on energy isn't the driving reason for Hitachi GST's decision to go green. Rather, we are committed to produce energy-saving products for consumers, and our goal is to minimize the adverse impact of these products on the environment through our green initiatives."

Green Energy Facilitates Resolution of Important Environmental Concerns

An important element of growth in the energy field will be the talks that lead up to the December COP15 United Nations Climate Change Conference in Copenhagen to work on a post-Kyoto global climate deal. The ability of the world's governments to formulate and stick to a plan for limiting carbon emissions will greatly impact the growth pace in green technologies and alternate energies.

The complexity of global environmental and climate change issues, which deal with the flow of shared resources across borders makes negotiation of a global accord extremely difficult. Developing nations feel the need for rapid development, believing it's "their turn" for unfettered growth, just as now-developed nations did for the last two centuries. When a population is living in abject poverty without basic food and sanitary provisions, rising to the global "common good" of restraining pollution and development is a difficult goal to achieve.

On the other hand, growing international acceptance of the essential need to address this issue -- has contributed to substantial progress in reaching an agreement. As of February 2009 over 180 nations have ratified the Kyoto Protocol agreement. According to the United Nations Framework Convention on Climate Change, this agreement is intended to achieve "stabilization of green house gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system."

Kyoto Protocol Participation Map – 2009

Signed and ratified.
Signed, ratification pending.
Signed, ratification declined.
No position.

Source: Wikipedia Commons

The map above, however, reveals the major flaw -- failure to gain ratification within the world's largest economy – the US. As environmental activist Bill McKibben, noted in a recent *New York Times* article "The lesson of Kyoto is that if the U.S. isn't taking it seriously there is no reason for anyone else to."

Fortunately, the incoming Obama administration -- in the words of the *New York Times* appears ready to "radically shift(ed) the global equation". It quotes US chief climate negotiator, Todd Stern as saying the US would be involved in the negotiation of a new treaty — to be signed in Copenhagen in December — "in a robust way."

The Times adds: "That treaty, officials and climate experts involved in the negotiations say, will significantly differ from the agreement of a decade ago, reaching beyond reducing greenhouse gas emissions and including financial mechanisms and making good on longstanding promises to provide money and technical assistance to help developing countries cope with climate change."

Welcoming this policy shift UN Secretary-General Ban Ki-moon stated in March 2009 "With US leadership, in partnership with the United Nations, we can and will reach a climate change deal that all nations can embrace."

While the US position on Copenhagen is still under development, Japan has been very explicit in its goals. The nation recently submitted a proposal to the UN, specifying the Japanese government would prefer a new protocol for the post-2012 framework. Japan is struggling to reduce greenhouse gas emissions by 50% by 2050 and would like to see all UN members make similar commitments. Technology and innovative technological developments are seen as important contributions to reduce global emissions.

Japanese officials, speaking at a February meeting of the European Union – Japan Centre for Industrial Cooperation, stated they would like to see mitigation actions from all countries under the leadership of developed countries. Japan thinks major developing countries will have to fulfill international obligations to take mitigation actions, based on economic development stages, response capabilities and share of greenhouse gas emissions, with binding targets.

Japan also proposes sectoral technological cooperation, with an Advisory Group related to the UN. In this context, additional protection of Intellectual Property Rights is needed and calls for developed countries to further invest in research and development and build international cooperative mechanisms for the development of innovative technologies.

Regarding the financing abilities of developing countries, Japan proposes a comprehensive assessment of the financial contribution each country is making. The nation is also planning to launch a $5 billion lending facility to help developing countries improve water, solar power and other green projects. This initiative was unveiled by Finance Minister Kaoru Yosano during a meeting of the Group of 20 finance ministers and central bankers in March. These funds will be provided over the next two years through the Japan Bank for International Cooperation for big private-sector projects. Japan also plans to supply syndicated loans with the Asian Development Bank and the International Finance Corp., an arm of the World Bank Group.

With the EU and Japan as leaders in the climate change negotiations and the new Obama administration committed to engage the US and to develop domestic legislation to reduce greenhouse gases, they too think there is a chance for success in Copenhagen.

Cooperation is Vital to Realize Growth and Environmental Standards

Speaking at the fourth annual CSIS-JETRO Conference on East Asian Economic Integration and US-Japan Relations sponsored by the Japan External Trade Organization (JETRO) and the Center for Strategic and International Studies (CSIS) in Washington DC this March, JETRO Chairman Yasuo Hayashi noted his belief the key to addressing international coordination and the gap between developing and developed economies is economic integration, declaring "Japan can use its past experience, technology and know-how to help China and India in such areas as energy conservation, environment and infrastructure development."

"Time is pressing," stated Hajime Ito, President, JETRO New York, in a presentation at this event. "We need a global, legally binding framework, but at the same time it should be supported by the framework of encouragement, cooperation and support."

Green Energy has Profound Importance for Businesses and Policymakers

The current global downturn is leading to major changes in corporate and investment behavior with green energy emerging as a sector of profound importance. This is due to the recognition new energy sources are essential to sustain worldwide growth and development, and the technologies and green jobs now being developed are likely to constitute the next drivers of global growth. Given the many new businesses and investment opportunities this will create, green initiatives are almost sure to remain a high priority for government and industry for decades to come.

While the development of renewable energy is often pictured as far-off science fiction, much of the essential technology is already in place. The main task is to devise the policies, standards, incentives, funding, awareness and acceptance that can drive development to the point where renewable energy become cost competitive with traditional sources. Randy Zwirn, President & CEO of Siemens Energy, expressed this belief at a recent Washington Post conference, noting his view that the effective utilization of renewable energy "is not a Manhattan, but rather a Policy Project."

Fortunately it is becoming understood that the two major problems of our time – an ailing economy and a wounded environment – are dependent rather than independent concerns. Our ability to deal with these issues in a coherent and complementary way will determine the way we live moving forward. Properly handled, it will also serve to raise global living standards and provide a foundation for growth and development well into the next century.

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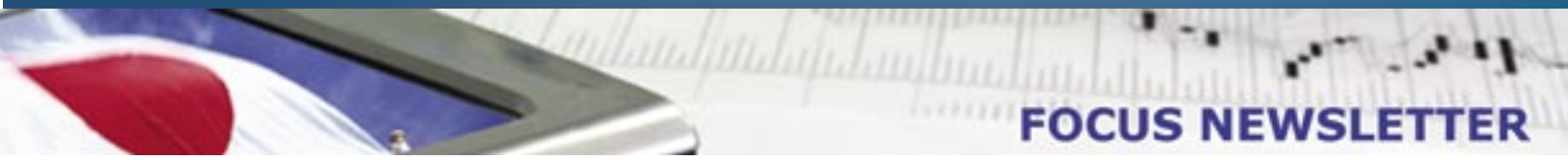

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