

Thought Paper | RETAIL & CONSUMER

Green Ready Asian Economies 2011



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1. Background

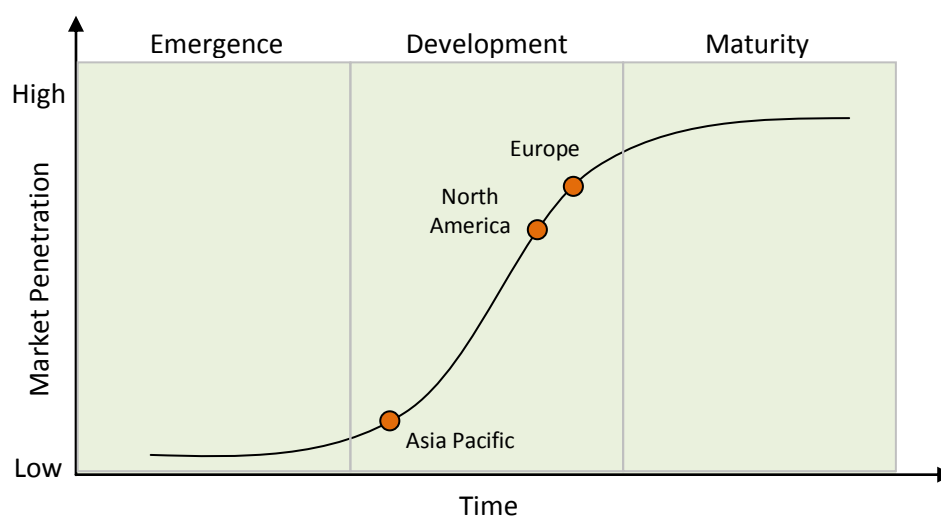
The global renewable energy industry is expected to witness impressive growth over the next decade despite the negative implications of the global financial crisis during the 2008/2009 period. Escalating concerns about climate and energy supply issues, increasing government support for the development of renewable energy¹, and cost reductions towards a level approaching grid parity will drive future demand for renewable energy products and services.

While Europe and North America are the most developed markets for renewable energy today, Asia Pacific is expected to emerge as the future theatre of growth and developments due to commitments from around the region to slash emissions, a push to boost renewable energy's share of total electricity production, and widespread availability of credit.

In addition, governments in the region have aggressively implemented policies such as feed-in tariffs and soft loans to end-users of renewable energy equipment, and these measures have been widely successful in pushing the overall penetration of renewable energy in the region.

Renewable energy investments in the Asia Pacific grew by 37 percent to reach US\$39 billion in 2009. By contrast, investments in North America and Europe declined by 33 percent and 16 percent, respectively, as western economies slowed, energy demand sagged, and credit markets tightened.

Renewable Energy Market Evolution



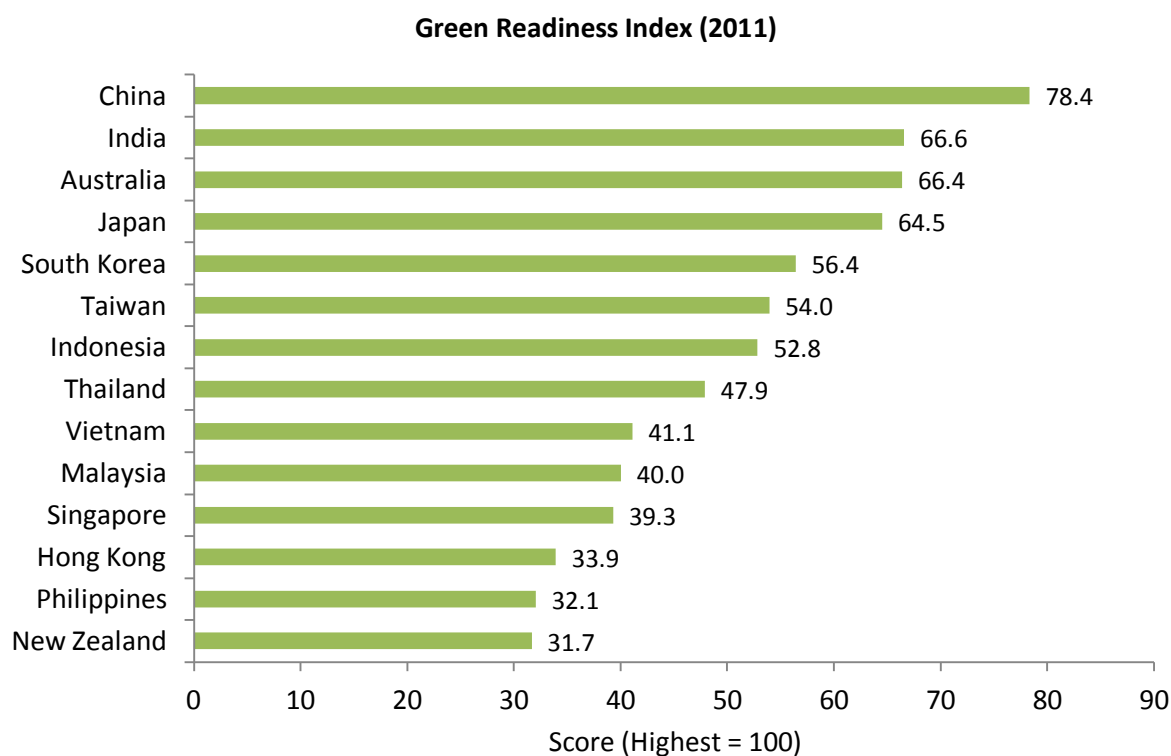
Riding on the significant growth of Asia Pacific's renewable energy market, Eden Strategy Institute's Green Readiness Index is a pioneer ranking of countries based on their long-term domestic demand potential for renewable energy products.

The Green Readiness Index (GRI) ranks 14 Asian countries on 35 indicators across four major categories covering Policy, Business Environment, Technological, and Environmental Readiness.

¹ Renewable Energy includes Wind, Solar, Hydro, Biofuels, and Geothermal sources

These indicators provide robust fact-based and data-driven analysis on a national scale of the overall market potential of major markets in the Asia Pacific.

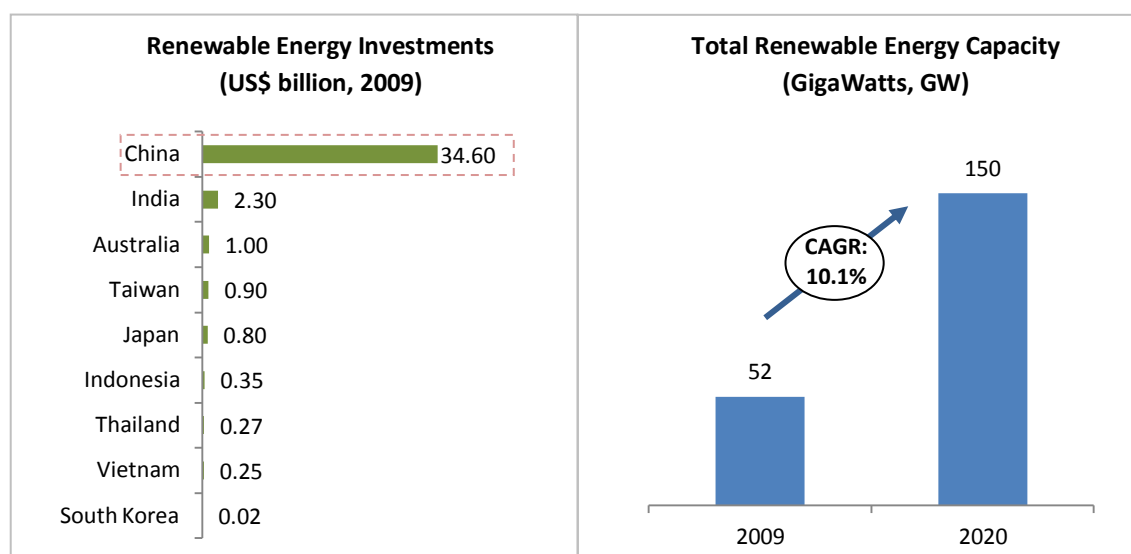
2. Green Readiness Index (GRI)



3. Commentary

The position of each country in the ranking represents its ability to adopt and purchase renewable energy products and services. China and India lead the ranking, followed by the developed economies of Australia, South Korea, and Japan. Given that strength of regulatory policies and size of the domestic market play significant roles in driving market demand, both factors feature strongly in shaping the outcome of the ranking results.

CHINA



According to the IEA, China emerged as the world's largest energy user, investor in clean energy, and wind market in 2009. A total of US\$34 billion was invested into renewable energy installations in 2009, representing nearly 84 percent of total investments in the Asia Pacific.

China's 52 GW of installed renewable energy capacity makes it the second largest market in the world behind the United States and currently accounts for 4 percent of the country's total energy capacity. This is forecast to increase to 15 percent by 2020, representing a total capacity of 150 GW, with key contributions from wind and biomass energy sources.

A combination of ambitious wind and solar power targets and the availability of credit have been the main engines of China's remarkable growth. The Chinese government also announced in 2009 that it intends to reduce the carbon intensity of China's economic output by 45 percent by 2020 and this strong mandate for change will create significant upsides to the development of the country's renewable energy sector.

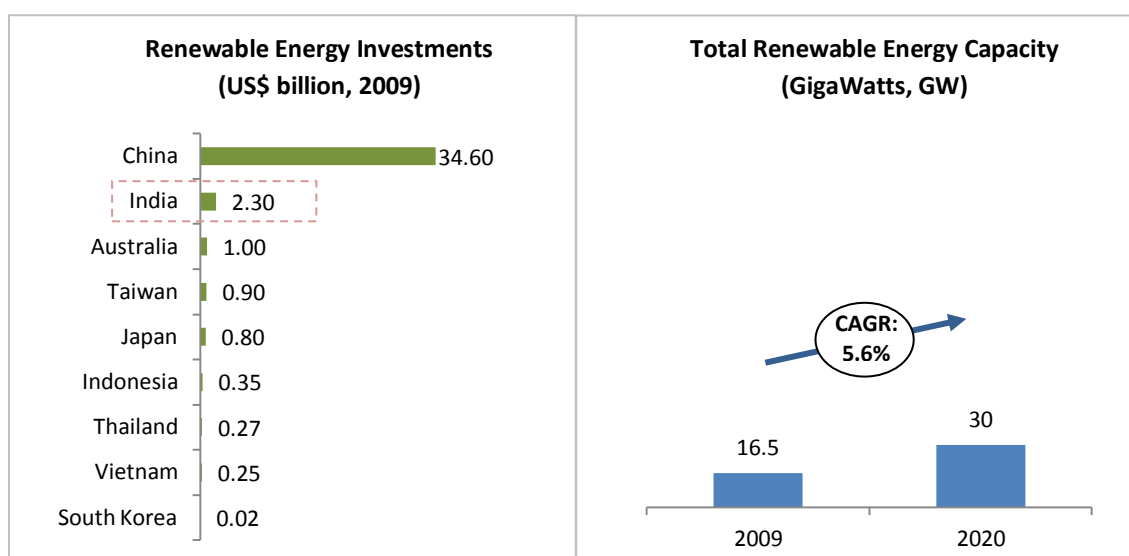
Despite the compelling potential in China, efforts by international suppliers to compete in the market have been undermined by protectionist policies favouring local manufacturers and China's poor record of intellectual property protection.

China protects its domestic producers through stringent policies that require 80 percent of equipment used in domestic power plants to be made in China. This practice, coupled with high import duties, means that joint venture partnerships continue to be the preferred market entry route for international players, leading to rising intellectual property protection concerns.

Given the high-tech nature of the industry, intellectual property transfer and theft continue to be major concerns for manufacturers. The Chinese government estimates that counterfeits constitute between 15 percent and 20 percent of all products made in China and are equivalent to about 8 percent of China's annual gross domestic product.

The two main barriers hurt investments, innovation, and performance of international suppliers seeking to operate in China and stronger action is required by the Chinese government to make it a fair and level playing ground for international trade.

INDIA



India is forecast to become one of Asia's fastest growing economies with a compounded annual growth rate (CAGR) of 9.7 percent between 2010 and 2015. However, the country is also faced with energy deficit and chronic energy reliability issues that threaten to hurt economic development and investor confidence in the long term.

India is a net importer of energy and domestic energy supply is estimated to meet only 80 percent of the total energy demand, leaving the country vulnerable to future energy shocks. Infrastructural developments, in particular power utilities, have also failed to keep in-step with India's blistering pace of economic development and large parts of the country's key economic regions such as Mumbai and New Delhi are often hit with irregular bouts of power outage throughout the day.

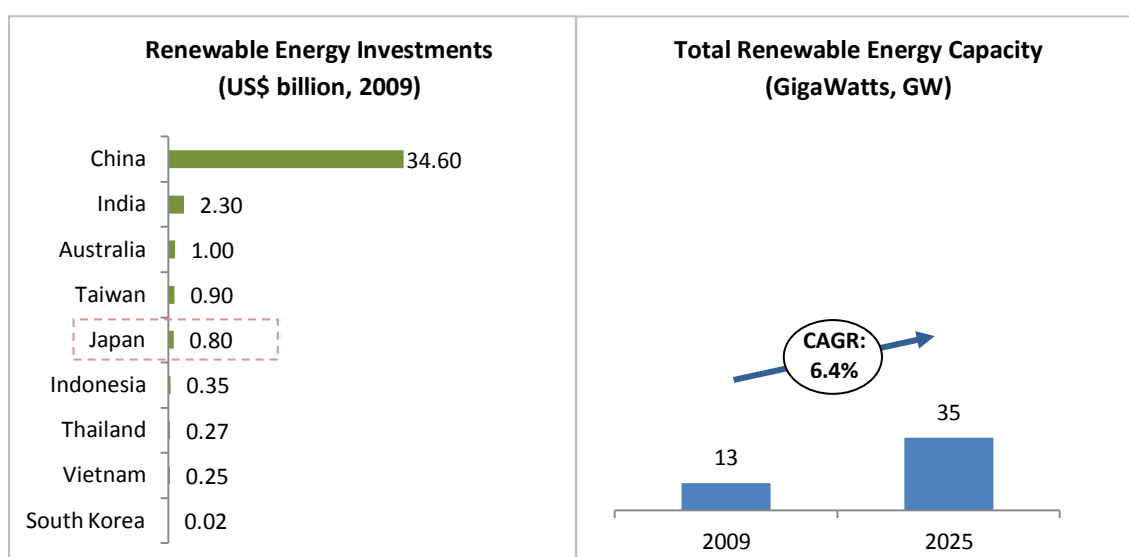
The government is cognizant of the supply shortfall and has started to invest heavily into alternative and renewable energy sources to manage risks and reliability issues. In 2009, India invested a total of US\$2 billion into renewable energy installations, and this represents about 6 percent of total investments in the Asia Pacific. India also announced in 2009 that it plans to reduce the carbon intensity of its economic output by 25 percent by 2020, from 2005 levels.

The current energy deficit situation and focus on reducing India's carbon footprint are twin pillars that will continue to drive the installation of renewable energy which currently accounts for a modest 16.5 GW or 9 percent of installed capacity, compared to conventional sources at 65 percent. Initial estimates show that total installation capacity is estimated to reach 30 GW by 2020, accounting for 15 percent of the country's total energy capacity.

With 11 GW, India is one of the leading nations for wind power. The country also has close to 5 GW of biomass and mini-hydro power. The Jawaharal Nehru Solar Mission Initiative launched in 2009 seeks to significantly increase installed solar capacity from the current 6 MW to 20 GW by 2022.

A large portion of India's renewable energy market is linked to various rural electrification schemes. Favourable policies such as the recently announced feed-in tariff scheme, accelerated depreciation mechanisms, and preferential tax rate of 15 percent (compared to standard rate of 30 percent) for renewable projects will continue to increase the focus on larger scale renewable energy projects.

JAPAN



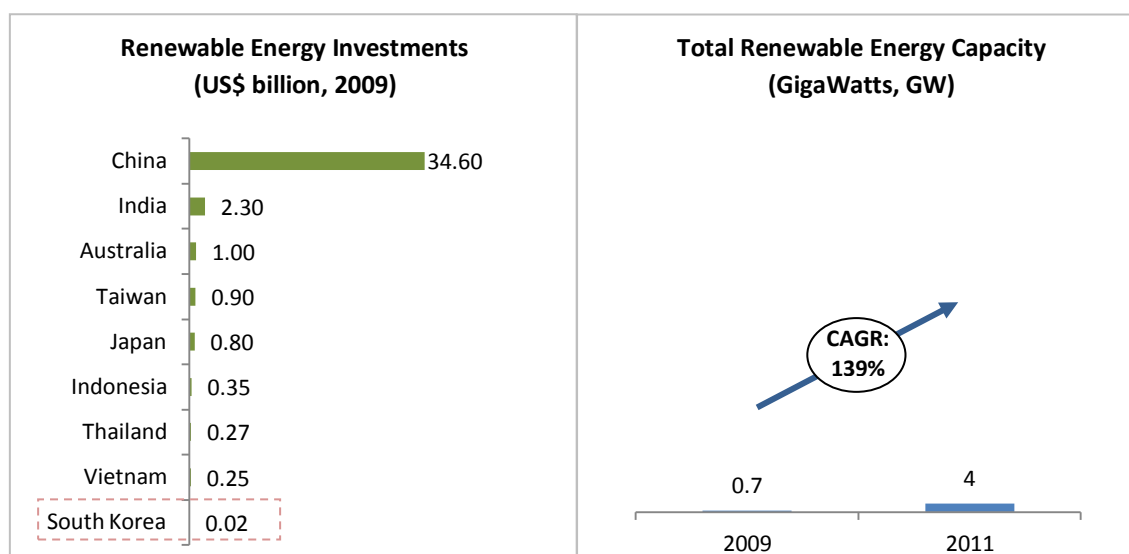
Japan has traditionally depended heavily on nuclear, coal, and oil for its energy supply and this dependency ratio of more than 90 percent is unlikely to change significantly in the long term, with renewable energy expected to constitute less than 2 percent of total installed capacity by 2030.

Despite Japan's domestic nuclear and hydropower production facilities, 80 percent of the country's energy requirements are imported and the heavy reliance on imports increases the overall vulnerability to external energy shocks and global competitiveness. Recent energy policies to reduce the country's greenhouse gas emissions by 25 percent by 2025 have also increased the focus on renewable energy sources as a source of diversification and efficiency.

A total of US\$800 million was invested into renewable energy installations in Japan in 2009, a relatively modest amount when compared to China and India. However, in terms of installation capacity, Japan has a total renewable energy capacity of nearly 13 GW and the target is to achieve nearly 35 GW of installed capacity by 2025, making it one of the most promising growth markets in the Asia Pacific.

Japan is already the world's third largest market for solar energy, with 1.7 GW backed by feed-in tariffs and subsidies to residential households installing photovoltaic systems. Installed capacity for solar and wind energy is expected to reach 28 GW and 5 GW, respectively by 2020.s

SOUTH KOREA



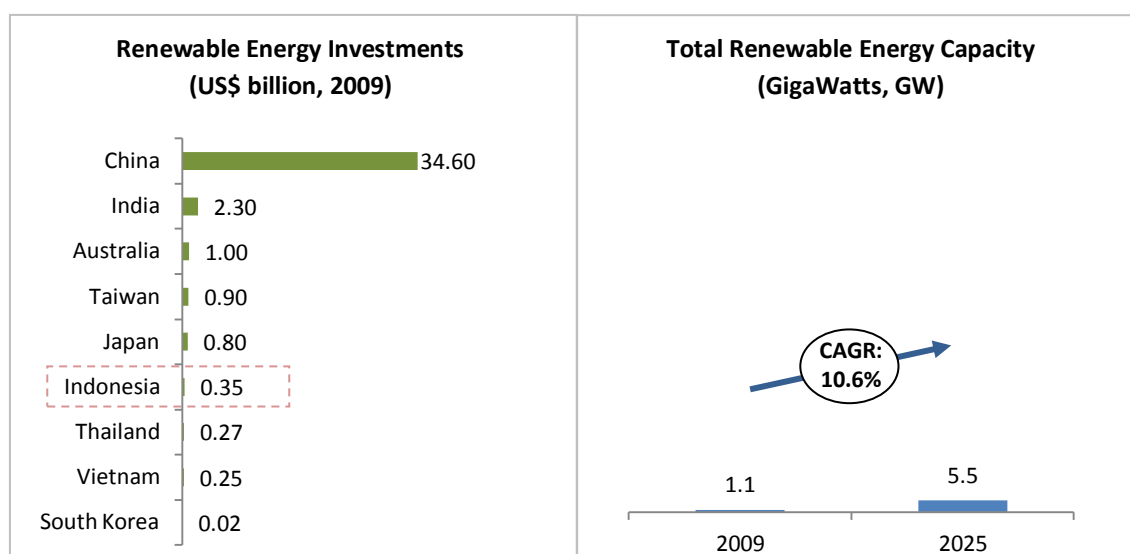
Similar to Japan, South Korea has limited domestic energy resources and imports approximately 80 percent of its primary energy consumption needs. Poor energy self-sufficiency and high energy prices continue to place a significant cost burden on the economy.

To ensure its energy supply, security, and sustainable development, South Korea's Basic National Energy Plan emphasizes the importance of establishing a low-carbon society and developing its economy with the use of energy-efficient technologies. Majority of the early attention has been placed on encouraging the adoption of energy efficient equipment such as LED lighting and energy efficient appliances.

South Korea is considered to be a relatively late entrant in investing into renewable energy technologies because of the initial focus towards pushing adoption of energy efficient technologies and products. This is evidenced by the small investment amount of US\$20 million into renewable energy installations in 2009, representing only 0.05 percent of total investments in the Asia Pacific.

South Korea currently has a total of 0.7 GW of renewable energy installations, with 0.6 GW of wind energy and 0.1 GW of photovoltaic installations. The short-term plan is to increase the overall capacity to 4 GW by 2011, representing 5 percent of the country's total energy capacity. With the announcement of a US\$27 billion renewable energy stimulus package by the government recently, the future potential looks promising, especially for the areas of solar and wind energy.

INDONESIA



A large portion of Indonesia's renewable energy market is linked to various rural electrification schemes and will benefit an estimated 35 percent of Indonesia's population or about 84 million people who lack access to electricity. Many parts of East Nusa Tenggara, West Nusa Tenggara, Papua, West Irian Jaya, and Southeast Sulawesi are still not connected to the power grid.

Indonesia invested nearly US\$350 million into renewable energy in 2009 and majority of the investment was to benefit households in remote regions of the country. For example, nearly US\$80 million was allocated to build solar plants to provide electricity to 200,000 households located in rural regions across the country.

The Indonesian government has set a target of constructing 250 solar-powered plants under its 2010-2014 power generation blueprint. There are also plans to build 570 small hydroplants with a generating capacity of 46 MW, and 270 wind power plants with a total capacity of 22 MW. A large share of the investments will be also channelled into the harnessing of geothermal power. The country has an existing exploitable potential of 28 GW of geothermal energy although only about 1 GW is currently installed. The target is to harness nearly 5 GW of geothermal energy by 2025.

Indonesia plans to secure 10 percent of all its energy requirements from renewable sources by 2025, from the current 4 percent. The increasing focus on renewable energy bodes well for industry players although the growth potential needs to be tempered with inherent concerns over the political and business environment of the country.

THAILAND

Thailand is the largest energy producer in ASEAN with a total energy capacity of 28 GW, and nearly half of the energy requirements are currently imported. The government has started to place strong emphasis on expanding the country's domestic renewable energy sources to reduce carbon emissions and strengthen energy security.

Thailand has a target of generating 20 percent of its energy requirements from renewable sources by 2022, up from the 5 percent currently. The main emphasis of the renewable energy plan is on the development of solar energy, with the objective of increasing its photovoltaic capacity from around 35 MW in 2007 to 550 MW by 2022.

The Electricity Generating Authority of Thailand (Egat) plans to invest nearly US\$644 million to develop renewable energy facilities with a combined capacity of 258 MW in 2010. The incentives offered by the government for renewable energy projects, including tax holidays and soft loans, will provide a significant boost towards increasing overall adoption of renewable energy in Thailand.

4. Implications

As Asia emerges as the melting pot of opportunities for renewable energy products and services, companies will no longer be able to adopt a 'one-size-fits-all' approach to compete in the region because of the intrinsic and unique differences in each market. Instead, it has become imperative to develop a 'Market Driven' approach towards designing a tailored and customized strategy based on critical fact-based analysis.

Given the strong economic spin-offs and job creation potential of the renewable energy sector, governments will also have to continuously re-evaluate their policy guidelines and incentive schemes to create viable economic opportunities for the domestic market and foreign direct investments. Countries that have adopted national renewable energy and energy efficiency standards, feed-in tariffs, carbon reduction targets and/or financial incentives for investment and production, are assuming leadership positions in the renewable energy sector.

Some key considerations for business decision making and policy formulation may include:

For industry

- *What factors are we currently using to prioritize various renewable energy markets?*
- *Are our technological development and marketing efforts customised to monitor, understand, and anticipate the diverse market dynamics across various Asian markets?*
- *Is our product and distribution strategy aligned with the key growth markets across Asia?*
- *How can we develop competencies to consistently understand the behaviour and unmet needs of our customer groups better than our peers?*
- *Can our operational processes, organizational structure, or lobbying strategies be shaped to take advantage of market forces?*

For government agencies

- *Do we understand the current commercial dynamics shaping the renewable energy markets in Asia better than other countries in the region?*
- *Are our regulatory policies and incentive schemes aligned with current business requirements, and are they sufficient in boosting industry development efforts?*
- *How should we benchmark our current regulatory and incentive policies with best-in-class international best practices?*

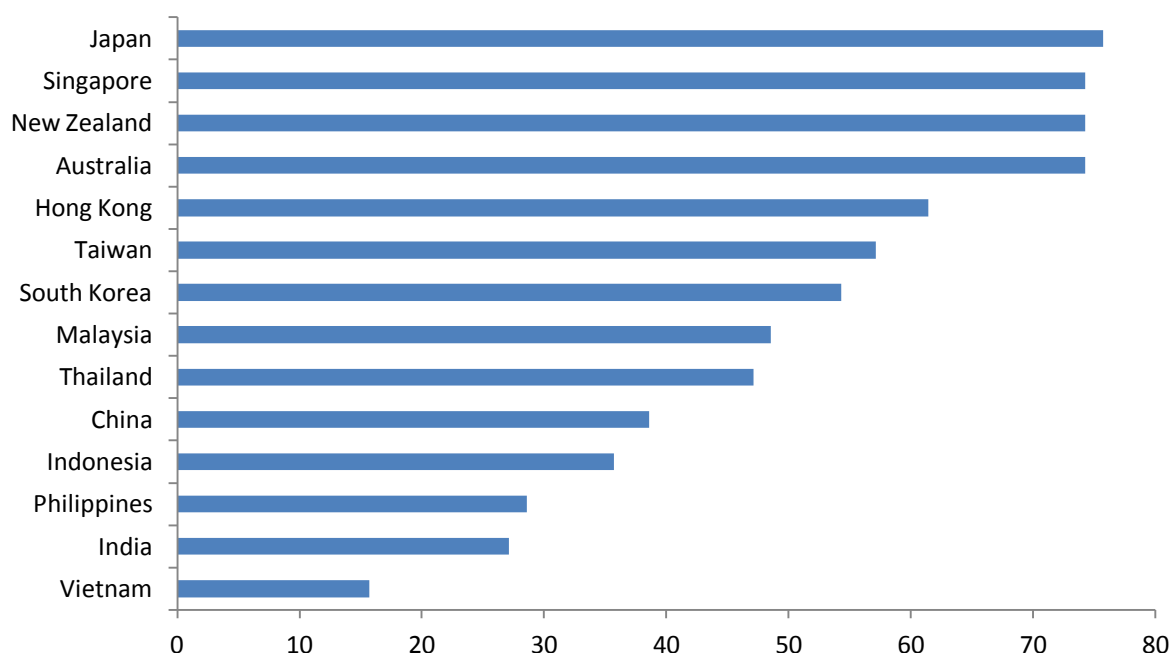
5. Glossary of Indicators

Eden Strategy Institute's Green Readiness Index (GRI) adopts a full-360° analysis of factors that have a major impact on the overall demand potential of a country's renewable energy sector (i.e. Policy, Business Environment, Technological, and Environmental). Quantitative data for all 35 indicators were obtained and ranked across the 14 countries.

Each country was awarded a score based on its relative position in each ranking (i.e. Top ranked awarded 14 points, Lowest rank awarded 1 point). Scores for each of the four major categories (i.e. Policy, Business Environment, Technological, and Environmental) were averaged and the final score is a summation of the four average scores, normalized to a scale of 100.

1. Regulatory and Policy Readiness Indicators	
Political Environment Index	Committed Clean Energy Targets
Business Environment Index	Auto Efficiency Standards
Infrastructure Readiness Index	Feed-in Tariffs
Carbon Cap	Government Procurement
Renewable Energy Standard	Green Bonds
Renewable Energy Tax Incentives and Grants	Import Tariffs (for renewable energy products)

Regulatory and Policy Readiness Ranking

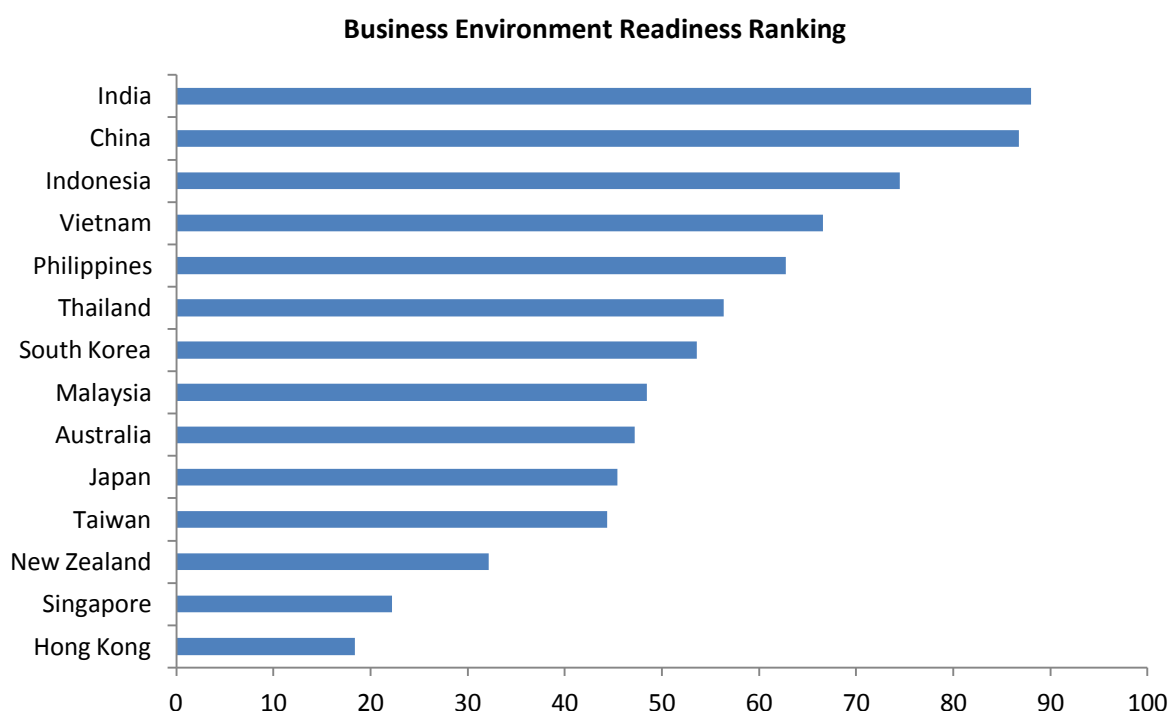


The regulatory and policy readiness ranking is an assessment by country of the general regulatory infrastructure for renewable energy. To capture various aspects of policy performance on demand for renewable energy, Eden's GRI assesses twelve different indicators.

National regulatory policies and incentives specific to the renewable energy industry are key to driving overall end-user adoption and industry development in Asia. Politically stable countries that have adopted national renewable energy and energy efficiency standards, feed-in tariffs, carbon reduction targets and/or financial incentives for investment and production are associated with higher scores in the rankings. Other nations seeking to build competitiveness for their renewable energy industries should benchmark themselves against the array of best-in-class policy mechanisms that can be employed to stimulate long-term renewable energy investments.

The major markets of China and India have made significant strides towards creating favourable national clean energy policies over the past few years and this has had a major impact in driving overall adoption of renewable energy. However, both countries performed poorly in the areas of political, business, and infrastructural environment as high import duties, preference towards local suppliers, and inadequate intellectual property protection continue to be notable barriers to industry growth in the near term.

2. Business Environment Readiness Indicators	
GDP and Forecast Growth (2010 - 2015)	Ratio Analysis (Demand vs Supply)
Energy Demand and Forecast Growth	Total Value of Energy Infrastructure Value
Electricity Demand and Growth	Pipeline of Power Infrastructure Projects
Renewable Electricity Demand and Growth	Proportion of Household Electricity Cost to Income per annum
Electricity Supply and Growth	Growth in % of households with annual income >USD10,000 (2010 – 2015)
Renewable Electricity Supply and Growth	



The business environment ranking is an assessment by country of the overall demand potential for renewable energy products and services, and is an indication of both current and future scenarios.

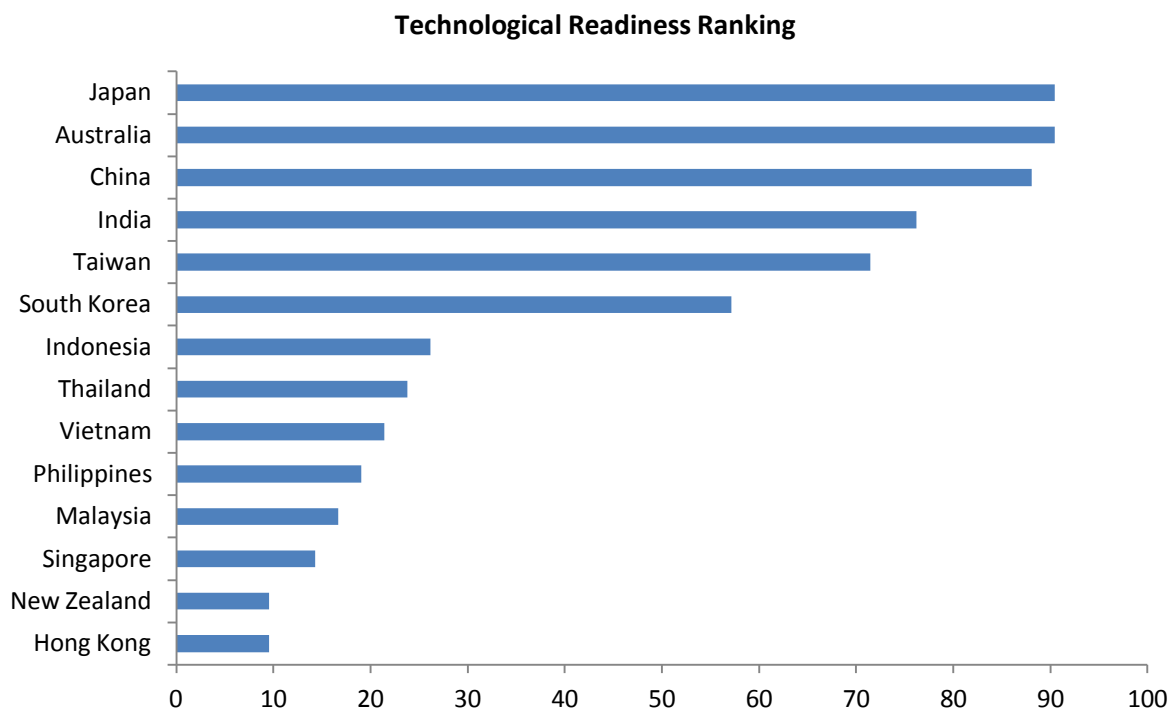
The rankings consider demand and supply capacities for energy, electricity, and renewable electricity. Each country's power infrastructure value and pipeline of future power infrastructure projects are also considered. Higher scores are awarded to countries with a large installed base of demand and supply as well as ambitious future targets as these indicators highlight strong future growth and an established energy market.

The ratio of demand and supply highlights the dependency of each country on energy imports. Higher scores are awarded to countries that exhibit a higher supply shortfall as these countries are more likely to turn to adoption of alternative sources of energy such as renewable energy in order to gain greater energy security and hedge against external risks.

An analysis of the growth in proportion of residential households earning an annual income of more than US\$10,000 is a measure of future demand potential within residential households who might be able to afford a basic unit of energy efficient or renewable energy product.

Future demand for renewable energy in Asia is heavily weighted towards the main emerging markets such as China, India, and Indonesia due to the immense potential offered by rural electrification projects. Government funded remote and rural electrification projects have been carried out through the widespread use of renewable energy systems for homes, for driving water pumps, battery charging, and also mini-grids.

3. Technological Readiness Indicators	
Total investments into green technology	Average share of global clean energy technology patents owned locally
Public R&D expenditure into clean technology	



The technological readiness ranking is an assessment by country on overall technological investments and R&D activity, and is an indication of innovation, commercialization, production, and installation of renewable energy products. Countries that have a high level of investments and R&D innovation are awarded higher scores.

A high level of investments indicates that the country has an established infrastructure and industry value chain in place, which will facilitate continued growth. As a measure of innovation, we also analyse the percentage share of global renewable energy technology patents owned locally. Although patents do not provide a measure of all innovation, they offer a good indication of the results of innovative activity and allow for interesting cross-country comparisons.

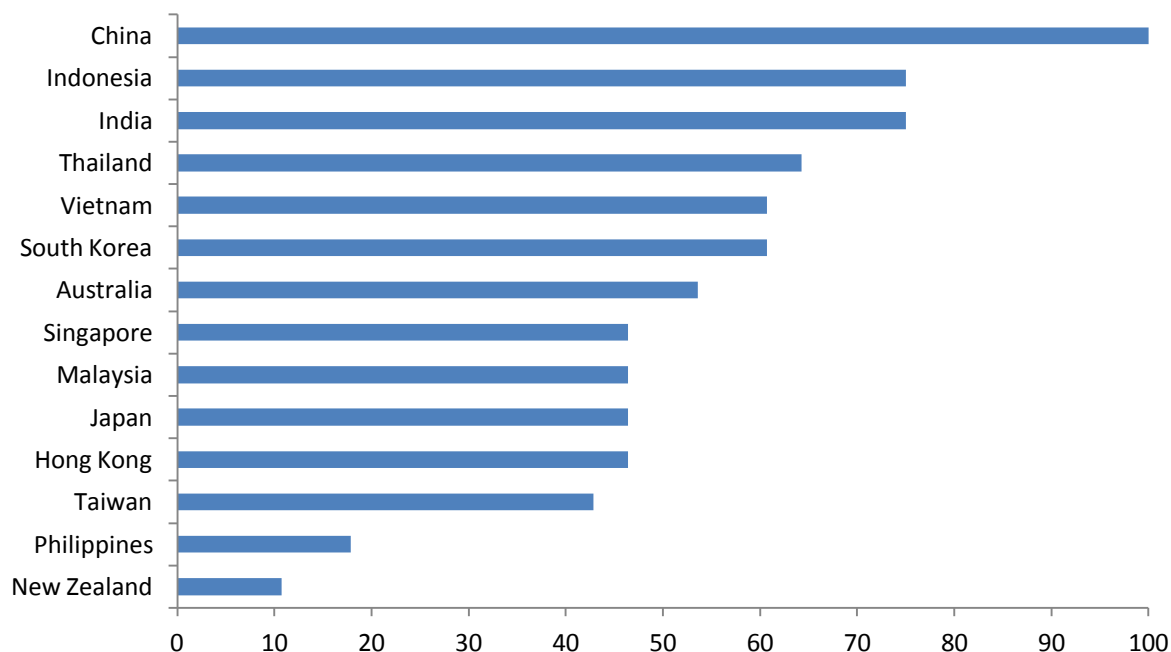
The innovation for renewable energy technologies in the Asia Pacific is highly concentrated in three countries, namely Japan, Australia, and China. The performance of Japan is particularly impressive as on average it accounts for 42 percent of worldwide innovation. The innovation performance of China, India, and South Korea is also far from being negligible as they represent about 11 percent of global inventions.

4. Environmental Indicators

Greenhouse Gas Emissions

Forecast Growth of Greenhouse and CO2 emissions

Environmental Ranking



The environmental readiness rankings is an assessment by country on current and future emissions of greenhouse gases, and is an indication of countries that are most likely to be affected by climate change impacts. Higher scores are awarded to countries with a high current base of emissions and high forecast growth as these countries are likely to have a greater impetus to adopt renewable energy technologies to reduce their overall emissions, directly translating into demand potential.

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- The mega-trend of Social Innovation is only starting to surface in our collective awareness. However, forward-thinking organizations that embrace problem-solving mindsets, disruptive innovations, and new business paradigms, are truly engaging the hearts and minds of their customers, shareholders, employees, partners, and constituents – to achieve superior, long-term financial performance by creating positive social impact.
- As Asia's leader in Social Innovation, Eden Strategy Institute approaches global poverty, disease, illiteracy, and exploitation head-on, and is relentless in formulating strategies, models, processes, products, and designs that create quantum value in solving these issues. We help organizations generate and grow additional profit in addressing such challenges, not *in spite* of them.
- We believe in the power of ideas to positively shape our world, one case at a time. Our focus is unparalleled in bringing to bear the world's foremost experts on our clients' most pressing sustainability and business issues. In turn, we only collaborate with clients who are seriously committed to strategic action that produces true sustainable advantage.



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