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1. Executive Summary

The aim of this report is to analyse Panasonic’s current business situation and to determine ways to improve its solar business.

The report will first analyse the market conditions that Panasonic faces in the Japanese market. Following that, a Five Forces Analysis will be done to determine the attractiveness of the Japanese solar market. A PEST Analysis will also be conducted to examine other factors that affect the solar industry in Japan.

To determine how Panasonic differentiate itself from its competitors’ products and services, the report will analyse 4 components of Panasonic’s competitive advantage; the innovativeness, quality, customer responsiveness and branding.

The report will also provide a brief overview of Panasonic’s current business situation and its financials before proceeding to list a number of strategic options available to Panasonic. These options will be prioritized and weighted according to three main criteria.

Finally, the report will conclude by identifying the most feasible option for the company and the steps needed to be taken in order to achieve its objectives.
2. Japanese Market Summary

Japan is slated to become the world’s biggest solar market. According to Steffan Studeny, a solar specialist based in Japan, the Japanese market is currently experiencing a hyper growth; a situation whereby an industry experiences exponential growth in an extremely short period of time.¹

The Japanese market has reached a milestone, whereby it is estimated that the revenue gained from the amount of solar capacity to be installed in the year 2013 will supersede that of Germany’s, which has been the world’s biggest solar market for a number of years running.

2.1 Installed capacity

Japan installed 2,186 MW of solar power capacity in 2012², bringing the cumulated installed capacity to 7.1 GW³. However, it is estimated that an additional capacity of between 6.9GW to 9.4GW will be installed in the year 2013, which could mean a cumulative installed capacity of between 13.9GW to 16.4GW by the end of year⁴.

![Figure 1: Accumulative Solar Capacity in Japan from 2008 to 2013](image_url)

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³ Solar Power Capacity Japan 2012
The additional capacity to be installed in Japan in 2013 is estimated to be worth $20 bn, an 82% increase from the $11 bn worth of installations in 2012\(^6\).

Although planned additional capacities for Japan will not supersede that of China’s target of 10 GW for 2013\(^7\), the high prices of PV systems in Japan will make Japan’s share of the total global revenue gained from PV increase by 10% points to 24% in 2013 as compared to 14% in 2012, making it the top solar market in terms of revenue\(^8\).

2.2 Types of installations

The types of installation of PV in Japan can be divided into three sectors: residential, non-residential and utility. The residential sector consists of private housing and apartment blocks while the non-residential sector consists of commercial and industrial facilities while the utility segment comprise large installations such as solar farms\(^9\).

![Figure 2: Forecast for PV installation type in Japan from 2011 to 2014\(^10\)](image)

The residential sector has traditionally formed the majority of PV installations in Japan, with it constituting about 90% of additional installed capacity in 2011. However, since the introduction of the FIT in July 2012, the proportion of residential to non-residential installations has increased.

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\(^8\) “Japan Set to Become World’s Largest Solar Revenue Market in 2013 as Installations Boom in Q1.”


installations has changed, with non-residential and mega solar projects comprising a bigger share of installed capacity\(^1\).

### 2.3 Government subsidies

As of July 2012, the Japanese government has introduced subsidies in the form of Feed-In-Tariffs (FITs) and capital subsidies to serve as an incentive for growth in the PV market.

For PV systems that produce 10KW of solar power or more, the government has granted consumers a tariff of ¥42/KWh for a period of 20 years while users of systems that generates less than 10KW of solar energy will receive ¥42/KWh for a period of 10 years\(^2\). In April 2013, the tariffs were reduced by 10% to ¥37.8/KWh\(^3\).

Including the costs of installation and maintenance over the guaranteed period of tariffs, it has been calculated that depending on the type of PV system used, users will receive an internal rate of return of between 3.2% and 6%\(^4\).

<table>
<thead>
<tr>
<th>Energy source</th>
<th>Solar PV</th>
<th>Wind power</th>
<th>Geothermal power</th>
<th>Small- and medium-scale hydraulic power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procurement category</td>
<td>10 kW or more</td>
<td>Less than 10 kW (purchase of excess electricity)</td>
<td>20 kW or more</td>
<td>Less than 20 kW</td>
</tr>
<tr>
<td>Installation cost</td>
<td>$325,000 yen/kW</td>
<td>$466,000 yen/kW</td>
<td>$300,000 yen/kW</td>
<td>$1,250,000 yen/kW</td>
</tr>
<tr>
<td>Operating and maintenance costs (per year)</td>
<td>$20,000 yen/kW</td>
<td>$4,700 yen/kW</td>
<td>$6,000 yen/kW</td>
<td>—</td>
</tr>
<tr>
<td>Pre-tax IRR (Internal Rate of Return)</td>
<td>6%</td>
<td>3.2%(^1)</td>
<td>8%</td>
<td>1.8%</td>
</tr>
<tr>
<td>Tax inclusive ((^3))</td>
<td>$42.00 yen</td>
<td>$42 yen (^3)</td>
<td>$23.10 yen</td>
<td>$57.75 yen</td>
</tr>
<tr>
<td>Tax exclusive</td>
<td>$40 yen</td>
<td>$42 yen</td>
<td>$22 yen</td>
<td>$55 yen</td>
</tr>
<tr>
<td>Duration</td>
<td>20 years</td>
<td>10 years</td>
<td>20 years</td>
<td>20 years</td>
</tr>
</tbody>
</table>

Figure 3: Chart of FITs in Japan, pre-April 2013 solar FIT adjustment\(^5\)

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\(^1\) "Japan to Install More than 5 Gigawatts of PV Systems in 2013 – Overtaking Germany and the US."


\(^4\) Feed-In Tariff Scheme in Japan.

\(^5\) Feed-In Tariff Scheme in Japan.
As for capital subsidies, the Japanese government currently grants a subsidy of ¥35,000/kW for systems designed for the residential market\textsuperscript{16}.

2.4 Key Players in the Japanese PV Market

From analysing the value chain of the solar industry, players in the Japanese PV market can be divided into 5 groups: Polysilicon suppliers, solar module manufacturers, installers, utility companies and others.

2.4.1 Polysilicon Suppliers

Polysilicon is the main material that is used to produce solar wafers and ingots that are present in solar modules.

As of 2012, there are seven polysilicon producers in Japan; Tokuyama Corp, Mitsubishi Materials Corp, Osaka Titanium Technologies Co. Ltd, M.Setek Co. Ltd, Japan Solar Sillicon Co. Ltd, JFR Steel Corp and NS Solar Material Co. Ltd\textsuperscript{18}. Global production of

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polysilicon was 250,000 metric tons in 2012\textsuperscript{19}, with Japanese producers supplying 7% of the world’s demand, or 17,500 metric tons of polysilicon\textsuperscript{20}.

2.4.2 Solar Manufacturers

The top 5 Japanese solar manufacturers in 2012 were Sharp, Kyocera, Solar Frontier, Panasonic and Mitsubishi Electric\textsuperscript{21}. Exact sales revenues derived from the solar business of these companies, with the exception of Sharp, has been a challenge to identify, due to the fact that the majority of these companies are conglomerates.

Foreign manufacturers supplied 869 MW, or 22.8% of all modules shipped in Japan in 2012\textsuperscript{22}. There are a number of foreign manufacturers operating as OEM suppliers to Japanese manufacturers in order to enter the Japanese market. It is expected that foreign imports of modules for 2013 will increase due to an increase of partnerships that foreign firms have with Japanese firms\textsuperscript{23}.

\begin{figure}[h]
\centering
\includegraphics[width=0.6\textwidth]{figure5.png}
\caption{Top 6 Japanese Solar Module Manufacturers: Market Share For in 2012}
\end{figure}

\begin{flushleft}
\textsuperscript{20} Annis, Charles.
\end{flushleft}
However, the dominance of Japanese firms will remain as according to IMS Research, Japanese consumers’ preference is still for domestic brands as well as highly efficient panels.  

2.4.3 Homebuilders

As most of the PV installations are currently from the residential sector, companies that implement the installations are homebuilders that install solar systems whilst constructing houses and apartments.

The main installers in Japan are Sekisui Home, Daiwa House Co., PanaHome, Misawa Home, Mitsui Home and Mitsubishi Estate. It is worthy to note that homebuilders such as PanaHome and Mitsubishi Home belong to the same conglomerate that manufactures solar panels and as such, install their own panels during the home building process.

2.4.4 Utility companies

Regional utility companies, such as Tokyo Electric Power, Kansai Electric Power, Hokkaido Electric Power and others have begun operations of PV plants that produce solar power in the MW scale. Overall, there are ten utility companies in Japan.

These utility companies are increasingly involved in the PV market due to the shutdown of most nuclear reactors in Japan after the March 11th Earthquake in Japan in 2011.

Furthermore, while there is a national FIT in place, utility companies like Tokyo Electric Power have been offering their own tariffs in the form of Time-Of-Use rates that allow consumers to buy electricity from the company at a low price and sell electricity at a premium price, albeit at a rate lower than that of the national FIT rate.

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2.4.5 Others

Aside from the manufacturers, installers and utility companies, companies that have traditionally not been part of the solar industry, such as the telecommunications company SoftBank and the e-commerce company Rakuten are being increasingly involved with PV.

These companies have been seen cooperating with installers and manufacturers, where Rakuten has teamed up with manufacturer Kyocera and installer Nippon ecosystem to offer consumers a variety of options when it comes to choosing PV systems29.

As for Softbank, the company has offered to install solar panels made by Sharp to consumers for free with the condition that they remit 85% of revenue gained from the national FIT to the company30.

2.5 System Prices in Japan

Japanese consumers pay a relatively high price for PV systems. In 2012, it was estimated that the price/watt in Japan was ¥501/W, or $6.3/W31.

On the other hand, consumers in Germany and the United States paid $2.2/W and $4.4/W respectively32. As such, the prices that Japanese consumers pay for PV systems are one of the highest in the world.

2.6 Funding

Confidence is high in the growth of the solar industry in Japan as banks; both foreign and domestic have been willing to invest in solar projects as they believe it to be worth ¥1.8 tn33.

Three of the largest Japanese banks, Mitsubishi UFJ Financial Group Inc., Mizuho Financial Group Inc. and Sumitomo Mitsui Financial Group Inc. as well as foreign investment

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29 Movellan, Junko. "Fighting Blackouts: Japan Residential PV and Energy Storage Market Flourishing."
31 "Prices Of Home Solar Power Systems Fall 10% Amid Cheaper Imports(Nikkei)."
bank Goldman Sachs are currently involved in solar projects across the country, with Mizuho currently considering funding ¥600 bn worth of solar projects\textsuperscript{34}. 

\textsuperscript{34} "Japan's Banks Follow in the Footsteps of Goldman Sachs."
3. Porter’s Five Forces Analysis of the Japanese PV industry

3.1 Supplier Power: Low

The level of influence that Japan has on the polysilicon market, the key material that is used in the production of solar wafers, is relatively low. This is due to the fact that Japanese production of polysilicon is considerably less than polysilicon producing countries such as China, the United States, Korea and Germany (as shown in Figure 4, page 6)35.

As the polysilicon market is currently facing oversupply, prices of the material have remained low and are not estimated to rise drastically in the near future.

In terms of solar modules, while cheaper foreign imports of solar modules only consisted of 20% of the total module supply in Japan in 2011, the figure grew to 22.8% in 2012 and is further expected to increase36.

While the current solar labor force in Japan is sufficient for installations, analysts at Bloomberg New Energy Finance have stated that a huge increase in demand may bring a shortage of skilled labor that is required37.

The supply of land is vital for non-residential and mega solar projects in land. Close relationships with the government is needed in order to be granted permission to use the land for solar projects. According to Dr. Stefan Lippert, permits to begin solar projects in spacious regions such as Hokkaido are hard to obtain, thus forcing project developers to look towards unsuitable regions such as Mie, an industrial area, instead38.

As there is an oversupply of polysilicon and a wide availability of module suppliers, suppliers upstream currently do not hold power. Upstream supplier, such as project developers and independent power producers have relatively low power as they can only depend on the government to grant them licenses and permission for the use of land to begin solar projects.

3.2 Buyer Power: Moderate

Buyers in the PV market in Japan are currently segmented by; residential, non-residential and utility sectors.

As of 2012, there are currently one million residential PV systems in Japan\(^39\), with the majority of the segment based in the Kanto, Chubu, Kinki and Kyushu regions\(^40\). Total shipments to the residential segment totalled 1,869.9 MW in 2012\(^41\). Considering that the capacity of an average PV residential system is 4.34 KW\(^42\), the average cost would be ¥1.7 mm\(^43\). Due to the relatively expensive prices of PV systems, consumers have high switching costs.

Non-residential solar customers form the 2\(^{nd}\) largest group of customers in the Japanese PV market. In 2012, there were 3,379 registrations for commercial solar projects that were above 10kW\(^44\), resulting in shipments of 1,213.4 MW to the segment\(^45\). Majority of the segment is based in the Kanto, Chubu, Kinki and Kyushu regions\(^46\).

As for utilities, there are currently 10 utility companies that operate in Japan\(^47\). Shipments to the utility sector were 724.2 MW in 2012\(^48\). Utility customers of PV are concentrated in regions with land availability, such as Hokkaido and Kyushu\(^49\).

Although the wide distribution of customers in the residential and non-residential sectors outnumber that of suppliers, buyers still retain their buying power as it is not mandatory to install a PV system in their homes or offices. Also, the small number of utility companies in Japan allows them to have more bargaining power as buyers.

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\(^{42}\) Burger, Scott

\(^{43}\) Wesoff, Eric.


\(^{45}\) "Statistical Information."

\(^{46}\) Movellan, Junko. "Is the Japan PV Market the Next Big Thing?"

\(^{47}\) *Trends in Photovoltaic Applications: Survey Report of Selected IEA Countries between 1992 and 2011* 

\(^{48}\) "Statistical Information."

\(^{49}\) Movellan, Junko. "Is the Japan PV Market the Next Big Thing?"
3.3 Competitive Rivalry: Low

The solar industry in Japanese is expected to grow an increased 82% from 2012, compared against the global growth rate of 4%\(^50\). Domestic firms supplied 2,964 MW, or 77.8% of all modules shipped in Japan in 2012\(^51\).

Although average PV system prices in Japan are highest in the world, prices are falling, from ¥544/W in 2011 to ¥501 in 2012\(^52\). Solar research firm RTS Corp estimates that average system prices will fall further to ¥400/W due to increased competition\(^53\).

Solar products in Japan are differentiated through technologies, brands and their conversion efficiency rates. Solar manufacturers such as Panasonic and Solar Frontier use proprietary technologies such as HIT (Heterojunction with Intrinsic Thin-layer) and CIS (Copper, indium and selenium) to manufacture their own solar cells and modules.

Other solar manufacturers such as Toshiba and Sharp outsource module production to foreign solar manufacturers and sell them under their own brand names. The emphasis on differentiation can be explained by heavy spending on R&D by Japanese manufacturers, with Panasonic leading the way with R&D expenditures at 6.9% of total sales revenue in 2012\(^54\).

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Figure 6: R&D Expenditures of Japanese solar manufacturing conglomerates in 2012\(^55\)

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\(^{50}\) “Japan Set to Become World’s Largest Solar Revenue Market in 2013 as Installations Boom in Q1.”
\(^{51}\) Watanabe, Chisaki. “Japan Domestic Solar Shipments Leap by Most in at Least 30 Years.”
\(^{52}\) “Prices Of Home Solar Power Systems Fall 10% Amid Cheaper Imports(Nikkei).”
\(^{53}\) “Prices Of Home Solar Power Systems Fall 10% Amid Cheaper Imports(Nikkei).”
As mentioned earlier, customer switching costs are high in Japan, with a residential PV system costing an average of ¥1.7 mm\(^56\). As such, customers are unlikely to purchase another system after investing a significant amount in their initial purchases.

In 2010, the CR4 ratios of solar manufacturing companies in Japan were at 84%. However, in 2012, the CR4 ratio was at 68\(^57\). The decreasing ratio suggests that consolidation or shakeout of solar manufacturing companies in the Japanese solar market has yet to occur.

3.4 Threat of Substitution: Moderate
Within the solar industry itself, the threat of substitution remains high as the products produced by domestic manufacturers offer consumers a variety of choice in terms of cost, capacity and efficiency.

There is also the lingering threat of foreign module imports as these modules are cheaper, such as Chinese modules that are priced at an average of ¥398/W as compared to the Japanese average of ¥501/W\(^58\). These modules are likely to attract price-sensitive consumers.

As for utility providers, residential PV installations are a threat as consumers now have the option of generating their own electricity instead of purchasing it from the company. However, the high prices of PV systems may serve to deter consumers from investing in one.

Other forms of renewable energy are a substitution to solar power. In 2012, Sumitomo Corp. announced that they take advantage of the FIT for renewable energy and would invest in wind farms and 2 biomass plants in Japan\(^59\). Other efforts to commercialize wind power are on-going as well, with Marubeni Corp. planning to set up experimental floating wind turbines off the coast of Fukushima.

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\(^{56}\) Wesoff, Eric.

\(^{57}\) "太陽光発電システム 2012年のメーカー別シェア."

\(^{58}\) "Prices Of Home Solar Power Systems Fall 10% Amid Cheaper Imports(Nikkei)."

While the turbines currently produce 2 MW of wind energy at the moment, the success of the experiment may pave the way forward for an additional 1,000 MW capacity of wind energy\(^{60}\).

Although nuclear power has fallen out of favour with the Japanese public, with 59% of voters in a poll conducted by Asahi opposing the use nuclear energy in Japan\(^{61}\), fossil fuels such as oil and natural gas currently produce 90% of Japan’s electricity and are traditional substitutes to solar power\(^{62}\).

### 3.5 Threat of New Entry: High

Due to expectations of huge growth in the PV market in Japan, it is highly likely that an increased number of firms, especially foreign firms like Canadian Solar and JA Solar, will attempt to enter the Japanese markets. This is especially so for Chinese firms, due to the recent anti-dumping tariffs put on Chinese manufactured solar modules by the European Union\(^{63}\). However, the Japanese market has a considerable number of market entry barriers.

In terms of governmental regulations, foreign manufacturers of inverters, a component that is used in solar modules, have found that strict certification requirements have prevented them from establishing a foothold in the Japanese market\(^{64}\).

Also, entry costs for manufacturers are high, as R&D and production facilities require a significant amount of capital. As such, companies may find it a challenge to directly invest in facilities in Japan and will choose to retain production facilities elsewhere.

However, some foreign suppliers have already been able to penetrate the Japanese market, either through direct distribution or through partnerships with domestic firms\(^{65}\). In October 2012, German firm SMA Solar Technology was chosen as the sole inverter supplier.


\(^{62}\) Humber, Yuriy, and Tsuyoshi Inajima


\(^{64}\) "Japan Set to Become World's Largest Solar Revenue Market in 2013 as Installations Boom in Q1."

for the 70MW solar power plant project in Kagoshima. Other firms such as American SunPower have agreements with domestic companies Sharp and Toshiba to supply modules. Large-scale solar farm projects have generated interest among foreign firms, with South Korean firm Hanwha Q-Cells winning exclusive orders to provide solar panels to mega solar projects in Hokkaido and Kyushu.

Despite the high growth of the Japanese solar market, foreign firms are facing a challenge from Japanese consumers due to their preference for domestic brands. Although foreign module manufacturers, such as those from China, may provide cheaper prices, they are still disadvantaged when competing against Japanese competitors that have already established their brand and sales channels throughout the country. However, the perception of foreign brands may change over time as their panels become more efficient and as the companies develop their own sales channels.

3.6 Porter’s Five Forces Analysis Outlook

The Japanese market is an attractive market for global solar manufacturers. As Japanese panels are relatively higher priced and more efficient than their Chinese counterparts, other foreign competitors will find an opportunity to compete by introducing efficient and competitively priced solar panels.

Initial barriers to entry such as the strict certification and Japanese consumers’ preference will be eventually overcome with time, and Japanese solar manufacturers will find increased competition from newer entrants into the market. As more entrants enter the market, there will also be firms exiting due to decreasing profits.

Also, with an increased number of competitors, consumers will gain more buying power as they have a variety of choices to choose from when making their purchases. Firms will have to respond by either differentiating their products and services further or by

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cutting prices. However, as Japanese consumers, especially those in the residential segment prefer energy efficient panels; differentiation is the likely approach for companies in Japan.

As such, companies that are innovative and able to afford increased R&D expenses will be the ones to succeed in the Japanese market.
4. PEST Analysis of the Japanese PV Industry

4.1 Political factors

The Japanese government is currently heavily vested in the solar industry. Due to the shutdown of the majority of nuclear reactors following the earthquake disaster in 2011, the government has faced a shortage of electricity and delays in gaining approval for safely restarting the reactors.\(^{70}\)

The power disruptions brought about from the earthquake and subsequent tsunami in 2011 brought about severe economic damage to Japanese companies. As such, it is in the interest of Japanese businesses that there is a sufficient level of energy available for operations.

The government has made an energy policy whereby solar power generators would provide a capacity of 28GW by the year 2020.\(^{71}\) In order to incentivise the growth of the solar industry in the country, the government has provided lucrative benefits in the form of capital subsidies and FITs for solar installations.

Effectively, the 2012 FIT law has forced electrical utilities to purchase electricity generated from PV at a premium price, thus creating a demand for PV installations. Although the residential sector of the PV market has always formed the majority of new installations, the FITs have brought about plans of big scale “mega-solar” projects that can provide capacities of the megawatt scale.\(^{72}\)

Also, strict government regulations, such as those governing the specifications of inverters, have discouraged foreign solar competitors from entering the market by forcing them to either redesign their products or partner with a local supplier.\(^{73}\) As such, the regulations ensure that Japanese companies maintain their foothold in Japan.

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\(^{73}\) "Japan Set to Become World’s Largest Solar Revenue Market in 2013 as Installations Boom in Q1."
4.2 Economic factors

Economic factors can be divided into two segments: Microeconomic and Macroeconomic.

4.2.1 Macroeconomic Factors

The Japanese economy has seen an increase in GDP of an annualized 3.5% in the first quarter of Q1 2013 since Prime Minister Abe Shinzo introduced his fiscal policies. The yen has depreciated against the dollar from a high of ¥76.39/$ in 2012 to a low of ¥102.30/$ earlier this year.

While the Nikkei has surged, private consumption has increased and exporters benefitting from the depreciation of the yen, capital expenditure of companies has not increased and deflation still remains, leading analysts to wonder if the measures enacted to spur the recovery of the economy is sustainable or not.

More importantly, Japanese government bonds (JGBs) have seen yields increasing recently, due to the devaluation of the yen. The increase in interest rates may have a detrimental effect on the economy as it would mean an increase in the budget deficit and government debt. Also, higher interest rates will dampen business investment due to the increased cost of capital.

While Japan has already decreased the FIT by 10% to ¥37.8/KWh, with Japan’s high debt ratio, it is unclear how long the FIT program can be sustained due to its high costs to the government.

4.2.2 Microeconomic factors

As mentioned above, the solar market in Japan is highly attractive. The residential segment currently forms the majority of the market but the share of the non-residential segment is expected to grow over the next few years due to the FIT.

As Japanese consumers in the residential segment have limited space to install their solar systems, they prefer highly efficient energy panels. On the other hand, consumers in

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the non-residential segment have more available space to install their solar systems and as such, prefer cheaper and less efficient solar panels. As such, the purchasing decisions of consumers in the residential and non-residential segments are different.

Japanese solar companies currently own the majority of market share in Japan and provide panels that are highly efficient but relatively expensive as compared to Chinese imports. Therefore, while opportunities may be limited for foreign firms in the residential segment, the non-residential segment is an avenue for these firms to provide their products and services.

4.3 Social factors
The Japanese are health conscious and put a high emphasis on safety. These traits were seen after the nuclear plant disaster in Fukushima in 2011. During the radiation scare, bottled water, iodine tablets and Geiger counters were high in demand. Numerous protests and petitions have been signed against the restarting of nuclear reactors in Japan76.

Due to Japanese society’s fear of another nuclear disaster, solar energy is viewed upon favourably in Japan. According to a poll conducted by Asahi in 2013, 59% of those polled stated that they wished to see nuclear power eliminated from Japan or reliance on it significantly reduced77.

Also, the Japanese have been seen to be conscious about the environment and their surroundings. After the nuclear disaster in 2011, households were seen participating in “setsu-den”, or energy saving campaigns that were aimed at conserving energy due to the shortage78. The campaign was a success as Tokyo managed to avoid feared blackouts.

Due to these factors, it can be inferred that the Japanese will view the growth of the solar industry in Japan in a favourable light.

77 "Asahi Poll: 59% Oppose Abe’s Nuclear Power Policy."
4.4 Technology factors

Japan is one of the few countries such as the United States, Germany, Korea, France and Australia that heavily invests in R&D for the PV industry, with the United States currently being at the forefront of R&D for PV\(^79\).

The Japanese government has invested a significant amount of resources into the PV industry, with the Ministry of Economy, Trade and Industry (METI) and the Ministry of Education, Culture, Sports, Science and Technology (MEXT) running several programs to develop high-performance and efficient PV cells\(^80\). Research is also being conducted by top schools, such as the University of Tokyo.

Technology remains one of the key areas of the PV industry in Japan due to the limitations of space. Aside from government regulations, another way that the Japanese manufacturing companies have managed to retain the lead in the Japanese market is by differentiating themselves from their cheaper Chinese counterparts by producing highly efficient solar panels.

Therefore, Japan’s innovative drive in the PV industry signals a shift away from traditional electronics industry such as LCDs and semiconductors, which was once its key competency but now is South Korea’s, into energy and green technologies\(^81\).

4.5 PEST Analysis Outlook

The PEST analysis reveals that the conditions in Japan are favourable for the solar industry. As long as the economy continues to grow sustainably in Japan, the government and Japanese public will support the growth of the solar industry in Japan.

Although the presence of foreign competitors will increase in Japan, Japanese firms can be expected to retain a technological edge against its rivals.

5. Internal Analysis: Evaluating the components of Panasonic’s competitive advantage

5.1 Efficiency

The efficiency of Panasonic can be divided into two segments; the company itself and its products.

5.1.1 Company Efficiency

The efficiency of the company can be measured through its effective use of its labor and capital. In order to analyse the company efficiency of Panasonic, the company will be compared against other Japanese conglomerates.

Listed below is a chart comprising of the number of employees and financials of Panasonic and its rival conglomerates in Japan.

<table>
<thead>
<tr>
<th>Conglomerate</th>
<th>Employees</th>
<th>Revenues (¥ mm)</th>
<th>Net Income (¥ mm)</th>
<th>Revenue/ Employee (¥ mm)</th>
<th>Net Income / Employee (¥ mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panasonic</td>
<td>293,742</td>
<td>7,846,216</td>
<td>-772,172</td>
<td>26.7</td>
<td>-2.6</td>
</tr>
<tr>
<td>Sharp</td>
<td>57,200</td>
<td>2,455,850</td>
<td>-376,076</td>
<td>42.9</td>
<td>-6.6</td>
</tr>
<tr>
<td>Kyocera</td>
<td>71,645</td>
<td>1,190,870</td>
<td>79,357</td>
<td>16.6</td>
<td>1.1</td>
</tr>
<tr>
<td>Mitsubishi</td>
<td>114,443</td>
<td>3,639,468</td>
<td>112,063</td>
<td>31.8</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Figure 7: Revenues and Net Income of Panasonic and its rival Japanese conglomerates FY2012\(^2\)

Panasonic has the highest amount of employees among the four conglomerates, with the revenue that each employee earns for the company being the second highest. However, in terms of net income per employees, Panasonic is not performing as well as Kyocera and Mitsubishi despite them having fewer employees.

This might suggest that the utilization of labor in Panasonic is inefficient, which is a result of a bloated workforce.

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In terms of capital efficiency, Panasonic’s performance was the second lowest as compared to its rival conglomerates. The negative financial ratios indicate inefficiency in the way Panasonic manages its assets and capital, which could be a result of high capital expenditures (Panasonic spent ¥495 bn in 2012\textsuperscript{84}), inefficient management or an ineffective business model.

### 5.1.2 Product Efficiency

Panasonic produces a single type of solar module; namely their HIT photovoltaic modules\textsuperscript{85}. HIT modules are produced with Panasonic’s proprietary technology, utilising mono polycrystalline wafers and amorphous silicon layers\textsuperscript{86}.

The HIT panels are mainly catered towards the residential segment, due to their relatively high efficiency ratings and the lack of space to place solar panels in residential areas in Japan. While the average efficiency levels of solar panels for the residential market range between 10%-15\%\textsuperscript{87}, the HIT panels’ average efficiency levels are at 20.2\%\textsuperscript{88}, with newer models achieving a 24.7\% efficiency level\textsuperscript{89}.

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\textsuperscript{83} "Financial Times: Equities."
\textsuperscript{84} "Annual Report 2012."\textit{Panasonic Solar.}
\textsuperscript{86} "HIT Photovoltaic."
5.2 Quality

The quality of Sharp Solar can be defined by its Products and Services.

5.2.1 Product Quality

As mentioned earlier, Panasonic’s solar panels which are sold under its HIT brand achieves conversion rates of up to 24.7%90, which is in the upper range of the average efficiency rates of 10% to 15%.

In terms of reliability, Panasonic’s solar panels have undergone reliability tests conducted by third-parties, with results showing that the panels are durable and reliable even under harsh conditions.

In 2013, TÜV Rheinland, a German provider of technical, safety, and certification services conducted a long term sequential test on HIT modules, which consisted of 1,000 hours of UV exposure, 2,000 hours of damp heat testing, 400 cycles of thermal cycling testing and four 1-cycle test blocks of humidity freeze testing91. Under these tests, Panasonic panels only displayed an 8% power loss as compared to the average power loss rate of 11.34% of 9 other panels that were tested by the same company92.

In a testament to the durability of Panasonic’s HIT modules, the failure rate of the modules have been low. Of the 3 million modules shipped to Europe, only 105 or 0.0035% of all modules has failed93.

5.2.2 Service Quality

The warranties that Panasonic provides for its solar products is for a 30 year period, with the first 10 years of the warranty guaranteeing 90% of the minimum rated power output and the remaining 30 years guaranteeing 80% of the minimum rated power output94.

As for its competitors, Sharp, Mitsubishi and Kyocera provide warranties of up to 25, 25 and 20 years respectively. All competitors provide a guarantee of 90% of the minimum

90 “Panasonic HIT® Solar Cell Achieves World’s Highest Conversion Efficiency of 24.7% at Research Level.”
rated power output for the first ten years and 80% of minimum rated power output for the remaining years of each respective warranty.  

<table>
<thead>
<tr>
<th>Guarantee covering:</th>
<th>90% of output</th>
<th>80% of output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sharp</td>
<td>10 years</td>
<td>15 years</td>
</tr>
<tr>
<td>Kyocera</td>
<td>10 years</td>
<td>10 years</td>
</tr>
<tr>
<td>Panasonic</td>
<td>10 years</td>
<td>20 years</td>
</tr>
<tr>
<td>Mitsubishi</td>
<td>10 years</td>
<td>15 years</td>
</tr>
</tbody>
</table>

Figure 9: Number of years of warranty provided by the conglomerates.

Although Panasonic provides the longest warranties for its solar products as compared to its peers, its products have been shown to be resilient, with a warranty claim rate of only 0.0022% of all solar products sold in Europe.

5.3 Innovativeness

The innovativeness of Panasonic can be defined by number of patents that the company has and the ratio of its expenditures on R&D to net sales.

5.3.1 Patents

As of 2010, Panasonic holds the second highest number of patents in Japan, with its 545 patents. The number of patents pending for Panasonic is the third highest as compared to other Japanese conglomerates listed in the chart below.

Overall, the total number of patents (patents already owned and patents pending) of Panasonic is at 544, putting the company behind Sharp.

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95 See Figure #9
5.3.2 R&D Expenditures

Compared against rival Japanese conglomerates, Panasonic spends the most on research and development, with R&D expenditures at 6.9% of sales in 2012. Percentage of R&D expenditures to sales for rivals Sharp, Kyocera and Mitsubishi were 6.3%, 3.7% and 4.7% respectively.

As such, it can be inferred that Panasonic places a huge emphasis on research and places it among one of their key activities.

5.4 Responsiveness to Customers

5.4.1 Product Development

The solar panels of Panasonic seem to cater towards the needs of the residential segment in Japan; where land is scarce and higher levels of efficiency is needed. Capitalizing on that, the newer solar panel prototypes of Panasonic have improved efficiency levels of

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up of 24.7\%\textsuperscript{100}, which is one of the highest conversion rates in the market for commercially available panels.

Panasonic is also now focusing on its energy management businesses, such as power storage systems. The company has partnered with American inverter firm, Power-One Inc to develop an energy management system that would combine its solar panels, power storage and Home Energy Management Systems\textsuperscript{101}.

The alliance is a strategic one as Studeny mentioned that demand for energy storage systems in Europe is on the rise\textsuperscript{102}, with people now needing to store their energy as there are no longer any energy buyers due to the end or reduction of the FIT in certain European countries. However, the market is believed to have strong growth potential, with it estimated to be worth ¥1 tn by 2020\textsuperscript{103}.

5.4.2 Customer Response Time

Although information on customer response times for the Japanese market is unavailable, Panasonic partnered with telecommunications company AT&T in the American market to develop a natural language speech application that helps connect customers to specialist quicker. While it took an average of 146 seconds to connect a customer to specialists, the application allowed customers to connect to specialists in 46 seconds, a 100 second or a 68% reduction in the time taken\textsuperscript{104}.

5.5 Branding

Panasonic as a conglomerate is a household brand name in Japan due to its home appliances and plasma TV’s. The wide proliferation of its solar products in the early 2000s worldwide made the company an established player in the global PV industry. As a

\textsuperscript{100} “Panasonic HIT® Solar Cell Achieves World’s Highest Conversion Efficiency of 24.7% at Research Level.”
\textsuperscript{103} Zip, Kathleen
testament to the recognition of the brand, Panasonic was the 7th biggest solar module manufacturer in the world from 2005 to 2007\textsuperscript{105}.

5.6 Internal Analysis Outlook

Key strengths of Panasonic lie in the quality and efficiency of its products and services, its emphasis on innovativeness, their responsiveness to customers and branding. Combined together, these strengths serve to differentiate Panasonic from its competitors, allowing Panasonic to offer value that its competitors cannot which enables it to sell its products at premium prices.

However, the company’s sole focus on solar panels for the residential segment may prove to be a weakness in the long run. As stated earlier in page 4, the non-residential and utility segments in Japan are expected to grow and as a result, Panasonic may stand to lose opportunities if it ignores these changes in the market.

From the analysis, the main weakness of Panasonic lies in its inefficient management of labor and capital. The weak financial ratios suggest that the company has been overspending on non-performing assets and retained an unnecessary level of employees. As such, investors will be wary and cautious when deciding to invest in Panasonic.


6.1 Current Overview of the Business and Financials

Panasonic is currently pursuing a differentiation business model. Its focus on innovation has led to reliable and high quality products and services but at the same time has resulted in increased costs to the company\textsuperscript{106}.

The company has been pursuing cost-cutting measures in order to offset the costs arising from this differentiation by closing its solar operations in California and Oregon in the United States\textsuperscript{107} and Hungary, shifting remaining operations to 3 main plants in Japan’s Osaka and Shiga prefectures and Kedah state in Malaysia\textsuperscript{108}.

However, the company is in a crisis. It has faced financial losses since 2009 to 2013 (with the exception of 2011), forcing the company to seek $7.6 bn of loans from Japanese banks in October 2012\textsuperscript{109}.

\begin{table}[h]
\centering
\begin{tabular}{|l|c|c|c|c|c|}
\hline
\hline
Net Sales & 7,303,045 & 7,846,216 & 8,692,672 & 7,417,980 & 7,765,507 \\
Operating Expenses & 7,530,830 & 8,365,652 & 8,422,110 & 7,227,527 & 7,692,634 \\
Operating Income & -227,785 & -519,436 & 270,562 & 190,453 & 72,873 \\
Net Income & (754,250) & (772,172) & 74,017 & (103,465) & (378,961) \\
Operating Ratio & 1.03 & 1.07 & 0.97 & 0.97 & 0.99 \\
Operating Margins & (0.03) & (0.07) & 0.03 & 0.03 & 0.01 \\
\hline
\end{tabular}
\caption{Net Income and Financial Ratios of Panasonic Corp 2009 - 2013 (¥ mm)}
\end{table}

\textsuperscript{106} See Figure #11
\textsuperscript{110} "Financial Times: Equities"
The sales of Energy Division of Panasonic, which comprises of the manufacture and sale of solar panels and lithium ion battery systems, formed 6% of Panasonic’s total sales for 2012. The segment lost ¥20.9 bn in 2012, with falling sales of photovoltaics and lithium ion batteries in Europe said to be the main cause\textsuperscript{111}.

Although various reports from Bloomberg and Studeny suggest that the solar business of Panasonic is profitable, it is difficult to estimate the exact profitability of it as Panasonic does not disclose the exact financial figures of the sales and profit of its solar panels in their annual and financial reports.

\begin{tabular}{|l|c|c|c|}
\hline
Conglomerate & Sales of Energy Division (¥ bn) & Segment Profit (¥ bn) & % of Total Sales \\
\hline
Panasonic & 614.9 & -20.9 & 6% \\
Sharp* & 223.9 & -21.9 & 7.90% \\
Kyocera & 179.8 & 6.5 & 15% \\
Mitsubishi** & Unlisted & Unlisted & Unlisted \\
\hline
\end{tabular}

* Sharp is the only company that lists the exact sales figures of its Solar Cells Business.

** Financial figures of the business involved in Solar Cells unavailable.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{sales_energy_conglomerates_2012.png}
\caption{Sales of Energy Business for Japanese Conglomerates 2012\textsuperscript{112}}
\end{figure}

6.2 Outlook for 2013

Although Panasonic faced huge losses in 2012, analysts believe that the company will return to profitability in 2013, with a forecast of a net profit of ¥80.5 bn\textsuperscript{113}.

The solar business of Panasonic is expected to grow, with the company forecasting an increase of sales by 25% from 2012, to 675 MW\textsuperscript{114}. The company also believes that the increase in sales would be driven by the residential segment in Japan\textsuperscript{115}.


7. Strategic Options

Although Panasonic is forecasted to return to profitability in 2013, projections may change and as such it is critical that the company look at different strategic options available to them.

7.1 Maintaining the business model

Panasonic currently manufacturers its own wafers, cells, modules and panels\textsuperscript{116}. The solar business main operations are within Japan, with 67% of all revenues in 2012 coming from the Japanese market\textsuperscript{117}.

7.1.1 Expanding the business

Panasonic can expand its business by catering to the non-residential and utility segment. This can be achieved by a merger or acquisition with another company. A potential target would be Solar Frontier, a Japanese company which produces solar panels made from thin-film technologies. Solar Frontier currently controlled 8% of the Japanese market share in 2012 and as such, acquiring it will allow Panasonic to gain further market share.

Thin-films modules offer less efficiency than polycrystalline modules, with average efficiency rates of 8% versus 15% of polycrystalline modules\textsuperscript{118}. However, thin film panels are cheaper to produce, with prices of an average thin-film module costing ¥55.5/W, 39% cheaper than polycrystalline modules which cost ¥76.9/W\textsuperscript{119}. As such, thin-film panels are ideal for use in non-residential or mega solar projects in Japan as these locations have more space than residential areas and do not require high efficiency panels as the residential segment.

\begin{footnotesize}
\begin{enumerate}
\item "14% Efficiency for Thin-Film Solar Cells, but Where Will the Indium Come From?" \textit{Forbes}. Forbes Magazine, 07 July 2010. Web. 28 July 2013.
\end{enumerate}
\end{footnotesize}
Another option would be to expand their current product line to include “non-premium” panels that are cheaper and less efficient than the top of their line HIT solar panels, to cater to the non-residential market. As HIT panels are traditional mono-silicon panels that are coated in amorphous silicon layers, what Panasonic can do is to sell their mono-silicon panels without adding on the amorphous silicon layers.

A geographic expansion to China would be another option of Panasonic to expand their business. Demand for PV in China is expected to increase, with the Chinese government announcing plans to install 10 GW of solar power a year from now till 2015\(^\text{120}\). Due to the large availability of land in China, there will be opportunities for Panasonic in large scale solar projects there.

Another opportunity to expand the home energy storage system would be in Europe, as Studeny stated that the demand for energy storage systems there has increased due to the end of the FITs in certain European countries.

7.1.2 Keeping it stable

Panasonic can choose to not change their business model or expand, and let the business run as it is. With its recent divestitures in the European and American market and the growing market for PV in Japan, Panasonic believes that it will return to profitability in 2013.

7.1.3 Shrinking the business

In order to further cut costs, Panasonic can choose to reduce expenditures on capital investments and research and development.

Panasonic started shipping solar cells from its factory in Malaysia in 2013, as part of an effort to reduce production costs by 20%\(^\text{121}\). Although the company has closed its factory in Hungary, the company may also choose to close its factories in Japan or to relocate the majority of its production of solar cells to its factory in Malaysia. This would allow the company to further cut down on labor and production costs.

\(^{120}\) "China Solar Demand Support Increase Sends Stocks Soaring."

7.2 Changing the business model

By changing its business model, Panasonic can reposition itself in the value chain of the solar industry. Currently, the company is involved in the manufacture of wafers, cells and modules\(^\text{122}\). As the polysilicon market is currently facing oversupply\(^\text{123}\), opportunities for Panasonic are present only if they integrate downstream.

By vertically integrating downstream, Panasonic can become an Engineering, Procurement and Construction (EPC) contractor, a project developer or an independent power producer. Due to the on-going boom of mega solar projects and the high FITs, analysts at Bloomberg New Energy Finance have estimated that equity returns for solar project developers can reach as high as 44\(^\%\)\(^\text{124}\), which could be a lucrative opportunity for Panasonic.

7.3 Exiting the Solar Market

Panasonic may divest itself from the solar market through two different ways.

One way would be to shut down all production facilities in Japan and Malaysia and solar sales offices globally. Remaining stock would most likely be held in inventories or sold off cheaply and staff would either be retrenched or transferred to other businesses.

Another option would be to sell the business of to a rival competitor or private equity fund. As the solar business of Panasonic is still profitable, it may be possible to sell the business at a premium. If rivals are unwilling to purchase all the assets of the business, the sale of Panasonic’s proprietary technology and patents of its HIT modules may also be a way for Panasonic to exit the business.

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\(^{122}\) "Panasonic to Build New Solar Manufacturing Base in Malaysia to Produce Wafers, Cells and Modules."


8. Criteria and Prioritization

Due to the dire financial state that Panasonic is in now, the 3 main criteria that will be used to evaluate the strategic options are; Financial Impact, Speed and Ease of Implementation.

8.1 Expanding the business through M&A

Acquiring Solar Frontier from its parent Showa Shell K.K will be an expensive option for Panasonic. Assets of the company’s solar business are estimated to be worth ¥156 bn as of 2012. As Panasonic is not in a strong financial position now, obtaining financing for the acquisition will likely be difficult. Parent company of Solar Frontier, Showa Shell Sekiyu K.K, is currently in a strong financial position with ¥18 bn in net income for 2012 and as such, will unlikely sell off Solar Frontier.

The speed of acquisition and the ease of implementation will also take time, due to the amount of due diligence that has to be conducted as well as the consultations between the two companies and the investment banks. In a recent case of an acquisition in the solar industry, it took South Korean company Hanwha five months to acquire German firm Q-Cells.

8.2 Expanding the business through new product lines

Introducing newer products to cater to the non-residential segment is a feasible option for Panasonic. Panels for the non-residential segment do not require such high efficiency ratings due to more availability of space for these projects. Since Panasonic already has the technology to produce mono-crystalline cells and as such, can produce it without having to invest in newer equipment or factories to produce it.

The cost to produce such panels is also likely to be cheaper than its HIT panels, due to the panels not requiring any amorphous silicon layers that are present in the HIT panels.

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126 "Financial Times: Equities."
The panels can be sold directly to customers or Panasonic may choose to be an OEM module supplier for other manufacturers.  

The current total production capacity of Panasonic is 900 MW\textsuperscript{128}. As sales for solar panels are forecasted to be 675MW\textsuperscript{129} in 2013, there will be 225 MW of spare capacity that will be unutilised. As such, Panasonic does not have to invest in additional production facilities and can produce these new modules within a short period of time.

8.3 Expanding the business through geographic segmentation

Although the Chinese solar market is set to grow at 10 GW annually till 2015, there are barriers to entry. The Chinese government views its solar industry as part of its national interest, with it being tied to the economy prosperity and local employment of regional constituencies\textsuperscript{130}. As such, the Chinese government will likely protect its own industries. Therefore, entering the Chinese market may require government connections.

Also, due to the large availability of land in China, customers may choose to purchase cheaper modules from the numerous domestic suppliers as they do not need highly efficient solar panels that Panasonic specialises in.

With regards to entering the European market for Home Energy Storage Systems, Studeny mentioned that re-entering the market would not make financial sense for Panasonic as they had just exited the market with the closure of their factory in Hungary.

8.4 No change to the business model

Not doing anything may prove to be a risky choice for Panasonic. Although the company predicts a return to profitability in 2013, their projections may be wrong.

Furthermore, shareholders of the company will likely not accept it if the company if it were to do nothing as the company has been making huge financial losses for the past few years.


\textsuperscript{129} Petrova, Veselina

8.5 Vertical Integration: Moving downstream

Should Panasonic becoming an EPC contractor, project developer or independent power producer, it would be following in the footsteps of rival firms Sharp, Kyocera and Solar\textsuperscript{131}. As mentioned above, equity return on solar projects can be as high as 44%, which is a lucrative proposition.

However, the costs of developing a solar project are expensive. The most recent mega solar project in Kagoshima, Japan is to provide 25.8 MW of power and is estimated to cost its developers ¥9.2 bn\textsuperscript{132}. The project is expected to be completed in August 2014, with it providing 28.5 MWh of electricity to the national grid per year, at a price of ¥1.14 bn\textsuperscript{133}. As such, it will take 8 years before the project developers recoup their investment.

Due to the high initial cost and long time period required to recoup the investment, it will be difficult for Panasonic to become integrate downstream. However, if Panasonic is able to find partners or join a project consortium, the project costs for Panasonic will be lowered.

8.6Exiting the Solar Market

As the solar business is the only profitable business of Panasonic at the moment, it is highly unfeasible for the company to exit the market as it would only reduce its chances of returning to profitability.

The Energy Division of Panasonic currently employs 23,246 staff\textsuperscript{134}. As Dr. Stefan Lippert mentioned before, Japanese companies are very much run like a family and as such, find it difficult to fire their employees\textsuperscript{135}. If the company exits the solar market, it is highly likely that the company will end up with a large number of redundant staff, which would put a further drain on its resources.


\textsuperscript{133} Colthorpe, Andy.


Furthermore, as Panasonic is seen as a symbol of Japanese industrial might, any closure of factories and job cuts will not be favourably viewed upon by its stakeholders\textsuperscript{136}.

8.7 Chosen Option: Expanding via New Product

The 6 strategic options were evaluated on 3 criteria: Financial Impact, Speed and Ease of Implementation. The strategic option of expanding the business was judged to have the highest priority due to it likely having a positive financial impact on Panasonic and it being easily executed in a short amount of time.

<table>
<thead>
<tr>
<th>Strategic Options</th>
<th>Financial Impact</th>
<th>Speed</th>
<th>Ease of Implementation</th>
<th>Score</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expand via M&amp;A</td>
<td>🔻</td>
<td>🔻</td>
<td>🔻</td>
<td>-3</td>
<td>5</td>
</tr>
<tr>
<td>Expand via Product</td>
<td>🔺</td>
<td>🔺</td>
<td>🔺</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Expand via Geography</td>
<td>🔺</td>
<td>🔻</td>
<td>🔻</td>
<td>-1</td>
<td>4</td>
</tr>
<tr>
<td>No change</td>
<td>🔺</td>
<td>-</td>
<td>-</td>
<td>-0.5</td>
<td>3</td>
</tr>
<tr>
<td>Integrate downstream</td>
<td>🔺</td>
<td>🔻</td>
<td>🔺</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Exit</td>
<td>🔻</td>
<td>🔻</td>
<td>🔻</td>
<td>-3</td>
<td>6</td>
</tr>
</tbody>
</table>

Scoring metrics: Positive Score (Favourable Option), Negative Score (Unfavourable Option)

\[\begin{align*}
&\text{🔺} +1 \\
&\text{🔺} +0.5 \\
&\text{🔻} -1 \\
&\text{🔺} -0.5
\end{align*}\]

\textsuperscript{136} Lippert, Stefan. Global Business Policies.
9. Conclusion

In the previous section, the strategic option of expanding via the introduction of new products was prioritized as the number one option. While the strategic option of vertically integrating downstream is also a feasible one, it is recommended that Panasonic implement only one option for the time being due to the weak financial state that the company is currently in.

The final section of the report will analyze the risk and uncertainties faced by choosing the option of expanding via new products and the steps that need to be taken by the company in order to implement it.

9.1 Risks and Uncertainties

The PV industry is undergoing a boom due to the FIT in Japan. However, it is unknown when the FIT will last or whether it will be further reduced. Should the FIT be cut off, it is highly likely that the demand in both the residential and non-residential segments will taper off, leading to reduced sales and profits for Panasonic.

Also, as land is limited in Japan, it is estimated that the number of mega solar projects will start to decrease once available land becomes scarce. As such, the onus is on Panasonic to get itself involved in these solar projects as quickly as possible.

9.2 Risk Mitigation

In order to mitigate the risk of the FIT being cut or removed by the Japanese government, the company should look out for key indicators of when that might happen. As Prime Minister Shinzo Abe won the Upper House elections in Japan in July 2013, the Liberal Democratic Party now has power political power to push its policies through parliament.137

As such, Panasonic should be aware of any changes to the nuclear policy. Should the government decide to further wean off its reliance on imported fossil fuels and increase the share of nuclear power in the national energy mix, it is highly likely that the FIT will be cut.

The willingness to pay for energy for customers will provide a good indicator as well. Should customers have a low willingness to pay for energy, nuclear energy may be favored instead of solar energy.

9.3 Next Steps

The next steps that Panasonic is recommended to take is a 3 pronged approach; 1) The continuation of production and sales of its HIT modules for the residential segment. 2) The development and manufacture of newer modules catered towards the non-residential segment. 3) Improving the company’s utilization of its assets and capital.

Panasonic should continue production of its HIT modules for the residential segment in Japan as it has been profitable for the past year.

The company should begin to design and produce newer modules for the non-residential segment. As production costs in Malaysia are cheaper than that of Japan, production of the new modules should be concentrated there in order to reduce overall production costs. The company should consider sell the new modules by two different channels; selling it under their own brand name and selling the modules as an OEM supplier.

In the internal analysis of Panasonic, the utilization of the company’s assets and capital were identified as weaknesses of the company. As such, the company should focus on improving its company efficiencies by identifying the factors behind its labor and capital inefficiencies.

While it is certain that the management of the company will face difficulties in divesting non-performing assets and cutting redundant staff due to certain factors such as the sunken-cost fallacy or the “loss of face”, it is a necessary step to bring back the company into profitability.