



LAST UPDATE 【2016/4/6】

Tamagawa Holdings | 6838 |

Research Report by Shared Research Inc.

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Key financial data

Income Statement (JPYmn)	FY03/10 Cons.	FY03/11 Cons.	FY03/12 Cons.	FY03/13 Cons.	FY03/14 Cons.	FY03/15 Cons.	FY03/16 Est.
Total Sales	2,803	2,640	3,106	3,672	4,171	5,095	7,077
YoY	-34.8%	-5.8%	17.7%	18.2%	13.6%	22.1%	38.9%
Gross Profit	392	326	590	1,049	1,198	1,479	
YoY	-58.8%	-16.8%	81.1%	77.8%	14.3%	23.4%	
GPM	14.0%	12.3%	19.0%	28.6%	28.7%	29.0%	
Operating Profit	-227	-286	-30	373	477	531	258
YoY	-	-	-	-	27.8%	11.3%	-51.4%
OPM	-8.1%	-10.8%	-1.0%	10.2%	11.4%	10.4%	3.6%
Recurring Profit	-224	-284	-24	375	478	514	187
YoY	-	-	-	-	27.6%	7.5%	-63.6%
RPM	-8.0%	-10.8%	-0.8%	10.2%	11.5%	10.1%	2.6%
Net Income	-570	-351	-37	340	436	427	176
YoY	-	-	-	-	28.5%	-2.2%	-58.8%
Net Margin	-20.3%	-13.3%	-1.2%	9.3%	10.5%	8.4%	2.5%
Per Share Data							
Number of Shares (thousands)	6,774	6,774	6,774	10,753	41,259	42,031	
EPS	-35.1	-17.8	-1.9	15.7	11.7	10.4	4.2
EPS (Fully Diluted)	-	-	-	14.8	10.6	10.2	
Dividend Per Share	-	-	-	-	-	1	1.0~3.0
Book Value Per Share	58.9	40.6	38.6	54.3	64.8	75.4	
Balance Sheet							
Cash and Equivalents	665	493	56	390	1,764	1,524	
Total Current Assets	1,918	1,530	1,293	2,114	3,421	3,606	
Tangible Fixed Assets, net	295	205	133	564	718	2,410	
Other Fixed Assets	89	30	18	27	38	154	
Intangible Assets	39	-	-	1	31	194	
Total Assets	2,341	1,766	1,445	2,709	4,210	6,376	
Accounts Payable	443	430	364	386	474	620	
Short-Term Debt	433	203	30	40	323	300	
Total Current Liabilities	1,026	884	598	708	1,130	1,481	
Long-Term Debt	67	-	-	151	294	539	
Total Fixed Liabilities	153	83	85	251	442	1,733	
Total Liabilities	1,179	967	683	959	1,572	3,215	
Net Assets	1,162	799	761	1,751	2,638	3,161	
Interest-Bearing Debt	500	203	30	192	618	839	
Cash Flow Statement							
Operating Cash Flow	-1	68	-332	36	764	387	
Investment Cash Flow	12	93	77	-454	-265	-865	
Financing Cash Flow	-82	-299	-168	783	875	238	
Financial Ratios							
ROA	-8.4%	-13.8%	-1.5%	18.0%	13.8%	9.7%	
ROE	-43.4%	-35.8%	-4.7%	27.1%	19.9%	14.7%	
Equity Ratio	49.6%	45.3%	52.7%	64.6%	62.7%	49.6%	

Source: Shared Research based on company data

Figures may differ from company materials due to differences in rounding methods.

Recent updates

Highlights

On **April 6, 2016**, Shared Research updated the report following interviews with Tamagawa Holdings Co., Ltd.

On **March 28, 2016**, the company announced successfully completed grid connections for its small-scale wind power generation facility.

As announced on February 1, 2016, the company has decided to begin power sales from small-scale wind power generation equipment. Following the construction of Small-scale Wind Power Generator Facility No. 1 (power output: 19.5kW) on grounds available at its Tateyama mega solar power plant (power output: approx. 2,000kW), connections with Tokyo Electric Power Company's grid were completed and sales of electrical power started on March 25, 2016.

On **March 14, 2016**, the company announced upward revisions to its FY03/16 earnings forecasts.

Revisions to full-year earnings forecast

Sales: JPY7.1bn (previous forecast JPY5.4bn)

Operating profit: JPY258mn (JPY159mn)

Recurring profit: JPY187mn (JPY105mn)

Net income: JPY176mn (JPY106mn)

Reasons for the revision

At the Renewable Energy Systems Sales segment, the company was able to win more new orders for its solar power plant equipment than projected in its previous forecast (December 10, 2015), and based on these favorable sales expects both sales and profits to outstrip the previous forecast.

On **March 1, 2016**, the company announced the development of optical transmission equipment for trains.

Subsidiary Tamagawa Electronics Co. Ltd. (Tamagawa Electronics) has increased efforts to win contracts for telecoms and broadcasting-related public works projects to minimize the impact of restrained capex spending in the mobile-phone infrastructure market. As a result, Tamagawa Electronics has won an order for optical transmission equipment for use in trains, and has decided to start developing these products.

According to the company's press release, one benefit of Tamagawa Electronics' analog optical transmission equipment is the cost effectiveness due to system simplification. They enable wireless signals that are the same as radio waves to be directly converted to optical signals and transmitted. Further, compared to coaxial cables, optical fiber is suitable for transmitting wireless signals over long distances because of its high frequency characteristics, in addition to fewer signal losses.

The company expects the development of these products to boost earnings from FY03/17–FY03/19, and plans to have a

separate release regarding the earnings impact of this product when announcing its FY03/17 earnings forecast.

On **February 22, 2016**, the company announced the establishment of a new subsidiary.

The company plans to expand its renewable energy business overseas, starting with Vietnam. In order to carry out accurate and precise assessments of the business environment, it has established a subsidiary to increase its understanding of the joint crediting mechanism (JCM) and the local electric power system in Vietnam, as well as to facilitate joint research with educational institutions as it seeks to develop businesses overseas in the future.

Subsidiary details

- ▶ Name: THD Research Institute Co., Ltd.
- ▶ Date of establishment: March 7, 2016 (planned)
- ▶ Capital: JPY1.0mn
- ▶ Owner: Tamagawa Holdings Co., Ltd. (100%)
- ▶ Business: Investigation, promotion of research, and the holding of seminars relating to the company's overseas renewable energy business, starting with Vietnam

On **February 10, 2016**, the company announced earnings results for Q3 FY03/16; see the results section for details.

On **February 1, 2016**, the company announced new products (small-scale wind power generation equipment) in its Renewable Energy Systems Sales segment. The new product will be sold by Tamagawa Energy, a subsidiary of the company.

Summary of small-scale wind power generation equipment

Small-scale wind power generation refers to wind power generation equipment producing less than 20kW of electricity, with a purchase period of 20 years. Provided that wind speeds are sufficient, wind power generation can generate electricity during the night, differentiating it from solar power generation. The company thinks that demand for such power generation will increase in the future.

In order to demonstrate the reliability and functionality of this product, the company plans to construct and operate Small-scale Wind Power Generator Facility No. 1 (power output: 19.5kW) on grounds available at its Tateyama plant (power output: approx. 2,000kW). The wind turbines are to be supplied by C&F Green Energy, the manufacturer of models the company plans to sell. The Tateyama plant has already received approval from the Ministry of Economy, Trade and Industry, and approval from Tokyo Electric Power (TSE: 9501) to provide power through its grid. Tamagawa aims to complete construction and began sales of power in March 2016.

Summary of turbine manufacturer

C&F Green Energy—a C&F Group member company based in Ireland—is set to provide wind turbines to Tamagawa. C&F Green Energy began development, production, and installation of small and medium scale wind power generation facilities in 2006. It has installed over 1,000 wind turbines across Europe, including in Ireland, the United Kingdom, Italy, France, and

Switzerland. The C&F Group began design, manufacturing, and supply of metal and chrome parts for automotive applications in 1989, and provides its products to companies across the globe.

The current wind turbine units—manufactured by C&F Green Energy—to be provided to Tamagawa have received ClassNK approval from Nippon Kaiji Kyokai, a necessity for facilities to receive approval under the feed-in tariff system.

Sales plans

From an efficiency standpoint, the small-scale wind power generation equipment should ideally be placed in regions where the wind speed is at least 5m/s. In FY03/16, Tamagawa plans to perform final checks on the functionality of wind power generation equipment it owns, prior to beginning sales of the same models in FY03/17. By actively acquiring and developing areas that meet the aforesaid standard, the company aims to sell about 100 units during FY03/17.

On **January 25, 2016**, the company announced plans to install a solar power tracking system at its solar park in Sodegaura.

As announced on March 24, 2015, the company launched electricity sales at its solar park in Sodegaura, Chiba (hereafter, Sodegaura solar park) last year. In order to explore new possibilities for its Solar Power Plant Operations business, it has decided to establish a solar power plant at this park which makes use of an automatic tracking system—the company's first usage of this technology.

About the tracking system

The tracking system the company plans to use is known as a universal-axis solar tracker. It automatically adjusts the solar panel to the optimal angle in relation to the sun's position, allowing it to gather more sunlight than a fixed panel and as such make full use of the available solar energy. This in turn greatly increases its energy output. The company expects that the total amount of energy generated will be 20-30% more than that generated by the fixed solar panels it has been using until now, and anticipates an increase in its power generating efficiency.

About the tracking system's installation

Location: Sodagaura City, Chiba Prefecture

Capacity: Approx. 12Kw

Feed-in tariff: JPY32/kWh (excluding tax, fixed for 20 years)

Maker: TopperSun (Taiwan)

On **January 12, 2016**, Tamagawa Holdings Co., Ltd. announced an update on the status of its plans to construct a solar park in Goto City, Nagasaki Prefecture.

As announced on November 18, 2014, the company is planning to construct and operate a solar park in Goto City, Nagasaki Prefecture. Tamagawa has now selected a contractor to carry out the construction work for the solar park.

The solar park plans to utilize a 5.3MW extra high voltage system—the first of its type for Tamagawa. The company has been preparing to start the sale of electricity there as soon as possible.

Nangoku Corporation, which is scheduled to perform construction work for the solar park, is a general trading company based in Kagoshima that operates businesses such as construction materials, machinery and equipment, telecommunications, and energy throughout the Kyushu region and has more than 40 subsidiaries and affiliates. Nangoku plans to build 30 solar energy power plants on its own in Kyushu for a total generation capacity of around 200MW and has constructed more solar power facilities.

About the Goto City solar park

Location:	Yoshikugi-cho, Goto City, Nagasaki Prefecture
Operator:	GP Energy 2 Co., Ltd. (wholly owned subsidiary)
Area:	10 hectares
Capacity:	Approx. 5.3MW
Feed-in tariff:	JPY36/kWh (fixed for 20 years)
Generation revenue:	JPY250mn/year (tentative)
First-year generation volume:	Approx. 6,790,566kWh
Start of the sale of electricity:	April 2017 (planned)

On **January 4, 2016**, the company provided an update on the status of its plans to launch a power plant business in Misawa, Aomori Prefecture.

As indicated in its December 26, 2014 announcement, the firm plans to construct and operate solar energy power plant facilities with a total capacity of approximately ten megawatts in Misawa, Aomori Prefecture (hereafter “power plant business”). It is in the process of performing the necessary procedures and hopes to start electricity sales at an early stage. Tohoku Electric Power Co. has now officially approved a request for grid connections to Tamagawa’s power plant facilities (procedure for connecting to a power company’s grid, which is a precondition for selling power).

As the firm indicated on June 11, 2015, it reached a basic agreement with Etrion Japan KK (hereafter “Etrion”) to jointly operate these power plant facilities. The official approval of the grid connection request should encourage quicker and more concrete discussions with Etrion as the company looks to start operations.

Tamagawa Holdings expects this power plant business to begin selling power from FY03/17 and plans to promptly report any concrete developments regarding this joint project with Etrion.

Power plant overview

- ▶ Location: Misawa, Aomori
- ▶ Operator: GP Energy A, GP Energy B, GP Energy C, GP Energy D (wholly owned units)
- ▶ Premises: Approx. 153,000sqm
- ▶ Capacity: Approx. 10MW
- ▶ Feed-in tariff: JPY36/kWh (before tax; fixed for 20 years)

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- ▶ Revenue: JPY390mn a year (estimate)
- ▶ First year output: Approx. 10,852,814 kWh (estimate)

For corporate releases over three months old, see the News and topics section.

Trends and outlook

Quarterly trends and results

Quarterly Performance (cumulative) (JPYmn)	FY03/15				FY03/16				FY03/16	
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	% of FY	FY Est.
Sales	835	1,924	3,101	5,095	682	1,108	3,341		47.2%	7,077
YoY	-8.7%	5.7%	13.3%	22.1%	-18.3%	-42.4%	7.7%			38.9%
Gross Profit	261	617	996	1,479	225	353	776			
YoY	3.0%	12.8%	17.4%	23.4%	-13.8%	-42.7%	-22.1%			
GPM	31.2%	32.1%	32.1%	29.0%	33.0%	31.9%	23.2%			
SG&A Expenses	204	405	624	947	247	514	866			
YoY	24.0%	22.0%	17.4%	31.4%	21.4%	27.1%	38.8%			
SG&A / Sales	24.4%	21.0%	20.1%	18.6%	36.2%	46.4%	25.9%			
Operating Profit	57	212	372	531	-22	-161	-90			258
YoY	-35.8%	-1.3%	17.6%	11.3%	-	-	-			-51.4%
OPM	6.9%	11.0%	12.0%	10.4%	-	-	-			3.6%
Recurring Profit	56	210	364	514	-32	-190	-138			187
YoY	-40.8%	-4.1%	14.2%	7.5%	-	-	-			-63.6%
RPM	6.8%	10.9%	11.7%	10.1%	-	-	-			2.6%
Net Income	26	120	261	427	-38	-249	-180			176
YoY	-71.1%	-36.9%	-14.5%	-2.2%	-	-	-			-58.8%
Net Margin	3.1%	6.3%	8.4%	8.4%	-	-	-			2.5%

Quarterly Performance (JPYmn)	FY03/15				FY03/16			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Sales	835	1,089	1,178	1,993	682	426	2,233	
YoY	-8.7%	20.1%	28.3%	39.1%	-18.3%	-60.9%	89.6%	
Gross Profit	261	356	379	482	225	128	423	
YoY	3.0%	21.3%	25.8%	37.8%	-13.8%	-63.9%	11.4%	
GPM	31.2%	32.7%	32.2%	24.2%	33.0%	30.2%	18.9%	
SG&A Expenses	204	201	220	323	247	267	352	
YoY	24.0%	20.0%	9.7%	70.5%	21.4%	33.0%	60.4%	
SG&A / Sales	24.4%	18.5%	18.6%	16.2%	36.2%	62.7%	15.8%	
Operating Profit	57	155	160	159	-22	-139	71	
YoY	-35.8%	23.2%	57.6%	-0.9%	-	-	-55.9%	
OPM	6.9%	14.2%	13.6%	8.0%	-	-	3.2%	
Recurring Profit	56	154	154	150	-32	-158	53	
YoY	-40.8%	24.1%	54.5%	-6.1%	-	-	-66.0%	
RPM	6.8%	14.1%	13.1%	7.5%	-	-	2.4%	
Net Income	26	94	141	166	-38	-211	69	
YoY	-71.1%	-6.6%	22.9%	26.6%	-	-	-51.1%	
Net Margin	3.1%	8.7%	11.9%	8.3%	-	-	3.1%	

Source: Shared Research based on company data

Figures may differ from company materials due to differences in rounding methods.

Net income is net income attributable to the parent company shareholders.

Segment Breakdown (cumulative)		FY03/15				FY03/16			
(JPYmm)		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Sales		835	1,924	3,101	5,095	682	1,108	3,341	
YoY		-8.7%	5.7%	13.3%	22.1%	-18.3%	-42.4%	7.7%	
Electronics and Telecoms Equipment		777	1,741	2,748	3,401	594	946	1,374	
YoY		12.2%	26.0%	22.9%	5.3%	-23.5%	-45.7%	-50.0%	
Solar System Sales		33	137	293	1,606	17	27	1,786	
YoY		-85.2%	-67.0%	-37.1%	80.4%	-47.2%	-80.1%	509.0%	
Solar Power Plant Operations		25	45	60	88	71	135	180	
YoY		-	93.3%	63.9%	70.7%	179.8%	197.9%	202.7%	
Geothermal Power Plant Operations		-	-	-	-	-	-	-	
Operating Profit		57	212	372	531	-22	-161	-90	
YoY		-35.8%	-1.3%	17.6%	11.3%	-138.6%	-175.8%	-124.3%	
Electronics and Telecoms Equipment		93	257	435	467	5	-90	-102	
YoY		13.7%	36.8%	33.0%	-2.7%	-95.0%	-	-	
Solar System Sales		-10	-6	-19	112	-46	-109	-28	
YoY		-	-	-	118.6%	-	-	-	
Solar Power Plant Operations		10	16	16	22	29	51	56	
YoY		-	-	-	-	179.3%	217.1%	258.6%	
Geothermal Power Plant Operations		-	-	-0	-0	-0	-0	-0	
Total		93	268	432	602	-12	-149	-74	
Adjustments		-36	-55	-60	-70	-10	-12	-16	
Segment Breakdown (quarterly)		FY03/15				FY03/16			
(JPYmm)		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Sales		835	1,089	1,178	1,993	682	426	2,233	
YoY		-8.7%	20.1%	28.3%	39.1%	-18.3%	-60.9%	89.6%	
Electronics and Telecoms Equipment		777	964	1,007	652	594	351	428	
YoY		12.2%	39.8%	18.0%	-34.4%	-23.5%	-63.6%	-57.4%	
Solar System Sales		33	104	157	1,313	17	10	1,759	
YoY		-85.2%	-46.0%	202.4%	209.8%	-47.2%	-90.4%	-	
Solar Power Plant Operations		25	20	14	28	71	65	45	
YoY		-	-14.2%	10.1%	86.8%	179.8%	220.5%	218.4%	
Geothermal Power Plant Operations		-	-	-	-	-	-	-	
Operating Profit		57	155	160	159	-22	-139	71	
YoY		-35.8%	23.2%	57.6%	-0.9%	-	-	-	
Electronics and Telecoms Equipment		93	164	178	32	5	-95	-12	
YoY		13.7%	54.5%	27.9%	-79.0%	-95.0%	-	-	
Solar System Sales		-10	5	-13	131	-46	-63	82	
YoY		-	-79.4%	-	590.8%	-	-	-	
Solar Power Plant Operations		10	6	-0	7	29	22	5	
YoY		-	-	-	349.3%	179.3%	287.6%	-	
Geothermal Power Plant Operations		-	-	-	-	-0	-0	-0	
Total		93	175	165	169	-12	-137	75	
Adjustments		-36	-20	-5	-10	-10	-2	-4	

Source: Shared Research based on company data
 Figures may differ from company materials due to differences in rounding methods.

As of Q1 FY03/15, Tamagawa's reporting segments comprised Electronics and Telecoms Equipment, Solar System Sales, Solar Power Plant Operations, and Geothermal Power Plant Operations, but from Q1 FY03/16, the Solar System Sales segment has been renamed Renewable Energy System Sales.

Q3 FY03/16 results (announced February 10, 2016)

- ▶ Sales: JPY3.3bn (+7.7% YoY)
- ▶ Operating loss: JPY90mn (operating profit of JPY372mn in Q3 FY03/15)
- ▶ Recurring loss: JPY137mn (recurring profit of JPY364mn in Q3 FY03/15)
- ▶ Net loss: JPY180mn (net income of JPY260mn in Q3 FY03/15)

Tamagawa revised its FY03/16 full-year forecast in December 2015. Cumulative Q3 results were in line with the revised figures.

Electronics and Telecoms Equipment

- ▶ Orders: JPY1.5bn (-42.9% YoY)
- ▶ Sales: JPY1.4bn (-49.5%)
- ▶ Operating loss: JPY102mn (operating profit of JPY435 in Q3 FY03/15)

Mobile telecom providers changed their construction plans for base stations and restrained investment, hurting segment earnings. In other areas (i.e., government services, disaster prevention, analysis), particularly in wireless transport (railways and airports), the company won orders for fiber optic-related products for use in airports. Orders for the company's own testing equipment for power semi-conductors were firm.

According to Tamagawa, there has been an increase in the volume of negotiations and contracts for telecoms and broadcasting-related public works projects, and given that the order balance at end-March reached the amount needed to achieve its revised forecast, the segment is expected to attain the company's revised forecast (sales: JPY2.1bn; operating profit: JPY0mn).

Renewable Energy System Sales

- ▶ Orders: JPY3.7bn (+143.4% YoY)
- ▶ Sales: JPY1.8bn (+509.0%)
- ▶ Operating loss: JPY27mn (loss of JPY18mn in Q3 FY03/15)

In FY03/16, the company expects sales projects to be concentrated in 2H. For this reason, the segment is expected to achieve the revised forecast (sales: JPY4.7bn; operating profit: JPY206mn).

Solar Power Plant Operations

- ▶ Sales: JPY180mn (+202.7% YoY)
- ▶ Operating profit: JPY56mn (+258.6% YoY)

Mega solar power plants in Shimonoseki, Tateyama, and Sodegaura sold electricity in line with forecasts.

Geothermal Power Plant Operations

The company is preparing to start operations of geothermal power plants, so no sales were recorded, and operating loss was zero.

For details on previous quarterly and annual results, see the Historical financial statements section.

Full-year company forecasts

FY03/16 Forecast (JPYmn)	FY03/15			FY03/16
	1H Act.	2H Act.	FY Act.	FY Est.
Sales	1,924	3,171	5,095	7,077
CoGS	1,307	2,309	3,616	
Gross Profit	617	862	1,479	
GPM	32.1%	27.2%	29.0%	
SG&A	405	543	947	
SG&A/Sales	21.0%	17.1%	18.6%	
Operating Profit	212	319	531	258
OPM	11.0%	10.1%	10.4%	3.6%
Recurring Profit	210	304	514	187
RPM	10.9%	9.6%	10.1%	2.6%
Net Income	120	307	427	176
Net Margin	6.3%	9.7%	8.4%	2.5%

Source: Shared Research based on company data
 Figures may differ from company materials due to differences in rounding methods.

Forecast by segment

Forecasts by Segment (JPYmn)	FY03/15	FY03/16	YoY
	FY Act.	FY Est.	
Sales	5,094	7,077	38.9%
Electronics and Telecoms Equipment	3,400	2,107	-38.0%
Solar Systems Sales	1,606	4,737	194.9%
Solar modules	552		
Sales of electricity from power plants	1,054	4,737	349.4%
Solar Power Plant Operations	87	232	166.7%
Geothermal power plant operations			
Operating Profit	531	258	-51.4%
Electronics and Telecoms Equipment	420		
Solar Systems Sales	89	206	131.5%
Solar Power Plant Operations	20	51	155.0%
Geothermal power plant operations			

Source: Shared Research based on company data
 Figures may differ from company materials due to differences in rounding methods.

FY03/16 forecast

- ▶ Sales: JPY7.1bn (+38.9% YoY)
- ▶ Operating profit: JPY258mn (-51.4% YoY)
- ▶ Recurring profit: JPY187mn (-63.6% YoY)
- ▶ Net income: JPY176mn (-58.8% YoY)

Electronics and Telecoms equipment

- ▶ Sales: JPY2.1bn (-38.0% YoY)
- ▶ Segment profit: JPY0mn (segment profit of JPY420mn during FY03/15)

Segment profit is a figure after allocation of corporate and other common costs; all segment profits below are on the same basis.

Due to the FY03/16 full-year earnings forecast revision announced in December 2015, company forecasts for this segment were reduced by JPY1.3bn for sales and JPY322mn for operating profit. Primary factors were a sudden acceleration in capex

restraint in the mobile telephone infrastructure market and large-scale projects in both the public and private sectors entering a tough phase. As a result, 1H sales were below initial estimates, coming in below the breakeven point for this segment. Forecasts were subsequently revised.

For 1H FY03/16, segment sales were down due to lower sales to mobile telecoms companies, which lowered their spending on base stations. Defense related sales were down due to fizzling demand for facility renewal. For the full-year, sales forecasts by channel—assuming that trends seen in 1H will continue—are JPY472mn (-67.0% YoY) in mobile telecoms, JPY678mn (-35.2% YoY) in defense, and JPY955mn (-3.5% YoY) in other (government services, disaster prevention, analysis).

To cope with year-on-year declines in sales, Tamagawa worked to restrain fixed costs and R&D expenses from the July-September quarter onward. As a result, although the segment booked an operating loss for 1H due to lower sales, the company plans to break even for the full year. According to the company, acquisition has been steady during FY03/16 for contracts of large-scale public works projects in mobile telecoms. As a result, although lower sales are forecast for FY03/16, these are forecast to be covered by higher sales and profits and FY03/17 and beyond.

The company expects sales of its own products, which have relatively high profitability, will total JPY1.1bn (-23.3% YoY), accounting for 50% of the total sales in the segment (40.4% in the previous year). In the previous year, sales of test equipment for power semiconductors and defense equipment increased. For FY03/16, Tamagawa expects that sales of power chip testing equipment will continue to grow and that optical transmission equipment for use in airports will contribute to sales.

The company began manufacturing at a subsidiary in Vietnam, Tamagawa Electronics Vietnam Co., Ltd., in October 2015. Of the two main parts for mobile telecoms facilities, filters and passive components, Tamagawa Electronics Vietnam will manufacture passive components for the foreseeable future. According to the company, Vietnam's working wage is about USD3,000 per annum, less than half of that in China. Vietnam boasts a labor force full of young, talented workers, with those under age 29 comprising over half of the population, and the literacy rate at over 95%. The company's manufacturing subsidiary in Vietnam was recognized as the first company to enter Kanagawa Prefecture's Industrial Park.

Kanagawa Industrial Park was established by Shinagawa Prefecture in the Thang Long Industrial Park II near Hanoi to support Shinagawa companies' overseas manufacturing. Kanagawa Prefecture and the Kanagawa Industrial Promotion Center offer comprehensive support to Japanese companies.

Renewable energy sales

- ▶ Sales: JPY4.7bn (+194.9% YoY)
- ▶ Segment profit: JPY206mn (+131.5% YoY)

Tamagawa forecasts sales and profit by selling equipment for solar power systems. The company in 1H obtained certain rights to sites for solar power plants and the Feed-in Tariff (FIT) scheme, and after constructing solar power plants, plans to start partial sales of solar power plant equipment. In 1H, Tamagawa reported sales of JPY1.1bn from selling 2.3MW equipment. Going forward, the company plans to sell geothermal power plants, in addition to solar power plant equipment, expecting to book combined sales of JPY4.7bn.

Solar and geothermal power plant operations

- ▶ Sales: JPY232mn (+166.7% YoY)
- ▶ Segment profit: JPY51mn (+155.0% YoY)

Due to the FY03/16 full-year earnings forecast revision announced in December 2015, company forecasts for this segment were reduced by JPY31mn for operating profit. This is attributable to decreased revenue from power sales in line sales of geothermal power plants.

In addition to sales of solar power at the Shimonoseki solar park, the Tateyama and Sodegaura solar parks, which began operating in February and March 2015, respectively, will fully contribute to annual sales, leading to the expected rises in both sales and profit. The total output of the business will increase by 3.2MW YoY to 4.8MW.

Dividend

The company plans to pay JPY1.0 to JPY3.0 in per-share annual dividend, the first dividend payment in the last eight years, judging that it is completing preparation work for a system enabling it to pay dividends stably.

Long-term outlook

In April 2013, Tamagawa announced its medium-term plan effective through FY03/18. The plan called for sales of JPY10.0bn, an operating profit margin of 20% and ROE of 20%. The company has not announced any medium-term plans since then.

Tamagawa expects several factors to drive earnings growth: higher sales from the Electronics and Telecoms Equipment segment; sales of electricity from solar and geothermal power plants that currently are or will become operational; and the partial or entire sale of some of its solar power plant equipment and geothermal power plants.

As of February 2016, Tamagawa appeared to still be in the process of formulating its medium-term plan.

Electronics and Telecoms Equipment

Since Masanori Kobayashi—CEO of Tamagawa Electronics—became a director at Tamagawa Holdings in June 2011, the plan has been to exit unprofitable projects, strengthen R&D, and launch new products to expand sales, while stepping up sales of more profitable Tamagawa-brand products.

In FY03/16, sales are forecast to decrease due to lower sales to mobile telecoms companies, which are lowering their spending on base stations. Defense related sales are also forecast to decrease due to fizzling demand for facility renewal. However, to cope with year-on-year declines in sales, Tamagawa worked to restrain fixed costs and R&D expenses from the July-September quarter onward. As a result, although the segment booked an operating loss for 1H due to lower sales, the company plans to break even for the full year. According to the company, acquisition has been steady during FY03/16 for contracts of public works projects in mobile telecoms. As a result, although lower sales are forecast for FY03/16, these are forecast to be covered by higher sales and profits in FY03/17 and beyond, driven by confirmed orders in FY03/16 for optical transmission equipment for trains.

- ▶ Mobile network operators (MNOs) are likely to accelerate base station upgrades as they launch LTE-Advanced high-speed data transmission services around 2016, so it expects renewal demand. According to the company, in

preparation for the 2020 Tokyo Summer Olympics there is expected to be an increase in demand, driven by demand for small-cell infrastructure that can handle high-speed data traffic. For 5G (Fifth-Generation Mobile Communications System), being developed by NTT DoCoMo, Inc. (TSE1: 9437) and slated for service launch in 2020, Tamagawa is anticipating the usage of femtocell (ultra-small base station) and optical extension (retransmission using optical transmission equipment) in light of 5G's higher frequency band with a smaller radius of radio waves, which necessitates the setting up of a large number of small-scale base stations. The company is working on developing 5G-g geared products for network operators and wireless equipment manufacturers, namely, analog optical transmission equipment enabling higher frequencies and wider bands, and small-scale transmission unit products for millimeter-wave frequencies.

- In terms of optical transmission equipment for trains, Tamagawa in FY03/16 has increased efforts to win contracts for telecoms and broadcasting-related public works projects to minimize the impact of restrained capex spending on the mobile-phone infrastructure market. As a result, the company has won an order. According to Tamagawa, it is an analog optical transmission equipment. One of its benefits is the cost effectiveness due to system simplification: They enable wireless signals that are the same as radio waves to be directly converted to optical signals and transmitted. Further, compared to coaxial cables, optical fiber is suitable for transmitting wireless signals over long distances because of its high frequency characteristics, in addition to fewer signal losses. This technology has been applied for use in airports, with a wireless system scheduled for delivery in Q4 FY03/16. The company expects the development of these products to boost earnings from FY03/17–FY03/19.
- Since FY03/14, the company has increased investments in R&D for products of its own brand. It started sales of testing equipment for power semiconductors and a high-definition-image monitoring system in FY03/15. For the medium term, Tamagawa has been developing new products for medical treatment. Products developed in-house accounted for 30% of sales in FY03/13 and more than 40% in FY03/15.
- In March 2015, Tamagawa established a second-tier subsidiary in Vietnam, Tamagawa Electronics Vietnam Co., Ltd. The subsidiary began operation in October 2015. Following its launch, the company began production of high-quality, high-frequency passive components for use in telecoms and broadcasting, as well as mobile base stations, geared toward the Japanese market. Reduced costs are planned to lead to improvements in price competitiveness, yielding an increase in orders. Before long, the company aims to expand business into Southeast Asia and the Middle East.

Renewable Energy System Sales

Selling solar power plant equipment

In FY03/15, Tamagawa obtained certain rights to sites for solar power plants and the Feed-in Tariff (FIT) scheme, and after the construction of solar power plants started sales of solar power plant equipment. The company reported sales of JPY1.1bn from selling 2.3MW equipment in FY03/15. It expects to book sales of JPY4.7bn in FY03/16.

When Green Investment Tax Incentives, under which a solar power producer can immediately have related facilities fully depreciated, expires at the end of March 2016, the percentage of depreciation will fall to 50% from April onwards. While Tamagawa still believes that it will be able to promote the selling of solar power plant equipment as a lucrative business in FY03/17, the company seems to be anticipating a sales decline. Being proactive, however, it plans to offset the sales decline by selling small-scale wind power generation equipment (see below for details).

Selling small-scale wind power generation equipment

Tamagawa will start selling small-scale wind power generation equipment, with projected sales of about 100 units (= approx. JPY3.0bn) in FY03/17.

Summary of small-scale wind power generation equipment

Small-scale wind power generation refers to wind power generation equipment producing less than 20kW of electricity. As of February 2016, the purchase period for a wind power generation equipment of less than 20kW is 20 years, at the price of JPY55/kWh. Provided that wind speeds are sufficient, wind power generation can generate electricity during the night, differentiating it from solar power generation.

In order to demonstrate the reliability and functionality of this product, the company plans to construct and operate Small-scale Wind Power Generator Facility No. 1 (power output: 19.5kW) on grounds available at its Tateyama plant (power output: approx. 2,000kW). The wind turbines are to be supplied by C&F Green Energy, the manufacturer of models the company plans to sell. As the Tateyama plant had already received approval from the Ministry of Economy, Trade and Industry, and approval from Tokyo Electric Power to provide power through its grid, Tamagawa went on to complete construction and has begun sales of power in March 2016.

C&F Green Energy—a C&F Group member company based in Ireland—is set to provide wind turbines to Tamagawa. C&F Green Energy began development, production, and installation of small and medium scale wind power generation equipment in 2006. It has installed over 1,000 wind turbines across Europe, including in Ireland, the United Kingdom, Italy, France, and Switzerland. The C&F Group began design, manufacturing, and supply of metal and chrome parts for automotive applications in 1989, and provides its products to companies across the globe. The current wind turbine units—manufactured by C&F Green Energy—to be provided to Tamagawa have received ClassNK approval from Nippon Kaiji Kyokai, a necessity for facilities to receive approval under the feed-in tariff system.

Sales plans

The unit price of Tamagawa's small-scale wind power generation equipment is about JPY30mn. From an efficiency standpoint, small-scale wind power generation equipment should ideally be placed in regions where the wind speed is at least 5m/s. By actively acquiring and developing areas that meet this standard, the company aims to sell about 100 units (= approx. JPY3.0bn in sales) during FY03/17.

Solar Power Generation

Generating capacity of solar power plants

As of February 2016, the company's solar power facilities, including those already in operation and planned facilities on secured land, had a combined generating capacity of 11.3MW (see "Solar power plant generation in Business section"). According to the company, it has pushed up the internal rate of return (IRR) on solar power systems by acquiring and building them through leases, starting with the Tateyama, Chiba plant. The average IRR on these plants is 13.4%, and the average net present value of expected future cash flows is JPY3.2bn.

In December 2014, Tamagawa acquired from ISE Power the rights to produce power in the city of Misawa, Aomori Prefecture, reaching the decision to build and operate a solar power plant there. When operations commence in March 2016, Tamagawa expects the Misawa power plant to have around 10MW of generation capacity, adding some JPY390mn to annual earnings. The plant received formal approval in January 2016 to provide power to Tohoku-Electric Power Co., Inc. Sales of power from this plant are expected to begin during FY03/17. Regarding the Misawa power plant, Tamagawa in June 2015 announced that it will form a business alliance with Etrion Japan KK. to establish a special-purpose company

(SPC), with Tamagawa holding a 30% stake in the SPC. Earnings from the plant, to be booked as equity-method investment profit, are expected to start making contributions from 2H FY03/17 onward.

The company is also negotiating and investigating the construction of 15 more solar power plants as shown in the table below, with total potential capacity of 61.6MW (including 43.6MW already approved for grid connection by power companies). These projects are yet to be confirmed, and potential capacity will vary depending on negotiations with land owners and the size of investments available to the company.

Tamagawa Holdings potential power plants

Region	Power plants	Avg. feed-in-tariff (JPY)	Capacity (MW)	Capex (JPYmn)	Tamagawa's investment (JPYmn)	PV of future cashflows (JPYmn)	NPV of future cashflows (JPYmn)
Kyushu	5	34	1.8	583	116	436	320
East Japan	3	38.0	21.7	8,325	1,655	6,850	5,185
Central Japan	6	33.6	14.1	4,878	975	4,920	3,945
North Japan	1	36.0	24.0	8,975	1,791	6,620	4,829
Total	15	36.1	61.6	22,743	4,548	18,829	14,280

Source: Shared Research based on company data

Improving fundraising

Shared Research thinks that the recent trend of looser lending restrictions by financial institutions will allow the company to readily expand its solar power generation business.

According to the company, lending from financial institutions has shown improvement since FY03/14, due to a recovery in earnings at subsidiary Tamagawa Electronics and solid results from the Shimonoseki Solar Power Plant. Borrowing activity included a loan of JPY200mn from Chiba Bank for long-term operating expenses and a JPY200mn loan from Resona Bank (subsidiary of Resona Holdings, Inc.; TSE1: 8308) for short-term operating expenses. Development is also progressing for a 2MW solar power plant currently scheduled to begin operation in February 2015 in Tateyama City, Chiba. For solar power generation systems to be used at this facility, the company entered into a lease agreement with Ricoh Leasing Co., Ltd. (TSE1: 8566) in the amount of JPY901mn. The company has finished construction of the solar power generation systems.

Geothermal power generation business

Geothermal power generation

Geothermal power generation involves using steam and hot water produced under the earth's surface to drive steam turbines connected to electricity generators. This type of generation produces less carbon dioxide than thermal power stations. Another advantage is that geothermal generation is not affected by the depletion or rising prices of fuel, and it can be used in perpetuity. Geothermal generation also provides stable power; it is not affected by the weather, seasons, or day/night fluctuations like other major renewable energy sources such as solar and wind power.

According to the company, the Japanese government mulled over next-generation energy sources during the oil shocks in the 1970s and determined nuclear power as a core source of electricity in Japan. However, due to the New Energy and Industrial Technology Development Organization (NEDO)'s accumulation of data on geothermal power generation, it is now considered a source of energy with high potential in Japan.

The two main methods of geothermal power generation are steam and binary generation.

- ▀ Steam generation: With this method, turbines are driven directly by natural steam at temperatures of 200–300C or more. Subterranean water at high temperatures and pressures is dominated by either steam or hot water. With the

former, moisture can be easily removed and the dry steam routed to turbines to generate electricity. If the source is dominated by hot water, the fluid is first run through a flasher, which separates the steam from the hot water. In a double-flash cycle, turbines are driven by both high- and low-pressure steam.

- Binary generation: This method is used when hot water and steam temperatures are 150C or less, and thus cannot drive turbines directly. Heat is exchanged from the geothermal fluid to a medium that has a lower boiling point than water (such as a water/ammonia mixture), and steam from that medium drives turbines to generate electricity.

Feed-in tariff system for geothermal power generation

Under the FY 2015 feed-in tariff system, the price for electricity produced by solar power plants is JPY27–29 per kilowatt and the purchase period is 20 years (consumption tax not included for 10kW or more). In contrast, the price for electricity produced by geothermal power plants is JPY40 per kilowatt and the purchase period is 15 years (consumption tax not included for 15,000kW or less).

According to the company, a 1MW solar power plant, which needs capital spending worth JPY301mn (on assumption that the site is rented), generates annual electricity sales of JPY29mn (on assumption of an average daily quantity of solar radiation of 3.7kWh/sqm), annual operating profit of JPY3mn, and an average yield of 6.3%, for a payout period of 15.7 years. Meanwhile, the company expects that its 125kW geothermal plant (which generates electricity roughly equivalent to a 1MW solar power plant) needs capital spending worth JPY205mn (the site on rent) and generates annual sales of JPY41mn, annual operating profit of JPY18mn, and an average yield of 15.5% for a payout period of 6.4 years.

Beppu geothermal power plant

In January 2015, the company announced that it planned to build a total of seven geothermal power plants, and to this end acquired a total of seven separate plots of land. The company moved forward on construction at two of the seven sites but changed its plan in December 2015. The company sold the two plants currently under construction to a third-party and sold back the sites acquired for the five other geothermal power plants to their original owners.

At the geothermal power plant located in Beppu City, Oita Prefecture, a reexamination of data acquired after work had begun showed that the company was unlikely to get the return on the project it originally envisioned. After a series of talks with the outside party that originally proposed the project, Tamagawa reached an agreement to sell the two power plants currently under construction to a company owned by the party that originally proposed the project at a price that would be greater than the total amount the company had invested in the two projects. The transaction and payment under this agreement are to be completed by the end of January 2016.

As for the remaining five sites at which construction of geothermal power plants has not yet begun, Tamagawa chose to exercise its right under the original purchase contract to sell the land back to the original owner at the same price for which it was purchased. Two of the five sites have already been sold back to their original owners and the sales of remaining three sites are expected to be completed by the end of December 2015.

Against risks of drilling springs, the company apparently considers a method of drilling based on joint investments, which will have no direct effect on the company's business results but will enable the company to secure preferential rights to springs.

Other business

Hydrogen power

In January 2016, Tamagawa announced that it would establish an internal division to prepare for future developments in hydrogen power. Plans call for research and exploration of methods to store power generated via hydrogen.

In the renewable energy field, limitations imposed by the impact of weather conditions on systems such as solar power and wind power generation are an ongoing concern. Hydrogen power storage systems produce hydrogen from excess power generated by solar and wind power generation systems, and store this hydrogen for future use. The stored hydrogen is then combined with fuel cells, to release power as needed. Conventional batteries lose charge over time, but hydrogen—stored in tanks—can be stored for much greater lengths of time, allowing for efficient energy storage. This stored energy can then be provided to various areas on an as-needed basis.

Vietnam: Basic agreement with HIM LAM on renewable energy business

In December 2015, Tamagawa announced that it had reached a basic agreement with HIM LAM BC INVESTMENT JSC. to cooperatively consider and promote renewable energy and other operations. In a joint venture with the AEON Group, HIM LAM in October 2015 opened AEON MALL Long Bien on the east side of Hanoi city, as it undertakes a major development project with a total area of 1,000 hectares. As part of the project, it is looking into the feasibility of a power supply business using a solar system. It is against such a backdrop that Tamagawa and HIM LAM are jointly exploring the prospect of renewable energy operations in Vietnam.

Further, Tamagawa in March 2016 established THD Research Institute, Limited (wholly owned). Its main function is to conduct research concerning renewable energy operations in Vietnam and other overseas nations, and to hold seminars based on the findings.

Business

Business description

Tamagawa has three business segments: 1) Electronics and Telecoms Equipment business, which it has been involved in since the founding of consolidated subsidiary Tamagawa Electric Co Ltd in 1968; 2) Solar Business, launched in FY03/12; and 3) Geothermal Power Generation Business, launched in FY03/15. In FY03/14 Tamagawa divided the Renewable energy system sales Business into Solar Power Plant operations and Solar Systems Sales.

Earnings by segment (JPYmn)		FY03/09 Act.	FY03/10 Act.	FY03/11 Act.	FY03/12 Act.	FY03/13 Act.	FY03/14 Act.	FY03/15 Act.
Sales		4,299	2,803	2,640	3,106	3,672	4,171	5,095
YoY		7.1%	-34.8%	-5.8%	17.7%	18.2%	13.6%	22.1%
Electronics and telecoms equipment		3,248	2,709	2,390	2,406	3,156	3,230	3,401
YoY		-14.2%	-16.6%	-11.8%	0.7%	31.2%	2.3%	5.3%
Components		75.6%	96.6%	90.5%	77.5%	85.9%	77.4%	66.7%
Renewable energy system sales					19	441	890	1,606
YoY					-	2215.0%	101.8%	80.4%
Components					0.6%	12.0%	21.3%	31.5%
Solar power plant operations							52	88
YoY							-	70.7%
Components							10.7%	18.8%
Solar power plant operations								
YoY								
Operating profit		-68	-227	-286	-30	373	477	531
YoY							27.8%	11.3%
Electronics and telecoms equipment		-162	-292	-236	63	375	480	467
YoY						497.4%	28.1%	-2.7%
Components						100.4%	100.7%	88.0%
Renewable energy system sales					-24	54	51	112
YoY						-	-5.5%	118.6%
Components						14.5%	10.7%	21.1%
Solar power plant operations						-12	-20	22
YoY								
Components						-3.3%	-4.1%	4.2%
Solar power plant operations								
YoY								

Source: Shared Research based on company data

Figures may differ from company materials due to differences in rounding methods.

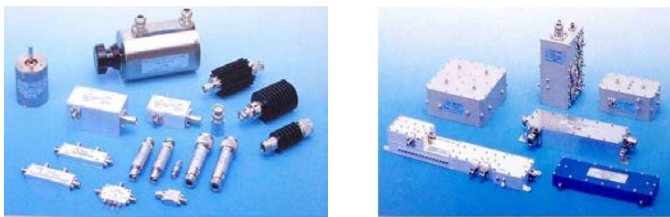
In FY03/14, the company changed segments to include solar system sales and solar power plant operations.

Business segments

Electronics and Telecoms Equipment

66.7% of FY03/15 sales; 88.0% of FY03/15 operating profit

Since the founding of consolidated subsidiary Tamagawa Electric in 1968, Tamagawa has used its high-frequency wireless technology to develop, manufacture and sell high-frequency devices (amplifiers, attenuators, filters, distributors and frequency synthesizers). These products act as components in the wireless equipment used in mobile telecoms base stations, as well as in broadcasting, disaster prevention, and firefighting systems. High-frequency devices (circuits and measuring instruments) support an antenna's radio wave transmissions by screening radio waves and adjusting signal intensity.



Source: Shared Research based on company data

According to Tamagawa, high-frequency wireless is useful for data and video transmission as it uses wide-band radio waves, enabling fast transmission. In recent years, the usage of digital technology in telecoms and broadcasting equipment has been rising. However, digital technology is still not suitable for use in parts intended to directly trade high-frequency signals with front-end parts, being unable to process these signals. As a result, these parts often make use of high-frequency analog technology, which Tamagawa holds as its specialization. While many vendors, including Tamagawa, are able to provide digital technology, few companies specialize in making high-frequency analog technology products. Tamagawa thus occupies a niche with high market share, with its market share in parts intended for mobile telecoms base stations standing at around 15%.

Mobile telecoms base stations: Mobile telecoms networks are built around wireless base stations, which have large antennas connected to wireless telecoms equipment joined to each other by fiber-optic and other cables. As mobile phone signals will only transmit over a limited range, operators create a honeycomb shaped network by installing a large number of base stations throughout a service area. As of March 2015 Japan had 710,000 base stations (Source: The Ministry of Internal Affairs and Communications, SR Inc.).

During FY03/15, approximately 41% of Electronics and Telecoms Equipment sales come from devices for mobile telecoms base stations, about 30% from defense system-related sales, and 29% from devices for such areas as government services, disaster prevention and terrestrial digital broadcasting. Tamagawa's main devices for mobile telecom base stations are high-frequency filters, distributors, synthesizers and attenuators, which identify radio waves of certain frequencies from among the diverse range of radio waves both transmitted and received by the antenna and amplify those specific radio waves.

Electronics and telecoms equipment sales by industry

(JPYmm)	FY03/13	FY03/14	FY03/15
Total	3,155	3,233	3,400
Mobile telecoms	1,924	1,422	1,404
YoY	-	-26.1%	-1.3%
% of total	-	44.0%	41.3%
Defense	504	905	1,026
YoY	-	79.6%	13.4%
% of total	-	28.0%	30.2%
Others (government etc.)	727	906	969
YoY	-	24.6%	7.0%
% of total	-	28.0%	28.5%

Source: Shared Research based on company data

About 60% of sales are custom orders for large electrical/electronics manufacturers, telecoms carriers and broadcasters; 40% are own-branded products sporting wider gross profit margins. The segment's gross profit margins are higher for products produced in-house.

In the 1990s base station components sales saw strong growth as domestic carriers aggressively built networks. Until 2005 Tamagawa tracked circa 30% market share. Thereafter foreign rivals with keen pricing gained market share prompting Tamagawa's growth to stall. The segment's profitability recovered once the company stopped accepting money-losing orders in FY03/12. The plan is to develop higher value-added products to boost profitability.

Renewable Energy System Sales

31.5% of FY03/15 sales; 21.1% of FY03/15 operating profit

Selling solar modules

In July 2011 Tamagawa entered an exclusive agreement to sell the solar modules of GPPV Solar Pte Ltd (GPPV below), and began selling GPPV solar systems (The exclusive selling agreement was changed to a selling agreement in February 2014, in order to further the growth of both companies' businesses).

Through sales agencies the company provides customers with photovoltaic (PV) modules and power conditioners. Where necessary the company also negotiates with electric utilities on behalf of customers and assists with loan applications to financial institutions.

Regarding sales activities, the company has offices in Kyushu, Nagoya, and Tokyo, and has eight sales employees as of May 2015.

Customers are primarily corporate clients that are existing customers or introduced from partner firms. Most customers are debutants jumping on the bandwagon of the solar power build-up, supported by the Japanese government, which has a 20 year fixed rate guarantee for feed-in tariffs of solar power facilities that generate 10kW or more. Other individuals and companies view solar power generation as a tax conservation method, due to the generous deductions and instant depreciation available for such developments. In December 2012, the company formed a partnership with Goto city in Nagasaki Prefecture, based on which it is installed a solar park. This has led to an increase in inquiries from local governments in surrounding areas.

In Japan contracts under the Feed-in Tariff (FIT, for details see later in report) scheme of the Ministry of Economy, Trade and Industry (METI) oblige electric utilities to buy electricity generated using 10-kilowatt or more solar power plants at a fixed price for 20 years. Prices and durations

are revised every year. In 2014 (April 2013 - March 2014) the price of solar electricity was JPY36 (excluding tax) per kW for 20 years. Prices for 2015 (April 2014 - March 2015) have been lowered to JPY32 (excluding tax) per kW. Prices for 2016 are JPY29 (excluding tax) per kW when contracts with utilities are done by June 2015 and JPY27 (excluding tax) per kW for contracts struck in July and later. Generation facilities must obtain FIT certifications from METI. If a solar power producer applies for Green Investment Tax Incentives, related facilities can be fully depreciated immediately. The government also has similar regulations in place for wind, hydroelectric, geothermal, and biomass generation.

Selling solar power plant equipment

From FY03/15, the company obtained certain rights to sites for solar power plants and the FIT scheme, starting partial sales of solar power plant equipment. By selling 2.3MW equipment, it reported sales of JPY1.1bn in FY03/15.

The company sells equipment for solar systems for about JPY400,000 per kW of installed capacity. Sales are determined by multiplying installed generating capacity (kW) by the price per kW of installed capacity. The solar system's gross profit margin is 15-25%.

Solar Power Plant Operation

18.8% of FY03/15 sales; 4.2% of FY03/15 operating profit

The solar power plant operation business also includes the operation of mega solar (power generation solar parks) from FY03/14.

What is mega solar?

Mega solar refers to solar power stations of 1MW-plus. Since the start of the FIT scheme for renewable energy in July 2012 it has been easier to secure profits, and a number of players from different sectors have joined the fray. There is also a trend for local governments and private-sector businesses to join forces and build mega solar businesses on vacant land. While output varies with the location and amount of sunlight, a 1MW mega solar plant typically generates a minimum of 1,000 M kWh per year. A normal four-person household uses 5.5 M kWh per year; a 1MW mega solar plant can normally supply 300 households. Mega solar plants need land: a 1MW plant covers about 15,000 m² (Tokyo Dome: 47,000 m²).

To take advantage of the FIT scheme first the operator needs METI approval to certify that the generation facilities comply with the law. The purchase price for power generated in the scheme depends on when the facilities were certified rather than when operations started (In April 2015 and onward, the purchase price to be applied is that at the time when connection contracts with utilities are struck after the facilities are certified). Other than gaining licenses for the generating facilities and equipment, operators face no special requirements to qualify to sell all the renewable power they generate under FIT. While it is necessary to appoint a chief electrical engineer company operators do not need to have electricity business experience.

Tamagawa's solar power plant operating business

When Tamagawa was considering entering the mega solar business, in June 2012 it set up a planning office and in September that year set up subsidiary GP Energy. Its first project—Shimonoseki power plant in Shimonoseki, Yamaguchi prefecture—began operations in June 2013.

Tamagawa operates mega solar power plants in this subsegment, forming special-purpose companies (SPC). The SPC buys or leases land on which it builds and runs solar power plants of 1MW-plus capacity. The SPC scheme enables separate project financing, i.e., finance based on expected revenues for a particular project. As of March 2015, Tamagawa HD had 10

subsidiaries responsible for running solar power plants, GP Energy 1 Co., Ltd. through GP Energy 6 Co., Ltd. and GP Energy A, LLC through GP Energy D, LLC.

The company said upfront investment in mega solar plants—covering PV modules, supporting structures, electrical facilities and labor—runs to JPY260–320mn per MW.

Electricity is sold to electric utilities. Revenue is selling price per kW multiplied by total amount of electricity sold. FIT defines electric utilities' purchase prices as JPY40.0 (excluding tax) per kW for electricity generated at facilities that were FIT-certified in 2012, JPY36.0 (excluding tax) for those certified in 2013, and JPY32.0 (excluding tax) for those certified in 2014. In 2015, the purchase prices are JPY29 (excluding tax) per kW for contracts between FIT-certified facilities and power utilities struck by June 2015 and JPY27 (excluding tax) per kW for contracts done in July and later. Purchase duration is fixed at 20 years.

If a solar plant generating 1.0GW to 1.4GW of electricity per year was FIT-certified in 2012, electric utilities will buy electricity for JPY40 (excluding tax) per kW—implying revenues of JPY40mn. Weather and other factors impact the amount of power generated. Panel aging cuts output by 0.25-0.75% per year. The main costs are depreciation, land rent, maintenance fees and insurance. Gross profit margins hover around 50% and the unlevered internal rate of return could be 9%.

Tamagawa's solar power plants

As of May 2015, the company's solar power facilities, including those already in operation and planned facilities with secured land had a combined potential generating capacity of 11.3MW. Shared Research estimates that revenue from the operating and planned plants will be around JPY510mn.

As of May 2015, the Shimonoseki (Yamaguchi Prefecture) and Tateyama (Chiba Prefecture) plants and the Sodegaura (Chiba Prefecture) solar park were in operation.

According to the company, the expected internal rate of return (IRR) is 7.5% for the Shimonoseki plant, 16.5% for the Tateyama plant, and 13.2% for the Sodegaura solar park. As Tamagawa leveraged financial leases for the Tateyama and Sodegaura facilities, it could obtain the higher expected IRR than that for the Shimonoseki plant, which was built on the company's own funds.

The company is also building a 1MW solar park in Minami Shimabara, Nagasaki Prefecture, and preparing to begin construction of a 5.5MW solar park in Goto City, Nagasaki Prefecture, which it expects to begin operations in Q4 FY03/16.

Shimonoseki Solar Power Plant



Source: Shared Research based on company data

Tamagawa Holdings solar power plants

Solar parks	Location	Feed-in-tariff (kW/JPY)	Output (MW)	Area (sqm)	Completion date	Investment (JPYmn)	Sales (JPYmn)
Shimonoseki	Shimonoseki, Yamaguchi	40.0	1.6	24,081	Q1 FY03/13	440	77
Tateyama	Tateyama, Chiba	40.0	1.9	35,386	Q4 FY03/15	637	91
Sodegaura	Sodegaura, Chiba	36.0	1.3	15,000	Q4 FY03/15	488	56
Minamishimabara, Nagasaki	Minamishimabara, Nagasaki	40.0	1.0	12,000	Q4 FY03/18	299	48
Goto Islands	Goto, Nagasaki	36.0	5.5	100,000	Q4 FY03/17	-	238
Total	-	-	11.3	-	-	-	510

Source: Shared Research based on company data

Shared Research estimate for sales, based on annual electricity sales of 1,200MW per 1MW solar power facility.

In addition, in December 2014 three Tamagawa subsidiaries acquired a power operator license in the city of Misawa, Aomori Prefecture, from ISE Power. At the same time, Tamagawa announced plans to build and operate the 10MW Misawa solar power plant. The company expects to begin selling electricity from the plant by FY03/16, contributing around JPY390mn to annual sales. In March 2015, Tamagawa announced a business alliance with Etrion Japan KK., an Etrion Group company under parent company Etrion Corporation. Tamagawa and Etrion Japan signed a memorandum of understanding to make a joint investment in Misawa solar power plant. In June 2015, Tamagawa said that the two companies will establish a special-purpose company (SPC) for this joint business and Tamagawa may hold a stake of up to 30% in the SPC. The alliance with Etrion Japan enables Tamagawa to expand valuation for business development, including fund procurement, and to build larger solar parks than those it has constructed.

In 2012, Etrion struck a deal with Hitachi High-Technologies Corporation (TSE1: 8036, Hitachi High-Tech) on a joint solar power generation business in Japan. In September 2014, the two companies announced an initial plan to build solar power stations for a total of 34 megawatts. Sumitomo Mitsui Trust Bank, Ltd. will provide project finance loans for 80% of the cost of the first stations. Of the remaining 20% of the cost, Etrion and Hitachi High-Tech will shoulder 87% and 13%, respectively. Shared Research supposes that the joint project for the Misawa solar power plant between Tamagawa and Etrion Japan will also use a scheme like project financing via an SPC.

Misawa power plant details

Solar park	Location	Feed-in-tariff	Output (MW)	Area (sqm)	Completion date	Investment (JPYbn)	Sales (JPYmn)
Misawa power plant	Misawa, Aoyama Prefecture	36.0	10.0	153,000	FY03/16	3.4	390

Source: Shared Research based on company data

Fundraising in solar power generation business

For the five years from FY03/08 Tamagawa posted back-to-back net losses, making debt funding difficult. To launch the Shimonoseki solar power plant, it raised JPY901mn (assuming all options exercised) via share placement and share option issuance in January 2013. The company is trying different operating models.

According to Tamagawa Holdings, it has an increasing number of financing options, owing to its three consecutive years of profitability as of FY03/15, and earnings results at the three solar power plants.

The 1.9MW solar power plant in Tateyama, Chiba Prefecture, has been operating since February 2015. For solar power generation systems being used at this facility, the company has entered into a lease agreement with Ricoh Leasing in the amount of JPY901mn.

Tamagawa is considering project finance and investment from sleeping partners. In June 2013 the company was certified as a qualified institutional investor.

Strengths and weaknesses

Strengths

- **Benefiting from stable demand the electronics business has regained competitiveness:** The company said it has regained its competitive edge in high-frequency devices. Selling higher value-added products via original equipment manufacturer (OEM) channels and measures to cope with new product development and public (defense and disaster prevention) demand has borne fruit. In public demand a preference for Japanese suppliers lends Tamagawa an advantage over overseas rivals. Restarting R&D and selling under its own brand should enhance earnings.
- **Correct size and skills for solar success:** Although Tamagawa is building its solar power generation business from scratch it already has experience in solar installations and project financing. It is listed and sports a profitable core business but given its modest size tackling small projects makes sense. Tamagawa appears to have the qualities to attract partners. A big plus: the government guarantees selling prices. If funding crystalizes watch for the solar parks to fuel earnings growth.
- **Entrepreneurial management wants to rekindle investor trust:** Shared Research flags a resolve to get it right this time. It has entrepreneurial energy although is aware of investor skepticism. Liaising with investors and partners, Tamagawa wants to rebuild its image. According to the company, investors appreciate its full disclosure.

Weaknesses

- **Reputation:** Tamagawa has a history of business failures. CEO Toru Masuzawa is the subject of controversy. Masuzawa has been a defendant in a number of civil lawsuits relating to his time at J Bridge, but asserts that he was a victim of circumstance, and will rebuild his reputation and prove his management acumen. In addition to developing procedures to deal with reputational risk, in February 2014, the company established a compliance committee, and contracts with an outside legal firm for advisory services.
- **Shortage of manpower in Renewable energy-related business:** The renewable energy-related businesses had a staff of 9 as of May 2015. The complexity of projects requires personnel with high entrepreneurship, strong motivation and expansive knowledge from fundraising to electrical engineering. However, efforts to hire appropriate personnel quickly may block sound corporate growth. Considering the downtrend in the feed-in-tariffs of renewable energy and limited business opportunities, this lack of human resources is concerning.
- **Potential rate cuts for fixed-rate feed-in tariffs:** The fixed FIT rate has been lowered each consecutive year, and it is likely that demand for solar power generation construction will decline in the medium term and that the expected profitability of new solar parks will decrease. According to the company, it will combat these issues by improving power conversion efficiency of its solar cells and other components in an effort to continue providing benefits to consumers. Tamagawa also plans to develop businesses using other renewable energy sources than solar power, including geothermal power and small-scale wind turbines businesses.

Group companies

At June 2015, the group comprised Tamagawa Holdings Co Ltd and 14 consolidated subsidiaries.

- ▶ Tamagawa Electronics Co Ltd (100%): electronic and telecoms equipment business.
- ▶ Tamagawa Electronics Vietnam Co Ltd (100%): subsidiary of Tamagawa, electronic and telecoms equipment manufacturing and sales.
- ▶ Tamagawa Energy (100%): renewable energy system sale business.
- ▶ GP Energy Co Ltd (100%): solar power plant business, geothermal power plant business.

Market and value chain

Market overview

Wireless telecoms infrastructure

Smartphones and tablets are revolutionizing the wireless telecoms market. Smartphones generate 10-20x as much data traffic as traditional mobile phones. As bandwidth-hungry content mushrooms, data volumes swell. Dealing with the traffic surge is a pressing issue, creating demand for network infrastructure that can handle serious data volumes and speeds. As of 2015, telecoms operators have rolled out high-speed mobile services like LTE and WiMAX. Spectrum reallocation is helping too. There is also a nationwide trend toward data offloading—using wi-fi and the like to funnel data through the fixed-line network.

Mobile data traffic is forecast to grow by 20.8x from 2010 to March 31 2016 (1.84x per year on average); traffic could swell by as much as 39.1x (2.08x per year). Source: Wireless LAN Business Study Group Report, published in July 2012 by the Ministry of Internal Affairs and Communications. Who knows whether network infrastructure will keep up?

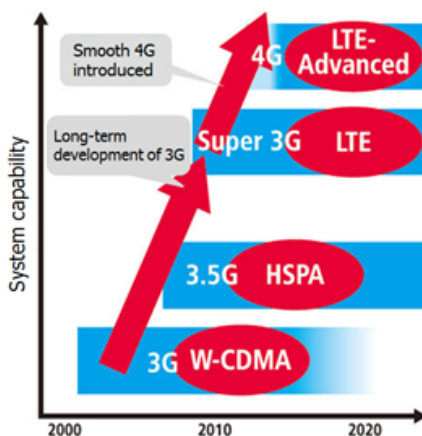
LTE Advanced

In February 2015, NTT DoCoMo, Inc. (TSE1: 9437) announced that it will launch a new telecoms service in March 2015 using LTE-Advanced, the next-generation mobile telecoms standard following LTE, paving the way for speedier data transmission. NTT DoCoMo begins with urban areas in 22 prefectures and plans to expand the service to major cities nationwide during FY2015. KDDI has announced that it will provide its LTE-Advanced service during FY2015.

LTE Advanced is a fourth generation mobile telecoms standard recognized by the International Telecommunication Union (ITU)*, offering higher speeds than LTE which has spread globally. Under development, it aims at providing speeds of up to 1Gbps when the user is stationary and up to 100Mbps when moving on a train.

* In mobile and electronic telecoms the ITU aims to establish standards and regulations between countries. Main activities: standardization, allocation of mobile spectrum and coordinating connections between countries to enable international telephone calls.

Evolution of Telecommunications Technology



Source: Shared Research based on Various data

Faster speeds under LTE Advanced will be attained by adding technical elements to existing LTE technology. Two elements are key: upgrading the multiple-input and multiple-output (MIMO) technology used in spatial multiplexing, and carrier

aggregation to enable bandwidth expansion.

MIMO technology is used to increase the volume of data that can be handled at any one time by sending different data packets and separating the mixed signals once received. In addition to the currently prescribed 2x2 MIMO and 4x4 MIMO, under LTE Advanced it will be possible to implement 8x8 MIMO using eight pairs of antennas. The upshot: higher maximum transmission speeds. Under current LTE technology where MIMO is not installed on the uplink side (sending data from the mobile device) it is handled by 2x2 MIMO and 4x4 MIMO.

It is Shared Research's understanding that NTT DoCoMo's current LTE network is composed mostly of 3G base stations that have been updated with LTE components. In contrast, new frequency allocations are planned for the introduction of LTE Advanced, and this will require changes to base stations, including the antennas. In the long term, it is reasonable to think that demand for capital investment in mobile telecom equipment will increase, with NTT DoCoMo leading the way for implementation of LTE Advanced.

New frequency bands for LTE-Advanced

In December 2014, the Ministry of Internal Affairs and Communications announced the allocation of 3.5GHz bandwidth for the LTE-Advanced 4G mobile communications system to three companies: NTT DoCoMo, KDDI and SoftBank Mobile. KDDI plans to begin service in the 3,520–3,560MHz band in June 2016, NTT DoCoMo plans on 3,480–3,520MHz in October 2016, and SoftBank Mobile on 3,560–3,600MHz in December 2016. Shared Research expects that capex demand related to the new frequency bands for the LTE-Advanced services will emerge toward 2016 and later.

Capex trends of mobile telecoms operators

Referring to LTE-related investments, NTT DoCoMo, which had 24,400 base stations as of end March 2013 and 55,300 as of end March 2014, planned to increase its base stations to 95,300 by end March 2015. KDDI Corporation (TSE1: 9433) increased its capital spending on mobile telecoms facilities from JPY374bn in FY03/14 to JPY385.2bn in FY03/15.

Both NTT DoCoMo and KDDI increased their LTE-related capital investments in FY03/15 from FY03/14, but they plan to decrease their spending in FY03/16.

Trends of mobile telecoms operators

(JPYbn)	FY03/14 Act.	FY03/15 Act.	FY03/16 Est.
NTT Docomo	703.1	661.8	630.0
LTE related	331.1	406.7	366.0
KDDI	571.8	576.2	600.0
Mobile	374.0	385.2	380.0
Softbank	712.5	535.5	390.0

Source: Shared Research based on company data

Solar power market

Outlook for Japan's solar power market

Underpinned by government policies promoting solar power in Japan, the number of solar power installations is multiplying. However, according to the Ministry of Economy, Trade and Industry, the amount of electrical power produced by renewable sources in Japan in FY 2013, including hydroelectric, was 10.7% of total power output, and solar power accounted for just 1.0% (0.2% during FY 2011; 0.4% during FY 2012).

Approved by the Cabinet in April 2014, the new Strategic Energy Plan includes items such as maximizing growth of renewable energy sources for three years after 2013, focusing on growth in the sector beyond 2016, and aiming to go above and beyond the measures outlined in the plan.

The existing Strategic Energy Plan, approved in August 2009, called for 13.5% (141.4bn kWh) of energy to come from renewable sources by 2020. Additionally, the Advisory Committee for Natural Resources and Energy published a recommendation in 2010 that 20% (214.0bn kWh) of energy come from renewable sources by 2030.

The accumulated amount of solar power generation capacity in Japan was 20.2GW at end November 2014 (estimated by Shared Research based on materials of the Agency for Natural Resources and Energy). According to the JPEA PV Outlook 2030, published by the Japan Photovoltaic Energy Association (JPEA) in March 2015, the amount of solar power generation capacity is estimated to reach 65.7GW by 2020, and 100.1GW by 2030. Concerning early installation figures, 2015 is expected to be slightly higher than 2014, gradually tapering off in 2018 and subsequent years.

Japan's policies to promote solar power

The Act on Special Measures Concerning Procurement of Renewable Electric Energy by Operators of Electric Utilities (abbreviated to FIT Act) was enacted in August 2011 and implemented in July 2012, and became fully eligible for the FIT scheme.

Feed-in Tariff (FIT) scheme

Under the FIT scheme, **to promote the use of renewables**, electric utilities are required to buy all the power generated by five types of renewable energy sources, including solar and wind. Solar power was popular in Spain and Germany owing to a similar system. A high tariff is designed to stimulate the development of renewables. As of May 2015, surplus power from solar generated from sub 10kW systems is bought under FIT and all power from solar power generated from systems over 10kW is bought under FIT.

For less than 10kW solar power generated systems, the FIT scheme is applied, and surplus solar power generated by households is sold to electric utility companies. When the scheme was launched in 2009, the feed-in tariff for surplus power was JPY48/kWh (including tax). The tariff remains fixed for 10 years from installation of the solar power system. The scheme envisages annually lowering the tariff for newly installed generation capacity. For FY2015 (from April 2015 to March 2016), the FIT for new installations was JPY33/kWh (for facilities not obliged to install output control equipment, excluding tax) and JPY35/kWh (for facilities obliged to install output control equipment, excluding tax).

Installation of output control equipment is obliged at solar power facilities whose applications for grid connection contracts are approved on April 1, 2015 and later in regions related to supply-and-demand control plans of Hokkaido Electric Power Co., Inc., Tohoku Electric Power Co., Inc., Hokuriku Electric Power Company, Chugoku Electric Power Co., Inc., Shikoku Electric Power Co., Inc., Kyushu Electric Power Co., Inc., and Okinawa Electric Power Company, Incorporated.

Separate from the surplus power FIT scheme (net metering), a different scheme covering all power generated by a renewable electricity producer has also been established. This scheme enables producers to sell all power generated regardless of their own consumption. In Japan, a FIT scheme for over 10kW capacity was launched in July 2012. FIT tariff rates for 2012 were JPY40 (excluding tax) per kWh, and power companies are required to purchase power at this rate for 20 years. Prices have since been pushed down, with the rate being JPY36 (excluding tax) per kWh in 2013 to JPY32 (excluding tax) per kWh in 2014. In 2015, the purchase prices is JPY29 (excluding tax) per kW for contracts between FIT-certified facilities and power utilities struck by June 2015 and JPY27 (excluding tax) per kW for contracts done in July and later.

The tariff and purchase period set under the FIT schemes are set each year by METI before the start of the financial year. The minister is required to take into account the opinions of a neutral, third-party committee (Feed-in Tariff Calculation Committee), which conducts public deliberations. To promote solar power supplementary provisions, the law requires power producer profits to be taken into consideration when determining the feed-in tariff for three years from the start of the scheme. The cost of purchasing power is recouped by utilities as an extra amount on electricity charges.

Solar power operators to have difficulty in forecasting profitability due to output curtailment

In September 2014, electric power companies suspended approvals of applications for grid connection by operators of (non-residential) solar power facilities. The suspension came as the utilities were concerned over possible disruption to stable supply of electricity as expansion of approved solar power generating facilities may disturb the supply-demand balance at a time when the burden of electricity demand remains light.

As a measure to cope with the situation, where some utilities had suspended acceptance of applications for grid connection by operators of renewable energy facilities, the Agency for Natural Resources and Energy (ANRE) in January 2015 decided to revise part of the Act on Special Measures Concerning Procurement of Electricity from Renewable Energy Sources by Electricity Utilities (the "Renewable Energy Act") and renew the operation system for the FIT scheme under new output control rules.

After the enforcement of revised ministerial ordinances (in January 2015 and later), solar power facilities calling for grid connection are obliged to restrict output when needed and install equipment to curtail output when relevant utilities require to do so.

Before the law revision, power companies were allowed to request suspension of power purchases for up to 30 days a year without compensation, but only at facilities with output of 500kW or more, when there was need to control output at solar power facilities. Under the revised ordinances, utilities are allowed to curtail purchases of power output from solar power plants for up to 360 hours a year, with the coverage expanding to facilities of less than 500kW. In regions covered by Tokyo Electric Power Company, Incorporated, Chubu Electric Power Co., Inc. and Kansai Electric Power Co., Inc., which are the companies usually with abundant grid connection volumes, solar power facilities with less than 50kW are not subject to the new output control rule. Meanwhile, the other utilities without room for grid connection volumes are allowed to curtail purchases of power output from solar power plants for up to 360 hours a year without compensation. They are Hokkaido Electric Power, Tohoku Electric Power, Hokuriku Electric Power, Chugoku Electric Power, Shikoku Electric Power, Kyushu Electric Power, and Okinawa Electric Power. As of April 2015, grid connection volumes of Hokkaido Electric Power, Tohoku Electric Power and Kyushu Electric Power exceeded their maximum limits. Solar power facilities in these regions are to connect themselves to the utilities' transmission grids on condition of being subject to curtailment of purchases for over 360 hours a year.

Shared Research recognizes that the extended coverage of the curtailment of solar power purchases under the revised ordinances make it difficult for operators of solar power plants to forecast volumes, revenues and profitability of electricity to be sold by facilities that newly apply for grid connection.

Stricter facility certification?

Purchase prices under the FIT scheme are set to enable the supplier to earn a reasonable rate of return. Prices are likely to fall given that solar generation costs are falling.

As a result Shared Research thinks that some solar park operators are rushing to get certification and lock in high electricity purchase prices. Construction may not start straightaway if in turn they are waiting for construction costs to fall. METI said some operators locked in procurement prices from the first year of the scheme (JPY40/kWh pretax) and then delayed the start of construction.

A June 2014 report from METI on the state of renewable energy power plants said that between the introduction of FIT in July 2012 and the end of June 2014 non-residential solar facilities with 66.0mn KW of generating capacity gained certification. As of June 2014, about 8.5mn kW of capacity was online, equal to 13% of certified capacity.

In March 2014, in line with the Administrative Procedure Act and in light of the findings of requests for information from facilities with more than 400kW of output prior to operation, METI began questioning operators of non-residential solar power plants (output of 10kW or more) certified in FY 2013 (April 2012-March 2013) without confirmed details regarding location or facilities. In cases where it could not confirm the necessary information, METI stripped the facilities of their approval in September 2014. As of August 2014, the total output for non-residential solar power plants certified in FY 2013 was 18.7mn kW—METI removed certification for 1.8mn kW of output, and plans to further question the operators of 2.7mn kW worth of output. In total, 8.8mn kW is produced by plants that have already begun operating, or fulfilled METI's requirements for certification.

Regarding the 2.7mn kW operators subject to further questioning, METI will begin stripping these plants of their certification after confirming details of location and facility if they do not satisfy requirements. METI also plans to request information from operators of plants certified in FY 2014.

Shared Research understands that power plant operators of renewable energy sources may lose their certification if they do not make efforts to bring their plants online.

Strategy

Tamagawa aims to be a company that contributes to the development of social infrastructure. The company engages in the Electronics and telecoms equipment business for the telecoms infrastructure and the Renewable energy system sales, Solar power plant operations, and Geothermal power plant operations for the electricity infrastructure.

Strengthening existing businesses. In Electronics and telecoms equipment, Tamagawa aims to increase sales and profitability by fortifying optical transmission equipment for trains, in addition to existing businesses. In the electricity infrastructure businesses (Renewable energy system sales, Solar power plant operations, and Geothermal power plant operations), it hopes to grow via a bumper investment program. The company may also develop renewable energy businesses besides solar power and geothermal power (such as biomass power generation, small-scale wind power generation, and small-scale hydroelectric power generation).

In May 2015 the company said it holds several potential projects, which will be operational if it can procure necessary funds. Constraints: insufficient funding and lack of skilled workers.

Raise capital, build its own solar park. Solar and geothermal power plant operations provide stable cash flows but need big upfront investment. Selling renewable energy systems (including the sale of solar power plant equipment and the sale of small-scale wind power generation equipment) does not require any upfront capital, but does not provide long-term revenues. Accordingly changes in profitability of renewable energy system sales may change the company's business results.

Tamagawa recognizes its need to push forward with the solar and geothermal power plant businesses to generate funds for capex—through loans from financial institutions and operating cash flows—as well as to cover personnel costs. To boost investment efficiency, the company intends to restructure its portfolio with measures that include the partial sale of power plant equipment.

Past performance

1H FY03/16 results (announced November 12, 2015)

- ▶ Sales: JPY1.1bn (-42.4% YoY)
- ▶ Gross profit: JPY353mn (-42.7% YoY)
- ▶ SG&A expenses: JPY514mn (+27.1% YoY)
- ▶ Operating loss: JPY161mn (operating profit of JPY212mn in 1H FY03/15)
- ▶ Recurring loss: JPY190mn (recurring profit of JPY210mn in 1H FY03/15)
- ▶ Net loss: JPY249mn (net income of JPY120mn in 1H FY03/15)

SG&A expenses were up despite an increase in sales due to higher R&D expenses (JPY143mn; up by JPY38mn compared to 1H FY03/15), and higher sales promotion expenses in the Renewable Energy System Sales segment.

Electronics and Telecoms Equipment

- ▶ Orders: JPY1.0bn (-43.5% YoY)
- ▶ Sales: JPY960mn (-44.9%)
- ▶ Operating loss: JPY90mn (operating profit of JPY257 in 1H FY03/15)

Mobile telecom providers changed their construction plans for base stations and restrained investment, hurting segment earnings.

The company sought to win new orders in the area of 3.9-generation mobile facilities, defense facilities, and public wireless facilities, as well as orders in new areas, focusing on new markets and customer acquisition. It also continued measures to add value, expand and cultivate business areas, and joint development with partner companies, while working to strengthen proposals for its in-house products. As a result, the company saw an increase in orders from new customers and new markets, digital signal processing boards required for high-speed signal processing, including for fiber optic-related products for various wireless applications (excluding high-frequency analog products). However, in the mobile phone infrastructure market, sales were lower year-on-year as restraint in corporate capex was greater than initial estimates.

Sales by channel

Mobile telecoms: JPY208mn (-68.3%)

Defense: JPY305mn (-56.6%)

Other (government services, disaster prevention, analysis): JPY445mn (+16.5% YoY).

Segment sales were down due to lower sales to mobile telecoms companies, which lowered their spending on base stations. Defense related sales were down due to fizzling demand for facility renewal. In wireless transport (railways and airports), the company won orders for fiber optic-related products for use in airports. Orders for the company's own testing equipment for power semi-conductors were firm.

To cope with year-on-year declines in sales, Tamagawa worked to restrain fixed costs and R&D expenses from the July-September quarter onward. As a result, although the segment booked an operating loss for 1H due to lower sales, the company plans to break even for the full year. According to the company, acquisition has been steady during FY03/16 for

contracts of large-scale public works projects in mobile telecoms. As a result, although lower sales are forecast for FY03/16, these are forecast to be covered by higher sales and profits and FY03/17 and beyond.

Tamagawa Electronics Vietnam Co., Ltd., the Vietnam-based manufacturing subsidiary owned by the company's consolidated subsidiary Tamagawa Electronics, began operation in October 2015. Following its launch, the company began production of high-quality, high-frequency passive components for use in telecoms and broadcasting, as well as mobile base stations, geared toward the Japanese market. Reduced costs are planned to lead to improvements in price competitiveness, yielding an increase in orders. In later years the company aims to expand business into Southeast Asia and the Middle East.

Renewable Energy System Sales

- ▶ Orders: JPY1.3bn (+776.1% YoY)
- ▶ Sales: JPY27mn (-80.1%)
- ▶ Operating loss: JPY109mn (loss of JPY5mn in 1H FY03/15)

In sales, the company reported gains on O&M (Operation and Management) for its power conversion and solar power tracking frame systems, as well as the solar power plant equipment, which it sold last year. In addition to power plant equipment, it is booking continuous O&M revenues following the sale.

In FY03/16, the company expects sales projects to be concentrated in 2H. During 1H, the company brought forward fixed costs, with profits likely to be concentrated in the second half of the year. Fixed costs brought forward were primarily those associated with capturing orders, including sales promotion expenses and expenses required to evaluate potential sites for solar power generation plants.

Solar Power Plant Operations

- ▶ Sales: JPY135mn (+197.9% YoY)
- ▶ Operating profit: JPY51mn (+JPY217.1% YoY)

Mega solar power plants in Shimonoseki, Tateyama, and Sodegaura sold electricity in line with forecasts.

Geothermal Power Plant Operations

The company is preparing to start operations of geothermal power plants, so no sales were recorded, and operating loss was zero.

In January 2015, the company announced that it planned to build a total of seven geothermal power plants, and to this end acquired a total of seven separate plots of land. The company moved forward on construction at two of the seven sites but changed its plan in December 2015. The company sold the two plants currently under construction to a third party and sold back the sites acquired for the five other geothermal power plants to their original owners.

At the geothermal power plant located in Beppu City, Oita Prefecture, a reexamination of data acquired after work had begun showed that the company was unlikely to get the return on the project it originally envisioned. After a series of talks with the outside party that originally proposed the project, Tamagawa reached an agreement to sell the two power plants

currently under construction to a company owned by the party that originally proposed the project at a price that would be greater than the total amount the company had invested in the two projects. The transaction and payment under this agreement are to be completed by the end of January 2016.

As for the remaining five sites at which construction of geothermal power plants has not yet begun, Tamagawa chose to exercise its right under the original purchase contract to sell the land back to the original owner at the same price for which it was purchased. Two of the five sites have already been sold back to their original owners and the sales of remaining three sites are expected to be completed by the end of December 2015.

Q1 FY03/16 results (announced August 12, 2015)

- ▶ Sales: JPY682mn (-18.3% YoY)
- ▶ Gross profit: JPY225mn (-13.8% YoY)
- ▶ Operating loss: JPY22mn (operating profit of JPY57mn in Q1 FY03/15)
- ▶ Recurring loss: JPY32mn (recurring profit of JPY56mn in Q1 FY03/15)
- ▶ Net loss: JPY38mn (net income of JPY26mn in Q1 FY03/15)

SG&A expenses were up 21.4% YoY to JPY247mn despite lower sales because of investments in R&D, rent and land, and hiring.

According to the company, Q1 sales and profits were down YoY, but this was in line with its initial forecasts, which project sales and profits to be concentrated in 2H.

Electronics and Telecoms Equipment

- ▶ Orders: JPY455mn (-41.6% YoY)
- ▶ Sales: JPY609mn (-21.7%)
- ▶ Operating profit: JPY5mn (-95.0%)

Mobile telecom providers changed their construction plans for base stations during Q4 FY03/15.

The company sought to win new orders in the area of transport infrastructure such as train radios, defense facilities, and public wireless facilities, as well as orders in new areas, focusing on new markets and customer acquisition. It also continued measures to add value, expand and cultivate business areas, and joint development with partner companies, while conducting joint technology development through research with universities. The company also installed a new high-definition monitoring system essential for the safe and smooth management of its group solar-power plants.

Sales by channel

Mobile telecoms: JPY120mn (-36.1%)

Defense: JPY214mn (-46.6%)

Other (government services, disaster prevention, analysis): JPY260mn (+38.4% YoY).

Segment sales were down due to lower sales to mobile telecoms companies, which lowered their spending on base stations. Defense related sales were down due to fizzling demand for facility renewal. Still, the company expects

year-on-year growth in the full year due to ongoing defense projects. In transport (bullet trains, subways, and airports), the company won orders for fiber optic-related products. Orders for the company's own testing equipment for power semi-conductors were firm.

In the full-year, the company forecasts a decline in mobile telecoms sales due to mobile telecoms companies lowering their spending on base stations. However, this may be offset by an increase in orders for defense-related products, wireless devices for transport, and other products outside of the mobile telecoms channel. The company also plans to take advantage of the many channels and high capacity of its analog communication technology to increase orders in the wireless transport field. The company tended to book losses following poor sales of its mobile telecoms products but plans to avoid booking losses due to exiting unprofitable projects and proceeding with development of its own products after FY03/12.

Tamagawa Electronics Vietnam Co., Ltd., the Vietnam-based manufacturing subsidiary owned by the company's consolidated subsidiary Tamagawa Electronics, continued preparations to begin operation in October 2015. Following its launch, there are plans for it to begin production of high-quality, high-frequency passive components for use in telecoms and broadcasting, as well as mobile base stations, geared toward the Japanese market. In later years the company aims to expand business into Southeast Asia and the Middle East.

Renewable Energy System Sales

- ▶ Orders: JPY202mn (+43.3% YoY)
- ▶ Sales: JPY17mn (-47.2%)
- ▶ Operating loss: JPY46mn (loss of JPY10mn in Q1 FY03/15)

In sales, the company reported gains on O&M (Operation and Management) for its power conversion and solar power tracking frame systems, as well as the solar power plant equipment sold last year. In addition power plant equipment, it is booking continuous O&M revenues following the sale.

In FY03/16, the company expects sales projects to be concentrated in 2H. Power plant equipment sales, which contribute significantly to sales, are projected to be JPY1.6bn–2.1bn (+47.6%–97.0% YoY) this year, from the JPY1.1bn seen last year. According to the company, orders had reached about JPY4.0bn as of the end of Q1.

Solar Power Plant Operations

- ▶ Sales: JPY71mn (+179.8% YoY)
- ▶ Operating profit: JPY29mn (+JPY179.3% YoY)

Mega solar power plants in Shimonoseki, Tateyama, and Sodegaura sold electricity in line with forecasts.

Geothermal Power Plant Operations

The company is preparing to start operations of geothermal power plants, so no sales were recorded, and operating loss was zero.

The company is preparing to bring online geothermal operations in Beppu City, Oita Prefecture. It officially received a notice on September 30, 2015 from Kyushu Electric Power Co. regarding the approval and timing for grid connections of

Tamagawa's two geothermal power plants. It plans to begin electricity sales around April 2016.

According to the company, as of September 2015 it began considering operating geothermal power plants in regions other than Beppu City, Oita Prefecture.

FY03/15 results (announced May 13, 2015)

- ▶ Sales: JPY5.1bn (+22.1% YoY)
- ▶ Operating profit: JPY531mn (+11.3%)
- ▶ Recurring profit: JPY514mn (+7.5%)
- ▶ Net income: JPY427mn (-2.2%)

Electronics and Telecoms Equipment

- ▶ Orders: JPY3.2bn (-7.8% YoY)
- ▶ Sales: JPY3.4bn (+5.3%)
- ▶ Operating profit: JPY467mn (-2.7%)

Mobile telecom providers increased their investments in wireless facilities at the beginning of 2H. However, they changed construction plans during Q4.

The company sought to win new orders in the area of 3.9-generation mobile facilities, defense facilities, and public wireless facilities. As a new business area, the company began to sell testing equipment for power semiconductors in June 2014. Since Tamagawa has secured orders in the new business, it expects to report sales in FY03/16. The company also installed a new high-definition monitoring system essential for the safe and smooth management of its group solar-power plants. Sales of the company's own products totaled JPY1.4bn (+22.5% YoY), accounting for 40.4% in the segment.

Operating profit declined due to spending on research and development worth JPY239mn (JPY124mn in the previous year).

Segment profit after allocation of corporate costs and others was JPY420mn (-7.3% YoY), surpassing the initial target of JPY370mn. The company attributed the more profit than planned to a rise in sales of its own products, efficient procurement of materials due to the introduction of a core system, and disappearance of the cost to cope with defects.

Solar System Sales

- ▶ Orders: JPY1.7bn (+102.8% YoY)
- ▶ Sales: JPY1.8bn (+101.8%)
- ▶ Operating profit: JPY112mn (+118.6%)

The company streamlined its operations and expanded sales reach to all parts of the country.

The company started sales of solar power plant equipment. By selling 2.3MW equipment, it reported sales of JPY1.1bn.

Solar Power Plant Operations

- ▶ Sales: JPY87mn (+70.7% YoY)
- ▶ Operating profit: JPY22mn (operating loss of JPY19mn a year earlier)

The Shimonoseki solar park, which operated for nine months in the previous year, was in full-year operation in FY03/15. Plants in Tateyama (1.9MW) and Sodegaura (1.3MW), both in Chiba Prefecture, began operations in February and March, respectively, of 2015.

Geothermal Power Plant Operations

This segment was created during FY03/15. The company is preparing to start operations of geothermal power plants during FY03/16. No sales were recorded, and operating loss was zero.

Q3 FY03/15 results (announced February 13, 2015)

- ▶ Sales: JPY3.1bn (+13.3% YoY)
- ▶ Operating profit: JPY372mn (+17.6%)
- ▶ Recurring profit: JPY364mn (+14.2%)
- ▶ Net income: JPY261mn (-14.8%)

Net income declined year-on-year because robust revenues in recent years eliminated losses carried forward at subsidiaries, meaning income tax returned to a normal level.

Electronics and Telecoms Equipment

- ▶ Orders: JPY2.7bn (-4.9% YoY)
- ▶ Sales: JPY2.7bn (+22.9%)
- ▶ Operating profit: JPY435mn (+33.0%)

Operating profit exceeded the company's initial full-year forecast of JPY370mn.

Mobile telecoms companies changed construction plans, resulting in lower orders year-on-year, but a recovery has been underway beginning in 2H FY03/15. According to the company, some sales to mobile telecoms companies were brought forward to Q3, meaning sales are unlikely to increase year-on-year in Q4. Public expenditure on defense facilities and public wireless facilities continued.

Tamagawa secured orders in its new business, testing equipment for power semiconductors. It expects to report sales in FY03/16. The company also promoted its new optical transmission device for high-definition video to companies that plan exhibitions, nursing facilities, and security companies, as part of its focus on winning orders in this business.

Solar System Sales

- ▶ Orders: JPY1.5bn (+107.5% YoY)
- ▶ Sales: JPY293mn (-37.1%)
- ▶ Operating loss: JPY18mn (operating profit of JPY32mn in Q3 FY03/14)

Although the company worked to make sales operations more efficient, there were shipment delays as clients pushed back construction commencement dates. Sales and profits were down year-on-year as a result.

Initial forecasts called for full-year segment sales of JPY1.0bn and operating profit of JPY104mn. As of Q3, the company has achieved 28.8% of its sales target, and has booked an operating loss. According to the company, it may still achieve its targets due to the division and sale of solar parks in Q4 (January to March 2015). Specifically, the company expects to book sales of about JPY900mn and operating profit of about JPY90mn from the division and sale of solar parks in Yokohama (Kanagawa Prefecture), Kagoshima Prefecture, and Nagasaki Prefecture, after having first bought the land and constructed the facilities.

Solar Power Plant Operations

- ▶ Sales: JPY59mn (+63.8% YoY)
- ▶ Operating profit: JPY15mn (operating loss of JPY21mn in Q3 FY03/14)

Sales of electricity at the Shimonoseki solar park were in line with targets, yielding higher sales and profits year-on-year.

The company expects to complete construction on a 2.0MW output solar park in Tateyama (Chiba Prefecture) and a 1.3MW output solar park in Sodegaura (Chiba Prefecture) during this year, FY03/15.

Geothermal Power Plant Operations

Newly established during Q3 FY03/15, this segment is working to commence operations of geothermal power plants as soon as possible. No sales were recorded, and due to miscellaneous expenses, the company booked an operating loss of JPY0mn for the segment.

The company also plans to construct a geothermal power plant across seven plots in Beppu (Oita Prefecture) with a total output of about 875kW. According to the company, this is equivalent to a solar park with an output of about 7MW, as each geothermal plot of 125kW or so provides the same amount of electricity as a solar power plant with an output of about 1MW. The company plans to bring the new facility online in FY03/16, and is targeting electricity sales of about JPY250mn per year.

FY03/14 results (announced May 13, 2014)

Results by segment:

Electronics and Telecoms Equipment

This segment saw mobile telecoms companies increase their capex spending on base stations and public expenditure increase for defense facilities and public wireless facilities. Orders received totaled JPY3.5bn (+7.3% YoY) and sales were JPY3.2bn (+2.5%). Specifically, sales in mobile telecoms were JPY1.4bn (-26.5%) due to a large-scale order that was completed in FY03/13 causing a relative decrease. Sales related to defense systems were JPY905mn (+79.6%).

According to the company, it is becoming increasingly adept at developing products in-house. As a result, sales of internally developed products were JPY1.3bn (+36.6% YoY).

Operating profit for the segment was JPY480mn (+28.1% YoY). In addition to the effects of increased revenue, the sales composition of internally developed products—which have relatively higher margins compared to other products in the

segment—went up from 30% in FY03/13 to 35% in FY03/14.

Solar system sales

Orders for solar power systems have been increasing since the Act on Special Measures Concerning Procurement of Renewable Electric Energy by Operators of Electric Utilities (FIT Act—for feed-in tariffs) came into effect (August 2011). The company also worked to make its sales operations more efficient. Thus, orders received were JPY845mn (+27.3% YoY), sales were JPY890mn (+83.0%), and operating profit was JPY54mn (-5.5%).

Solar power plant operations

Sales of electricity began, following the completion of construction of the solar park in Shimonoseki, Yamaguchi Prefecture. The company booked sales revenue from the project from July 2013. However, other solar power projects required startup investment. In the end, sales were JPY52mn (there were no sales recorded for this segment the previous year), and the company made an operating loss of JPY20mn (against an operating loss of JPY12mn the previous year).

Full-year FY03/13 results

Sales hit JPY3.7bn (+18.2% YoY). Operating profit was JPY373mn vis-à-vis a JPY29mn loss in FY03/12. Recurring profit was JPY374mn contrasting with a JPY23mn loss in FY03/12. Net income was JPY339mn compared with a JPY37mn loss in FY03/12. Segment results:

Electronics and telecommunications equipment

Owing to a recovery in mobile telecoms companies' base station capex and a resumption of public investment in defense and public wireless facilities, sales touched JPY3.2bn (+31.1% YoY) and operating profit nudged JPY374mn (+497.4% YoY).

Solar energy business

The introduction of FIT in July 2012 and better marketing boosted solar generating system orders. Sales rose to JPY486mn from JPY19mn in FY03/12. Operating profit came in at JPY41mn vis-à-vis a JPY24mn loss in FY03/12.

Biomass energy business

Sales were JPY74mn (-89.0% YoY). Operating loss reached JPY30mn compared with a JPY47mn loss in FY03/12. The company exited this business in the wake of consolidated subsidiary Bioenergy Resources Co Ltd filing for bankruptcy.

FY03/12 results

Sales were JPY3.1bn (+17.7% YoY). There was an operating loss of JPY29mn from a JPY286mn loss in the previous year. In the Electronics and Telecoms Equipment division there was a recovery in capex for mobile base stations. Sales were up 0.7% YoY. Margins improved due to lowered COGS and operating expenses. In the biomass energy business, sales rose 172.3% YoY but operating losses were largely in line with the previous year due to cost increases. There was a recurring loss of JPY23mn compared with a JPY284mn loss in the previous year. We flag an impairment loss of JPY3mn, a loss on sale of investment securities of JPY3mn and an annual net loss of JPY37mn (JPY351mn loss in the previous year).

Income statement

Income Statement (JPYmn)	FY03/07 Non-cons.	FY03/08 Cons.	FY03/09 Cons.	FY03/10 Cons.	FY03/11 Cons.	FY03/12 Cons.	FY03/13 Cons.	FY03/14 Cons.	FY03/15 Cons.
Total Sales	3,114	4,012	4,299	2,803	2,640	3,106	3,672	4,171	5,095
YoY	22.1%	28.8%	7.1%	-34.8%	-5.8%	17.7%	18.2%	13.6%	22.1%
CoGS	2622	3274	3,348	2,412	2,314	2,516	2,623	2,973	3,616
Gross Profit	526	738	951	392	326	590	1,049	1,198	1,479
GPM	16.9%	18.4%	22.1%	14.0%	12.3%	19.0%	28.6%	28.7%	29.0%
SG&A	457	620	1,020	619	612	619	675	721	947
SG&A / Sales	14.7%	15.5%	23.7%	22.1%	23.2%	19.9%	18.4%	17.3%	18.6%
Operating Profit	69	118	-68	-227	-286	-30	373	477	531
YoY	271.9%	71.0%	-	-	-	-	-	27.8%	11.3%
OPM	2.2%	2.9%	-1.6%	-8.1%	-10.8%	-1.0%	10.2%	11.4%	10.4%
Non-Operating Income	42	49	45	16	18	14	19	9	8
Non-Operating Expenses	12	58	105	14	16	8	17	8	25
Recurring Profit	99	109	-128	-224	-284	-24	375	478	514
YoY	226.7%	9.9%	-	-	-	-	-	27.6%	7.5%
RPM	3.2%	2.7%	-3.0%	-8.0%	-10.8%	-0.8%	10.2%	11.5%	10.1%
Extraordinary Gains	44	16	52	0	45	-	1	2	5
Extraordinary Losses	3	492	341	346	109	7	0	0	0
Tax Charges	2	39	-7	-1	3	6	36	44	92
Implied Tax Rate	2%	-11%	1.6%	0.1%	-0.8%	-20.9%	9.6%	9.1%	17.7%
Net Income	138	-408	-408	-570	-351	-37	340	436	427
YoY	-169.0%	-395.5%	-	-	-	-	-	28.5%	-2.2%
Net Margin	4.4%	-10.2%	-9.5%	-20.3%	-13.3%	-1.2%	9.3%	10.5%	8.4%

Source: Shared Research based on company data
 Figures may differ from company materials due to differences in rounding methods.

Historical forecast accuracy

Initial CE vs. Results (JPYmn)	FY03/07 Non-cons.	FY03/08 Cons.	FY03/09 Cons.	FY03/10 Cons.	FY03/11 Cons.	FY03/12 Cons.	FY03/13 Cons.	FY03/14 Cons.	FY03/15 Cons.
Sales (Initial CE)	2,650	3,000	3,870	3,389	3,110	2,980	3,378	4,504	4,534
Sales (Results)	3,114	4,012	4,299	2,803	2,640	3,106	3,672	4,171	5,095
Initial CE vs. Results	17.5%	33.7%	11.1%	-17.3%	-15.1%	4.2%	8.7%	-7.4%	12.4%
Operating Profit (Initial CE)	-	40	129	139	191	22	69	493	506
Operating Profit (Results)	69	118	-68	-227	-286	-30	373	477	531
Initial CE vs. Results	-	195.2%	-	-	-	-	441.1%	-3.2%	5.0%
Recurring Profit (Initial CE)	101	52	71	133	179	18	65	488	489
Recurring Profit (Results)	99	109	-128	-224	-284	-24	375	478	514
Initial CE vs. Results	-1.8%	109.5%	-	-	-	-	476.5%	-2.0%	5.1%
Net Profit (Initial CE)	92	50	63	133	179	13	60	449	450
Net Profit (Results)	138	-408	-408	-570	-351	-37	340	436	427
Initial CE vs. Results	50.3%	-	-	-	-	-	466.3%	-2.8%	-5.1%

Source: Shared Research based on company data
 Figures may differ from company materials due to differences in rounding methods.

From FY03/09 through FY03/12 the company initially forecast profits every year but delivered a series of losses. However, in the absence of a solid profitability roadmap, results fell short of company forecasts. Results in FY03/13 and subsequent years, though, came in well above or in line with Tamagawa's forecasts. In addition to a profit recovery in the Electronics and telecoms equipment business, Solar system sales chipped in.

Balance sheet

Balance Sheet (JPYmn)	FY03/07 Non-cons.	FY03/08 Cons.	FY03/09 Cons.	FY03/10 Cons.	FY03/11 Cons.	FY03/12 Cons.	FY03/13 Cons.	FY03/14 Cons.	FY03/15 Cons.
ASSETS									
Cash and Equivalents	1,074	706	820	665	493	56	390	1,764	1,524
Marketable securities		256	-	-	-	-	-	-	-
Accounts Receivable	1,343	2,046	1,033	915	663	864	1,345	1,112	1,377
Inventories	306	580	345	275	328	299	328	347	447
Other Current Assets	192	134	47	63	45	74	52	197	258
Total Current Assets	2,915	3,722	2,245	1,918	1,530	1,293	2,114	3,421	3,606
Buildings	186	174	162	132	94	80	87	114	130
Equipment, Plant	62	458	88	36	5	1	58	87	126
Machinery and equipment	3	20	2	1	1	0	22	430	1,458
Land	198	198	198	126	106	52	52	52	540
Construction in Progress							346	35	156
Acc. Depreciation	973	1,142	1,151	997	959	899	884	908	966
Total Tangible Fixed Assets	453	855	451	295	205	133	564	718	2,410
Investments	630	90	251	69	23	8	14	19	23
Other	156	7	16	20	7	9	13	19	131
Total Other Fixed Assets	786	97	267	89	30	18	27	38	154
Software	17	301	25	25	-	-	1	19	88
Other	25	22	22	14	-	-	-	12	106
Total Intangible Assets	42	323	47	39	-	-	1	31	194
Total Fixed Assets	1,281	1,275	765	423	235	150	593	788	2,759
Total Assets	4,195	4,997	3,010	2,341	1,766	1,445	2,709	4,210	6,376
LIABILITIES									
Accounts Payable	145	1,301	511	443	430	364	386	474	620
Short Term Debt	615	404	507	433	203	30	40	323	300
Accrued Amount Payable	38	253	108	39	31	48	108	86	169
Other Current Liabilities	512	336	99	111	220	156	173	247	392
Total Current Liabilities	1,310	2,293	1,226	1,026	884	598	708	1,130	1,481
Long Term Debt	242	441	216	67			151	294	539
Lease obligations									947
Other Fixed Liabilities	84	208	101	86	83	85	100	148	247
Total Long Term Liabilities	327	649	318	153	83	85	251	442	1,733
Total Interest Bearing Debt	858	844	724	500	203	30	192	618	839
Total Liabilities	1,636	2,942	1,544	1,179	967	683	959	1,572	3,215
SHAREHOLDER EQUITY (NET ASSETS)									
Issued Capital	1,029	1,029	1,029	1,102	1,102	1,102	1,387	1,625	1,656
Reserves	1,196	1,196	1,024	1,096	1,096	1,096	1,381	1,620	1,077
Retained Earnings	322	-119	-619	-983	-1,335	-1,372	-991	-555	445
Total Shareholder Equity (Net Assets)	4,195	2,055	1,466	1,162	799	761	1,751	2,638	3,161
Working Capital	1,504	1,325	867	747	562	800	1,287	986	1,204
Interest Bearing Debt	858	844	724	500	203	30	192	618	839
Net Debt	-216	138	-96	-165	-290	-26	-198	-1,146	-685

Source: Shared Research based on company data

Figures may differ from company materials due to differences in rounding methods.

Assets

During FY03/15, current assets accounted for 56.6% of total assets. The ratio of fixed assets has increased since FY03/13.

Primary factors of current assets were cash and equivalents (42.3% of current assets in FY03/15) and accounts receivable (38.2%). Operating cash flows stemming from improved profitability, stock issuances, and financing activity were factors in cash and equivalents increasing from JPY390mn in FY03/13 to JPY1.5bn in FY03/15.

Tangible fixed assets shrank from JPY451mn in FY03/09 to JPY133mn in FY03/12 owing to a string of impairment losses amid

slumping profits. In FY03/13 and onward, tangible fixed assets have been on an uptrend due to construction of solar parks and capex in the Electronics and telecoms equipment business.

Liabilities

In FY03/15, a majority of liabilities is comprised of accounts payable, interest-bearing liabilities, and lease obligations.

Interest-bearing liabilities shrank from JPY844mn in FY03/08 to JPY30mn in FY03/12. Shared Research estimates that borrowing was difficult due to the profit slump, so Tamagawa repaid short- and long-term borrowings, corporate bond redemptions continued, and there was no debt refinancing. In FY03/13 interest-bearing liabilities increased for the first time in five years and amounted to JPY192mn. In FY03/15 the figure increased to JPY839mn.

In FY03/15 net debt (interest-bearing liabilities minus cash and deposits) was positive, amounting to positive JPY685mn.

The company newly reported lease obligations worth JPY947mn in FY03/15 because it built the solar parks in Tateyama and Sodegaura, both in Chiba Prefecture, on leases.

Net assets

Due to the extended profit slump and net losses, net assets declined from JPY4.2bn in FY03/07 to JPY761mn in FY03/12. Retained earnings were minus JPY1.3bn in FY03/12. In FY03/13 net income returned to the black, leading to an increase in retained earnings for the first time in five years. Capital and additional paid-in capital increased due to the placement of 2.1mn shares in January 2013 and the issuance of options (potential issuance: 4.8mn additional shares). We note that 1.8m additional shares were issued in FY03/13 on the exercising of options.

During FY03/14, net assets increased by JPY477mn from the exercise of share subscription rights issued in January 2013 and by JPY436mn in net income.

In FY03/15 net assets totaled JPY3.2bn due to JPY427mn in net income and others.

Cash flows

Cash Flow Statement (JPYmn)	FY03/07 Non-cons.	FY03/08 Cons.	FY03/09 Cons.	FY03/10 Cons.	FY03/11 Cons.	FY03/12 Cons.	FY03/13 Cons.	FY03/14 Cons.	FY03/15 Cons.
Operating Cash Flow (1)	-305	-136	259	-1	68	-332	36	764	387
Investment Cash Flow (2)	59	-111	-17	12	93	77	-454	-265	-865
Free Cash Flow (1+2)	-246	-247	242	11	162	-255	-418	499	-478
Financial Cash Flow	-43	-121	-194	-82	-299	-168	783	875	238
Depreciation & Amortization (A)	48	58	217	76	20	14	22	84	106
Capital Expenditures (B)	-31	-134	-82	-22	-7	-12	-446	-254	-866
Working Capital Changes (C)	381	-179	-459	-120	-186	238	488	-301	219
Simple FCF (NI + A + B - C)	-226	-305	186	-397	-152	-272	-572	568	-552

Source: Shared Research based on company data

Figures may differ from company materials due to differences in rounding methods.

Operating cash flow

Operating cash flow hinges on net income, depreciation, goodwill amortization and changes in working capital. The reason that operating cash flow topped net losses plus depreciation and goodwill amortization from FY03/09 through FY03/11 was impairment losses, valuation losses on investment securities and a drop in working capital. In FY03/12 operating cash flow fell despite a narrower net loss due to an increase in accounts receivable. In FY03/13 and later operating cash flow stayed in the black as the company continued to report annual net income. .

Investment cash flow

Through FY03/12 Tamagawa was restrained in its investments with capex below JPY100mn, so cash flows from investing activities were minus JPY17mn in FY03/09 but positive from FY03/10 through FY03/12. Tamagawa's investment cash flow remained in negative territory in FY03/13 and the subsequent years due to capital investments in the Electronics and telecoms equipment business and capex in the solar parks.

Financial cash flow

Interest-bearing debt declined from FY03/09 through FY03/12, so financing cash flows remained negative. In January 2013 Tamagawa made a placement of 2.1mn shares and issued options (if exercised would prompt the issuance of 4.8mn additional shares) to fund solar park construction. There were 1.8m shares issued in FY03/13 on the exercising of options. In FY03/13 Tamagawa saw JPY783mn in financing cash flows: JPY554mn from the issuance of shares; JPY47mn from option issuance; JPY170mn from long-term borrowing; and JPY100mn from corporate bond issuance.

During FY03/14, inflows included JPY450mn from the issuance of shares, and inflows from borrowings, leading to JPY875mn in financing cash flows.

In FY03/15, financing cash flows came to JPY238mn, due to JPY58mn in revenue from issuing new shares, JPY26mn in revenue from issuing share purchase warrants, and borrowings.

Other information

History

Founded in 1968, the company was a leader in analog high-frequency wireless technology. By the mid-2000s the business was derailed by Korean competitors. After several missteps and ownership changes Tamagawa found itself with the current leadership in 2012.

J Bridge Corp became a shareholder in 2007. In 2007 J Bridge Corp (now Asia Alliance Holdings Co Ltd; TSE2: 9318) became a shareholder. J Bridge in turn installed an executive from a company in which it held an equity stake (J Capital Management Co Ltd, 14.7% stake) to Tamagawa's board in 2007. The new board member was then made CEO and proceeded to make a number of failed acquisitions, speculative investments and unwise decisions, leading to further deterioration.

Raised capital for biomass energy in 2010. After the J Bridge-appointed CEO stepped down in 2009, the company liquidated some money-losing subsidiaries in a bid to regain profitability. But amid declining sales its core electronics and telecommunications equipment business continued to lose money in FY03/09-FY03/11. In 2010 the company raised JPY144mn in new capital to launch a biomass energy business. It was liquidated in March 2012 after posting operating losses in FY03/11 through Q2 FY03/13.

Masanori Kobayashi joins core business in June 2011. In June 2011, Masanori Kobayashi, a veteran of the company, was appointed a director of Tamagawa Electronics Co Ltd, a subsidiary that is the core business. Kobayashi was subsequently appointed CEO of Tamagawa Electronics in April 2012 and he took charge of rebuilding the electronics and telecommunications equipment business. The reform included exiting unprofitable projects, something Tamagawa was routinely doing while battling overseas rivals. The segment returned to operating profitability in FY03/12.

Focusing on profits. In April 2012, following a request from a major Tamagawa HD shareholder, Toru Masuzawa became executive director of Tamagawa Holdings, and CEO in June 2012. In June 2014, Tamagawa shifted to a joint leadership system of two representative directors to cope with difficult market conditions. In addition to the incumbent Representative Director Toru Masuzawa, the company promoted Masanori Kobayashi to new representative director with the aim to establish a fair and transparent management base by maintaining and improving its compliance system and ensuring strong corporate governance. In the same month, Yasuhiko Noguchi assumed presidency of Tamagawa Solar Systems (currently Tamagawa Energy).

The company's main task is to ensure profitability. The focus is on Tamagawa Energy, headed by Mr. Noguchi, and solar park management where FIT pricing is guaranteed by the government. Another priority is ensuring stable profitability at Tamagawa Electronics under the command of Kobayashi.

News and topics

December 2015

On December 10, 2015, the company revised its sales and earnings forecast for FY3/16, and also provided an updated status report on its Geothermal Power Plant Operations.

Revised FY 3/16 forecast

Sales: JPY5.41bn (previously JPY5.6–7.3bn)

Operating profit: JPY159mn (previously JPY590–850mn)

Recurring profit: JPY105mn (previously JPY520–790mn)

Net income: JPY106mn (previously JPY400–570mn)

Reasons for the revision

Moves by telecommunications carriers to restrain abrupt spending on mobile phone infrastructure and a lull (due to seasonality) in work on large government projects hurt sales at the Electronics and Telecoms Equipment segment. As this left 1H sales short of the company's initial forecast and put the Electronics and Telecoms Equipment segment below its breakeven point, the company revised its full-year earnings forecast.

Tamagawa Holdings had previously given its full-year forecast as a range estimate, owing to its Renewable Energy Systems Sales segment, where sales and earnings vary depending on changes in the operating environment caused by external factors. As indicated in the Geothermal Power Plant Operations status report released the same day, the upper end of the forecast range was based on the assumption that upon the completion of construction of the two geothermal power plants that are currently under construction, the company would sell electrical power from the geothermal power plant and the geothermal power plants themselves, and would also sell the sites previously acquired for two other geothermal power plants where construction has not yet begun. However, the company has sold the two plants that were under construction to a third party, resold the land acquired to build the two other geothermal power plants, and halted the sale of geothermal power plants. In addition to lowering the expected sales amount at the Electronics and Telecoms Equipment segment, these moves caused the company to revise down earnings figures at both the upper and lower end of the expected range.

The sharp drop in expected profits relative to the company's full-year revised sales forecast is due to the fact that the decline in sales was at the high-margin Electronics and Telecoms Equipment segment.

Given the current operating environment, company plans for restoring orders and sales at the Electronics and Telecoms Equipment segment call for focusing on expanding sales to the defense market and the public sector disaster preparedness-related market, and also on acquiring new customers. These efforts have brought in new large scale orders and improved the segment's order flow but, since most of the deliveries under these orders will not be until April 2016 or later, the contributions to earnings from will not appear until next fiscal year.

Current status of previously planned geothermal power plants

On January 29, 2015, the company announced that it planned to build a total of seven geothermal power plants, and to this end acquired a total of seven separate plots of land. The company moved forward on construction at two of the seven sites but changed its plan. Under the new plan, the company will sell the two plants currently under construction to a third-party and sell back the sites acquired for the five other geothermal power plants to their original owners.

At the geothermal power plant located in Beppu City, Oita Prefecture, a reexamination of data acquired after work had begun showed that Tamagawa Holdings was unlikely to get the return on the project it originally envisioned. After a series of talks with the outside party that originally proposed the project, Tamagawa Holdings reached an agreement to sell the two power plants currently under construction to a company owned by the party that originally proposed the project at a price that would be greater than the total amount Tamagawa Holdings had invested in the two projects. The transaction and payment under this agreement are to be completed by the end of January 2016.

As for the remaining five sites at which construction of geothermal power plants has not yet begun, Tamagawa Holdings chose to exercise its right under the original purchase contract to sell the land back to the original owner at the same price for which it was purchased. Two of the five sites have already been sold back to their original owners and the sales of remaining three sites are expected to be completed by the end of December 2015.

The company had expected to use some of the capital that was raised by a warrant issue for its geothermal power plant operations. However, after only 10 of the warrants issued were exercised, adverse changes in the operating environment and the stock market pushed the company's share price down to a level where it made sense for the company to buy back and cancel all of the remaining 9,990 warrants and finance construction at the first geothermal power plant site with cash on hand.

October 2015

On **October 1, 2015**, the company announced the current status of its Geothermal Power Plant Operations (in planning).

As announced on December 26, 2014, the company has been carrying out administrative procedures and construction work for its new Geothermal Power Plant Operations in order to initiate electric power sales at an early stage. The company officially received a notice on September 30, 2015 from Kyushu Electric Power Co. regarding the approval and timing for grid connections of Tamagawa's two geothermal power plants.

Overview of the Geothermal Power Generation segment

- ✔ Connection date: Around April 2016
- ✔ Business: Geothermal power generation is not affected by the weather, seasons, or day/night fluctuations like solar power. As a result, one 125Kw geothermal power plant generates electricity roughly equivalent to a 1MW solar power plant. Geothermal power plants can be built on small plots of land, which makes efficient power procurement possible. The feed-in tariff of electricity produced by geothermal power plants is JPY40 per kilowatt (consumption tax not included for 15,000kW or less).

Overview of the geothermal power plant

- ✔ Location: Beppu, Oita Prefecture
- ✔ Output capacity: About 250kW
(equivalent to a 1MW solar power plant; two plants equivalent to a 2MW solar plant)
- ✔ Feed-in tariff: JPY40/kWh (fixed for 15 years)
- ✔ Feed-in revenue: About JPY80mn/year (estimated)
- ✔ Generation capacity: About 2.2mn kWh/year (estimated)
- ✔ Sales start date: Around April 2016

The company projects that this geothermal power plant will begin operations in FY03/17. Although it expects the effect on FY03/16 earnings to be negligible, it will swiftly announce any updates as soon as it is possible to calculate earnings forecasts.

September 2015

On **September 18, 2015**, the company announced the acquisition and cancellation of No. 6 stock warrants (with an option to adjust the exercise price).

At a board of directors meeting on the same day, the company resolved to acquire and cancel all No. 6 stock warrants issued to Macquarie Bank Limited on January 16, 2015.

Details of the acquisition and cancellation of warrants

- ▶ Name: No. 6 stock warrant (with an option to adjust the exercise price)
- ▶ Allottee: Macquarie Bank Limited
- ▶ Number of warrants: 10,000 (1,000 shares per warrant)
- ▶ Allocation date: January 16, 2015
- ▶ Payment amount: JPY1,960 per share
- ▶ Exercise price: JPY218 per warrant
- ▶ Exercise period: January 19, 2015 to January 18, 2017
- ▶ Number outstanding: 9,990 warrants
- ▶ Acquisition and cancellation date: October 16, 2015

Reasons for the acquisition and cancellation of No. 6 stock warrants

The company issued No. 6 stock warrants on January 16, 2015 to the allottee, Macquarie Bank Limited, in order to procure funds for the development of its solar and geothermal power plants. However, Tamagawa Holdings' stock price has remained at a low level following the issuance of the warrants, owing to the company's operating environment and the stock market, and so the company believes the allottee is unlikely to voluntarily exercise the warrants. It is also possible for the company to meet the abovementioned funding needs using cash on hand and indirect financing. Further, the company has determined that it is necessary to alleviate market concerns of possible dilution owing to the continued existence of unexercised warrants that the company believes are unlikely to be exercised.

Tamagawa Holdings believes that the acquisition and cancellation of the warrants will have a negligible impact on its FY03/16 investment plans.

July 2015

On **July 24, 2015**, the company released the update on its geothermal power plant operations.

On December 26, 2014, the company had announced that it was planning to kick off selling electricity of its geothermal power plant in August 2015. However, it now states that this may be pushed back, because of a surge in applications for grid connections to its geothermal power plant in Beppu, Oita Prefecture, where it is driving geothermal business while engaging in grid-connection talks with Kyushu Electric Power Co. This has created a potential need to procure voltage regulators (SVCs, or Static Voltage Controllers) in the grid-connection project with Kyushu Electric to begin selling power.

Tamagawa has already completed the negotiation stage for grid connection with Kyushu Electric and has received confirmation that it can proceed with the connection. Going forward, the company will crystallize timelines for the

completion date and the selling start date based on the detailed blueprint for grid connection by Kyushu Electric.

June 2015

On **June 11, 2015**, the company announced the progress of a business alliance with Etrion Japan KK.

The company has concluded a Memorandum of Understanding regarding the business alliance with Etrion Japan, and the two companies have discussed the process for establishing a solar power business in Misawa, Aomori. Both parties have now agreed upon a Term Sheet setting forth the specific process for this business and each company's stake. The company is analyzing the effect of this alliance on earnings for FY03/16 and plans to make an announcement as soon as possible.

Key points

- ▶ The two companies will establish a special-purpose company (SPC) for this joint business.
- ▶ Tamagawa may hold a stake of up to 30% in the SPC.
- ▶ The two companies aim to complete all procedures necessary to begin construction by December 2015.
- ▶ The two companies will jointly decide the method of funding and appoint engineering, procurement, and construction agents.

Overview of the power plant

- ▶ Location: Misawa, Aomori
- ▶ Operator: GP Energy A, GP Energy B, GP Energy C, GP Energy D (wholly owned units)
- ▶ Premises: 153,000sqm
- ▶ Capacity: 10MW
- ▶ Feed-in tariff: JPY36/kWh (before tax; fixed for 20 years)
- ▶ Revenue: JPY390mn a year (estimate)
- ▶ First year output: 10,852,814 kWh (estimate)

May 2015

On **May 12, 2015**, the company announced a reduction in capital reserves and the distribution of a surplus.

At a meeting of the board of directors held on the same day, the company resolved to reduce capital reserves by JPY200mn and transfer the entire amount to the capital surplus account. It plans to use JPY41mn of the increase in capital surplus to pay a dividend of JPY1 per share. The aim of the above is to secure shareholder return, and ensure a flexible capital policy in future.

The planned record date for this distribution is March 31, 2015, provided the proposal to reduce capital reserves is approved at the general meeting of shareholders on June 26, 2015, and the necessary procedures to protect creditors are completed.

April 2015

On **March 30, 2015**, the company announced a business alliance with Etrion Japan KK.

On the day of announcement, the two companies signed a Memorandum of Understanding to make a joint investment in a solar power plant in Misawa, Aomori Prefecture.

Etrion Japan KK is part of the Etrion Group under parent company Etrion Corporation, which constructs, owns, and operates full-scale solar power plants. It is an independent power producer (IPP) with solar power plants totaling 130MW in output in Italy and Chile, and is listed on the Toronto and Stockholm stock exchanges. Headquartered in Canada, this international renewable energy provider also has branches in Geneva, Miami, Rome, Santiago, and Tokyo.

As announced on December 26, 2014, the company has acquired the land for a solar power plant in Misawa, and is making preparations to begin selling electricity as soon as possible. Per this Memorandum of Understanding, Tamagawa and Etrion will raise funds for this project once both companies have completed their due diligence. The company thus expects to complete the construction soon and with no major issues. The company has yet to decide on the method of raising funds, and how the plant will be operated.

Overview of the power plant

- ▶ Location: 5-chome, Mukawame, Misawa City, Aomori Prefecture
- ▶ Operator: GP Energy A, GP Energy B, GP Energy C, GP Energy D (wholly owned units)
- ▶ Premises: 153,000sqm
- ▶ Capacity: 10MW
- ▶ Feed-in tariff: JPY36/kWh (before tax; fixed for 20 years)
- ▶ Revenue: JPY390mn a year (estimate)
- ▶ First year output: 10,852,814 kWh (estimate)

On **March 24, 2015**, the company announced the start of electricity sales at its solar park in Sodegaura (Chiba Prefecture).

The company launched electricity sales on March 24, 2015, after connecting to the Tokyo Electric Power (TEPCO) grid. The company does not expect this to have any material impact on earnings results for FY03/15.

Overview of the Sodegaura solar park

- ▶ Name: Sodegaura Hayashi Power Plant
- ▶ Footprint: Approx. 15,000sqm
- ▶ kW output: Approx. 1,300kW
- ▶ Feed-in tariff: JPY36/kWh (pre-tax; fixed for 20 years)
- ▶ Expected revenue: Approx. JPY60mn per year from the sale of electricity

▶ (cumulative total for 20 years: JPY1.2bn).

March 2015

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On the day of announcement, the two companies signed a Memorandum of Understanding to make a joint investment in a solar power plant in Misawa, Aomori Prefecture.

Etrion Japan KK is part of the Etrion Group under parent company Etrion Corporation, which constructs, owns, and operates full-scale solar power plants. It is an independent power producer (IPP) with solar power plants totaling 130MW in output in Italy and Chile, and is listed on the Toronto and Stockholm stock exchanges. Headquartered in Canada, this international renewable energy provider also has branches in Geneva, Miami, Rome, Santiago, and Tokyo.

As announced on December 26, 2014, the company has acquired the land for a solar power plant in Misawa, and is making preparations to begin selling electricity as soon as possible. Per this Memorandum of Understanding, Tamagawa and Etrion will raise funds for this project once both companies have completed their due diligence. The company thus expects to complete the construction soon and with no major issues. The company has yet to decide on the method of raising funds, and how the plant will be operated.

Overview of the power plant

- ▶ Location: 5-chome, Mukawame, Misawa City, Aomori Prefecture
- ▶ Operator: GP Energy A, GP Energy B, GP Energy C, GP Energy D (wholly owned units)
- ▶ Premises: 153,000sqm
- ▶ Capacity: 10MW
- ▶ Feed-in tariff: JPY36/kWh (before tax; fixed for 20 years)
- ▶ Revenue: JPY390mn a year (estimate)
- ▶ First year output: 10,852,814 kWh (estimate)

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- kW output: Approx. 1,300kW
- Feed-in tariff: JPY36/kWh (pre-tax; fixed for 20 years)
- Expected revenue: Approx. JPY60mn per year from the sale of electricity
(cumulative total for 20 years: JPY1.2bn).

On **March 5, 2015**, the company announced revisions to its full-year earnings forecasts.

Full-year FY03/15 forecast revisions (previous forecasts in parentheses)

- ▶ Sales: JPY5.0bn (JPY4.5bn)
- ▶ Operating profit: JPY517mn (JPY506mn)
- ▶ Recurring profit: JPY507mn (JPY489mn)
- ▶ Net income: JPY455mn (JPY450mn)

Reasons for the revisions

The company expects sales and profits to outperform previous forecasts, due to it being able to secure land to facilitate sales of solar power plant equipment, as well as robust sales conditions.

February 2015

On **February 23, 2015**, the company announced that its mega solar power plant in Tateyama City, Chiba Prefecture commenced operations.

According to the company, connections from its mega solar power plant in Tateyama City to the Tokyo Electric Power (TEPCO) grid have been completed, and sales of power began on February 23, 2015. The company does not expect this to have a material impact on its FY03/15 earnings results.

Summary of Tateyama City mega solar power plant

- ▶ Plant name: Tateyama Power Plant
- ▶ Land area: approx. 35,386sqm
- ▶ Generation capacity: 1,999kW
- ▶ Feed-in tariff (fixed rate for 20 years): JPY40/kWh (tax exclusive)
- ▶ Estimated feed-in revenue: JPY95mn/year, JPY1.9bn cumulative total for 20 years

On **February 6, 2015**, the company announced that it will borrow long-term operating funds.

Funds will be loaned to the company from the Chiba Bank in the amount of JPY100mn, with a due date of January 31, 2018.

On **February 3, 2015**, the company announced that a subsidiary will secure a site for to facilitate the sale of solar power plant equipment.

Subsidiary Tamagawa Solar Systems Co., Ltd. decided at a meeting of the board of directors that it will secure land to facilitate the sale of power plant equipment. According to the company, after acquiring the rights to a feed-in tariff of JPY36 set by the Ministry of Economy, Trade and Industry (METI), it will be able to divide ownership of the low-voltage power plant into 13 lots, to sell to outside buyers. This is expected to boost group earnings.

Details of the equipment sales

- ▶ Location: Kanoya City, Kagoshima Prefecture

- ▶ Total area: about 11,070sqm (for all 13 lots)
- ▶ Output capacity: about 650Kw (for all 13 lots)
- ▶ Feed-in tariff: JPY36/kWh (fixed for 20 years)
- ▶ Acquisition date: February 3, 2015

January 2015

On **January 29, 2015**, the company announced that it would acquire additional land for its geothermal power operations.

Purpose

Tamagawa Holdings, which plans to launch a geothermal power generation business, has already acquired land in Beppu City, Oita Prefecture, to build a 125kW plant. The construction is currently underway to providing electricity as early as possible. The company has decided to acquire six additional plots to build plants with a total capacity of 750kW. As a result, the group will have seven plots for a total capacity of 875kW. A 125kW geothermal plant generates electricity equivalent to a 1MW solar power plant. Thus, the company will have power plants with a combined generation capacity of a 7MW solar power plant.

The choice of Beppu City

The company will build binary cycle power plants that use underground steam to rotate turbines. Binary power plants generate electricity through a medium that has a lower boiling point than water. There is no need for the company to seek a new energy source because it will use a power source already being used for a hot spring nearby. Thus, the company will be able to start operations within a short period of time at a relatively low cost. In addition, the company has determined that the location is suitable for geothermal power generation because another binary cycle power plant is operating nearby and there is an ample supply of hot water.

Overview of the land

- ▶ Location: Beppu City, Oita Prefecture
- ▶ Size: 2,100sqm
- ▶ Output: 750kW (One plot accommodates a 125kW geothermal plant, equivalent to a 1MW solar plant. Thus, six plots of land would allow for power generation equivalent to a 6MW solar plant.)
- ▶ Electricity price: JPY40/kWh (fixed for 15 years)
- ▶ Expected annual revenue: JPY250mn
- ▶ Expected initial year output: 6,800,000kWh
- ▶ Transfer date: January 30, 2015

On **January 16, 2015**, the company announced the completion of payments related to the issuance of warrants (with an option to adjust the exercise price).

The payments related to warrants announced on December 26, 2014.

November 2014

On **November 25, 2014**, the company announced the establishment of a second-tier overseas subsidiary.

Tamagawa Electronics Co., Ltd., a wholly owned subsidiary of the company, will form a subsidiary in Vietnam on March 31, 2015.

Purpose of establishment

Tamagawa Electronics is engaged primarily in the design, manufacture, and sales of mobile high frequency telecommunications base stations, and other high frequency devices used in television transmission and public wireless infrastructure. Tamagawa Electronics has been a manufacturer and supplier to major domestic telecommunications manufacturers. In recent years, price competition has caused a greater portion of manufacturing and procurement to occur overseas, and in order to meet this demand and further reduce manufacturing costs for high frequency devices, the company has decided to establish a subsidiary in Vietnam with the intent of expanding its sales overseas and providing higher quality products.

Subsidiary details

- ▶ Name: Tamagawa Electronics Vietnam Co., Ltd.
- ▶ Location: Socialist Republic of Vietnam
- ▶ Capital: JPY50.0mn
- ▶ Owner: Tamagawa Electronics Co., Ltd. (100%)
- ▶ Business: Manufacture and sales of telecommunications equipment

On **November 18, 2014**, the company announced progress regarding construction of the solar park in Goto City, Nagasaki Prefecture.

As disclosed on May 29, 2013, the company has acquired land in Goto City for the construction of a solar park, and is continuing preparations to begin operations. Tamagawa has now received approval from Nagasaki Prefecture to develop in a forested area.

As the company continues preparations to begin construction, it has been applying to relevant authorities for permits required to begin work. Approval from Nagasaki Prefecture to develop in a forested area was one such requirement to begin construction of the solar park. The solar park is planned to utilize a 5.5MW extra high voltage system—the first of its type for Tamagawa.

About the Goto City solar park

- ▶ Location: Yoshikugi-cho, Goto City, Nagasaki Prefecture
- ▶ Operator: GP Energy 2 Co., Ltd. (wholly owned subsidiary)
- ▶ Area: 10 hectares
- ▶ Capacity: Approx. 5.5MW
- ▶ Feed-in tariff: JPY36/kWh (fixed for 20 years)

- ▶ Generation revenue: JPY250mn/year (tentative)
- ▶ First-year generation volume: Approx. 6,790,566kWh

The company has modified its capacity estimates for this facility from 6.0MW to 5.5MW.

July 2014

On **July 22, 2014**, the company announced the progress of work on its solar park in Minami Shimabara, Nagasaki Prefecture.

The company has completed construction of a 49kW generator, and is now expanding the facility into a 1MW solar power plant. In a bid to ensure the smooth operation of the new plant, the company also changed the contract from a land lease contract to a contract establishing superficies (surface rights) on July 22—thus securing the surface rights necessary to build a 1MW solar power plant. The company has already completed development work on the area required for the expansion, and now plans to begin full-fledged construction work.

Overview of the Minami Shimabara Solar Park

- ▶ Location: Nagasaki Prefecture, Minami Shimabara
- ▶ Operator: GP Energy 3-A Co., Ltd. (wholly-owned subsidiary)
- ▶ Area: 22,112sqm
- ▶ Capacity: Approx. 1MW
- ▶ Tariff: JPY40/kWh (fixed for 20 years)
- ▶ Revenue from the sale of electricity (planned): approx. JPY50mn / year
- ▶ Output in the first year (planned): approx. 1.3mn kWh.

Other

The company has been subject to harmful internet rumors, and is taking steps to improve its reputation, including filing civil and criminal actions, to bring the perpetrators to account.

Major shareholders

Top Shareholders	Amount Held
Marilyn Hweetieng Tang	12.90%
CBSG Bank Julius Bär Group Ltd. (Singapore)	10.20%
Japan Securities Finance Co., Ltd	5.10%
Hiromasa Shimanuki	4.60%
Yadi Perman	3.60%
Yugen Kaisha Sato Sogo Kikaku	3.30%
Sada Kubota	2.40%
Masuzawa Toru	2.20%
Rakuten Securities, Inc.	2.00%
Noriyuki Arai	1.90%

Source: Shared Research based on company data
As of March 31, 2015

Company profile

Company	Head office
Tamagawa Holdings Co., Ltd	VORT Hamamatsu-cho I, 1-6-15, Hamamatsu-cho, Minato-ku Tokyo, Japan 105-0013
Phone	Listed on
+81-3-6435-6933	JASDAQ
Established	Exchange listing
May 7, 1970	August 31, 1999
Website	Fiscal year-end
http://www.tmex.co.jp/english/index.html	March
IR Web	
http://www.tmex.co.jp/english/ir-info.html	

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Axell Corporation	IID, Inc.	Ryohin Keikaku Co., Ltd.
Azbil Corporation	Infomart Corp.	Sanix Incorporated
Bell-Park Co., Ltd.	Intelligent Wave Inc.	Sanrio Co., Ltd.
Benefit One Inc.	istyle Inc.	SATO Holdings Corp.
Canon Marketing Japan Inc.	Itochu Enex Co., Ltd.	SBS Holdings, Inc.
Carna Biosciences, Inc.	ITO EN, Ltd.	Ship Healthcare Holdings Inc.
Chiyoda Co., Ltd.	J Trust Co., Ltd	SMS Co., Ltd.
Chugoku Marine Paints, Ltd.	Japan Best Rescue System Co., Ltd.	SOURCENEXT Corporation
Cocokara Fine, Inc.	JIN Co., Ltd.	Star Mica Co., Ltd.
Comsys Holdings Corporation	Kameda Seika Co., Ltd.	SymBio Pharmaceuticals Limited
CRE, Inc.	Kenedix, Inc.	Takashimaya Co., Ltd.
Creek & River Co., Ltd.	KLab Inc.	Takihyo Co., Ltd.
Daiseki Corp.	LAC Co., Ltd.	Tamagawa Holdings Co., Ltd
DIC Corporation	Lasertec Corp.	TEAR Corporation
Digital Garage Inc.	MAC-HOUSE Co.	3-D Matrix, Ltd.
Don Oijote Holdings Co., Ltd.	Matsui Securities Co., Ltd.	TOKAI Holdings Corp.
Dream Incubator Inc.	Medinet Co., Ltd.	Verite Co., Ltd.
Elecom Co.	MEGANESUPER CO., LTD.	WirelessGate, Inc.
EMERGENCY ASSISTANCE JAPAN Co.	Milbon. Co., Ltd.	Yellow Hat Ltd.
en-Japan Inc.	MIRAIT Holdings Corp.	Yumeshin Holdings
FerroTec Corp.	MONEY SQUARE HOLDINGS, INC.	VOYAGE GROUP, Inc.
Fields Corp.	NAGASE & CO., LTD	ZAPPALLAS, INC.
Financial Products Group Co., Ltd.	NAIGAI TRANS LINE LTD.	ZIGEXN Co., Ltd.
FreeBit Co., Ltd.	NanoCarrier Ltd.	

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