



LAST UPDATE 【2016/11/11】

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 Cons.	FY03/17 Est.
Total sales	2,803	2,640	3,106	3,672	4,171	5,095	7,260	6,633
YoY	-34.8%	-5.8%	17.7%	18.2%	13.6%	22.1%	42.5%	-8.6%
Gross profit	392	326	590	1,049	1,198	1,479	1,550	
YoY	-58.8%	-16.8%	81.1%	77.8%	14.3%	23.4%	4.8%	
GPM	14.0%	12.3%	19.0%	28.6%	28.7%	29.0%	21.3%	
Operating profit	-227	-286	-30	373	477	531	280	354
YoY	-	-	-	-	27.8%	11.3%	-47.4%	26.6%
OPM	-8.1%	-10.8%	-1.0%	10.2%	11.4%	10.4%	3.9%	5.3%
Recurring Profit	-224	-284	-24	375	478	514	211	260
YoY	-	-	-	-	27.6%	7.5%	-58.9%	23.0%
RPM	-8.0%	-10.8%	-0.8%	10.2%	11.5%	10.1%	2.9%	3.9%
Net Income	-570	-351	-37	340	436	427	165	192
YoY	-	-	-	-	28.5%	-2.2%	-61.3%	16.1%
Net Margin	-20.3%	-13.3%	-1.2%	9.3%	10.5%	8.4%	2.3%	2.9%
Per share data								
No. of shares ('000)	6,774	6,774	6,774	10,753	41,259	42,031	42,598	
EPS	-35.1	-17.8	-1.9	15.7	11.7	10.4	4.0	4.6
EPS (fully diluted)	-	-	-	14.8	10.6	10.2	3.9	
Dividend per share	-	-	-	-	-	1.0	1.5	1.0-3.0
Book value per share	58.9	40.6	38.6	54.3	64.8	75.4	78.1	
Balance sheet (JPYmn)								
Cash and equivalents	665	493	56	390	1,764	1,524	2,737	
Total current assets	1,918	1,530	1,293	2,114	3,421	3,606	4,221	
Tangible fixed assets, net	295	205	133	564	718	2,410	2,464	
Other fixed assets	89	30	18	27	38	154	169	
Intangible assets	39	-	-	1	31	194	309	
Total assets	2,341	1,766	1,445	2,709	4,210	6,376	7,164	
Accounts payable	443	430	364	386	474	620	321	
Short-term debt	433	203	30	40	323	300	1,395	
Total current liabilities	1,026	884	598	708	1,130	1,481	2,049	
Long-term debt	67	-	-	151	294	539	612	
Total fixed liabilities	153	83	85	251	442	1,733	1,820	
Total liabilities	1,179	967	683	959	1,572	3,215	3,869	
Net assets	1,162	799	761	1,751	2,638	3,161	3,295	
Interest-bearing debt	500	203	30	192	618	839	2,007	
Cash flow statement (JPYmn)								
Cash flows from operating activities	-1	68	-332	36	764	387	1,614	
Cash flows from investing activities	12	93	77	-454	-265	-865	-392	
Cash flows from financing activities	-82	-299	-168	783	875	238	-2	
Financial ratios								
ROA	-8.4%	-13.8%	-1.5%	18.0%	13.8%	9.7%	3.1%	
ROE	-43.4%	-35.8%	-4.7%	27.4%	20.1%	14.8%	5.2%	
Equity ratio	49.6%	45.3%	52.7%	64.6%	62.7%	49.6%	46.0%	

Source: Shared Research based on company data

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

Recent updates

Highlights

On **November 11, 2016**, Tamagawa Holdings Co., Ltd. announced earnings results for 1H FY03/17; see the results section for details.

On **November 1, 2016**, the company announced that it received an order for a subsystem that will be used in a next generation weather instrument.

The company received an order from Toshiba Corporation for a subsystem that will be used in a next-generation weather instrument. This device is part of the “research and development of technology to predict heavy rains and tornadoes,” one item of the national project “Enhancement of Societal Resiliency against Natural Disasters” under the Strategic Innovation Promotion Program (SIP). The results of this project are expected to be used in the 2020 Tokyo Olympics and Paralympics.

Resiliency is used in this case to refer to the ability of a society to recover and withstand natural disasters that result from climate change.

On **October 31, 2016**, the company made an announcement regarding the acquisition of fixed assets (mega-solar electricity generation facilities) through a lease.

GP Energy 6 Co., Ltd., a subsidiary of Tamagawa Holdings’ consolidated subsidiary GP Energy Co., Ltd., has passed a resolution to acquire the mega-solar power plant in Noboribetsu city, a facility with an output of approximately 2MW that the company has been planning for construction in Hokkaido’s Noboribetsu city. GP Energy 6 intends to acquire the power generation plant by entering into a contract with Ricoh Leasing Company, Ltd., with the lease planned to begin in August 2017.

The mega-solar electricity generation facility in Noboribetsu city, Hokkaido occupies a favorable site approximately 72,000sqm in area, and will be able to sell electricity at a fixed feed-in tariff of JPY40 per kW (excluding consumption tax) for twenty years, with an expected yearly generation revenue (planned) of approximately JPY94mn. Further, twelve units of tracking systems that can be anticipated to improve the efficiency of solar energy power generation are planned for installation within the same site, and are expected to contribute to earnings of the company. KCCS Mobile Engineering Co., Ltd., the company responsible for construction of this power generation facility, is a Kyocera group company that has worked on installation and construction of public and industrial solar power generation system facilities throughout Japan. Shared Research believes that the construction of this facility to proceed in a rapid, reliable manner.

Description of assets to be leased (mega solar power generation facility in Noboribetsu city, Hokkaido)

- Operator: GP Energy 6 Co., Ltd.
- EPC operator: KCCS Mobile Engineering Co., Ltd.
- Capacity: Approximately 2 MW
- First year output (planned): About 2,350,000 kWh

- Outline of leased assets and total lease fee: Solar power generation systems for JPY711 mn
- Acquisition cost equivalent: JPY490mn

On **October 6, 2016**, the company announced the operational launch of a system for which the company had earlier won a consignment contract in the public and social infrastructure field.

The company's Tamagawa Electronics Co., Ltd. unit (Tamagawa Electronics), sought to win more contracts in the public and social infrastructure field to expand its business territory. As a result, the company received an order from Nippon Airport Radio Service Co., Ltd. for development and production of an optic distributed antenna system (DAS) for an airport multi-channel access (MCA) radio network. The system has begun operation at Narita International Airport.

Tamagawa Electronics supplied the DAS system, an optical transmission device for dead zones aimed at increasing the number of communications lines and enhancing the overall network functionality. One of the major features of this system is that it can be expanded with the addition of more units, allowing the user to easily enlarge the wireless communications area. The system can also be used with a surveillance application using the ethernet to monitor various devices in operation.

On **September 12, 2016**, the company announced the status of its mega solar power plant in Noboribetsu, Hokkaido Prefecture.

Status of the mega solar power plant in Noboribetsu

The company already received certification for the land and power sales business at the mega solar power plant in Noboribetsu, Hokkaido Prefecture. It had been applying for development permits and preparing for construction. It received permission from Hokkaido Prefecture to develop forested area necessary to build a large solar power plant.

The price has been approved under METI's feed-in tariff scheme for renewable energy, at JPY40 per kWh (excl. tax; fixed for 20 years).

Overview of the plant

Capacity:	About 2 MW
Feed-in tariff (fixed for 20 years):	JPY40/kWh (excl. tax)
Generation revenue (planned):	About JPY94mn/year
First-year output:	About 2,350.000kW

On **September 2, 2016**, Shared Research updated this report following interviews with the company.

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

Trends and outlook

Quarterly trends and results

Quarterly performance (cumulative) (JPYmn)	FY03/16				FY03/17				FY03/17	
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	% of FY	FY Est.
Sales	682	1,108	3,341	7,260	476	1,814			27.3%	6,633
YoY	-18.3%	-42.4%	7.7%	42.5%	-30.2%	63.7%				-8.6%
Gross profit	225	353	776	1,550	132	526				
YoY	-13.8%	-42.7%	-22.1%	4.8%	-41.1%	48.8%				
GPM	33.0%	31.9%	23.2%	21.3%	27.8%	29.0%				
SG&A expenses	247	514	866	1,270	237	522				
YoY	21.4%	27.1%	38.8%	34.0%	-4.1%	1.6%				
SG&A-to-sales ratio	36.2%	46.4%	25.9%	17.5%	49.7%	28.8%				
Operating profit	-22	-161	-90	280	-104	3				354
YoY	-	-	-	-47.4%	-	-				26.6%
OPM	-	-	-	3.9%	-	0.2%				5.3%
Recurring profit	-32	-190	-138	211	-129	-43				260
YoY	-	-	-	-58.9%	-	-				23.0%
RPM	-	-	-	2.9%	-	-				3.9%
Net income	-38	-249	-180	165	-90	-4				192
YoY	-	-	-	-61.3%	-	-				16.1%
Net margin	-	-	-	2.3%	-	-				2.9%

Quarterly performance (JPYmn)	FY03/16				FY03/17			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Sales	682	426	2,233	3,919	476	1,338		
YoY	-18.3%	-60.9%	89.6%	96.6%	-30.2%	214.0%		
Gross profit	225	128	423	774	132	393		
YoY	-13.8%	-63.9%	11.4%	60.4%	-41.1%	206.1%		
GPM	33.0%	30.2%	18.9%	19.7%	27.8%	29.4%		
SG&A expenses	247	267	352	404	237	285		
YoY	21.4%	33.0%	60.4%	24.8%	-4.1%	6.8%		
SG&A-to-sales ratio	36.2%	62.7%	15.8%	10.3%	49.7%	21.3%		
Operating profit	-22	-139	71	370	-104	108		
YoY	-	-	-55.9%	132.6%	-	-		
OPM	-	-	3.2%	9.4%	-	8.1%		
Recurring profit	-32	-158	53	349	-129	86		
YoY	-	-	-66.0%	133.2%	-	-		
RPM	-	-	2.4%	8.9%	-	6.4%		
Net income	-38	-211	69	346	-90	86		
YoY	-	-	-51.1%	108.1%	-	-		
Net margin	-	-	3.1%	8.8%	-	6.5%		

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)		FY03/16				FY03/17			
(JPYmm)		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Sales		682	1,108	3,341	7,260	476	1,814		
YoY		-18.3%	-42.4%	7.7%	42.5%	-30.2%	63.7%		
Electronics and Telecoms Equipment		594	946	1,374	2,091	402	948		
YoY		-23.5%	-45.7%	-50.0%	-38.5%	-32.4%	0.2%		
Renewable Energy System Sales		17	27	1,786	4,938	8	735		
YoY		-47.2%	-80.1%	509.0%	207.5%	-56.4%	-		
Solar Power Plant Operations		71	135	180	230	67	131		
YoY		179.8%	197.9%	202.7%	161.8%	-5.0%	-2.8%		
Geothermal Power Plant Operations		-	-	-	-	-	-		
Operating Profit		-22	-161	-90	280	-104	3		
YoY		-138.6%	-175.8%	-124.3%	-47.4%	372.0%	-102.1%		
Electronics and Telecoms Equipment		5	-90	-102	-12	-22	6		
YoY		-95.0%	-	-	-	-	-		
Renewable Energy System Sales		-46	-109	-28	287	-64	81		
YoY		-	-	-	155.9%	-	-		
Solar Power Plant Operations		29	51	56	57	29	55		
YoY		179.3%	217.1%	258.6%	155.2%	-1.9%	7.4%		
Geothermal Power Plant Operations		-0	-0	-0	-21	-	-		
Adjustments		-10	-12	-16	-31	-46	-139		
Segment breakdown (quarterly)		FY03/16				FY03/17			
(JPYmm)		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Sales		682	426	2,233	3,919	476	1,338		
YoY		-18.3%	-60.9%	89.6%	96.6%	-30.2%	214.0%		
Electronics and Telecoms Equipment		594	351	428	717	402	546		
YoY		-23.5%	-63.6%	-57.4%	9.9%	-32.4%	55.4%		
Renewable Energy System Sales		17	10	1,759	3,152	8	727		
YoY		-47.2%	-90.4%	-	140.1%	-56.4%	-		
Solar Power Plant Operations		71	65	45	50	67	64		
YoY		179.8%	220.5%	218.4%	76.0%	-5.0%	-0.5%		
Geothermal Power Plant Operations		-	-	-	-	-	-		
Operating Profit		-22	-139	71	370	-104	108		
YoY		-	-	-	-	-	-		
Electronics and Telecoms Equipment		5	-95	-12	91	-22	29		
YoY		-95.0%	-	-	-	-	-		
Renewable Energy System Sales		-46	-63	82	314	-64	145		
YoY		-	-	-	140.6%	-	-		
Solar Power Plant Operations		29	22	5	1	29	26		
YoY		179.3%	287.6%	-	-91.8%	-1.9%	19.9%		
Geothermal Power Plant Operations		-0	-0	-0	-21	-	-		
Adjustments		-10	-2	-4	-15	-46	-93		

Source: Shared Research based on company data

Note: 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.

1H FY03/17 results

Sales:	JPY1.8bn (+63.7% YoY)
Operating profit:	JPY3mn (operating loss of JPY161mn in 1H FY03/16)
Recurring profit:	JPY43mn (recurring loss of JPY190mn in 1H FY03/16)
Net loss*:	JPY4mn (net loss of JPY249mn in 1H FY03/16)

*Net loss refers to net loss attributable to parent company's shareholders.

Electronics and Telecoms Equipment

Orders:	JPY1.3bn (+34.0% YoY)
Sales:	JPY948mn (+0.2% YoY)
Operating profit:	JPY6mn (operating loss of JPY90mn in 1H FY03/16)

Mobile telecom providers restrained capital investment on base stations, leading to a drop in demand, but growth in orders in the public and government sectors, as well as shrinking costs from streamlining operations resulted in higher sales and profits.

Renewable Energy System Sales

Orders:	JPY778mn (-41.6% YoY)
Sales:	JPY735mn (27x 1H FY03/16)
Operating profit:	JPY81mn (operating loss of JPY109mn in 1H FY03/16)

Although major sales projects tend to be concentrated in 2H, focusing on sales promotions led to higher sales and profits.

Solar Power Plant Operations

Sales:	JPY131mn (-2.8% YoY)
Operating profit:	JPY55mn (+7.4% YoY)

The segment booked electricity sales from mega solar power plants in Shimonoseki, Tateyama, and Sodegaura

Geothermal Power Plant Operations

No sales or expenses were booked, as the company prepares to start operations of geothermal power plants.

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

Full-year company forecasts

(JPYmn)	FY03/16 FY Act.	FY03/17 FY Est.
Sales	7,260	6,633
CoGS	5,710	
Gross profit	1,550	
GPM		
SG&A	1,270	
SG&A-to-sales ratio		
Operating profit	280	354
OPM	3.9%	5.3%
Recurring profit	211	260
RPM	2.9%	3.9%
Net income	165	192
Net margin	2.3%	2.9%

Source: Shared Research based on company data

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

Company forecasts by segment

Forecasts by Segment (JPYmn)	FY03/16 Act.	FY03/17 FY Est.	YoY
Sales	7,260	6,633	-8.6%
Electronics and Telecoms Equipment	2,108	2,600	23.3%
Renewable Energy Systems Sales	4,965	3,787	-23.7%
Solar modules	28	-	-
Power plants (subdivision)	4,937	3,787	-23.3%
Solar Power Plant Operations	230	246	6.8%
Geothermal Power Plant Operations	0	0	-
Operating Profit	280	354	26.6%
Electronics and Telecoms Equipment	-12	214	-
Renewable Energy Systems Sales	287	223	-22.2%
Solar Power Plant Operations	57	61	7.7%
Geothermal Power Plant Operations	-21	-	-
Adjustments	-31	-144	-

Source: Shared Research based on company data

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

FY03/17 forecast

Sales:	JPY6.6bn (-8.6% YoY)
Operating profit:	JPY354mn (+26.6% YoY)
Recurring profit:	JPY260mn (+23.0% YoY)
Net income:	JPY192mn (+16.1%YoY)

Forecasts by segment are as follows.

Electronics and Telecoms Equipment

Sales:	JPY2.6bn (+23.3% YoY)
Operating profit*:	JPY214mn (operating loss of JPY12mn during FY03/16)

*Operating profit includes corporate distributed costs; the same applies throughout.

According to the company, its balance of orders as of end May 2016 was 54.3% higher year-on-year, the result of focusing on capturing orders in the telecoms and broadcasting industries in the public and private sectors. The company projects

that results for FY03/17 will be skewed toward the second half, owing to a high percentage of sales being booked in the second half for products targeting the public sector.

Although sales of mobile-related products are forecast to decline, sales of optical equipment in the transportation sector—which includes railway and airports—are projected to increase, while sales are also forecast to rise in defense-related areas and testing equipment for power semiconductors.

In mobile-related products, mobile telecommunications providers are working to enrich base station facilities for 4G services such as LTE-Advanced and WiMAX2+, but as the company's ability to provide products compatible with these communications standards are limited, sales are forecast to decrease. However, mobile-related sales decreased during FY03/16 and the sales composition declined to 23.1%, signaling a lower contribution from this product family to overall segment results.

In the transportation sector (railway and airports), Tamagawa has been focusing on capturing orders from FY03/16 in areas that utilize optical transmission technologies, which it had been developing for many years in cooperation with Tamagawa Electronics. As a result, sales of optical equipment for airport facilities are projected to increase in FY03/17. In defense-related areas, sales were subdued in FY03/16 as it was a trough period for major projects, but a recovery is projected for FY03/17 in line with contributions from new projects. In testing equipment for power semiconductors, the company was also successful in acquiring orders for products in the aerospace sector; sales are estimated to double year-on-year.

Renewable Energy Systems Sales

Sales:	JPY3.8bn (-23.7% YoY)
Operating profit*:	JPY223mn (-22.2% YoY)

The Renewable Energy Systems segment saw strong results in FY03/16 due to increasing sales activity of equipment for solar power plants. In FY03/17, sales and profits are forecast to decline year-on-year, owing to the booking of sales for solar power plant equipment in FY03/16 that was initially projected to be recorded during FY03/17.

Sales of small-scale wind power generation equipment—scheduled to begin in FY03/17—are forecast to reach JPY830mn, factoring in only sales with a high degree of certainty. As of June 2016, small-scale wind power generation equipment was undergoing test installation at the Tateyama plant, and Tamagawa is gathering data to use in its promotional activities.

Solar Power Plant Operations and Geothermal Power Plant Operations

Sales:	JPY246mn (+6.8% YoY)
Operating profit*:	JPY64mn (+7.7% YoY)

Higher power output from solar tracker generation systems and small-scale wind power generation is forecast to contribute to higher sales and profits. Although the Noboribetsu plant in Hokkaido Prefecture (Power output: 1.99MW; Feed-in tariff: JPY40/kWh) is to begin operation during Q4 FY03/17, revenue generated by this plant is not incorporated into the company's forecasts.

The Misawa plant (Aomori Prefecture) is also scheduled to begin operation in Q4, and this plant is projected to contribute

to investment income in affiliates due to the company's 30% ownership stake.

Dividends

Tamagawa projects dividends of between JPY1.0 and JPY3.0 per share.

Long-term outlook

In June 2016, Tamagawa announced its medium-term plan for FY03/17–FY03/20. Targets for FY03/20 are sales of JPY10.1bn and operating profit of JPY1.1bn. Goals by segment are as shown in the table below.

Medium-term plan sales and profit targets by segment

Long-Term Outlook (JPYmn)	FY03/16		FY03/17 vs. FY03/16		FY03/20 vs. FY03/16	
	Act.	Plan	Changes	Plan	Changes	
Sales	7,259	6,633	-8.6%	10,140	39.7%	
Electronics and Telecoms Equipment	2,091	2,600	24.3%	3,500	67.4%	
Renewable Energy System Sales	4,938	3,787	-23.3%	5,100	3.3%	
Solar Power Plant Operations	230	246	7.0%	1,190	417.4%	
New Businesses	-	-	-	350	-	
Operating Profit	279	354	26.9%	1,090	290.7%	
Electronics and Telecoms Equipment	-11	214	-	350	-	
Renewable Energy System Sales	286	223	-22.0%	370	29.4%	
Solar Power Plant Operations	56	61	8.9%	335	498.2%	
New Businesses	-	-	-	35	-	

Source: Shared Research based on company data

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

Electronics and Telecoms Equipment

Under the medium-term plan, Tamagawa will aim for sales of JPY3.5bn (+67.4% versus FY03/16) and operating profit of JPY350mn (operating loss of JPY11mn in FY03/16) in FY03/20.

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 decreased due to lower sales to mobile telecoms companies, which lowered their spending on base stations. Defense related sales also decreased 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. According to the company, acquisition has been steady during FY03/16 for contracts of public works projects in mobile telecoms and broadcasting. As a result, although sales dipped in 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), technologies such as the SHF band, submillimeter and millimeter waves, carrier aggregation, massive-MIMO, beam forming, and NOMA are scheduled to be implemented in order to reach transmission speeds of up to 100 times those that are currently available, and the company is moving forward with development to meet these technological needs.
- 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 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 delivered in 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 related to heavy particle accelerators for cancer treatment in the medical field, and electric noise resistance testing in the automotive sector.
- 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 through increased local procurement 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, focusing on capturing orders for overseas mobile infrastructure devices via low-cost proposals.
- In other areas, the medium-term plan calls for acquiring orders via product proposals in the areas of AM/FM rebroadcasting equipment for dead zones and subsystems for next-generation digital terrestrial broadcasting equipment ahead of the Tokyo Olympics. Expansion of business via M&A in related areas is also a possibility.

Renewable Energy System Sales

Under the medium-term plan, Tamagawa will aim for sales of JPY5.1bn (+3.3% versus FY03/16) and operating profit of JPY370mn (+29.4% versus FY03/16) in FY03/20. The company plans for contributions from sales of small-scale wind power generation equipment and development contracting fees in solar power plant development.

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 2.2MW equipment in FY03/15, and in FY03/16, sales of JPY5.0bn were booked through the sale of 10.2MW equipment.

When tax incentives for promoting investments in facilities to improve productivity, under which a solar power producer can immediately have related facilities fully depreciated, expired at the end of March 2016, the percentage of depreciation I fell 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 is anticipating a sales decline. Being proactive, however, it plans to offset the sales decline by adding the sale of small-scale wind power generation equipment (see below for details) to its portfolio from FY03/18 onward. Entering the market for secondhand solar power generation plants is also included in the medium-term plan.

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) over the medium term.

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.

Small-scale wind power generation equipment sold by Tamagawa utilizes wind turbines supplied by C&F Green Energy. According to the company, these turbines have the highest output out of all small-scale wind power generation equipment that have obtained ClassNK approval from the Nippon Kaiji Kyokai, a required certification for facilities to be used in the fixed-rate guarantee program. Seven companies in Japan are first-tier sales agents for C&F Green Energy, and the only publicly listed company that specializes in renewable energy among these seven is Tamagawa. 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 supplied by C&F Green Energy, the manufacturer of models the company plans to sell.

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.

C&F Green Energy small-scale wind power generation equipment (Tateyama plant)



Source: Company data

Sales plans

The unit price of Tamagawa's small-scale wind power generation equipment is about JPY30mn. Sales—scheduled to begin in FY03/17—are forecast to reach JPY830mn, factoring in only sales with a high degree of certainty.

Development contracting fees in solar power plant development

For large-scale solar power generation projects with capacity of about 10MW or more, the company has a policy of securing funding through joint development. During joint development of mega solar power generation facilities, the company generates revenue not only from selling power, but by transferring ownership of the land to be used for the plant. Sales also come in the form of development contracting fees, which include fees received on disposal of land ownership rights and for the preparation of requisite legal documentation. The company plans to receive such fees from the Misawa plant (power output of 9.5MW), scheduled to begin operation in FY03/17.

As of June 2016, the company estimates that there is latent demand for solar power generation projects—much like the Misawa plant—equivalent to about 100MW of output. By being involved in development of latent projects over the medium term, Tamagawa aims to acquire development contracting fees. In June 2016, with the intent of establishing a proprietary project financing system for the development of renewable energy power generation plants, the company newly established a dedicated project financing office.

Solar and Geothermal Power Plant Operations

Under the medium-term plan, Tamagawa will aim for sales of JPY1.2bn (+417.4% versus FY03/16) and operating profit of JPY335mn (+498.2% versus FY03/16) in FY03/20. Plans call for combined power output of solar, geothermal, and small-scale wind power generation to grow from 4.8MW in FY03/16 to 20.0MW in FY03/19. The company also plans to consider renewable power generation businesses within Asia during the medium-term plan.

Power output under the medium-term plan

	FY03/16	FY03/19
Solar power plants	4.8MW	16.2MW
Geothermal power plants	-	850kW (equivalent to 6.8MW of solar power)
Small-scale wind power plants	-	351kW (equivalent to 2.8MW of solar power)

Source: Shared Research based on company data

Generating capacity of solar power plants

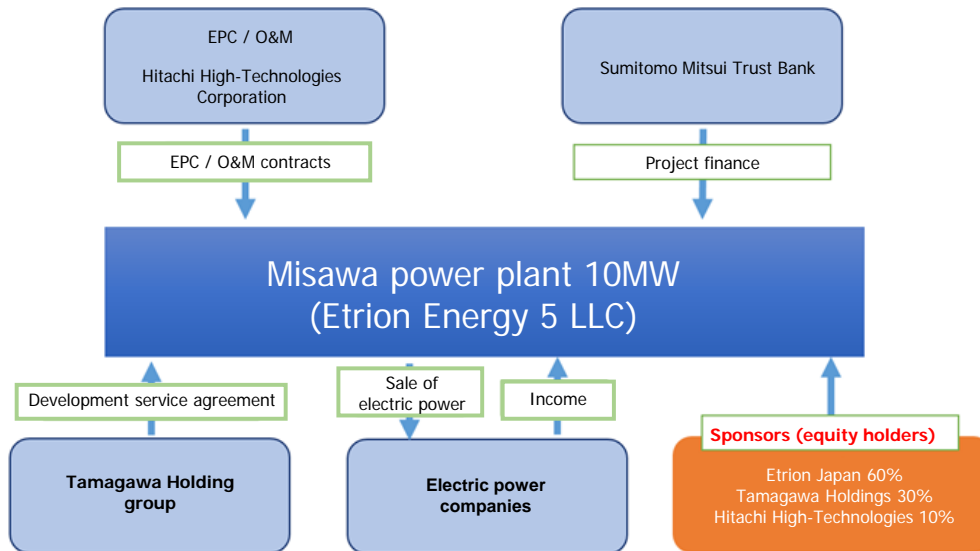
As of June 2016, the company's solar power facilities, including those already in operation and those planned for construction, had a combined generating capacity of 11.4MW (see "Solar power plant generation in the Business section"), in addition to total output of 4.8MW from solar power plants. Land and rights to develop have already been secured to meet the goal of 16.2MW in generating capacity set forth as a target for FY03/19 under the medium-term plan.

In the development of solar power generation facilities, the company utilized its own funds in the development of the solar power generation plant at Shimonoseki—its first venture—but from the Tateyama plant onward, Tamagawa has made use of leases and joint development initiatives to secure funding for facilities development. If a solar power plant is constructed under a leasing arrangement, the internal rate of return (IRR) is improved; compared with an IRR of 7.5% for the Shimonoseki plant, the Tateyama plant achieved an IRR of 16.5%.

For large-scale solar power generation plants with generating capacity of about 10.0MW or more, the company has as its policy to acquire funding via joint development. In June 2015, Tamagawa established an SPC via joint investment with Etrion Japan for development of the Misawa plant (Aomori Prefecture), with Tamagawa holding a 30% stake. The Misawa plant is scheduled to begin operation in February 2017 with power generating capacity of about 9.5MW (Tamagawa will

hold 3.0MW), and it is expected to generate approximately JPY390mn per year in revenue. Earnings from the plant, to be booked as equity-method investment profit, are expected to start making contributions from 2H FY03/17 onward.

Outline of Etrion Energy 5 LLC



Source: Company materials

*EPC refers to businesses comprehensively undertaking construction projects across the fields of engineering, procurement, and construction

*O&M refers to businesses that undertake operation and maintenance of facilities after construction is complete

Geothermal power generation business

Under the medium-term plan, Tamagawa will aim for geothermal power generation of 850kW (equivalent to 6.8MW of solar power) in FY03/19.

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 2016 feed-in tariff system, the price for electricity produced by solar power plants is JPY24 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, a 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 an expected payout period of 6.4 years.

Beppu geothermal power plant achievements

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.

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.

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 Electronics Co., Ltd. in 1968; 2) Solar Business, launched in FY03/12; and 3) Geothermal Power Generation Business, launched in FY03/15.

Earnings by segment (JPYmn)	FY03/09	FY03/10	FY03/11	FY03/12	FY03/13	FY03/14	FY03/15	FY03/16
	Act.	Act.	Act.	Act.	Act.	Act.	Act.	Act.
Sales	4,299	2,803	2,640	3,106	3,672	4,171	5,095	7,260
YoY	7.1%	-34.8%	-5.8%	17.7%	18.2%	13.6%	22.1%	42.5%
Electronics and Telecoms Equipment	3,248	2,709	2,390	2,406	3,156	3,230	3,401	2,091
YoY	-14.2%	-16.6%	-11.8%	0.7%	31.2%	2.3%	5.3%	-38.5%
% of total	75.6%	96.6%	90.5%	77.5%	85.9%	77.4%	66.7%	28.8%
Renewable Energy System Sales	-	-	-	19	441	890	1,606	4,938
YoY	-	-	-	-	-	101.8%	80.4%	207.5%
% of total	-	-	-	0.6%	12.0%	21.3%	31.5%	68.0%
Solar Power Plant Operations	-	-	-	-	-	52	88	230
YoY	-	-	-	-	-	-	70.7%	161.8%
% of total	-	-	-	-	-	1.2%	1.7%	3.2%
Geothermal Power Plant Operations	-	-	-	-	-	-	-	-
YoY	-	-	-	-	-	-	-	-
Operating profit	-68	-227	-286	-30	373	477	531	280
YoY	-	-	-	-	-	27.8%	11.3%	-47.4%
Electronics and Telecoms Equipment	-162	-292	-236	63	375	480	467	-12
YoY	-	-	-	-	497.4%	28.1%	-2.7%	-102.5%
% of total	-	-	-	-	100.4%	100.7%	88.0%	-4.2%
Renewable Energy System Sales	-	-	-	-24	54	51	112	287
YoY	-	-	-	-	-	-5.5%	118.6%	155.9%
% of total	-	-	-	-	14.5%	10.7%	21.1%	102.5%
Solar Power Plant Operations	-	-	-	-	-12	-20	22	57
YoY	-	-	-	-	-	-	-	155.2%
% of total	-	-	-	-	-3.3%	-4.1%	4.2%	20.3%
Geothermal Power Plant Operations	-	-	-	-	-	-	0	-21
YoY	-	-	-	-	-	-	-	-

Source: Shared Research based on company data

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

Note: In FY03/14, the company changed segments to include Solar System Sales and Solar Power Plant Operations. Then in FY03/16, the Solar System Sales segment was changed to the Renewable Energy System Sales segment.

Business segments

Electronics and Telecoms Equipment

28.8% of FY03/16 sales

Since the founding of consolidated subsidiary Tamagawa Electronics 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.

Tamagawa Electronics products: Components for LTE-Advanced mobile telecom base stations (left); Universal FPGA board with high-frequency frontend circuit (middle); and RoF system for optical power feeding (right)



Source: 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 FY03/16, approximately 23% of Electronics and Telecoms Equipment sales come from devices for mobile telecoms base stations, about 33% from defense system-related sales, and 44% 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

(JPYmn)	FY03/13	FY03/14	FY03/15	FY03/16
	Act.	Act.	Act.	Act.
Total	3,155	3,233	3,400	2,108
YoY	-	2.5%	5.2%	-38.0%
Mobile telecoms	1,924	1,422	1,404	486
YoY	-	-26.1%	-1.3%	-65.4%
% of total	-	44.0%	41.3%	23.1%
Defense	504	905	1,026	688
YoY	-	79.6%	13.4%	-32.9%
% of total	-	28.0%	30.2%	32.6%
Others (public sector, etc.)	727	906	969	934
YoY	-	24.6%	7.0%	-3.6%
% of total	-	28.0%	28.5%	44.3%

Source: Shared Research based on company data

Renewable Energy System Sales

68.0% of FY03/16 sales; 102.5% of FY03/16 operating profit

This segment sells solar power modules and solar power equipment. During FY03/16, the main contributor to this segment was sales of solar power equipment. From FY03/17 onward, revenue from development contracting fees is expected to be booked in this segment.

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.

Sales activities are conducted by consolidated subsidiary Tamagawa Energy.

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. The figure was later further reduced to JPY24 (excluding tax) for contracts made during FY 2016 (April 2016 to March 2017). 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

The company began selling solar power plant equipment from FY03/15. Under this business, the company obtains certain rights to sites for solar power plants and the FIT scheme from land and rights owners, then makes sales to outside customers. By selling 2.3MW equipment, it reported sales of JPY1.1bn in FY03/15. In FY03/16, sales were JPY5.0bn, the result of sales of 10.2MW in equipment.

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 about 15%.

Development contracting fees in solar power plant development

For large-scale solar power generation projects with capacity of about 10MW or more, the company has a policy of securing funding through joint development. During joint development of mega solar power generation facilities, the company generates revenue not only from selling power, but by transferring ownership of the land to be used for the plant. Sales also come in the form of development contracting fees, which include fees received on disposal of land ownership rights and for the preparation of requisite legal documentation.

The company plans to receive such fees from the Misawa plant (power output of 9.5MW), scheduled to begin operation in FY03/17.

Solar Power Plant Operations

3.2% of FY03/16 sales; 20.3% of FY03/16 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 15,000sqm (Tokyo Dome: 47,000sqm).

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.

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. The figure was later reduced again to JPY24 (excluding tax) for FY 2016 (April 2016 to March 2017), and purchase duration is fixed at 20 years. However, the company received approval for its solar power generation plants in FY 2014 and before, and its average sale price of electricity appears to be at least JPY32.0 (excluding tax) per kW.

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 June 2016, the company's solar power facilities, including those already in operation and those planned for construction, had a combined generating capacity of 11.4MW (see "Solar power plant generation in the Business section"), in addition to total output of 4.8MW from solar power plants. Land and rights to develop have already been secured to meet the goal of 16.2MW in generating capacity set forth as a target for FY03/19 under the medium-term plan.

In the development of solar power generation facilities, the company utilized its own funds in the development of the solar power generation plant at Shimonoseki—its first venture—but from the Tateyama plant onward, Tamagawa has made use of leases and joint development initiatives to secure funding for facilities development. If a solar power plant is constructed under a leasing arrangement, the internal rate of return (IRR) is improved; compared with an IRR of 7.5% for the Shimonoseki plant, the Tateyama plant achieved an IRR of 16.5%.

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)	Operation start	Sales (JPYmn)
Shimonoseki	Shimonoseki, Yamaguchi	40.0	1.6MW	Q1 FY03/13	77
Tateyama mega solar	Tateyama, Chiba	40.0	1.9MW	Q4 FY03/15	91
Sodegaura mega solar	Sodegaura, Chiba	36.0	1.3MW	Q4 FY03/15	56
Noboribetsu	Noboribetsu, Hokkaido	40.0	2.0MW	Q4 FY03/17	96
Misawa	Misawa, Aomori	36.0	3.0MW	Q4 FY03/18	130
Goto	Goto, Nagasaki	36.0	5.3MW	Q3 FY03/18	229
Minamishimabara	Minamishimabara, Nagasaki	40.0	1.0MW	Q2 FY03/19	48
Total	-	-	16.2MW	-	631

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.

Joint development with Etrion Japan

For large-scale solar power generation plants with generating capacity of about 10.0MW or more, the company has as its policy to acquire funding via joint development. In June 2015, Tamagawa established an SPC via joint investment with Etrion Japan for development of the Misawa plant (Aomori Prefecture), with Tamagawa holding a 30% stake. The Misawa plant is scheduled to begin operation in February 2017 with power generating capacity of about 9.5MW (Tamagawa will hold 3.0MW), and it is expected to generate approximately JPY390mn per year in revenue. Earnings from the plant, to be booked as equity-method investment income, are expected to start making contributions from 2H FY03/17 onward.

The Misawa plant is to be developed and operated by Etrion 5 LLC, owned 30% by Tamagawa, 60% by Etrion, and 10% by Hitachi High-Technologies Corporation. The EPC will be operated by Hitachi High-Technologies, and capital expenditures of JPY3.4bn will be covered by investments from the LLC and project financing from Sumitomo Mitsui Trust Bank Ltd.

According to the company, the alliance with Etrion Japan enables Tamagawa to expand valuation for business development, including fund procurement, and to build large solar parks. As of June 2016, the company estimates that there are latent solar power generation projects—much like the Misawa plant—equivalent to about 100MW of output. By being involved in development of latent projects over the medium term, Tamagawa aims to gain development contracting fees. In June 2016, with the intent of establishing a proprietary project financing system for the development of renewable energy power generation plants, the company newly established a project financing office.

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 139MW in output in Italy and Chile, and is listed on the Toronto and Stockholm stock exchanges. Etrion is also a part of the Lundin Group, an acclaimed resource group in the oil, gas, mining, and energy sectors. The Lundin Group is composed of 11 group companies and has operations in 25 countries worldwide. The top shareholder in Etrion is the Lundin Group, owning about 24%. Etrion has become the most significant renewable energy company within the group.

Misawa power plant details

Solar parks	Location	Feed-in-tariff (kW/JPY)	Output (MW)	Area (sqm)	Operation start	Investment (JPYbn)	Sales (JPYmn)
Misawa	Misawa, Aomori	36.0	9.5	153,000	FY03/17	3.4	390

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.

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.

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.
- **Real-world achievements and latent projects in solar power:** Although Tamagawa has built its solar power generation business from scratch, it already has experience in solar installations and project financing. As of June 2016, funds allowing, it has the equivalent of about 180MW in latent projects that can be developed for mega solar power generation applications or used for sales of solar power generation equipment, and commercialization of these projects can be a significant contributor to increasing earnings.
- **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 2016. 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 the end of June 2016, 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 Electronics, electronic and telecoms equipment manufacturing and sales.

Tamagawa Energy Co., Ltd. (100%): renewable energy system sale business.

GP Energy Co., Ltd., and other GP Energy companies (all 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. 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 in Japan is accelerating rapidly alongside the proliferation of smartphones. However, according to projections published in the Cisco Visual Networking Index, this trend is likely to continue, and mobile data traffic within Japan during 2019 is projected to reach 1.5 exabytes per month, an increase of 5.3x versus the 282 petabytes per month seen during 2014. It remains uncertain whether network infrastructure will keep up.

Capex trends at telecoms carriers

Actual investment trends at telecoms carriers are on an upward swing amid efforts to expand capacity and improve service, with focus on new technologies and new frequency bands. For example, in investment for LTE—the latest communications technology—the number of LTE base stations operated by NTT DoCoMo, Inc. (TSE1: 9437) was about 24,400 as of end March 2013, but this number grew to 55,300 at end March 2014, 97,400 at end March 2015, and 138,100 LTE base stations at end March 2016.

As the nationwide rollout of LTE is generally complete, capex at the various carriers declined during FY03/16. Total capex by NTT DoCoMo during FY03/16 was down 10.1% YoY, to JPY595.2bn, and LTE-related capex was JPY365.4bn, also down 10.2%. Mobile telecom capex at KDDI during FY03/16 was JPY365.4bn, down 29.5% YoY, with a particular decline in LTE-related investment. However, capex ahead of the rollout of next-generation LTE-advanced technology is projected to increase from FY03/17 onward, as equipment must be updated to support new frequency bands.

Capex per company (JPYbn)	FY03/08 Act.	FY03/09 Act.	FY03/10 Act.	FY03/11 Act.	FY03/12 Act.	FY03/13 Act.	FY03/14 Act.	FY03/15 Act.	FY03/16 Act.	FY03/17 Target
NTT Docomo	758.7	737.6	686.5	668.5	726.8	753.7	703.1	661.8	595.2	585.0
YoY	-18.8%	-2.8%	-6.9%	-2.6%	8.7%	3.7%	-6.7%	-5.9%	-10.1%	-1.7%
LTE	-	-	-	26.0	92.3	218.9	331.1	406.7	365.4	339.0
YoY	-	-	-	-	255.0%	137.2%	51.3%	22.8%	-10.2%	-7.2%
KDDI	501.3	575.1	518.0	441.8	421.6	467.0	571.8	667.7	531.4	560.0
YoY	20.2%	14.7%	-9.9%	-14.7%	-4.6%	10.8%	22.4%	-	-20.4%	5.4%
Mobile	391.7	432.1	376.8	338.7	304.2	338.2	374.0	479.1	338.0	350.0
YoY	19.1%	10.3%	-12.8%	-10.1%	-10.2%	11.2%	10.6%	-	-29.5%	3.6%
Others	109.6	140.6	138.7	103.1	115.6	128.8	197.8	188.6	193.4	210.0
YoY	24.5%	28.3%	-1.4%	-25.7%	12.1%	11.4%	53.6%	-	2.5%	8.6%
SoftBank	293.7	259.1	222.9	392.6	474.1	631.6	712.5	583.7	412.6	-
YoY	-24.7%	-11.8%	-14.0%	76.1%	20.8%	33.2%	12.8%	-18.1%	-29.3%	-

Source: Shared Research based on data from respective companies

Note: Capex at KDDI from FY03/15 onward includes portions consolidated from UQ Communications.

Note: SoftBank figures only include group telecoms companies within Japan

LTE Advanced

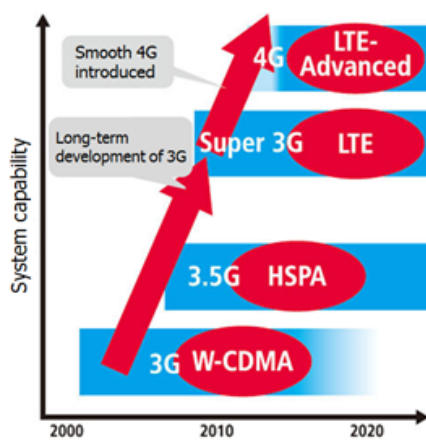
NTT DoCoMo, Inc. (TSE1: 9437) launched a new telecoms service in March 2015 using LTE-Advanced, the next-generation mobile telecoms standard following LTE, paving the way for speedier data transmission. NTT DoCoMo began with urban

areas in 22 prefectures and expanded the service to major cities nationwide during FY2015. KDDI also began providing 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, NTT DoCoMo plans on 3,480–3,520MHz, and SoftBank Mobile on 3,560–3,600MHz. According to documentation submitted to the Ministry of Internal Affairs and Communications by each company, NTT DoCoMo plans to begin service in October 2016, KDDI in June 2016, and SoftBank Mobile in December 2016.

Solar power market

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 2016, 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 FY2016 (from April 2016 to March 2017), the FIT for new installations was JPY31/kWh (for facilities not obliged to install output control equipment, excluding tax), JPY33/kWh (for facilities obliged to install output control equipment, excluding tax), JPY27/kWh (for facilities combining multiple systems, such as solar power generation, residential fuel cells, and gas engine power generation; including tax), and JPY29/kWh (for facilities that are required to have equipment that limits output; including 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 figure was JPY24 (excluding tax) during 2016.

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.

Revised FIT Act passed in May 2016

Revisions to the FIT Act were passed by the Diet in May 2016, and the fixed-price purchasing scheme for renewable energy will undergo changes from April 2017. It is Shared Research's understanding that the revisions to take place from April 2017 onward that will have an impact on the company's operations are changes to the methods employed to determine the

purchase price of power, and changes to approval procedures for power generation equipment.

Changes to methods employed to determine prices

Prior to the revisions, the purchase price was fixed as of the time the solar power generation facilities were approved, and power would subsequently be purchased at that price for a fixed period, typically between 10 to 20 years.

After the revisions, for industrial power generation with capacity of 10kW or more in generating capacity will have the purchase price revised on an annual basis, and for large-scale solar power generation plants with high capacity, a bidding system will be introduced. This is to create conditions such as purchase volume and price limits on solar power generation, causing solar power generation companies to request a purchase price and bid on power generation output, ultimately allowing for companies with lower prices to win the auction and receive approval for the purchase system.

Changes to approval procedures for power generation equipment

Under the pre-revision FIT, the purchase price for power relied solely on the pricing that was obtained when approval was granted for the equipment. As a result, some mega solar providers received approval in the early years of the program—when the FIT price was JPY40/kWh (excluding tax)—but have yet to actually build any facilities.

After the revision in April 2017, even companies that have received approval will, in principle, lose their approvals if they are unable to enter into connection contracts with power companies (including contracts for payment of construction costs) by March 31, 2017.

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.

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.

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).

Raise capital, build its own solar park. Solar Power Plant Operations and Geothermal Power Plant Operations provide stable cash flows but need initial large-scale investments. Selling renewable energy systems (including solar power plant equipment, geothermal power plants, and small-scale wind power generation equipment) does not require large 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

Q1 FY03/17 results (announced August 12, 2016)

Sales:	JPY476mn (-30.2% YoY)
Operating loss:	JPY104mn (operating loss of JPY22mn in Q1 FY03/16)
Recurring loss:	JPY129mn (recurring loss of JPY32mn in Q1 FY03/16)
Net loss*:	JPY90mn (net loss of JPY38mn in Q1 FY03/16)

(*Net loss refers to net loss attributable to parent company's shareholders.)

Electronics and Telecoms Equipment

Orders:	JPY481mn (+5.9% YoY)
Sales:	JPY402mn (-32.4% YoY)
Operating loss:	JPY22mn (operating profit of JPY5mn in Q1 FY03/16)

Mobile telecom providers continued to restrain capital investment on base stations from Q4 of the previous year, leading to a drop in both segment sales and profit.

Renewable Energy System Sales

Orders:	JPY127mn (-36.9% YoY)
Sales:	JPY8mn (-56.4% YoY)
Operating loss:	JPY64mn (operating loss of JPY46mn in Q1 FY03/16)

As major sales projects are concentrated in 2H, the segment saw reductions in sales and profit.

Solar Power Plant Operations

Sales:	JPY67mn (-5.0% YoY)
Operating profit:	JPY29mn (-1.9% YoY)

The segment booked electricity sales from mega solar power plants in Shimonoseki, Tateyama, and Sodegaura

Geothermal Power Plant Operations

No sales or expenses were booked, as the company prepares to start operations of geothermal power plants.

FY03/16 results (announced May 13, 2016)

Sales:	JPY7.3bn (+42.5% YoY)
Operating profit:	JPY280mn (-47.4% YoY)
Recurring profit:	JPY211mn (-58.9% YoY)
Net income:	JPY165mn (-61.3% YoY)

Electronics and Telecoms Equipment

Orders:	JPY2.2bn (-33.1% YoY)
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Sales:	JPY2.1bn (-38.1% YoY)
Operating loss:	JPY12mn (operating profit of JPY467 in FY03/15)

Mobile telecom providers changed their construction plans for base stations and restrained capital investment, leading to a drop in both segment earnings and profits. In other areas (public sector, disaster prevention, measurement, etc.), orders were acquired in the wireless transport (railway and airports) sector for fiber-optic products for use in airport facilities, and in Tamagawa-manufactured products, orders were favorable for testing equipment for power semiconductors.

A breakdown of sales is as follows:

Mobile telecoms:	JPY486mn (-65.4% YoY)
Defense:	JPY688mn (-32.9%)
Other (public sector, disaster prevention, measurement, etc.)	JPY934mn (-3.6%)

Renewable Energy System Sales

Orders:	JPY4.9bn (+187.9% YoY)
Sales:	JPY5.0bn (+176.4% YoY)
Operating profit:	JPY287mn (+155.9% YoY)

The sale of equipment for solar power plants resulted in both sales and profits rising year-on-year.

Solar Power Plant Operations

Sales:	JPY230mn (+161.8% YoY)
Operating profit:	JPY57mn (+155.2% YoY)

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

Geothermal Power Plant Operations

No sales were recorded, and operating loss was JPY20mn due to various expenses.

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.

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)
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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.

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).

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.

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.	FY03/16 Cons.
Total sales	3,114	4,012	4,299	2,803	2,640	3,106	3,672	4,171	5,095	7,260
YoY	22.1%	28.8%	7.1%	-34.8%	-5.8%	17.7%	18.2%	13.6%	22.1%	42.5%
CoGS	2622	3274	3,348	2,412	2,314	2,516	2,623	2,973	3,616	5,710
Gross profit	526	738	951	392	326	590	1,049	1,198	1,479	1,550
GPM	16.9%	18.4%	22.1%	14.0%	12.3%	19.0%	28.6%	28.7%	29.0%	21.3%
SG&A expenses	457	620	1,020	619	612	619	675	721	947	1,270
SG&A-to-sales ratio	14.7%	15.5%	23.7%	22.1%	23.2%	19.9%	18.4%	17.3%	18.6%	17.5%
Operating profit	69	118	-68	-227	-286	-30	373	477	531	280
YoY	271.9%	71.0%	-	-	-	-	-	27.8%	11.3%	-47.4%
OPM	2.2%	2.9%	-1.6%	-8.1%	-10.8%	-1.0%	10.2%	11.4%	10.4%	3.9%
Non-operating income	42	49	45	16	18	14	19	9	8	16
Non-operating expenses	12	58	105	14	16	8	17	8	25	84
Recurring profit	99	109	-128	-224	-284	-24	375	478	514	211
YoY	226.7%	9.9%	-	-	-	-	-	27.6%	7.5%	-58.9%
RPM	3.2%	2.7%	-3.0%	-8.0%	-10.8%	-0.8%	10.2%	11.5%	10.1%	2.9%
Extraordinary gains	44	16	52	0	45	-	1	2	5	61
Extraordinary losses	3	492	341	346	109	7	0	0	0	3
Tax charges	2	39	-7	-1	3	6	36	44	92	104
Implied tax rate	2%	-11%	1.6%	0.1%	-0.8%	-20.9%	9.6%	9.1%	17.7%	38.6%
Net income	138	-408	-408	-570	-351	-37	340	436	427	165
YoY	-	-	-	-	-	-	-	28.5%	-2.2%	-61.3%
Net margin	4.4%	-10.2%	-9.5%	-20.3%	-13.3%	-1.2%	9.3%	10.5%	8.4%	2.3%

Source: Shared Research based on company data

Note: 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.	FY03/16 Cons.
Sales (Initial CE)	2,650	3,000	3,870	3,389	3,110	2,980	3,378	4,504	4,534	5,600-7,300
Sales (Results)	3,114	4,012	4,299	2,803	2,640	3,106	3,672	4,171	5,095	7,260
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	590-850
Operating profit (Results)	69	118	-68	-227	-286	-30	373	477	531	280
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	520-790
Recurring profit (Results)	99	109	-128	-224	-284	-24	375	478	514	211
Initial CE vs. Results	-1.8%	109.5%	-	-	-	-	476.5%	-2.0%	5.1%	-
Net income (Initial CE)	92	50	63	133	179	13	60	449	450	400-570
Net income (Results)	138	-408	-408	-570	-351	-37	340	436	427	165
Initial CE vs. Results	50.3%	-	-	-	-	-	466.3%	-2.8%	-5.1%	-

Source: Shared Research based on company data

Note: 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.

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.	FY03/16 Cons.
ASSETS										
Cash and equivalents	1,074	706	820	665	493	56	390	1,764	1,524	2,737
Marketable securities		256	-	-	-	-	-	-	-	-
Accounts receivable	1,343	2,046	1,033	915	663	864	1,345	1,112	1,377	985
Inventories	306	580	345	275	328	299	328	347	447	318
Other current assets	192	134	47	63	45	74	52	197	258	181
Total current assets	2,915	3,722	2,245	1,918	1,530	1,293	2,114	3,421	3,606	4,221
Buildings	186	174	162	132	94	80	87	114	130	157
Tools, furniture and fixtures	62	458	88	36	5	1	58	87	126	88
Machinery and equipment	3	20	2	1	1	0	22	430	1,458	1,407
Land	198	198	198	126	106	52	52	52	540	652
Construction in progress	-	-	-	-	-	-	346	35	156	159
Accumulated depreciation	973	1,142	1,151	997	959	899	884	908	966	966
Total tangible fixed assets	453	855	451	295	205	133	564	718	2,410	2,464
Investment securities	630	90	251	69	23	8	14	19	23	17
Other	156	7	16	20	7	9	13	19	131	152
Total other fixed assets	786	97	267	89	30	18	27	38	154	169
Software	17	301	25	25	-	-	1	19	88	77
Other	25	22	22	14	-	-	-	12	106	232
Total intangible assets	42	323	47	39	-	-	1	31	194	309
Total fixed assets	1,281	1,275	765	423	235	150	593	788	2,759	2,942
Total assets	4,195	4,997	3,010	2,341	1,766	1,445	2,709	4,210	6,376	7,164
LIABILITIES										
Accounts payable	145	1,301	511	443	430	364	386	474	620	321
Short-term interest-bearing debt	615	404	507	433	203	30	40	323	300	1,395
Accounts payable	38	253	108	39	31	48	108	86	169	101
Other current liabilities	512	336	99	111	220	156	173	247	392	232
Total current liabilities	1,310	2,293	1,226	1,026	884	598	708	1,130	1,481	2,049
Long-term interest-bearing debt	242	441	216	67	-	-	151	294	539	612
Lease obligations	-	-	-	-	-	-	-	-	947	925
Other fixed liabilities	84	208	101	86	83	85	100	148	247	283
Total fixed liabilities	327	649	318	153	83	85	251	442	1,733	1,820
Total interest-bearing debt	858	844	724	500	203	30	192	618	839	2,007
Total Liabilities	1,636	2,942	1,544	1,179	967	683	959	1,572	3,215	3,869
SHAREHOLDER EQUITY (NET ASSETS)										
Capital stock	1,029	1,029	1,029	1,102	1,102	1,102	1,387	1,625	1,656	1,677
Capital surplus	1,196	1,196	1,024	1,096	1,096	1,096	1,381	1,620	1,077	1,057
Retained Earnings	322	-119	-619	-983	-1,335	-1,372	-991	-555	445	611
Total shareholder equity (net assets)	4,195	2,055	1,466	1,162	799	761	1,751	2,638	3,161	3,295
Working capital	1,504	1,325	867	747	562	800	1,287	986	1,204	982
Interest-bearing debt	858	844	724	500	203	30	192	618	839	2,007
Net debt	-216	138	-96	-165	-290	-26	-198	-1,146	-685	-730

Source: Shared Research based on company data

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

Assets

During FY03/16, current assets accounted for 58.9% of total assets. The ratio of fixed assets has increased since FY03/13.

Primary factors of current assets were cash and equivalents (64.8% of current assets in FY03/16) and accounts receivable (23.3%). 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 JPY2.7bn in FY03/16.

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 FY03/16, 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 FY03/16 the figure increased to JPY2.0bn.

In FY03/16 net debt (interest-bearing liabilities minus cash and deposits) was positive, amounting to positive JPY730mn.

The company newly reported lease obligations 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.

From FY03/14 onward, net assets increased by JPY477mn from the exercise of share subscription rights issued in January 2013 and by net income in each year.

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.	FY03/16 Cons.
Cash flows from operating activities (1)	-305	-136	259	-1	68	-332	36	764	387	1,614
Cash flows from investing activities (2)	59	-111	-17	12	93	77	-454	-265	-865	-392
Free cash flow (1+2)	-246	-247	242	11	162	-255	-418	499	-478	1,222
Cash flows from financing activities	-43	-121	-194	-82	-299	-168	783	875	238	-2
Depreciation & amortization (A)	48	58	217	76	20	14	22	84	106	187
Capital expenditures (B)	-31	-134	-82	-22	-7	-12	-446	-254	-866	-662
Working capital changes (C)	381	-179	-459	-120	-186	238	488	-301	219	-222
Simple FCF (NI + A + B - C)	-226	-305	186	-397	-152	-272	-572	568	-552	-87

Source: Shared Research based on company data

Note: 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.

Operating cash flow was significantly higher than net income during FY03/16 due to equipment sales in the Renewable Energy Systems Sales business, which caused cash inflows from the increase and decrease in inventories.

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

June 2016

On **June 29, 2016**, the company announced a new medium-term management plan, covering from FY03/17 to FY03/20.

The new plan calls for FY03/20 sales of JPY10.1bn and operating profit of JPY1.1bn. Detailed targets for each segment are outlined below:

Medium-term management plan: Segment sales and profit targets

Long-Term Outlook (JPYmn)	FY03/16	FY03/17	vs. FY03/16	FY03/20	vs. FY03/16
	Act.	Plan	Changes	Plan	Changes
Sales	7,259	6,633	-8.6%	10,140	39.7%
Electronics and Telecoms Equipment	2,091	2,600	24.3%	3,500	67.4%
Renewable Energy System Sales	4,938	3,787	-23.3%	5,100	3.3%
Solar Power Plant Operations	230	246	7.0%	1,190	417.4%
New Businesses	-	-	-	350	-
Operating Profit	279	354	26.9%	1,090	290.7%
Electronics and Telecoms Equipment	-11	214	-	350	-
Renewable Energy System Sales	286	223	-22.0%	370	29.4%
Solar Power Plant Operations	56	61	8.9%	335	498.2%
New Businesses	-	-	-	35	-

Source: Shared Research based on company data

Note: Figures may differ from company documents due to differences in rounding methods.

- ▶ Electronics and Telecoms Equipment segment: Generate stronger earnings by capturing orders for power amplifiers (used in next generation mobile phones), increasing overseas market share, and M&A targeting related businesses.
- ▶ Renewable Energy System Sales segment: Expand sales of small-scale wind power generation equipment, commercialize geothermal power generation, biomass power generation and small-scale wind power generation equipment, and launch initiatives to win orders in the second-hand solar power plant market, expand the sales network, and strengthen its organizational structure by expanding the sales network and hiring more personnel.
- ▶ Solar Power Plant/Geothermal Power Plant operations: Expand capacity at the company's power stations from the present 5MW to 20MW, generate stronger earnings by acquiring customers for its upcoming geothermal power plant operations and evaluate the possibility of setting up renewable energy plants in the overseas Asian market.
- ▶ New businesses: Undertake initiatives related to hydrogen power storage and business investment, and explore ways to realize synergies with existing businesses and to directly/indirectly tap opportunities at related businesses.

On **June 22, 2016**, the company announced that it had obtained an equity interest in Etrion Energy 5 LLC (to become an equity-method affiliate).

As it announced on March 30 and June 11, 2015, Tamagawa was in talks with Etrion Japan KK ("Etrion") as to how to proceed on a joint solar power generation venture in Misawa City, Aomori Prefecture. At a board of directors meeting held on June 22, 2016, a resolution was passed on obtaining an equity interest in Etrion Energy 5 LLC ("Etrion 5GK"). The effective date of the equity purchase is June 22, at a price of JPY300,000, and this will give Tamagawa a 30% stake in Etrion 5GK, making it an equity-method affiliate.

With the equity interest Tamagawa is obtaining from Etrion in Etrion5GK, the operation will proceed as a joint venture, and construction will begin as early as possible so that the sale of electricity can begin in the near future. According to a term

sheet agreed with Etrion, Tamagawa will hold a 30% stake in the special purpose company that will oversee the project, and the equity purchase is based on this agreement.

Tamagawa will also make an additional investment of JPY53mn in Etrion 5GK effective the same date as the aforementioned equity purchase (June 24, 2016). The other investors in the project will make additional investments in proportion to their stakes, so that even after this additional round of investments, the equity interest ratio will remain unchanged. Furthermore, on the same date as the aforementioned equity purchase and in keeping with their respective stakes, the various investors in Etrion 5GK will provide subordinated loans in accordance with subordinated loan agreements they have with Etrion 5GK. Tamagawa's planned loan is JPY106mn.

By conducting development operations jointly with a major corporation and a major EPC contractor, Tamagawa believes it can effectively operate this large solar power generation facility. This will also be the first project to receive financing through a project finance scheme with a major financial institution, so this is an important project in terms of the company's business strategy. Once Etrion 5GK receives the initial loan from the financial institution, Tamagawa plans to transfer land for the project to Etrion 5GK at a price of JPY274mn (book value).

Power plant overview

Location: Misawa City, Aomori Prefecture

Operator: Etrion Energy 5 LLC

EPC: Hitachi High-Technologies Corporation

Capacity: approximately 9.5MW (total)

Feed-in tariff: JPY36/kWh (before tax; fixed for 20 years)

First-year output: 10,740,000kWh (estimate)

Construction to start: July 2016

Commercial operation to start: February 2017

Outline of Etrion Energy 5 LLC

Source: Company data

*EPC refers to businesses comprehensively undertaking construction projects across the fields of engineering, procurement, and construction.

*O&M refers to businesses that undertake operation and maintenance of facilities after construction is complete.

March 2016

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.

February 2016

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.

January 2016

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)

Revenue: JPY390mn a year (estimate)

First year output: Approx. 10,852,814 kWh (estimate)

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 (estimate)
- ✔ Generation capacity: About 2.2mn kWh/year (estimate)
- ✔ 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

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)

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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).

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.

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
Tang Marilyn Hweeti	10.4%
Bank Julius Bär & Co., Ltd. (Singapore) Clients	10.1%
Japan Securities Finance Co., Ltd.	7.2%
Hiromasa Shimanuki	4.6%
Toru Masuzawa	3.2%
EFG Bank AG (Hong Kong) Account Client	2.8%
Sada Kubota	2.4%
Tamagawa (treasury stock)	1.4%
Yuichi Sunaga	1.3%
Hiroyuki Ohtake	1.2%

Source: Shared Research based on company data
As of March 31, 2016

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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Aucfan Co., Ltd.	IID, Inc.	Sanix Incorporated
Axell Corporation	Infomart Corp.	Sanrio Co., Ltd.
Azbil Corporation	Intelligent Wave Inc.	SATO Holdings Corp.
Bell-Park Co., Ltd.	istyle Inc.	SBS Holdings, Inc.
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Canon Marketing Japan Inc.	ITO EN, Ltd.	SMS Co., Ltd.
Carna Biosciences, Inc.	J Trust Co., Ltd	SOURCENEXT Corporation
Chiyoda Co., Ltd.	Japan Best Rescue System Co., Ltd.	Star Mica Co., Ltd.
Chugoku Marine Paints, Ltd.	JIN Co., Ltd.	Symbio Pharmaceuticals Limited
Cocokara Fine, Inc.	Kameda Seika Co., Ltd.	Takashimaya Co., Ltd.
Comsys Holdings Corporation	Kenedix, Inc.	Takihyo Co., Ltd.
CRE, Inc.	KFC Holdings Japan, Ltd.	Tamagawa Holdings Co., Ltd
Creek & River Co., Ltd.	LAC Co., Ltd.	TEAR Corporation
Daiseki Corp.	Lasertec Corp.	3-D Matrix, Ltd.
DIC Corporation	MAC-HOUSE Co.	TKC Corporation
Digital Arts Inc.	Matsui Securities Co., Ltd.	TOKAI Holdings Corp.
Digital Garage Inc.	Medinet Co., Ltd.	WirelessGate, Inc.
Don Quijote Holdings Co., Ltd.	MEGANESUPER CO., LTD.	Yellow Hat Ltd.
Dream Incubator Inc.	Milbon. Co., Ltd.	Yumeshin Holdings
Earth Chemical Co., Ltd.	MIRAIT Holdings Corp.	Yushiro Chemical Industry Co., Ltd.
Elecom Co.	MONEY SQUARE HOLDINGS, INC.	V-cube, Inc.
EMERGENCY ASSISTANCE JAPAN Co.	NAGASE & CO., LTD	Vision Inc.
en-Japan Inc.	NAIGAI TRANS LINE LTD.	VOYAGE GROUP, Inc.
FerroTec Corp.	NanoCarrier Ltd.	ZAPPALLAS, INC.
Fields Corp.	Nichi-Iko Pharmaceutical Co., Ltd.	

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Contact Details

Shared Research Inc.

3-31-12 Sendagi Bunkyo-ku Tokyo, Japan

<http://www.sharedresearch.jp>

Phone: +81 (0)3 5834-8787

Email: info@sharedresearch.jp