

Worksites

Takaoka Plant

Introduction to the Takaoka Plant

Toyama Prefecture was ranked second in a 2011 survey of the “happiest” places to live in Japan (conducted by Hosei University), and is widely considered to be one of the most livable prefectures in the country. The prefecture is commonly referred to as the “Home of Manyo” after the poet Otomo no Yakamochi, an 8th century statesman-poet who famously compiled the poetry collection “Manyo-shu (Anthology of Myriad Leaves).” The founder of Takaoka was Toshinaga Maeda, a 16th century samurai lord, and the area has been known for its unique Takaoka copperware and lacquerware. Along with its arts, the city has been the center of a thriving commercial area in the Hokuriku District along the Sea of Japan.

The Takaoka Plant is situated along the Oyabe River, which runs north-south through the city. The plant was established in 1956 to manufacture polyvinyl chloride resins and expanded as the mass production site for the product over a half century until the company exited the business in 2008. During that time, the plant began producing such current mainstay products as hydrogenated nitrile rubber Zetpol[®], semiconductors etching gas ZEORORA[®], and the organic coating insulation material ZEOCOAT[®] for electric devices. The plant also became home to the Precision Optics Laboratory and a medical laboratory, establishing itself as the center of cutting-edge research at ZEON.

The plant is adjacent to a residential community and strives to ensure the security of the local community through daily safety-assurance activities and regular emergency-preparedness training. At the National Industrial Safety and Health Convention held in Toyama Prefecture in 2012, ZEON was recognized for its attitude to safety efforts and the results it has achieved, and subsequently received a letter of appreciation from the Japan Industrial Safety & Health Association.

In 2014, the plant turns 58 years of age, but it is still well in its prime and all employees continue to strive towards excellence with the spirit that the future of ZEON will be born in Takaoka. The plant will continue to listen carefully to the needs of the local community to ensure the sustainment of an environment rich in harmony and co-prosperity.



Aerial view of the Takaoka Plant

CSR Efforts at the Takaoka Plant

The Takaoka Plant has evolved from a mass producer of polyvinyl chloride resins to an R&D-style plant focused on the development of cutting-edge technologies. The fact remains, however, that a quiet residential community sits just a step outside the plant gate. With this in mind, ZEON takes into consideration the possible impact of new products tests and newly introduced product materials on the local community from the R&D phase of product development, as it has done with the manufacturing of its current products. Each and every employee of the plant understands the CSR Policy, and based on this policy they strive to ensure ZEON has a reason for being from the perspective of the local community and can continue to make contributions to that community and society as a whole.

Environmental and Safety Activities

1. Reducing toxic chemical emissions

The plant terminated the manufacture of polyvinyl chloride resins in March 2008, and therefore the amount of emissions and transfer of PRTR^{*1}-regulated substances declined in fiscal 2008 to less than one-tenth the amount of the previous year. As part of the initiative to achieve zero emissions^{*2}, the plant has newly installed equipment to collect organic solvents used in the manufacturing process and plans to reduce the amount used in stages going forward.

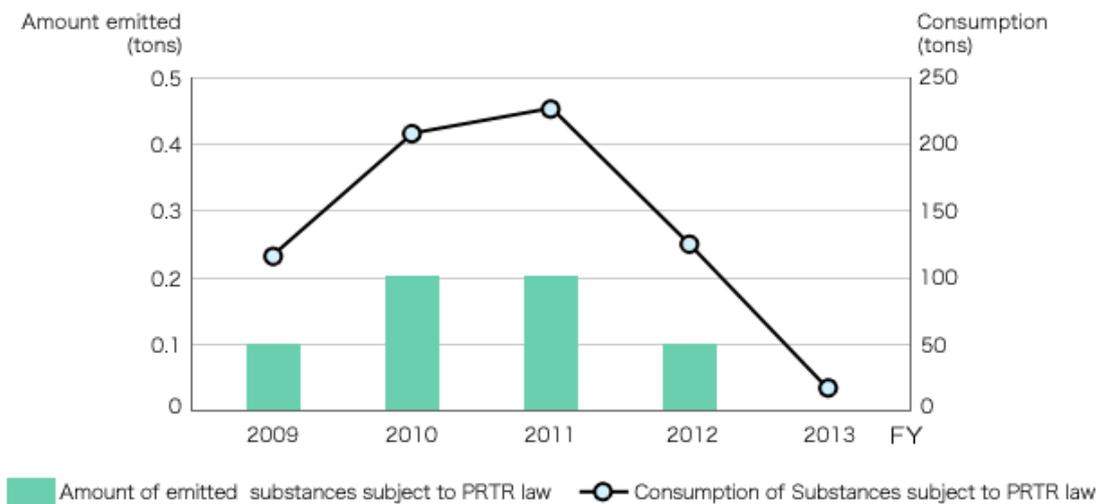
*1 Pollutant Release and Transfer Register

A database of hazardous chemical substances released into the environment and transferred off-site in waste. It provides the public with important information such as where and how much pollutants are being emitted and transferred.

*2 Zero emissions

The establishment of systems that discharge no emissions into the natural world, and the fundamental idea behind such establishment.

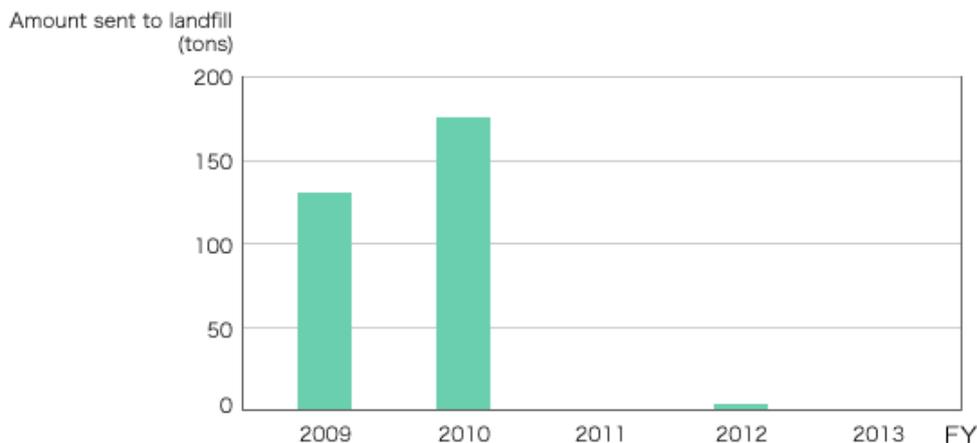
Substances subject to PRTR law



2. Reducing industrial waste

In fiscal 2011, the Takaoka Plant achieved zero emissions of industrial waste by recycling all of the waste plastics, rubber, and sludge emitted from wastewater processing facilities, which were previously disposed of at external landfills. In fiscal 2013, although new facilities began operating and there were changes to the environment, the plant achieved zero landfill waste. Despite continuing to operate new facilities, the plant will study new ways to achieve 100% recycling and maintain zero landfill waste.

Amount of Waste to Landfill



3. Reducing air and water pollution

Atmospheric emission from the plant's boiler, which uses heavy fuel oil A^{*1}, is one of the environmental issues the plant has been dealing with. Until now, the plant has controlled boiler emissions by creating appropriate operating conditions collectively with steam emissions inside the plant. From December 2013, however, the plant has switched from heavy fuel oil A to liquefied natural gas (LNG)^{*2}, and is proceeding to drastically reduce CO₂.

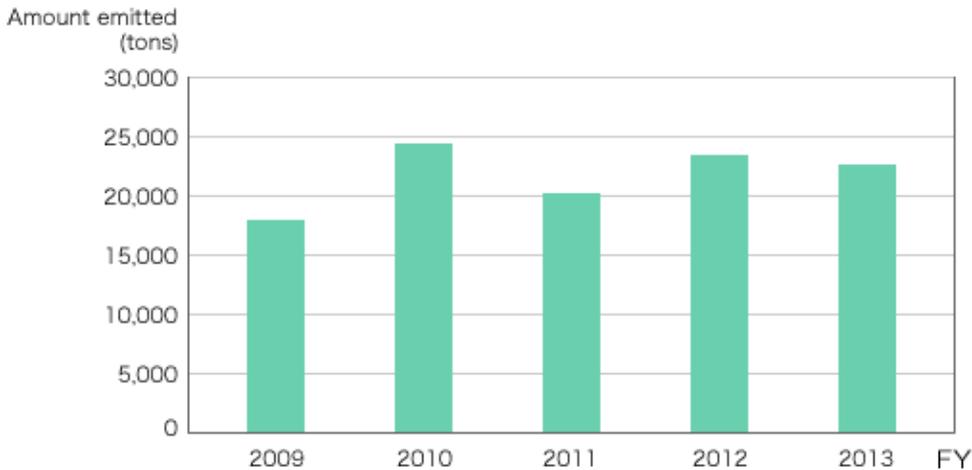
*1 Heavy fuel oil A

A heavy oil classified as type 1 heavy viscosity under JIS standards.

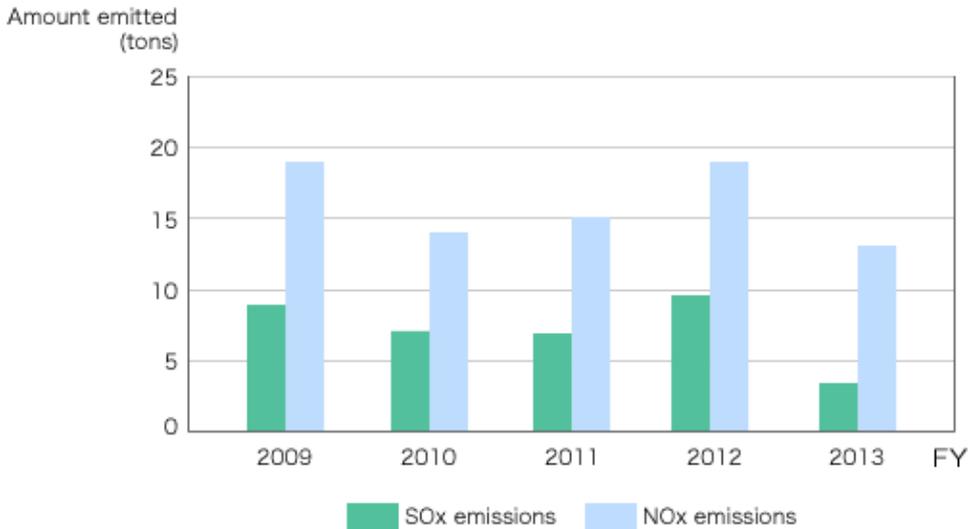
*2 LNG

Liquefied natural gas. Emits less CO₂ than many other fossil fuels when combusted and therefore is seen as a more environmentally friendly fuel.

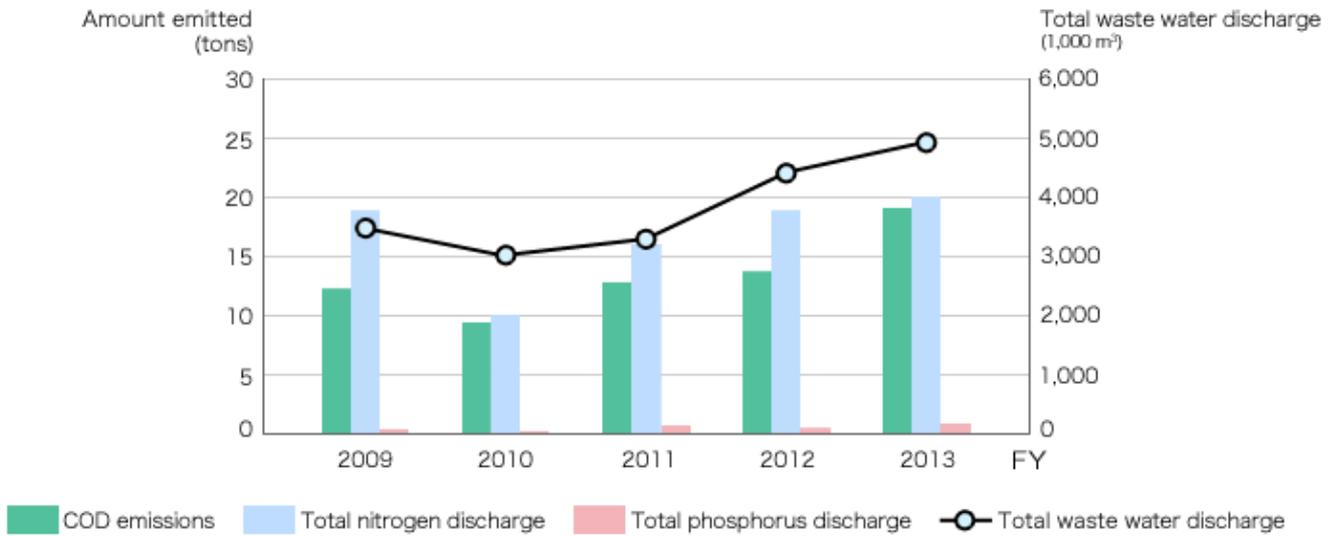
CO₂ emissions



SOx and NOx emissions



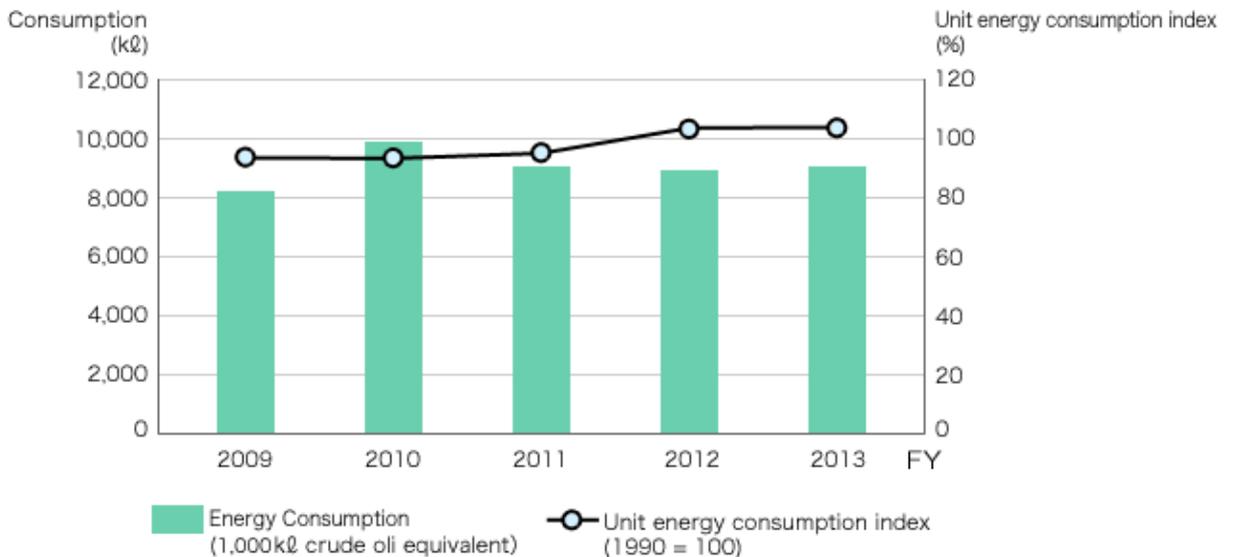
Overall wastewater, COD, total nitrogen (TN) and total phosphorus (TP) discharge



4. Saving resources and energy

The plant has taken measures to conserve energy by means of energy-conserving, high-efficiency boilers, which began operation in December 2013. The Takaoka Plant also leveled-out electricity consumption in fiscal 2013 by shifting the operation of high electricity usage equipment to off-peak hours in the morning. The plant plans to enhance energy-conservation even further by involving all employees in conservation efforts.

Total amount of energy and Unit energy consumption index



5. Environmental Data

Takaoka Plant		FY2009	FY2010	FY2011	FY2012	FY2013
Toxic substances	Vinyl chloride monomer consumption (tons)	0.0	0.0	0.0	0.0	0.0
	Vinyl chloride monomer emissions (tons)	0.0	0.0	0.0	0.0	0.0
Substances subject to PRTR law	Consumption (tons)	114	210	223	125	16
	Amount emitted (tons)	0.1	0.2	0.2	0.1	0.0
Industrial waste	Amount generated (before volume reduction) (tons)	2,130	3,458	4,730	4,882	12,494
	Amount generated (after volume reduction) (tons)	388	671	529	535	1,056
	Amount sent to landfill (tons)	129	174	0.0	3.4	0.0
Atmospheric emissions	CO ₂ emissions (tons)	17,817	24,208	20,132	23,329	22,546
	SO _x emissions (tons)	8.7	7.0	6.8	9.5	3.2
	NO _x emissions (tons)	19	14	15	19	13
	Soot emissions (tons)		0.4	0.7	0.0	0.0
Water resources (Industrial water + Ground water + Waterworks) consumption (1,000m³)		3,183	3,732	3,808	4,052	3,732
Waste water	Total waste water discharge (1,000m ³)	3,516	3,050	3,398	4,408	4,890
	COD emissions (tons)	12	9.2	13.0	14.3	18.9
	Total phosphorus discharge (tons)	0.4	0.2	0.7	0.5	0.8
	Total nitrogen discharge (tons)	19	10	16	19	20
Energy	Total consumption (crude oil equivalent, kL)	8,112	9,750	8,994	8,868	8,986
	Unit consumption index (1990 = 100)	93%	94%	96%	103%	104%
Production of PDR equivalent (tons)		4,523	5,419	4,866	4,295	4,433

Quality Assurance Initiatives

To support the realization of ZEON's Mid-Term Management Plan, SZ-20, and the enterprise blueprint for 2020, "ZEON creates the future today through the power of chemistry," the Takaoka Plant is aiming to achieve a 100% yield rate*. To achieve this goal, the plant will rely on science to analyze and visualize the underlying causes of quality anomalies as well as to devise measures to address the problems.

* Yield rate:

The percentage of products rolling off the production line that pass quality inspections. A 100% yield rate means that no defective products were produced.

VOICE Stabilizing processes starts with visualizing processes quantitatively

Chemical companies rely on science to perform work. We abide by the following policies in order to stabilize the manufacturing processes and deliver products with consistent quality.

1. We analyze and visualize manufacturing technologies quantitatively based on accepted scientific standards.
2. We determine management values and ranges and standardize work processes based on accepted scientific standards after a discussion of various quantitative data.
3. We aim to realize and sustain a 100% yield rate by using the Quality Assurance Conference as the primary organization for quality enhancement measures, along with management reviews of quality, technology, and safety by various committees.
4. We develop new manufacturing technology and incorporate it into our products to achieve a 100% yield rate immediately after product commercialization by building deep bonds between the R&D organizations and the plant from the product development stage.



Hiroshi Fujisawa, Corporate Officer and Takaoka Plant Manager

Based on the above policies, we will ensure that we operate a stable and safe plant.

Living Together with the Local Community

1. Contributing to the community through volunteer work

On June 9, 2013, some 200 employees and family members, representing not just the Takaoka Plant but the entire ZEON Takaoka Group, took part in the Himi Coastal Cleanup organized by a local environmental organization. Also, on July 7, about 200 members of the Group took part in the Fushiki-Kokubu Coastal Cleanup organized by the Takaoka-Fushiki Beautification Volunteer Group and made a dedicated effort to clean up the beach. On February 22, 2014, we were given an environmental activity award by the "Himi City Environmental Improvement Council" in connection to this coastal cleanup activity, which we have continually participated in since 2008.



Fushiki-Kokubu Coastal Cleanup

In addition, in 2012 Aoba-cho—where the Takaoka Plant dormitory is located—marked 50 years since its founding. To commemorate this event, employees joined local residents to plant six cherry blossom trees alongside the dormitory. There is one cherry blossom tree on the property planted around 1957 that local residents lovingly call the "ZEON cherry blossom." The six newly planted trees will also surely be cherished by the local residents for many years to come.

2. Interaction with the local community

ZEON Takaoka Group Summer Festival

The annual ZEON Takaoka Group Summer Festival was held on August 2, 2013. Employees, along with their family members and local residents, were invited, bringing the total number of participants to over 500. All enjoyed local delicacies including Takaoka-style Totomaru *okonomiyaki*, which has quietly been gaining popularity, and a curry using bitter melon grown at the Takaoka Plant. Attendees also enjoyed entertainment including a performance by a Hawaiian band comprised of employees, and a massive quiz event.

Futagami Manshou Kai

Employees from the Takaoka Plant actively take part in the Futagami Manshou Kai, an industry-academia-government association in the Futagami district as a way to deepen ties to the local community.

Takaoka Manyo Festival

Takaoka City holds an annual Takaoka Manyo Festival. The Takaoka Plant takes part in the annual main event, the recitation of all 20 volumes of the “Manyo-shu (Anthology of Myriad Leaves).” In 2013, the event was held on October 4, and 16 ZEON Takaoka Group employees took part in the festivities, awakening their feelings of bygone days to recite many a Japanese poem at the gathering.



Employees taking part in the recitation of “*Manyo-shu*”