Ajinomoto Group Sustainability Data Book 2016

Environment

Additional Documents and Data

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Eat Well, Live Well.
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Ajinomoto Group Zero Emissions Plan (AGZEP)

AGZEP for 2014–2016

Key targets and results of the AGZEP for 2014–2016

	Item	Scope	Targets to be achieved	Results			Target (reference)
				FY 2013	FY 2014	FY 2015	Vision for FY2020
Water resources	Biochemical Oxygen Demand, Total Nitrogen	All production sites of the Group	BOD ≤ 10 ppm, TN ≤ 5 ppm	Target achieved at 23 out of 36 sites	Target achieved at 27 out of 34 sites	Target achieved at 24 out of 32 sites	BOD ≤ 10 ppm, TN ≤ 5 ppm
	Water use per unit of production	All production sites of the Group	Reduce by at least 70% (compared to fiscal 2005)	71% reduction	73% reduction	75% reduction	Reduce by at least 70% (compared to fiscal 2005)
	Discharged water per unit of production	All production sites of the Group	Reduce by at least 70% (compared to fiscal 2005)	71% reduction	75% reduction	79% reduction	Reduce by at least 70% (compared to fiscal 2005)
CO_2 emissions	CO_2 emissions per unit of production	Entire Group (production sites + non-production sites)	Reduce by at least 35% (compared to fiscal 2005)	26% reduction	28% reduction	33% reduction	TBD
	CO_2 emissions	All production sites in Japan	≤ 496 kt[1] (reduce by 11% compared to fiscal 2005)	348 kt	351 kt	407 kt	≤ 474 kt (reduce by 15% compared to fiscal 2005) *1% reduction per year[2]
	Renewable energy use ratio	Entire Group (production sites + non-production sites)	≥ 15%	10%	15%	18%	TBD
3Rs of waste	Resource recovery ratio (waste + co-products)	Entire Group (production sites + non-production sites)	≥ 99%	99.2%	99.4%	99.6%	≥ 99%
	Volume of waste (based on actual reports)	Entire Group (production sites + non-production sites)	Zero waste caused by trouble	—	1.248 kt	1.785 kt	TBD

1 Base year (2005): 558 kt
2 Results for Ajinomoto Windsor, Inc. not included.

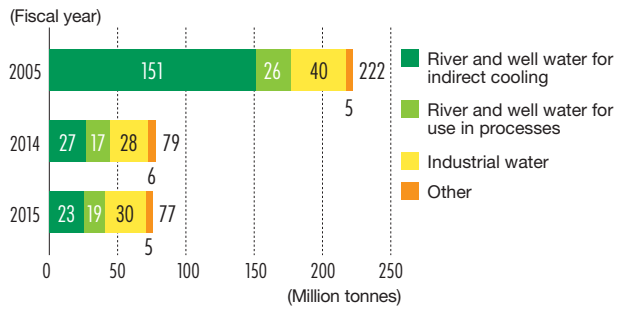
Conservation of water resources

Water use

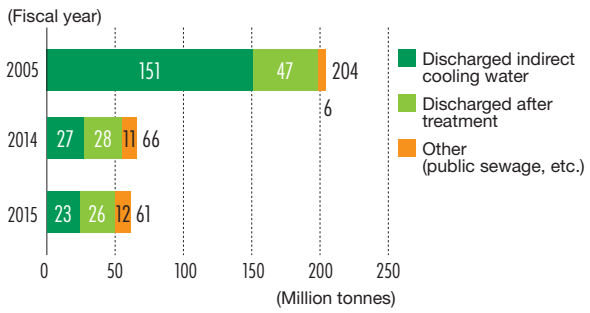
(Million tonnes)

		Base year		Results				
		FY2005	Ratio (%)	FY2013	FY2014	FY2015	Ratio (%)	Difference
Water use		222	100%	82	79	77	100%	-145
	Japan	83	38%	34	30	32	41%	-52
	Asia/Africa	82	37%	22	23	21	28%	-60
	Europe	29	13%	13	11	11	15%	-18
	North America	3	2%	5	5	5	7%	2
	South America	18	8%	7	7	6	8%	-12
	China	6	3%	1	1	1	2%	-5
Water used per unit of production (per tonne of product)		123	—	36	34	30	—	—
	Reduction ratio of water use per unit of production	—	—	71%	73%	75%	—	—
Reference value: Production volume (10 kilotonnes)		180	—	226	235	253	—	—

Water use

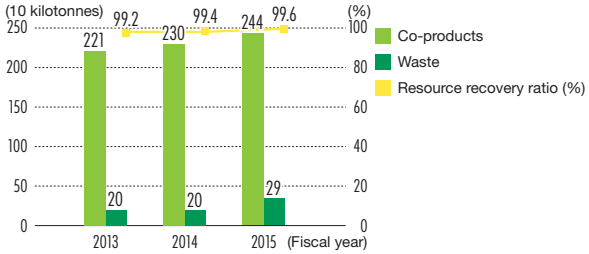


Discharged water

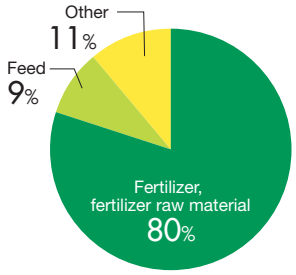


3Rs of waste

Volume of waste and co-products and resource recovery ratio



Applications of recovered co-products



Reduction of greenhouse gas emissions

Total CO_2 emissions and CO_2 emissions per unit of production

(10 kilotonnes)

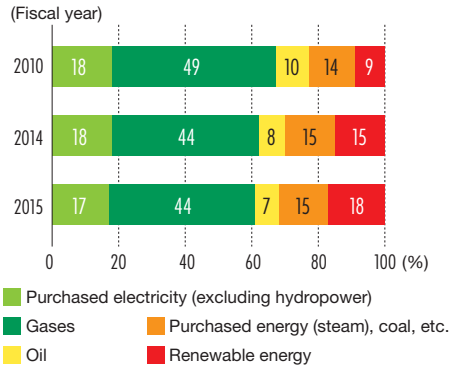
		Base year		Results				
		FY2005	Ratio (%)	FY2013	FY2014	FY2015	Ratio (%)	Difference
Total CO_2 emissions		236	100%	220	221	223	100%	-12
	Japan	58	25%	39	40	45	20%	-13
	Asia/Africa	87	37%	93	97	104	47%	17
	Europe	33	14%	23	22	17	8%	-16
	North America	23	10%	35	36	35	16%	12
	South America	20	9%	19	18	14	6%	-7
	China	14	6%	10	9	8	4%	-6
CO_2 emissions per unit of production (per tonne of product)		1.31	—	0.97	0.94	0.88	—	—
	Reduction rate of CO_2 emissions per unit of production	—	—	26%	28%	33%	—	—
Reference value: Production volume (10 kilotonnes)		180	—	226	235	253	—	—

Input of energy

	FY2013	FY2014	FY2015
Input of energy (TJ)[1]	35,342	36,356	37,362
Energy input per unit of production (per tonne of product)	15.6	15.5	14.8

1 TJ: terajoule, T (tera) = 10^{12}

Energy use at the Ajinomoto Group (thermal equivalent)



Fiscal 2015 Input and Output Balance

The Ajinomoto Group is working to minimize its impact on the environment, based on its Medium-Term Environmental Plan and Ajinomoto Group Zero Emissions Plan (AGZEP). The Group always pursues the most efficient use of the resources needed for its business activities, including raw materials, energy, and water.

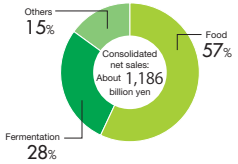
Input and output balance

Scope of reporting: Including Ajinomoto Co., Inc. and its consolidated subsidiaries, 102 key business sites in the Group's environmental management. This number declined by six sites (nine eliminated, three added), from fiscal 2014 due to the consolidation of business sites and other reasons.

Reporting period: April 1, 2015, to March 31, 2016

Reported data: Estimated values are included. The sum of all values in a graph may not equal the total due to rounding.

Consolidated net sales (reference)



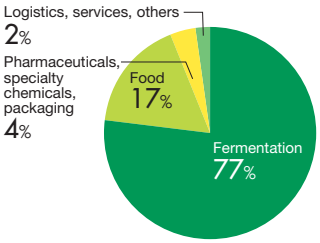
Note:
The Ajinomoto Group's business segments are categorized according to the characteristics of the environmental impact incurred by the various manufacturing methods, excluding cooperative ventures, such as edible oils and coffee products. These categories are different from the business segments based on consolidated financial accounting. Their scope of reporting is different from the scope applied to the input and output balance.

Input and output balance for the Ajinomoto Group

Input: Energy, water, raw material

Input of energy

37,362 TJ[1]

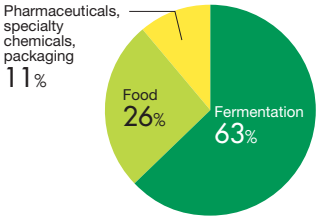


Purchased electricity	2.17 million MWh (7,829 TJ)
Purchased steam	900 kt (2,435 TJ)
Gas	388 million m³ (16,374 TJ)
Oil	65 million L (2,624 TJ)
Coal	100,628 t (2,989 TJ)
Biomass	5,111 TJ

1 TJ: terajoule, T (tera) = 10^{12}

Water consumption

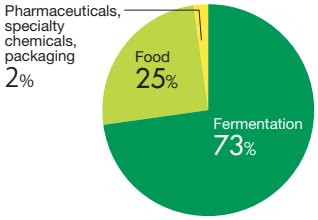
76,912 kt



River water	25,272 kt
Industrial water	29,574 kt
Well water	16,972 kt
Tap water, municipal water	5,090 kt
Others (rainwater, etc.)	4,000 t

Raw material consumption

3,997 kt



Raw material

Main raw material	1,677 kt
Sub raw material	2,320 kt
Acids/alkalis	581 kt
Other	1,739 kt

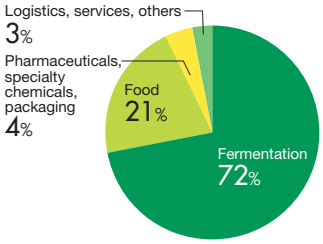
Packaging material

Plastic	41 kt
Paper, cardboard	108 kt
Other	53 kt

Output: Emissions, discharged water, waste

CO_2 emissions

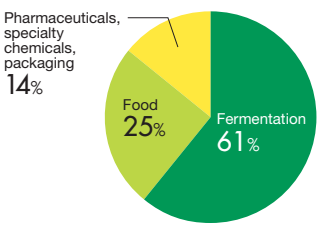
2,234 kt



CO_2	Combustion	938 kt
	Purchased energy	1,268 kt
	Vehicle fuel	29 kt
NOx		1,999 t
SOx		1,461 t
Soot and dust		2,445 t
CFCs, HCFCs, HFCs		4 t

Discharged water

60,873 kt

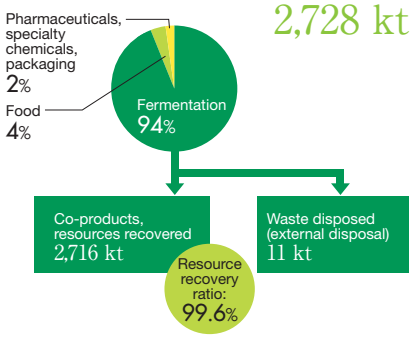


Discharged to

Public waterways (indirect cooling water, etc.)	23,284 kt
Public waterways (discharged after treatment, etc.)	26,059 kt
Public sewerage	10,171 kt
Water for irrigation use	1,359 kt
BOD	185 t
Nitrogen	365 t

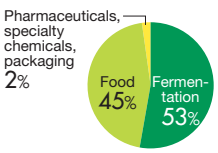
Co-products, waste emissions

2,728 kt



Volume of production

2,532 kt



Environmental Accounting

[Environmental Conservation Cost]

Aggregation period: April 2015 - March 2016
Aggregation scope: Ajinomoto Co., Inc.

Investment

(millions of yen)

Category	Item	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015	Remarks
Business area	Environmental conservation investment to control environmental impacts resulted from production and service activities within the business area	1,004	2,085	1,129	1,075	1,159	**531**	Investment for environment related facilities and equipment in Head Office, branch offices and 3 plants in Japan
	1) Pollution prevention investment	808	2,018	311	390	497	**376**	Investment for controlling quality of discharged air and wastewater. Investment for restructuring of utility area in Kyusyu Plant.
	2) Global environmental conservation investment	192	57	729	521	508	**60**	Investment for CO_2 emission reduction, energy saving. (IT infrastructure)
	3) Resource circulation investment	5	11	88	164	154	**95**	Investment for recycling of co-products and waste, and waste disposal. Investment for fertilizer process in Kyusyu Plant.
Upstream/ downstream	Environmental conservation investment to control environmental impacts resulted from business operations upstream or downstream	3	1	0	5	0	**0**	
Administration	Environmental conservation investment stemming from administrative activities	18	88	69	25	8	**12**	Investment for the well for underground water monitoring.
R&D	Environmental conservation investment stemming from related R&D activities	0	1	0	18	9	**0**	
Social activity	Environmental conservation investment stemming from social activities	5	0	6	52	29	**75**	Investment for the plant tours.
Environmental remediation	Investment incurred for dealing with environmental degradation	0	1	0	0	0	**0**	
	Total	1,029	2,176	1,204	1,174	1,205	**617**	

Expenditure

(millions of yen)

Category	Item	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015	Remarks
Business area	Environmental conservation cost to control environmental impacts resulted from production and service activities within the business area	2,601	2,366	3,155	2,761	2,287	**2,265**	Operating cost in environment related facilities or equipment's in Head Office, branch offices and 3 plants in Japan
	1) Pollution prevention cost	1,592	1,389	2,307	1,812	1,403	**1,419**	Cost for controlling air and water quality (mainly cost of wastewater treatment, etc.)
	2) Global environmental conservation cost	65	38	38	31	31	**31**	Cost for CO_2 emission reduction, energy saving
	3) Resource circulation cost	944	939	809	918	852	**815**	Cost for recycling of co-products and waste, and waste disposal
Upstream/ downstream	Environmental conservation cost to control environmental impacts resulted from business operations upstream or downstream	275	259	257	252	247	**236**	Cost for the Containers and Packaging Recycling Act
Administration	Environmental conservation cost stemming from administrative activities	491	438	402	369	418	**207**	Cost for maintaining EMS and environment related administrative operations in Head Office. (Excluding social activities cost)
R&D	Environmental conservation cost stemming from related R&D activities	1,684	2,777	3,105	3,044	1,715	**1,839**	Cost for the environmentally contributing R&D themes.
Social activity	Environmental conservation cost stemming from social activities	147	143	125	128	123	**139**	Cost for Environmental Report, Eco Products, environmental campaigns and so on.
Environmental remediation	Cost incurred for dealing with environmental degradation	0	0	0	0	108	**63**	Cost for countermeasures against soil pollution.
	Total	5,199	5,983	7,044	6,555	4,898	**4,749**	

Investment/ R&D expenditures (Ajinomoto Group)

(millions of yen)

Item	Detail	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015	Remarks
Investment	Capital investment	7,970	10,389	11,999	11,140	12,131	**11,992**	
	Investment for environment related equipment/facility included in capital investment	1,029	2,177	1,204	1,174	1,205	**617**	
R&D	R&D	32,283	29,872	27,505	27,569	28,419	**28,045**	
	Investment for environment related development included in R&D*	1,684	2,778	3,105	3,044	1,715	**1,839**	*Total amount of the cost for the environmentally contributing themes.

Major environmental performance

Category		Item	Unit	FY2010 Actual	FY2011 Economic Effect*	FY2012 Actual	FY2013 Economic Effect*	FY2014 Actual	FY2015 Economic Effect*	FY2010 Actual	FY2011 Economic Effect*	FY2012 Actual	FY2013 Economic Effect*	FY2014 Actual	FY2015 Economic Effect*
Production		Volume	Thousands of tonnes	175	-	172	-	165	-	165	-	137	-	**132**	-
Input	Water	River water	Thousands of tonnes	15,024	-	12,449	-	11,118	-	8,603	-	7,426	-	**6,632**	-
		Industrial water	Thousands of tonnes	28,762	-	28,682	-	30,632	-	21,733	-	19,569	-	**18,838**	-
		Other	Thousands of tonnes	863	-	808	-	747	-	740	-	699	-	**437**	-
		Total water input	Thousands of tonnes	44,649	-	41,940	-	42,498	-	31,076	-	27,694	-	**25,907**	-
	Energy	Electricity	MWH	71,037	4.0	56,689	5.7	51,667	6.3	55,710	5.9	48,084	6.8	**51,243**	**6.4**
		City gas	KM^3	40,787	8.8	39,994	9.2	40,109	9.1	38,983	9.7	37,956	10.2	**36,813**	**10.8**
		LNG	KNM^3	29,731	0.0	31,119	-0.7	22,783	3.4	26,894	1.4	23,247	3.2	**25,114**	**2.3**
		Heavy oil	KL	27,814	5.1	30,417	3.8	28,809	4.6	26,342	5.8	21,613	8.0	**20,513**	**8.6**
		Total energy input	TJ	4,318	-	4,402	-	3,978	-	4,016	-	3,599	-	**3,590**	-
		Per-unit energy usage	GJ/Production (t)	25	-	26	-	24	-	24	-	26	-	**27**	-
Output	Water	Discharged water	Thousands of tonnes	37,346	-	34,573	-	30,433	-	29,518	-	24,757	-	**25,615**	-
		Per-unit discharged water	Thousands of tonnes / Production (t)	0.21	-	0.20	-	0.18	-	0.18	-	0.18	-	**0.19**	-
		BOD emissions	t	207	-	169	-	129	-	89	-	102	-	**120**	-
		TN emissions	t	662	-	477	-	406	-	321	-	328	-	**332**	-
	NO_X	Emissions	t	142	-	153	-	134	-	121	-	118	-	**130**	-
	SO_X	Emissions	t	640	-	710	-	712	-	671	-	497	-	**529**	-
	CO_2	CO_2 emissions	Thousands of tonnes	259	1.6	262	1.5	238	2.0	239	2.0	218	2.4	**218**	**2.4**
		Per-unit CO_2 emissions	t/Production (t)	1.48	-	1.52	-	1.44	-	1.45	-	1.59	-	**1.65**	-
	Waste	Waste generation	Thousands of tonnes	67	-	70	-	71	-	79	-	63	-	**61**	-
		Resource recovery ratio	%	99.8	-	100.0	-	99.8	-	85.6	-	99.7	-	**99.8**	-
Waste product		Total amount	100 million (JPY)	8.0	5.3	17.9	-4.6	12.2	1.1	9.3	4.0	11.0	2.4	**10.5**	**2.8**
		Total weight	t	2,348	-	3,070	-	1,263	-	1,499	-	995	-	**619**	-
Economic effect			100 million (JPY)		24.8		14.9		26.6		28.7		33.0		**33.2**

*Compared to FY2005 based on technical cost. CO_2 reduction benefit is calculated by 2,000/t-CO_2.

Chemical Substances and Emission Levels

The Ajinomoto Group manages chemical substances and reports on the results in accordance with laws in each region. The Group reports on the results in accordance with PRTR* Law or relevant laws/regulations in each country.

*A law which estimates the amounts of specific chemical substances released into the environment, and promotes the improvement of management.

Aggregation period: April 2015 - March 2016 (Japan), January 2015 - December 2015 (Outside Japan)
Aggregation scope: Ajinomoto Co., Inc. and its subsidiaries in and outside Japan

Japan

Applicable laws and regulations: PRTR (Pollutant Release and Transfer Register) System

(kg)

Class I Designated Chemical Substances			Amount released into				Amount transferred to	
Substance name	No.	Specific Class I	Air	Water (public area)	Land (inside)	Landfills (inside)	Sewer	Outside
Acetonitrile	013		1,300	610	-	-	-	35,200
N-alkylbenzenesulfonic acid and its salts (alkyl C=10-14)	030		-	-	-	-	-	5
Asbestos	033	○	-	-	-	-	-	560
Xylene	080		930	-	-	-	33	13
HCFC-22 (chlorodifluoromethane)	104		100	-	-	-	-	-
Chloroform	127		200	610	-	-	-	6,400
N,N-dimethylformaldehyde	232		100	-	-	-	-	13,000
Thiourea	245		-	-	-	-	-	490
Toluene	300		340	-	-	-	-	16,000
2-chlorobiphenyl	406		-	-	-	-	-	6,600
Formaldehyde	411	○	8	-	-	-	60	240
Methylnaphthalene	438		27	-	-	-	-	-
Tritolyl phosphate	460		-	-	-	-	-	8
Triphenyl phosphate	461		-	-	-	-	-	360

*Business sites which reported performance are: Ajinomoto Co., Inc. (Kawasaki Plant, Tokai Plant, Kyushu Plant), Ajinomoto Fine-Techno Co., Inc. (BU Activated Carbon), AJINOMOTO BAKERY CO.,LTD. (Shimada Plant)
*Each site's data is available on the website of the Ministry of Economy, Trade and Industry. (Performance of FY2015 will be released in March, 2017)
http://www.meti.go.jp/policy/chemical_management/law/prtr/6.html (Japanese only)

North America

Applicable laws and regulations: EPCRA (Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986)

(kg)

Chemical substance	Amount used	Amount transferred (released)
Ammonia	651,426	74,291
Methanol	421,717	1,232

*Business sites which reported results are: AJINOMOTO HEARTLAND, Inc., AJINOMOTO NORTH AMERICA, Inc.

South America

Applicable laws and regulations: IBAMA Normative Instruction No. 31 of December 3, 2009.

(kg)

Chemical substance	Amount used
Ammonia	18,335,099
Potassium hydroxide	335,787
Sodium hydroxide	7,520,490
Phosphoric acid	1,154,140
Hydrochloric acid	15,790,944
Sulfuric acid	22,583,901
Ethyl alcohol	68,687
Sodium hypochlorite	62,509

*Business sites which reported results are: AJIMONOTO do BRASIL Ind. e Com. de Alimentos Ltda (4 business sites)

Europe

Applicable laws and regulations: Flemish Decree on General Environmental Policy, Flemish Environmental Regulation (Vlarem II) (Belgium) Ministerial order from February the 2nd 1998, modified by the decree from May the 29th 2000 (France)

(kg)

Chemical substance	Amount transferred (released) to		
	Waste	Air	Water
Toluene	-	15	-
Dichloromethane	-	20	-
Solvents	25	127	-
Non-methane short chain organic compounds	-	85	-
Halogenated hydrocarbons	-	21	-
Aromatic hydrocarbons	-	23	-
Other chemical substances	11,984	5	-

*Business sites which reported results are: S.A. AJINOMOTO OMNICHEM N.V., AJINOMOTO EUROLYSINE S.A.S., AJINOMOTO FOODS EUROPE S.A.S.

Other Areas

Thailand: Introduction of similar system is under consideration.