

Osaka Gas in brief 2018

LNG / Electricity Business

I. LNG business

(1) Purchase volume

(thousand ton)

FY	Brunei	Indonesia	Australia	Malaysia	Qatar	Oman	Russia	Papua New Guinea	Others	Total
2009.3	765	2,616	1,434	801	240	924			757	7,538
2010.3	667	2,555	1,170	940	415	1,017			64	6,827
2011.3	663	2,790	1,440	1,360	296	1,485			57	8,092
2012.3	798	2,124	1,488	1,636	176	1,461	256		169	8,108
2013.3	731	1,713	1,587	1,654	410	1,333	386		339	8,153
2014.3	640	1,250	1,864	1,678	296	1,476	505		479	8,187
2015.3	626	587	1,749	1,684	359	1,348	577	539	605	8,075
2016.3	763	612	1,325	1,063	409	1,309	507	1,451	363	7,802
2017.3	556	750	2,039	1,025	359	1,454	703	1,724	305	8,915
2018.3	765	523	3,024	940	415	1,269	575	1,667	340	9,519

(2) LNG vessels

Name of vessel	Completion	Tank capacity (Moss type)	Builder	Operator
LNG VESTA	June 1994	125,000 m ³ (4 tanks)	Mitsubishi Heavy Industries	Mitsui O.S.K. Lines
LNG JAMAL	October 2000	135,000 m ³ (5 tanks)	Mitsubishi Heavy Industries	Nippon Yusen Kaisha
LNG DREAM	September 2006	145,000 m ³ (4 tanks)	Kawasaki Shipbuilding	Nippon Yusen Kaisha
LNG BARKA	December 2008	153,000 m ³ (4 tanks)	Kawasaki Shipbuilding	Nippon Yusen Kaisha
LNG JUPITER	July 2009	153,000 m ³ (4 tanks)	Kawasaki Shipbuilding	Nippon Yusen Kaisha
LNG VENUS	November 2014	153,000 m ³ (4 tanks)	Mitsubishi Heavy Industries	Mitsui O.S.K. Lines
LNG MARS	October 2016	153,000 m ³ (4 tanks)	Mitsubishi Heavy Industries	Mitsui O.S.K. Lines

(3) Upstream business (excluding power generation business)

Project	Country	Main business	Ownership (%)	Acquired
Universe Gas & Oil Company, Inc. (Sanga Sanga Gas Field)	Indonesia	Gas field development	1.46	1990
Sunrise LNG Project	Australia, East Timor	LNG production	10	2000
Evans Shoal Gas Field	Australia	Gas field development	10	2000
Idemitsu Snorre Oil Development Co., Ltd.	Norway	Oil development	2 - 10	2005
Qalhat LNG	Oman	LNG production	3	2006
Crux Gas and Condensate Field	Australia	Gas / condensate development	3	2007
Gorgon Project Gas Field	Australia	LNG production	1.25	2009
Ichthys LNG Project	Australia	LNG production	1.2	2012
Pearsall Shale Gas and Liquids Development Project	U. S. A.	Shale gas and liquids development	35	2012
Western Papua New Guinea Gas and Condensate Field	Papua New Guinea	Gas / condensate development	10 - 20	2014
East Texas Shale Gas Project	U. S. A.	Shale gas production	30	2018

(4) Mid-, down-stream business (excluding power generation business)

Project	Country	Main business	Ownership (%)	Acquired
Freeport LNG Terminal (gasification)	U. S. A.	LNG terminal	10.81	2008
Sagunto LNG Terminal	Spain	LNG terminal	20	2010
Sumisho Osaka Gas Water UK Limited	United Kingdom	Water utility	50	2013
Osaka Gas (THAILAND)	Thailand	Energy-utility-related business	49	2013
City-OG Gas Energy Services	Singapore	Gas sales	49	2013
Freeport LNG Terminal (liquefaction)	U. S. A.	LNG liquefaction business	25	2014
NS-OG Energy Solutions (Thailand)	Thailand	Cogeneration business	30	2014
OGP Energy Solutions	Thailand	Fuel switch / energy service	29.4	2015
Erogasmet	Italy	Gas distribution	-	2015

II. LNG terminals

(1) Outline of LNG terminals

	Senboku	Himeji
LNG vaporization capacity (thousand m ³ / hour)	2,119	891
LNG vaporizers	21	7
LNG tanks	20	8
Total storage capacity (LNG)	1,860,000 kl	740,000 kl
Main resource	LNG	LNG

(as of April 1, 2018)

III. Power generation business

(1) Power generation facilities of Daigas Group (for domestic electricity business)

	Projects	Location	Total capacity	Generation type	Commercial operation commenced
Natural gas	Senboku LNG Terminal	Sakai, Osaka	20,000 kW	GTCC ^{*1} , etc.	July, 2002
	Senboku Natural Gas Power Plant (Senboku LNG Terminal) Unit: 1, 2 Unit: 3, 4	Takaishi Sakai (Osaka)	277,000 kW x 2 <u>277,500 kW x 2</u> Total 1,109,000 kW	GTCC	Unit 2: April, 2009 Unit 1: May, 2009 Unit 4: October, 2009 Unit 3: November, 2009
	Himeji LNG Terminal	Himeji, Hyogo	66,000 kW	GTCC, etc.	April, 2004
	Nakayama Joint Power Generation Co., Ltd., Funamachi Power Plant	Osaka, Osaka	149,000 kW ^{*2}	GTCC	April, 1999
	Gas and Power Co., Ltd., Torishima Energy Center	Osaka, Osaka	141,000 kW	GTCC	April, 2002
	Gas and Power Co., Ltd.	Uji, Kyoto	67,000 kW	GTCC	October, 2004
	Gas and Power Co., Ltd.	Settsu, Osaka	17,000 kW	Gas engine	April, 2006
	OGCTS Co., Ltd., Senri Energy Center	Toyonaka, Osaka	7,000 kW	Gas turbine	January, 2008
Coal	Nakayama Joint Power Generation Co., Ltd., Nagoya Power Plant	Chita, Aichi	149,000 kW ^{*2}	Coal-fired steam turbine, biomass (5%)	April, 2000
	Nakayama Joint Power Generation Co., Ltd., Nagoya Power Plant II	Chita, Aichi	110,000 kW ^{*2}	Coal-fired steam turbine, biomass (30%)	September, 2017
Wind	Hayama Wind Power Generation Co.	Hayama, Kochi	20,000 kW	Wind (1,000 kW x 20 units)	March, 2006
	Hirogawa Myojin-yama Wind Power Co.	Wakayama	16,000 kW	Wind (1,000 kW x 16 units)	November, 2008
	Yura Wind Power	Wakayama	10,000 kW	Wind (2,000 kW x 5 units)	September, 2011
	Hizen Wind Power	Karatsu, Saga	12,000 kW	Wind (1,500 kW x 8 units)	March, 2005
	Hizen Wind Power	Karatsu, Saga	18,000 kW	Wind (1,500 kW x 12 units)	January, 2008
	Hirao Wind Power	Kumage, Yamaguchi	9,000 kW ^{*3}	Wind (1,500 kW x 6 units)	February, 2009
	Inami Wind Power	Wakayama	26,000 kW ^{*2}	Wind (2,000 kW x 13 units)	June, 2018
Mega-solar, other	Gas and Power Co., Ltd., Torishima Mega-solar Power Plant	Osaka, Osaka	1,800 kW ^{*4}	Photovoltaic	April, 2013
	Gas and Power Co., Ltd., Torishima Mega-solar Power Plant II	Osaka, Osaka	1,200 kW ^{*4}	Photovoltaic	January, 2014
	Gas and Power Co., Ltd., Shoo Mega-solar Power Plant	Okayama	900 kW ^{*4}	Photovoltaic	April, 2013
	Hirogawa Myojin-yama Mega-solar Power Plant	Wakayama	800 kW ^{*4}	Photovoltaic	April, 2013
	Yura Wind Development Co., Ltd., Yura Solar Power Plant	Wakayama	1,700 kW ^{*4}	Photovoltaic	December, 2016
	Nabari Kintetsu Gas Co., Ltd., Yahata Mega-solar Power Plant	Nabari, Mie	700 kW ^{*4}	Photovoltaic	September, 2013
	JGC Mirai Solar Co., Ltd., NISSAN Green Energy Farm in Oita	Oita, Oita	26,500 kW ^{*4 *5}	Photovoltaic	May, 2013

	Biomass Power Technologies Inc., Matsusaka Woody Biomass Power Plant	Matsusaka, Mie	2,000 kW ^{*6}	Photovoltaic	January, 2018
	OGCTS Co., Ltd.	6 stations	7,800 kW ^{*4}	Photovoltaic, etc.	
	Energy Bank Japan Co., Ltd.	24 stations	33,000 kW ^{*4}	Photovoltaic, etc.	
Total capacity			2,006,700 kW ^{*7}		

*1 Gas turbine combined cycle

*2 Quota for Osaka Gas is 95% of the total capacity (14,900 kW).

*3 Quota for Osaka Gas is 99.8% of the total capacity (9,000 kW).

*4 Total generation capacity of solar panels.

*5 Quota for Osaka Gas is 49% of the total capacity (26,500 kW).

*6 Quota for Osaka Gas is 14.5% of the total capacity (2,000 kW).

*7 Quota for Osaka Gas of NISSAN Green Energy Farm in Oita and Matsusaka Woody Biomass Power Plant, which are 13,000 kW and 300 kW respectively, are included.

(2) Power generation facilities of Daigas Group (overseas)

Projects	Location	Total capacity (quota for Osaka Gas)	Generation type	Commercial operation commenced
Tenaska Gateway Generating Station	Texas, U. S. A.	845,000 kW (338,000 kW)	GTCC	June, 2004
Osaka Gas Power America, LLC ^{*1}	U. S. A. (7 locations)	1,446,000 kW (301,000 kW) ^{*1}	Diversified	December, 2005
Marianas Energy Company, LLC ^{*1}	Guam, U. S. A.	87,000 kW (87,000 kW) ^{*1}	Diesel engine	December, 2005
Energy Infrastructure Investments Pty Ltd. ^{*2}	Queensland, Australia (2 locations)	59,000 kW (18,000 kW)	Gas engine	December, 2008
Hallett 4	South Australia, Australia	132,000 kW (53,000 kW)	Wind (2,100 kW x 63 units)	June, 2011
Shuweihat S2 Independent Water and Power Project ^{*3}	Abu Dhabi, U. A. E.	1,510,000 kW (151,000 kW)	GTCC	October, 2011
Solar Power Generation Project	Ontario, Canada (9 locations)	101,000 kW ^{*4} (51,000 kW)	Solar	February in 2012 through March in 2013
St. Charles Power Plant	Maryland, U. S. A.	725,000 kW (181,000 kW)	GTCC	February, 2017
Shore Power Plant	New Jersey, U. S. A.	725,000 kW (145,000 kW)	GTCC	Acquired in March, 2017
Michigan Power Natural Gas-Fired Thermal Power Plant	Michigan, U. S. A.	12,500 kW (12,500 kW)	GTCC	Acquired in June, 2018
Kleen Energy Natural Gas-Fired Thermal Power	Connecticut, U. S. A.	620,000 kW (151,000 kW)	GTCC	Acquired in May, 2018
Total capacity		6,375,000 kW (1,601,000 kW)		

*1 Quota for Marianas Energy (50%) is excluded.

*2 4 pipelines, 2 gas refineries, 2 power plants, 2 power lines connected to the grid.

*3 Quota for Osaka Gas of seawater desalination capacity is 10 million gallon per day.

*4 Total generation capacity of solar panels.