



40<sup>th</sup>

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power generation order survey

**Diesel & Gas Turbine**  
**WORLDWIDE**

engine systems technology for marine,  
stationary power, oil & gas and rail since 1969

# 40<sup>th</sup> power generation order survey

## Mostly Steady

By Jack Burke

*Diesel & Gas Turbine Worldwide's Power Generation Order Survey is part one of three surveys designed to provide details on the markets of larger reciprocating engines, steam turbines and gas turbines used in power generation, marine propulsion and mechanical drive applications.*

*We divide the data into three reports in order to provide a more in-depth look at each market segment. The Power Generation Order Survey examines reciprocating engines, steam turbines and gas turbines for power generation service. The Mechanical Drive Order Survey is devoted to engine orders for mechanical drive applications including pumps, compressors, oil exploration machinery, rail and other industrial applications. The Marine Propulsion Order Survey examines mechanical drive, auxiliary and diesel-electric marine propulsions systems. The Mechanical Drive and Marine Propulsion surveys will appear soon on [www.diesलगasturbine.com](http://www.diesलगasturbine.com).*

### Procedures

The Power Generation Order Survey includes reciprocating engines starting at 500 kW; gas turbines rated 1.0 MW and above and steam turbines.

New orders are broken into types of generating service — standby, peaking and continuous. Manufacturers provide their own distinction between peaking and standby service; however, standby service typically refers to power generation in backup or emergency service. Peaking service is associated with power generation used in conjunction with local utilities. The time that peak service operates is dependent on the condition of the local electrical grid. Continuous service typically refers to continuous power generation, stopping only for maintenance or unexpected outages.

An accompanying table shows the geographic breakdown we provide OEMs, highlighting the specific countries within the reported geographic regions.

Every effort is made to ensure that this survey is as complete and comprehensive as possible and would not have the level of detail it contains without the generous contributions of the participating companies. An accompanying table identifies those companies that participated in the 2016 survey.

## Country Information For Regions/Regional Codes, *D&GTW* Annual Market Surveys

### Western Europe

Andorra  
Austria  
Belgium  
Denmark  
Finland  
France  
Germany  
Greece  
Iceland  
Liechtenstein  
Luxembourg  
Italy  
Ireland  
Netherlands  
Malta  
Norway  
Portugal  
San Marino  
Slovenia  
Spain  
Sweden  
Switzerland  
United Kingdom

### Eastern Europe, Russia & CIS

Albania  
Armenia  
Azerbaijan  
Belarus  
Bosnia and Herzegovina  
Bulgaria  
Croatia  
Czech Republic  
Estonia  
Georgia  
Hungary  
Kazakhstan  
Kyrgyzstan  
Latvia  
Lithuania  
Moldova  
Poland  
Republic of Macedonia  
Romania  
Russia  
Serbia  
Slovak Republic  
Tajikistan  
Turkmenistan  
Ukraine  
Uzbekistan

### Middle East

Bahrain  
Cyprus  
Egypt  
Iran  
Iraq  
Israel  
Jordan  
Kuwait  
Lebanon  
Oman  
Qatar  
Saudi Arabia  
Syria  
Turkey

It is important to note, some units reported in the 2016 Power Generation Order Survey did not have complete information. In some cases OEMs chose not to provide generating service, fuel type or geography for some of their reported orders. There was another wrinkle to the survey this year. When contacted after not responding, some companies simply said they had no sales in a particular segment, so felt no need to respond to the survey. Those companies were included in the list of participants.

## Overview

Total orders (all reported driver types) reported in the 2016 Power Generation Order Survey (2015 data) were down about 2% compared to those reported in last year's survey (2014 data). The 2015 Survey showed a 1% drop compared to 2013, which seems to indicate the continued impact of low oil prices, among other economic uncertainties.

Reciprocating engine orders totaled 31 305 units, down roughly 1% from to last year's count.

Gas turbine orders were up about 9% compared to last year's report. The 2016 Survey found 620 gas turbine orders, while 569 orders were reported in the 2015 Survey. In comparison, the 2014 Survey found 710 orders.

Reported steam turbine orders were down 23% in 2015. The survey found 140 units in 2015, compared to 181 in 2014. It is important to remember the 2014 figure was a high-water mark for steam turbine orders reported in our annual survey and represented an 11% increase from the 2013 Survey.

Top five regions revealed in the 2016 Power Generation Order Survey are: Southeast Asia & Australia (45%); the Middle East (13%); the Far East (12%); North America (10%) and Western Europe (9%).

*continued on page 5*

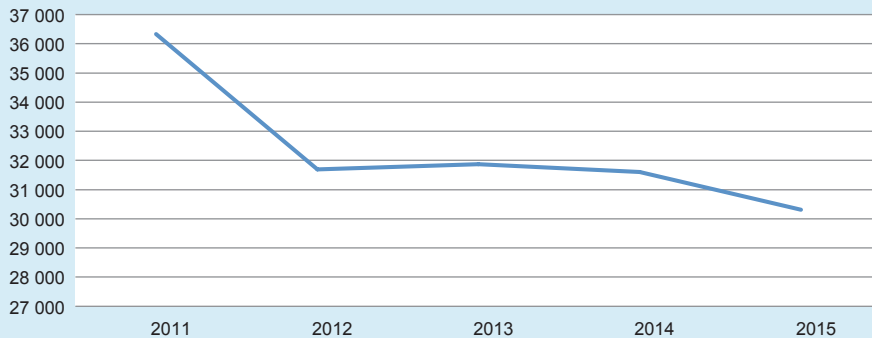


RECIPROCATING ENGINE (DIESEL, DUAL-FUEL & GASEOUS-FUEL) POWER GENERATION ORDERS, January – December 2015																									
Output Range (MW)	Units Ordered	Total Engine Output (MWe)	Type Of Generating Service			Engine Operating Speed Ranges (r/min)				Fuel					Western Europe	Eastern Europe, Russia & CIS	Middle East	Far East	Southeast Asia & Australia	Central Asia	North Africa	Central, West, East & South Africa	North America	Central America & Caribbean	South America
			Standby	Peaking	Continuous	Below 300	300 - 600	720 - 1000	Above 1000	Diesel Fuel	Heavy Fuel	Dual Fuel	Liquid Biofuel	Natural Gas											
0.50 to 1.00	15 646	11 171	8442	213	6991	0	0	0	15 646	14 871	3	0	0	772	2518	558	2492	3128	1296	476	51	700	3170	462	795
1.01 to 2.00	12 335	17 538	4929	214	7192	0	5	58	12 272	10 309	0	0	0	1975	2345	373	1943	2901	1544	241	48	395	1757	342	446
2.01 to 3.50	2883	7088	1940	83	860	0	40	19	2824	2586	0	0	0	253	585	45	217	577	180	23	6	49	1007	64	130
3.51 to 5.00	159	674	30	0	129	0	0	87	72	56	1	0	0	99	61	11	26	28	1	0	4	2	12	3	0
5.01 to 7.50	64	384	24	0	40	0	2	27	34	41	13	1	0	9	5	0	7	14	17	2	0	2	7	0	8
7.51 to 10.00	137	1286	0	0	137	0	3	134	0	16	13	7	0	101	26	5	8	0	2	22	4	20	21	15	14
10.01 to 15.00	7	75	0	0	6	0	1	5	0	0	5	1	0	0	0	0	5	0	0	0	0	0	0	1	0
15.01 to 20.00	74	1339	0	0	74	0	74	0	0	0	56	3	0	15	0	0	54	0	0	0	0	9	11	0	0
20.01 to 30.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30.01 and above	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	31 305	39 555	15 365	510	15 429	0	125	330	30 848	27 879	91	12	0	3224	5540	992	4752	6648	3040	764	113	1177	5985	887	1393

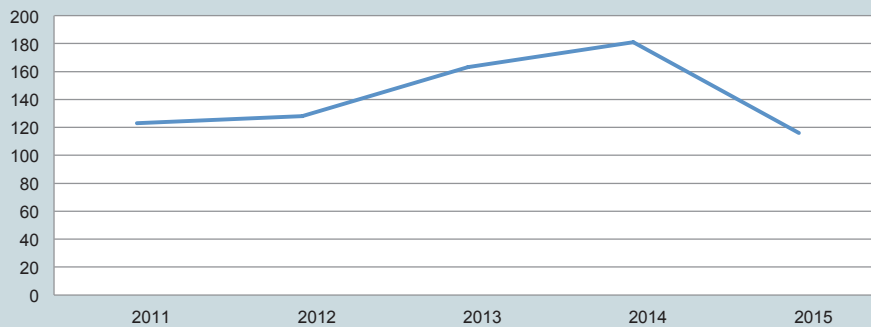
STEAM TURBINE POWER GENERATION ORDERS, January – December 2015																					
Output Range (MW)	Units Ordered	Total Engine Output (MWe)	Type Of Generating Service			Steam Turbine Types					Western Europe	Eastern Europe, Russia & CIS	Middle East	Far East	Southeast Asia & Australia	Central Asia	North Africa	Central, West, East & South Africa	North America	Central America & Caribbean	South America
			Standby	Peaking	Continuous	Condensing	Non-Condensing	Reheat	Extraction	Induction											
0.0 to 1.00	4	2645	0	0	4	0	4	0	0	0	0	0	0	0	1	0	0	1	1	0	1
1.01 to 5.00	20	36 923	0	0	20	2	18	0	1	0	1	0	0	0	18	0	0	0	1	0	0
5.01 to 10.00	4	6624	0	0	4	3	1	0	2	0	3	0	0	1	0	0	0	0	0	0	0
10.01 to 30.00	11	234	0	0	11	5	6	0	4	0	4	1	0	0	4	0	2	0	0	0	0
30.01 to 60.00	30	1214	0	0	30	0	30	0	30	0	4	0	0	0	24	0	0	0	2	0	0
60.01 to 120.00	2	136	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
120.01 to 200.00	13	2152	0	0	13	12	0	12	4	0	0	0	0	5	6	0	0	0	2	0	0
200.01 to 300.00	23	6264	0	0	23	18	0	11	0	0	0	0	16	2	0	0	3	0	2	0	0
300.01 to 500.00	14	5299	0	0	14	12	0	12	0	0	0	0	2	0	2	6	0	0	4	0	0
500.01 to 700.00	18	11 640	0	0	18	16	0	16	0	0	0	0	0	8	6	2	0	0	2	0	0
700.01 to 1000.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1000.01 and above	1	1070	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Totals	140	74 201	0	0	140	68	59	51	41	0	12	1	18	17	63	8	5	1	14	0	1

GAS TURBINE POWER GENERATION ORDERS, January – December 2015																				
Output Range (MW)	Units Ordered	Total Engine Output (MWe)	Type Of Generating Service			Fuel				Western Europe	Eastern Europe, Russia & CIS	Middle East	Far East	Southeast Asia & Australia	Central Asia	North Africa	Central, West, East & South Africa	North America	Central America & Caribbean	South America
			Standby	Peaking	Continuous	Diesel Fuel	Heavy Fuel	Dual Fuel	Natural Gas											
1.00 to 2.00	111	162	83	0	28	21	58	4	12	4	1	0	97	7	0	2	0	0	0	0
2.01 to 3.50	40	118	32	0	8	9	22	4	5	0	0	0	34	2	0	1	1	0	0	1
3.51 to 5.00	43	175	36	0	7	16	20	3	4	1	2	0	36	3	0	0	0	1	0	0
5.01 to 7.50	40	235	7	0	33	7	0	5	28	3	9	5	11	0	3	4	1	4	0	0
7.51 to 10.00	28	221	0	2	26	0	0	1	27	6	2	0	6	7	0	2	0	4	1	0
10.01 to 15.00	11	140	0	0	11	0	0	2	9	1	0	0	2	2	0	0	0	3	3	0
15.01 to 20.00	13	205	0	1	12	1	0	8	4	2	3	0	3	0	0	0	3	2	0	0
20.01 to 30.00	22	608	0	1	21	4	1	13	4	1	1	1	0	5	1	0	10	2	1	0
30.01 to 60.00	109	4249	0	18	91	13	0	41	55	2	9	19	5	44	4	0	20	8	2	2
60.01 to 120.00	46	3898	0	12	34	0	0	6	40	0	8	4	3	3	0	0	0	20	4	4
120.01 to 180.00	23	3625	0	4	19	0	0	4	19	0	7	4	1	0	3	4	4	0	0	0
180.01 and above	134	38 265	0	25	109	0	0	22	112	0	2	35	22	0	9	0	0	27	17	3
<b>Totals</b>	<b>620</b>	<b>51 901</b>	<b>158</b>	<b>63</b>	<b>399</b>	<b>71</b>	<b>101</b>	<b>113</b>	<b>319</b>	<b>20</b>	<b>44</b>	<b>68</b>	<b>220</b>	<b>73</b>	<b>20</b>	<b>13</b>	<b>39</b>	<b>72</b>	<b>28</b>	<b>10</b>

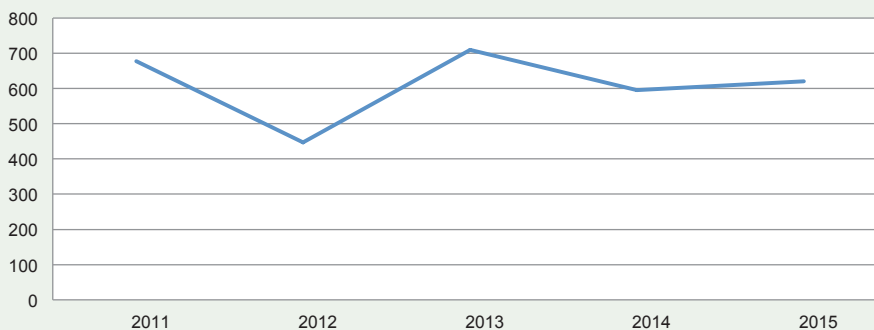
Recip Engine Orders, Five-Year Data



Steam Turbine Orders, Five-Year Data



Gas Turbine Orders, Five-Year Data



Country  
Information For  
Regions/Regional  
Codes, *D&GTW*  
Annual Market  
Surveys

United Arab Emirates  
Yemen

**Far East**

China  
Hong Kong  
Japan  
Mongolia  
North Korea  
South Korea  
Taiwan

**Southeast Asia & Australia**

Australia  
Brunei  
Burma  
Cambodia  
Fiji Islands  
Indonesia  
Kiribati  
Laos  
Malaysia  
Marshall Islands  
Micronesia  
Palau  
Papua New Guinea  
Philippines  
Samoa  
Singapore  
Solomon Islands  
Tahiti  
Tonga  
Thailand  
Tuvalu  
Vanuatu  
Vietnam

**Central Asia**

Afghanistan  
Bangladesh  
India  
Maldives Islands  
Nepal  
Pakistan  
Sri Lanka

**North Africa**

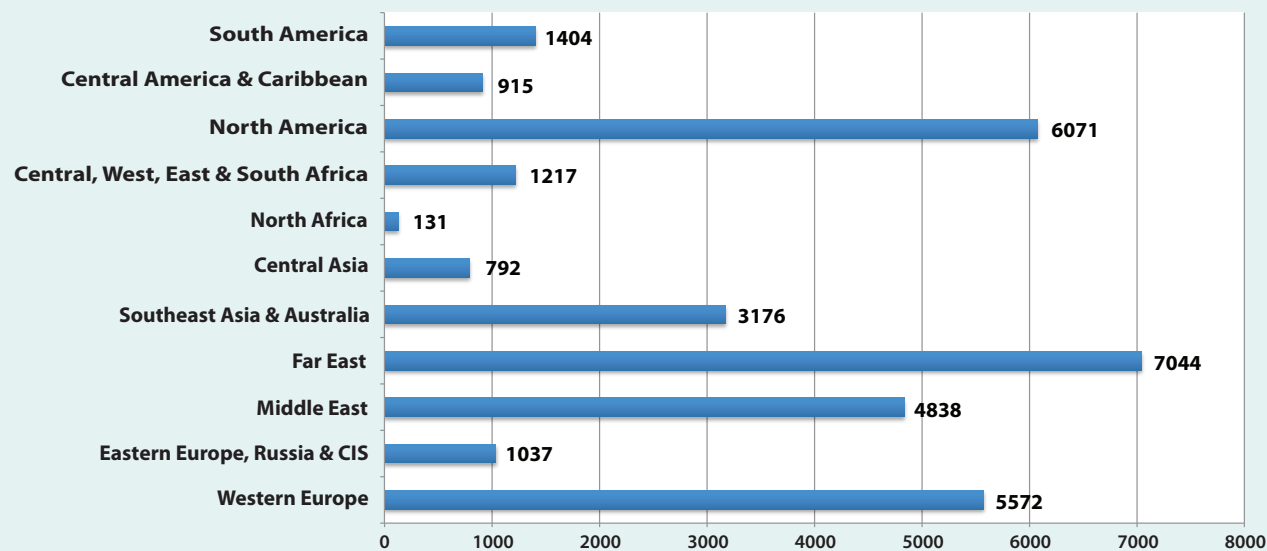
Algeria  
Libya  
Morocco  
Tunisia

**Central, West, East &  
South Africa**

Botswana  
Comoros  
Congo  
Cote d'Ivoire  
Djibouti  
Eritrea  
Ethiopia  
Gambia  
Ghana  
Madagascar  
Malawi  
Mozambique  
Seychelles  
Somalia  
Sudan  
Tanzania

Continues

## 2015 Combined Regions/Regional Codes



## Diesel, Dual-Fuel And Gas Engine Orders

The number of diesel, dual-fuel and natural gas engines ordered in 2015 totaled 31 305, a decrease of just under 1% compared to last year's survey. The majority of orders (50%) were once again in the power range of 500 kW to 1 MW, followed by 1.01 to 2.00 MW range (39%).

The 2016 Survey found that orders for continuous duty and standby service were nearly equally split, with roughly 49% each (continuous duty was slightly ahead). Peaking service represented less than 2% of the orders.

Engine operating speeds above 1000 r/min comprised 98% of the total units ordered in 2015.

Diesel fuel remained the preferred fuel for reciprocating engines in power generation applications, claiming 89% of the reported engines fuel type. Natural gas represented roughly 10%.

Top geographic locations for diesel, dual-fuel and gas engines were Far East (21%), North America (19%), Western Europe (17%), Middle East (15%) and Southeast Asia & Australia (10%).

The 2014 Survey found North America to be to top destination for diesel, dual-fuel and gas engines, but perhaps the market was affected by the slowdown of the shale boom.

## Gas Turbines

Gas turbine orders reported in the 2016 Survey totaled 620 units, up about 9% from last year. Gas turbines rated 180.1 MW and above saw the most activity, accounting for 22% of the orders.

Natural gas was the dominant fuel type (51%), followed by dual fuel (18%), heavy fuel (16%) and diesel fuel (11%).

The Far East was again the top geographic location for gas turbine orders (36%). Southeast Asia and Australia claimed the number two spot (12%), followed closely by North America (11.6%).

## Steam Turbines

Steam turbine orders totaled 140 units in the 2016 Survey, down 23% compared to last year.

Units rated 30 to 60 MW saw the most demand, accounting for 21% of all steam turbine orders.

Southeast Asia & Australia was the top geographic location (45%), followed by the Middle East (13%), Far East (12%), North America (10%) and Western Europe (9%).

## Annual Surveys

On behalf of *Diesel & Gas Turbine Worldwide*, thank you to all contributors for your continued participation in this annual survey process. It is our hope that the three surveys combined will provide an accurate snapshot of the entire large engine landscape, with fine-tuned detail provided for three market segments through each individual report — power generation, mechanical drive and marine propulsion. Electronic versions of past surveys are available at our website: [www.diesलगasturbine.com](http://www.diesलगasturbine.com). Questions, comments and suggestions should be directed to [jburke@dieselpub.com](mailto:jburke@dieselpub.com).

Country  
Information For  
Regions/Regional  
Codes, D&GTW  
Annual Market  
Surveys

Angola  
Benin  
Burkina Faso  
Burundi  
Cameroon  
Cape Verde  
Central African Republic  
Chad  
Equatorial Guinea  
Gabon  
Guinea  
Guinea Bissau  
Ivory Coast  
Kenya  
Lesotho  
Liberia  
Mali  
Mauritania  
Mauritius  
Namibia  
Niger  
Nigeria  
Rwanda  
Senegal  
Sierra Leone  
South Africa  
Swaziland  
Togo  
Uganda  
Zaire  
Zambia  
Zimbabwe

**North America**  
Canada  
USA

**Central America & Caribbean**

Bahamas  
Bermuda  
Belize  
Costa Rica  
Cuba  
Dominica  
Dominican Republic  
El Salvador  
Guatemala  
Haiti  
Honduras  
Jamaica  
Mexico  
Nicaragua  
Panama  
Puerto Rico  
Virgin Islands  
West Indies

**South America**

Argentina  
Bolivia  
Brazil  
Chile  
Colombia  
Ecuador  
Guyana  
Paraguay  
Peru  
Surinam  
Uruguay  
Venezuela

Power Generation Order Survey Participants

**Diesel, Dual-Fuel  
And Gas Engine  
Manufacturers**

Caterpillar  
Cummins Power  
Generation  
Dresser-Rand  
Fairbanks Morse  
GE Power & Water  
Hyundai Heavy Industries,  
Engine and Machine  
Division  
MAN Diesel & Turbo  
Mitsubishi Heavy  
Industries Ltd.  
Niigata Power  
Systems Co. Ltd.  
Rolls-Royce  
Power Systems  
Wärtsilä Corp.

**Gas Turbine  
Manufacturers**

Ansaldo Energia S.p.A.  
Aviadvigatel  
GE Oil & Gas  
GE Power & Water  
Kawasaki Heavy  
Industries Ltd.  
MAN Diesel & Turbo  
Mitsubishi Hitachi  
Power Systems Ltd.  
OPRA Turbines  
Siemens AG  
Solar Turbines Inc.  
Vericore Power Systems  
Zorya-Machproekt

**Steam Turbine  
Manufacturers**

Ansaldo Energia S.p.A.  
Elliott Group  
Fincantieri S.p.A.  
GE Oil & Gas  
GE Power & Water  
MAN Diesel & Turbo SE  
Mitsubishi Heavy  
Industries  
Compressor Corp.  
Mitsubishi Hitachi  
Power Systems Ltd.





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engine systems technology for marine,  
stationary power, oil & gas and rail since 1969

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