

GlobalData»

**FLUE-GAS DESULFURIZATION SYSTEMS MARKET
ANALYSIS TO 2020, 2013 UPDATE -
GLOBAL MARKET SIZE, EQUIPMENT MARKET
SHARE, COMPETITIVE LANDSCAPE, REGULATIONS
AND PRICING ANALYSIS**

Executive Summary

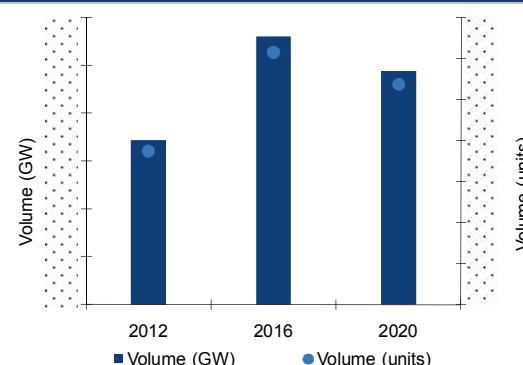
High Dependency on Coal and Stringent Emission Regulations to Drive Flue-Gas Desulfurization System Installations

Electricity generation globally is dominated by fossil fuels. With the exception of a few countries, the capacity of fossil-fuel-fired power plants far outweighs the capacity of the alternative sources of energy such as wind, hydro and others. Coal is the dominant fuel used in thermal power plants. The downside of this over-dependence on fossil fuels, especially coal, has been the emissions released into the environment by burning these fuels. Sulfur dioxide (SO₂) has had a devastating effect on the environment and the health of living beings all over the world. With such dependence on coal, demand for equipment that could check the pollution caused by coal is huge and will only increase until an efficient and economical method for replacing coal is found. The Flue-Gas Desulfurization (FGD) system is one of the most effective of the technologies used in limiting sulfur emissions.

A number of countries, in order to reduce the emissions from power plants, have formulated stringent regulations. International agreements such as the Kyoto Protocol have set targets for greenhouse gas emission reductions. Moreover, there are selective regulations by a large number of countries to curb sulfur oxide (SO_x) emissions.

In the US, the government introduced the Clean Air Interstate Rule and revisions to the Acid Rain Program in 2005 to reduce the US's SO₂ emissions. In the UK, the revised Large Combustion Plant Directive (LCPD) in 2008 was put in place, setting new emission limit values for SO₂. China has the Atmospheric Pollution Prevention and Control Law (APPCL), which was amended in 2005. This law mandates that all new power plants that exceed the set SO₂ emission levels must install a FGD system and de-dusting equipment. These regulations will only get more stringent as time progresses, driving the market for FGD systems. Global FGD system sales are estimated to total XX units between 2012 and 2020.

The chart below shows the global market volume of FGD systems for the years 2012, 2016 and 2020.

Flue-Gas Desulfurization Market, Global, Volume (GW, Units), 2012, 2016 and 2020

Source: GlobalData, Power eTrack [Accessed on October 15, 2013]

Table of Contents

1 Table of Contents

1	Table of Contents	4
1.1	List of Tables	10
1.2	List of Figures	12
2	Introduction	14
2.1	Emissions from Thermal Power Plants, Pollutants	15
2.1.1	Sulfur Oxides.....	15
2.1.2	Sulfur Oxide Control Technology, Flue-Gas Desulfurization Systems, Overview.....	17
2.1.3	Flue-Gas Desulfurization	18
2.2	GlobalData Report Guidance	21
3	Flue-Gas Desulfurization Systems Market, Global	23
3.1	Flue-Gas Desulfurization Systems Market, Global, Overview.....	23
3.2	Flue-Gas Desulfurization Systems Market, Global, Drivers and Restraints, 2013–2020	24
3.2.1	Flue-Gas Desulfurization Systems Market, Global, Drivers, 2013–2020	24
3.2.2	Flue-Gas Desulfurization Systems Market, Global, Restraints, 2013–2020	26
3.3	Flue-Gas Desulfurization Systems Market, Global, Porter Five Forces Analysis	28
3.4	Flue-Gas Desulfurization Systems Market, Global, Market Volume, 2006–2020	30
3.5	Flue-Gas Desulfurization Systems Market, Global, Market Value Analysis, 2006–2020	33
3.6	Flue-Gas Desulfurization Systems Market, Global, Market Share, 2012	36
4	Flue-Gas Desulfurization Systems Market, US	39
4.1	Flue-Gas Desulfurization Systems Market, US, Overview	39
4.2	Flue-Gas Desulfurization Systems Market, US, Market Volume, 2006–2020	40
4.3	Flue-Gas Desulfurization Systems Market, US, Pricing Analysis, 2006–2020	43
4.4	Flue-Gas Desulfurization Systems Market, US, Market Value Analysis, 2006–2020	45
4.5	Flue-Gas Desulfurization Systems Market, US, Market Share Analysis, 2012.....	47
4.6	Flue-Gas Desulfurization Systems Market, US, Regulations	48
4.6.1	Clean Air Act	48

Table of Contents

4.6.2	Energy Policy Act of 2005	52
4.6.3	Energy Improvement and Extension Act of 2008	53
4.6.4	Greenhouse Gas Reporting Rule	55
4.6.5	Power Plant Improvement Initiative	55
4.6.6	Clean Energy Standard Act	56
4.6.7	Coal Combustion Residual Rule	57
4.6.8	FutureGen 2.0 Project	58
4.6.9	Regional Greenhouse Gas Initiative	58
4.6.10	Innovations for Existing Plants Program: Carbon Dioxide Capture	59
4.6.11	Climate Change Technology Program	59
4.6.12	Cross State Air Pollution Rule	60
4.6.13	American Recovery and Reinvestment Act	60
5	Flue-Gas Desulfurization Systems Market, UK	61
5.1	Flue-Gas Desulfurization Systems Market, UK, Overview	61
5.2	Flue-Gas Desulfurization Systems Market, UK, Market Volume, 2006–2020	62
5.3	Flue-Gas Desulfurization Systems Market, UK, Pricing Analysis, 2006–2020	65
5.4	Flue-Gas Desulfurization Systems Market, UK, Market Value Analysis, 2006–2020	67
5.5	Flue-Gas Desulfurization Systems Market, UK, Regulations	69
5.5.1	Climate Change Act 2008	69
5.5.2	Electricity Market Reform 2011	70
5.5.3	Energy Act 2010	71
5.5.4	Low Carbon Transition Plan	72
5.5.5	Climate Change Programme 2000	73
5.5.6	Climate Change Levy	73
5.5.7	Climate Change Agreement	74
5.5.8	Waste Strategy of 2007	74
5.5.9	The Carbon Plan	75

Table of Contents

6	Flue-Gas Desulfurization Systems Market, Spain	76
6.1	Flue-Gas Desulfurization Systems Market, Spain, Overview.....	76
6.2	Flue-Gas Desulfurization Systems Market, Spain, Market Volume, 2006–2020	77
6.3	Flue-Gas Desulfurization Systems Market, Spain, Pricing Analysis, 2006–2020	80
6.4	Flue-Gas Desulfurization Systems Market, Spain, Market Value Analysis, 2006–2020	82
6.5	Flue-Gas Desulfurization Systems Market, Spain, Regulations	84
6.5.1	National Emissions Ceiling Directive	84
6.5.2	Spanish Power Market, Energy Taxation.....	85
7	Flue-Gas Desulfurization Systems Market, Germany	86
7.1	Flue-Gas Desulfurization Systems Market, Germany, Overview	86
7.2	Flue-Gas Desulfurization Systems Market, Germany, Market Volume, 2006–2020.....	87
7.3	Flue-Gas Desulfurization Systems Market, Germany, Pricing Analysis, 2006–2020.....	90
7.4	Flue-Gas Desulfurization Systems Market, Germany, Market Value Analysis, 2006–2020.....	93
7.5	Flue-Gas Desulfurization Systems Market, Germany, Market Share Analysis, 2012	95
7.6	Flue-Gas Desulfurization Systems Market, Germany, Regulations	97
7.6.1	German Greenhouse Gas Emission Trading Law	97
7.6.2	National Allocation Plan	97
7.6.3	Allocation Act, 2007.....	99
7.6.4	Allocation Act, 2012.....	99
7.6.5	Emission Allowances Auction Ordinance 2012.....	100
7.6.6	Large Combustion Plant Directive	100
7.6.7	Initiatives towards Reducing Greenhouse and Carbon Dioxide Emissions	100
8	Flue-Gas Desulfurization Systems Market, China	101
8.1	Flue-Gas Desulfurization Systems Market, China, Overview.....	101
8.2	Flue-Gas Desulfurization Systems Market, China, Market Volume, 2006–2020	103
8.3	Flue-Gas Desulfurization Systems Market, China, Pricing Analysis, 2006–2020	106
8.4	Flue-Gas Desulfurization Systems Market, China, Market Value Analysis, 2006–2020 ...	109

Table of Contents

8.5	Flue-Gas Desulfurization Systems Market, China, Market Share Analysis, 2012	112
8.6	Flue-Gas Desulfurization Systems Market, China, Regulations	115
8.6.1	Large Substitute for Small Program.....	115
8.6.2	Low Carbon Development Zones	115
8.6.3	New Emission Standards	117
8.6.4	China Energy Conditions and Policies.....	118
8.6.5	Asia-Pacific Partnership for Clean Development Climate	119
8.6.6	Energy and Carbon Intensity Targets	120
8.6.7	12 th FYP for Energy Development	122
8.6.8	Investment System Reform Decision of 2004	123
8.6.9	National Climate Change Program	123
8.6.10	Coal Pricing for Power Generation	124
8.6.11	12 th FYP Installed Capacity Targets	125
8.6.12	Energy Policy of 2012	126
8.6.13	Atmospheric Pollution Prevention and Control Law	126
8.6.14	Catalog for Foreign Investment	127
8.6.15	Coal-Fired Electric Generating Units Desulfurization Operation and Management Plan (Draft).....	128
8.6.16	Denitrification Subsidy.....	129
8.6.17	Pollution Levy on Sulfur Dioxide Emissions.....	129
8.6.18	Notice on Fossil-Fired Power Plant Nitrogen Oxide Emission Prevention and Treatment Policy	129
9	Flue-Gas Desulfurization Systems Market, India.....	131
9.1	Flue-Gas Desulfurization Systems Market, India, Overview	131
9.2	Flue-Gas Desulfurization Systems Market, India, Market Volume, 2006–2020.....	132
9.3	Flue-Gas Desulfurization Systems Market, India, Pricing Analysis, 2006–2020	135
9.4	Flue-Gas Desulfurization Systems Market, India, Market Value Analysis, 2006–2020	138
9.5	Flue-Gas Desulfurization Systems Market, India, Regulations	141

Table of Contents

9.5.1	12 th Five-Year Plan.....	141
9.5.2	13 th Five-Year Plan.....	141
9.5.3	Ultra Mega Power Project Scheme.....	142
9.5.4	Mega Power Policy.....	143
9.5.5	Section 80 IA of the Income Tax Act of 1961.....	144
9.5.6	Foreign Direct Investment in the Power Sector.....	145
9.5.7	Coal Linkage Policy for 12 th Five-Year Plan.....	145
9.5.8	Tariff Regulation, 2009–2014	146
9.5.9	National Mission for Development of Clean Coal Technologies.....	147
9.5.10	Bulk Tendering	148
9.5.11	Import Duties on Fossil Fuel.....	148
9.5.12	New Coal Distribution Policy	148
9.5.13	National Electricity Policy, 2005.....	150
9.5.14	Provision for Future Installation of Flue-Gas Desulfurization System.....	151
10	Flue-Gas Desulfurization Systems Market, South Korea.....	153
10.1	Flue-Gas Desulfurization Systems Market, South Korea, Overview	153
10.2	Flue-Gas Desulfurization Systems Market, South Korea, Market Volume, 2006–2020....	154
10.3	Flue-Gas Desulfurization Systems Market, South Korea, Pricing Analysis, 2006–2020 ..	157
10.4	Flue-Gas Desulfurization Systems Market, South Korea, Market Value Analysis, 2006–2020.....	159
10.5	Flue-Gas Desulfurization Systems Market, South Korea, Regulations	161
10.5.1	Integrated Energy Supply Act (1999).....	161
10.5.2	National Basic Energy Plan 2008–2030	161
10.5.3	National Strategy for Low Carbon, Green Growth, 2050.....	162
10.5.4	GHG Emissions Trade Program Developments	163
10.5.5	The Framework Act on Low Carbon, Green Growth 2010	163
10.5.6	South Korea's Coal Industry Rationalization Act.....	164
10.5.7	Security of Natural Gas and Coal	164

Table of Contents

11	Flue-Gas Desulfurization Systems Market, Saudi Arabia	165
11.1	Flue-Gas Desulfurization Systems Market, Saudi Arabia, Overview.....	165
11.2	Flue-Gas Desulfurization Systems Market, Saudi Arabia, Market Volume, 2006–2020 ...	166
11.3	Flue-Gas Desulfurization Systems Market, Saudi Arabia, Pricing Analysis, 2006–2020..	169
11.4	Flue-Gas Desulfurization Systems Market, Saudi Arabia, Market Value Analysis, 2006–2020.....	171
11.5	Flue-Gas Desulfurization Systems Market, Saudi Arabia, Market Share Analysis, 2012 .	172
11.6	Flue-Gas Desulfurization Systems Market, Saudi Arabia, Regulations.....	173
11.6.1	Saudi Arabia Power Market, Electricity Law, Regulatory Structure, Overview	173
11.6.2	Meteorological and the Environmental Protection Agency	173
11.6.3	Royal Commission Environmental Regulations	173
12	Appendix.....	174
12.1	Definitions.....	174
12.1.1	Power.....	174
12.1.2	Installed Capacity.....	174
12.1.3	Active Installed Capacity	174
12.1.4	Electricity Generation	174
12.1.5	Electricity Consumption	174
12.1.6	Coal-Fired Power Plant	174
12.1.7	Flue-Gas Desulfurization	174
12.1.8	Renewable Energy Resources	175
12.2	Abbreviations	175
12.3	Bibliography	178
12.4	Research Methodology	179
12.4.1	Coverage	179
12.4.2	Secondary Research.....	179
12.5	Disclaimer	180

Table of Contents

1.1 List of Tables

Table 1: Flue-Gas Desulfurization Market, Global, Volume (GW, Units), 2006–2020	32
Table 2: Flue-Gas Desulfurization Market, Global, Market Value (\$bn), 2006–2020.....	35
Table 3: Flue-Gas Desulfurization Market, Global, Market Share (%), 2012.....	38
Table 4: Sulfur Dioxide Emissions from Electricity Generation (Million Tons), 1990–2040	39
Table 5: Flue-Gas Desulfurization Market, US, Volume (GW, Units), 2006–2020.....	42
Table 6: Flue-Gas Desulfurization Market, US, Average Price (\$/kW), 2006–2020.....	44
Table 7: Flue-Gas Desulfurization Market, US, Market Value (\$m), 2006–2020	46
Table 8: Flue-Gas Desulfurization Market, US, Market Share (%), 2012	48
Table 9: National Ambient Air Quality Standards, US, 2011.....	49
Table 10: Flue-Gas Desulfurization Market, US, Clean Energy Standard Act.....	56
Table 11: Flue-Gas Desulfurization Market, UK, Volume (GW, Units), 2006–2020.....	64
Table 12: Flue-Gas Desulfurization Market, UK, Average Price (\$/kW), 2006–2020.....	66
Table 13: Flue-Gas Desulfurization Market, UK, Market Value (\$m), 2006–2020	68
Table 14: Flue-Gas Desulfurization Market, UK, Climate Change Act 2008, Carbon Budgets (million tons of CO ₂), 2008–2027	69
Table 15: Flue-Gas Desulfurization Market, Spain, Volume (GW, Units), 2006–2020.....	79
Table 16: Flue-Gas Desulfurization Market, Spain, Average Price (\$/kW), 2006–2020.....	81
Table 17: Flue-Gas Desulfurization Market, Spain, Market Value (\$m), 2006–2020	83
Table 18: Flue-Gas Desulfurization Market, Germany, Volume (GW, Units), 2006–2020	89
Table 19: Flue-Gas Desulfurization Market, Germany, Average Price (\$/kW), 2006–2020	92
Table 20: Flue-Gas Desulfurization Market, Germany, Market Value (\$m), 2006–2020	94
Table 21: Flue-Gas Desulfurization Market, Germany, Market Share (%), 2012.....	96
Table 22: Flue-Gas Desulfurization Market, China, Volume (GW, Units), 2006–2020	105

Table of Contents

Table 23: Flue-Gas Desulfurization Market, China, Average Price (\$/kW), 2006–2020	108
Table 24: Flue-Gas Desulfurization Market, China, Market Value (\$m), 2006–2020.....	111
Table 25: Flue-Gas Desulfurization Market, China, Market Share (%), 2012.....	114
Table 26: Focus Areas of Low Carbon Development Zones, China,	116
Table 27: Emission Standards (mg/m ³), China, 2012.....	117
Table 28: Flue-Gas Desulfurization Market, China, Energy Intensity Targets per Unit of GDP (%), 2006–2015	120
Table 29: Flue-Gas Desulfurization Market, India, Volume (GW, Units), 2006–2020	134
Table 30: Flue-Gas Desulfurization Market, India, Average Price (\$/kW), 2006–2020.....	137
Table 31: Flue-Gas Desulfurization Market, India, Market Value (\$m), 2006–2020	140
Table 32: Flue-Gas Desulfurization Market, India, O&M Cost for Thermal Power Plants ('000/MW), 2009–2014.....	147
Table 33: Flue-Gas Desulfurization, India, Market Reduction Factor for Multiple Units, 2009–2014.....	147
Table 34: Flue-Gas Desulfurization Market, South Korea, Volume (GW, Units), 2006–2020	156
Table 35: Flue-Gas Desulfurization Market, South Korea, Average Price (\$/kW), 2006–2020	158
Table 36: Flue-Gas Desulfurization Market, South Korea, Market Value (\$m), 2006–2020.....	160
Table 37: Flue-Gas Desulfurization Market, Saudi Arabia, Volume (GW, Units), 2006–2020.....	168
Table 38: Flue-Gas Desulfurization Market, Saudi Arabia, Average Price (\$/kW), 2006–2020	170
Table 39: Flue-Gas Desulfurization Market, Saudi Arabia, Market Value (\$m), 2006–2020	172
Table 40: Abbreviations	175

Table of Contents

1.2 List of Figures

Figure 1: Pollutants Released into Environment by Burning of Coal	14
Figure 2: Conversion of Sulfur Oxides into Acid	15
Figure 3: Harmful Impact of Sulfur Oxide Emissions	16
Figure 4: Major Flue-Gas Desulfurization processes	17
Figure 5: Flue-Gas Desulfurization Market, Global, Drivers, 2013–2020	25
Figure 6: FGD Market, Global, Restraints, 2013–2020	27
Figure 7: FGD Market, Global, Porter Five Forces Analysis	28
Figure 8: Flue-Gas Desulfurization Market, Global, Volume (GW, Units), 2006–2020	31
Figure 9: Flue-Gas Desulfurization Market, Global, Market Value (\$bn), 2006–2020	34
Figure 10: Flue-Gas Desulfurization Market, Global, Market Share (%), 2012	38
Figure 11: Flue-Gas Desulfurization Market, US, Market Volume (GW, Units), 2006–2020	41
Figure 12: Flue-Gas Desulfurization Market, US, Average Price (\$/kW), 2006–2020	43
Figure 13: Flue-Gas Desulfurization Market, US, Market Value (\$m), 2006–2020	45
Figure 14: Flue-Gas Desulfurization Market, US, Market Share (%), 2012	47
Figure 15: Flue-Gas Desulfurization Market, UK, Market Volume (GW, Units), 2006–2020	63
Figure 16: Flue-Gas Desulfurization Market, UK, Average Price (\$/kW), 2006–2020	65
Figure 17: Flue-Gas Desulfurization Market, UK, Market Value (\$m), 2006–2020	67
Figure 18: Flue-Gas Desulfurization Market, Spain, Market Volume (GW, Units), 2006–2020	78
Figure 19: Flue-Gas Desulfurization Market, Spain, Average Price (\$/kW), 2006–2020	80
Figure 20: Flue-Gas Desulfurization Market, Spain, Market Value (\$m), 2006–2020	82
Figure 21: Flue-Gas Desulfurization Market, Germany, Market Volume (GW, Units), 2006–2020	88
Figure 22: Flue-Gas Desulfurization Market, Germany, Average Price (\$/kW), 2006–2020	91
Figure 23: Flue-Gas Desulfurization Market, Germany, Market Value (\$m), 2006–2020	93

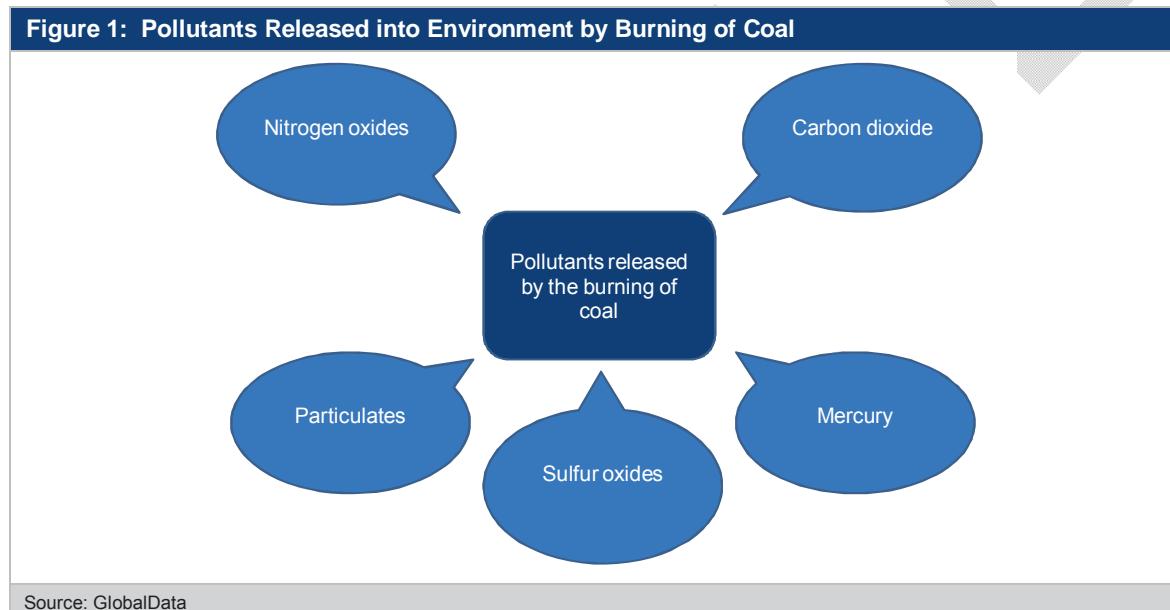
Table of Contents

Figure 24: Flue-Gas Desulfurization Market, Germany, Market Share (%), 2012	95
Figure 25: Flue-Gas Desulfurization Market, China, Market Volume (GW, Units), 2006–2020.....	104
Figure 26: Flue-Gas Desulfurization Market, China, Average Price (\$/kW), 2006–2020	107
Figure 27: Flue-Gas Desulfurization Market, China, Market Value (\$m), 2006–2020	110
Figure 28: Flue-Gas Desulfurization Market, China, Market Share (%), 2012	113
Figure 29: Flue-Gas Desulfurization Market, India, Market Volume (GW, Units), 2006–2020	133
Figure 30: Flue-Gas Desulfurization Market, India, Average Price (\$/kW), 2006–2020.....	136
Figure 31: Flue-Gas Desulfurization Market, India, Market Value (\$m), 2006–2020	139
Figure 32: Flue-Gas Desulfurization Market, India, Space Requirement (Acres)	152
Figure 33: Flue-Gas Desulfurization Market, South Korea, Market Volume (GW, Units), 2006–2020	155
Figure 34: Flue-Gas Desulfurization Market, South Korea, Average Price (\$/kW), 2006–2020	157
Figure 35: Flue-Gas Desulfurization Market, South Korea, Market Value (\$m), 2006–2020	159
Figure 36: Flue-Gas Desulfurization Market, Saudi Arabia, Market Volume (GW, Units), 2006–2020.....	167
Figure 37: Flue-Gas Desulfurization Market, Saudi Arabia, Average Price (\$/kW), 2006–2020	169
Figure 38: Flue-Gas Desulfurization Market, Saudi Arabia, Market Value (\$m), 2006–2020.....	171

Introduction

2 Introduction

Coal is a dominant source of energy, and is employed globally as one of the most efficient and economical methods of electricity generation. However, the downside of the fuel is that its burning releases large amounts of gases that are extremely harmful for the environment. This is due to the pollutants released in the atmosphere by the combustion of coal. Coal has a significant amount of impurities in it. Along with carbon, as a prime constituent, it also contains sulfur, hydrogen, oxygen and nitrogen. When coal is burned in power plants to drive steam turbines, considerable amounts of pollutants are emitted into the environment.



Sulfur is one of the main elements in the earth's crust. It is identified most commonly as an impurity in coal, crude oil and other ores. Hence, whenever coal, oil or other derived fuels are burned, sulfur is emitted on a large scale. Sulfur oxides (SO_x) are one of the major pollutants from industrial power plants.

Sulfur dioxide (SO_2) is the predominant form of SO_x . It is produced by volcanoes and by burning fuels such as coal and oil. SO_2 emissions create acidic rain and particulate soot. Both of these pose significant risks to our health.

Introduction

2.2 GlobalData Report Guidance

- The report begins with an executive summary that provides a snapshot of the key indicators in the global FGD systems market.
- Chapter two covers the report introduction, an overview of the pollutants emitted by power plants and their preventative measures. It also covers the types of FGD processes in detail.
- Chapter three discusses the global FGD market, explaining the drivers and restraints of the market. It also provides details about the market volume, market value, and the market share of the global FGD businesses.
- Chapter four discusses the FGD market in the US, describing market volume, market value, average price, market share and regulations.
- Chapter five contains the FGD market in the UK, explaining market volume, market value, market share, average price and regulations.
- Chapter six covers Spain's FGD market, explaining market volume, market value, market share, average price and regulations.
- Chapter seven covers the FGD market in Germany, explaining market volume, market value, market share, average price and regulations.
- Chapter eight covers the FGD market in China, explaining market volume, market value, market share, average price and regulations.
- Chapter nine covers the FGD market in India, explaining market volume, market value, market share, average price and regulations.
- Chapter 10 covers the FGD market in South Korea, explaining market volume, market value, market share, average price and regulations.
- Chapter 11 covers the FGD market in Saudi Arabia, explaining market volume, market value, market share, average price and regulations.
- The report ends with an appendix section.

Introduction

Please note: The scope of the market analysis data provided in this report is limited to FGD systems in thermal power plants only. Market values have been rounded off throughout the report, which may result in some minor discrepancies caused by errors in the rounding-off. In the tables in the pricing analysis sections, ‘-’ is used to indicate the years in which the actual sale of FGD systems did not occur.

SAMPLE

Flue-Gas Desulfurization Systems Market, Global

3.4 Flue-Gas Desulfurization Systems Market, Global, Market Volume, 2006–2020

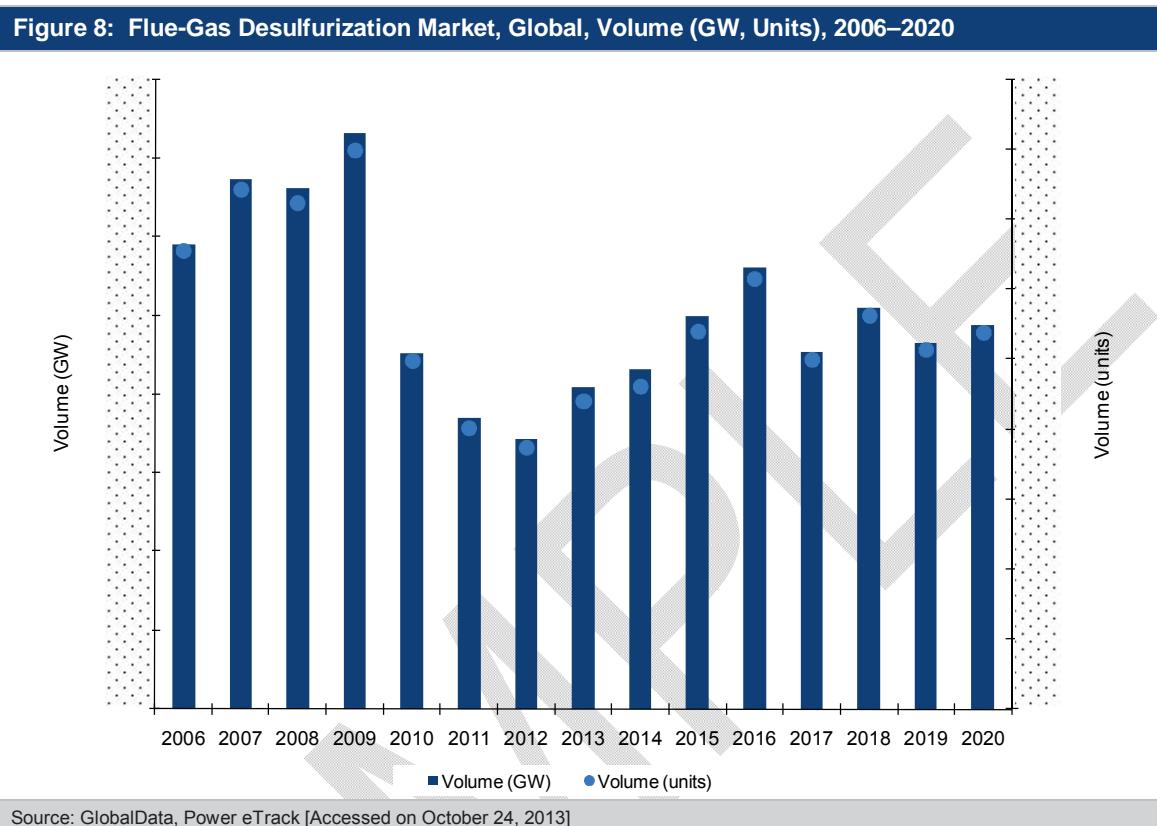
The increasing demand for electricity owing to the growing population and economic development worldwide is the most important factor for the growth of the global FGD market. Thermal power is still the dominant source of energy in the world and although its share is scheduled to decrease, it will remain as one of the most important sources of power for many years. With many new coal-fired plants scheduled to come online in the near future all over the world, the FGD market is expected to grow and experience significant new activities.

Between 2006 and 2012 there was a sharp rise in the FGD market. The overall increased awareness of people regarding emissions and their harmful impact helped this growth. The number of FGD systems sold in a year increased from XX units in 2006 to XX units in 2009. However, the market experienced a slump after 2009 as a result of the economic crisis. The liquidity crunch that followed the sub-prime crisis resulted in an absence of financing options for various projects, which, along with investors' lack of confidence in most of the projects, resulted in the overall decline of the market. With increasing numbers of power plant projects being abandoned, the global FGD market received a strong hit and its growth was checked. Moreover, the development of the FGD market globally was sluggish between 2010 and 2012, partly because countries failed to impose strict regulations to install FGD in power plants. As a result, the number of FGD units sold decreased from XX units in 2010 to XX units in 2012.

With the expected introduction of more stringent norms and adoption of emission norms in countries where currently there are none, the FGD systems market is expected to grow. The sales volume of FGD systems is expected to increase from XX units in 2013 to around XX units by 2020.

Flue-Gas Desulfurization Systems Market, Global

The figure below shows the global FGD systems market volume between 2006 and 2020.



Flue-Gas Desulfurization Systems Market, Global

The table below indicates the global FGD systems market volume between 2006 and 2020.

Table 1: Flue-Gas Desulfurization Market, Global, Volume (GW, Units), 2006–2020

Year	Volume (GW)	Volume (units)
2006		
2007		
2008		
2009		
2010		
2011		
2012		
2013		
2014		
2015		
2016		
2017		
2018		
2019		
2020		

Source: GlobalData, Power eTrack [Accessed on October 24, 2013]

SA

Flue-Gas Desulfurization Systems Market, US

4.5 Flue-Gas Desulfurization Systems Market, US, Market Share Analysis, 2012

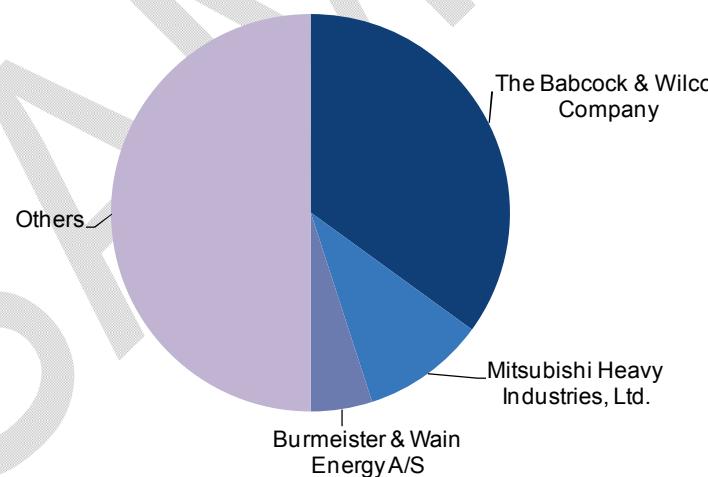
There is one company that has completely dominated the FGD systems market in the US. B&W has been leading the market in the country for many years. No other company has come close to B&W in terms of market value. The brand name of B&W and the expertise of its operations are the main reasons for its dominance in the US. In 2012, the company again led all other players in the market, with a significant share of XX%.

MHI is another player in the FGD market in the country. In 2012, it was the distant second-largest player in the market, accounting for a XX% share.

Burmeister & Wain Energy A/S (BWE) has been in close competition with MHI to secure the third-position in the FGD systems market. BWE specializes in designing advanced Ultra Super Critical (USC) steam boilers and other power equipment for utility power stations worldwide. In 2009, it attained a XX% share of the FGD systems market in the country.

The figure below represents the share of the key players in the FGD system market in the US in 2012.

Figure 14: Flue-Gas Desulfurization Market, US, Market Share (%), 2012



Source: GlobalData, Power eTrack [Accessed on October 15, 2013]

Appendix

12 Appendix

12.1 Definitions

12.1.1 Power

Power refers to the rate of production, transfer, or energy use, usually related to electricity. It is measured in watts and often expressed in kilowatts (kW) or megawatts (MW), and is also known as “real” or “active” power.

12.1.2 Installed Capacity

Installed capacity refers to the generator's nameplate capacity as stated by the manufacturer or the maximum rated output of a generator under given conditions. It is given in Megawatts (MW) on a nameplate affixed to the generator.

12.1.3 Active Installed Capacity

Active installed capacity refers to the component of electric power that actually performs work. It is given in kilowatts (kW) or Megawatts (MW).

12.1.4 Electricity Generation

Electricity generation is the production of electric energy by transforming other forms of energy. It also refers to the amount of electric energy produced, expressed in Gigawatt hours (GWh).

12.1.5 Electricity Consumption

Electricity consumption is calculated by adding electricity generated and imports, minus exports and transmission and distribution losses. It is measured in Gigawatt hours (GWh).

12.1.6 Coal-Fired Power Plant

A coal-fired power plant produces electricity from the combustion of coal.

12.1.7 Flue-Gas Desulfurization

Flue-gas desulfurization is one of the most effective and popular processes for removing the SO₂ from the flue gas emitted by large coal-fired power plants.

Appendix

12.1.8 Renewable Energy Resources

Renewable energy resources are naturally replenishing energy resources that are limited in the amount of energy that is available per unit of time. Biomass, geothermal, solar, small hydro and wind are all examples of renewable resources.

12.2 Abbreviations

Table 40: Abbreviations

Abbreviation	Expanded form
APP	Asia-Pacific Partnership
APPCL	Atmospheric Pollution Prevention and Control Law
ARRA	American Reinvestment and Energy Act
B&W	Babcock & Wilcox Company
BACT	Best Available Control Technology
BCD	Basic Customs Duty
BHEL	Bharat Heavy Electricals Limited
CAA	Clean Air Act
CAGR	Compound Annual Growth Rate
CAIR	Clean Air Interstate Rule
CCC	Central Advisory Committee on Climate Change
CCGT	Combined Cycle Gas Turbine
CCL	Climate Change Levy
CCPI	Clean Coal Power Initiative
CCRR	Coal Combustion Residential Rule
CCTP	Climate Change Technology Program
CCUS	Carbon Capture, Utilization and Storage
CDM	Clean Development Mechanism
CEA	Central Electricity Authority
CER	Certified Emission Reductions
CERC	Central Electricity Regulatory Commission
CESA	Clean Energy Standard Act
CFB	Circulating Fluidized Bed
CHP	Combined Heat and Power
CIL	Coal India Limited
CSAPR	Cross State Air Pollution Rule
CCS	Carbon Capture and Sequestration
CVD	Concessional Countervailing Duty
DECC	Department of Energy and Climate Change

Appendix

DoE	Department of Energy
EC	European Commission
EC Scheduling	Energy Conservation Power Generation Scheduling
ECRA	Electricity and Cogeneration Regulatory Authority
EEX	Leipzig Energy Exchange
EIEA	Energy Improvement and Extension Act
ELVs	Emissions Limit Values
EPA	Environmental Protection Agency
EPS	Emission Performance Standard
ESP	Electrostatic Precipitators
EUA	Emission Allowance
FDI	Foreign Direct Investment
FGD	Flue-Gas Desulfurization
FSA	Fuel Supply Agreement
FYP	Five-Year Plan
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GHGRR	Green House Gas Reporting Rule
GW	Gigawatt
GWh	Gigawatt hours
HCL	hydrogen chloride
ID	Induced Draught
IEF	Integrated Energy Facility
IEP	Innovation for Existing Plants
IESA	Integrated Energy Supply Areas
IGCC	Integrated Gasification Combined Cycle
JI	Joint Implementation
KfW	Bankengruppe
kW	kilowatt
LAER	Lowest Achievable Emission Rate
LCPD	Large Combustion Plant Directive
LOA	Letter of Assurance
LSS	Large Substitute for Small
m	million
MACT	Maximum Achievable Control Technology
MEP	Ministry of Environmental Protection
MET	Marsulex Environmental Technologies
mg/m ³	milligrams per cubic meter
µg/m ³	micrograms per cubic meter

Appendix

MHI	Mitsubishi Heavy Industries
MKE	Ministry of Knowledge Economy
MOC	Ministry of Commerce
mtoe	million tons of oil equivalent
MW	Megawatt
MWh	Megawatt hour
NAPCC	National Action Plan on Climate Change
NAAQS	National Ambient Air Quality Standards
NDRC	National Development and Reform Commission
NEP	National Electricity Policy
NERP	National Emissions Reduction Plan
NESHAPs	National Emission Standards for Hazardous Air Pollutants
NETL	National Energy Technology Laboratory
NO _x	mono-nitrogen oxides
NSPS	New Source Performance Standards
NSR	New Source Review
NTP	National Tariff Policy
O&M	Operation and Maintenance
OEMS	Original Equipment Manufacturers
Ofgem	Office of Gas and Electricity Markets
PFBC	Pressurized Circulating Fluidized Bed
PM	Particulate Matter
PME	Presidency of the Meteorological and Environment
PPA	Power Purchase Agreement
ppb	parts per billion
PPII	Power Plant Improvement Initiative
ppm	parts per million
PSD	Prevention of Significant Deterioration
RACT	Reasonably Available Control Technology
RCRA	Resource Conservation and Recovery Act
RfP	Request for Proposals
RfQ	Request for Qualification
RoE	Return on Equity
RRGI	Regional Greenhouse Gas Initiative, Inc.
SCR	Selective Catalytic Reduction
SEB	State Electricity Board
SERC	State Electricity Regulatory Commission
SIPss	State Implementation Plans
SNCR	Selective Non-Catalytic Reduction

Appendix

SO ₂	sulfur dioxide
SO ₃	sulfurous acid
SO _x	sulfur oxides
SPV	Special Purpose Vehicle
T&D	Transmission and Distribution
TEHG	Treibhausgas-Emissionshandelsgesetz
USC	Ultra Super Critical
ZuG	Zuteilungsgesetz

Source: GlobalData

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Appendix

12.4 Research Methodology

GlobalData's dedicated research and analysis teams consist of experienced professionals with a pedigree in marketing and market research, consulting backgrounds in the energy industry, and advanced levels of statistical expertise.

GlobalData adheres to the Codes of Practice of the Market Research Society (www.mrs.org.uk) and the Strategic and Competitive Intelligence Professionals (www.scip.org).

All GlobalData's databases are continuously updated and revised. The following methodology has been followed for the collection and analysis of data presented in this report.

12.4.1 Coverage

The report provides comprehensive coverage of global FGD systems market developments for the period from 2006 to 2012 and expected market trends for the period from 2013 to 2020 and the market developments for the following countries: the US, the UK, Spain, Germany, China, India, South Korea and Saudi Arabia. Detailed coverage is provided for the following major topics:

- FGD systems market volume trends (2006 to 2020)
- FGD systems market value trends (2006 to 2020)
- FGD systems market share (2012)
- FGD systems pricing analysis (2006 to 2020)
- Renewable policy changes, financial incentives and policy support for thermal power and updates by country

12.4.2 Secondary Research

The research process begins with exhaustive secondary research within GlobalData's own databases and external sources.

Investment estimates and market growth rates are arrived at by taking the following into consideration:

- Statistics and historical trends provided by government bodies, industry associations and equipment vendors
- Utility expansion plans

Appendix

- Government and private sector investment
- Government regulations and policies
- GlobalData's proprietary databases such as Capacity and Generation Database and Equipment Markets Database
- Other insights built through secondary research and analysis of company websites, annual reports, investor presentations, industry and trade journals, and association data.

12.5 Disclaimer

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