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5

International Valve Market

5.1 Market Overview

The market in new valves tends to be cyclical following the cycle of economic activity. For example, in the chemical processing industry, which is an important user of valves, there is a time lag of approximately 12–18 months between economic activity and investment. Other end-user industries for valves, such as mining, are in steady decline, while changes in technology in other sectors, such as the move from coal- and oil-fired power stations to gas turbine, have changed valve requirements.

The market for replacement valves follows a different pattern to that for new valves with less emphasis on cyclical economic activity. This difference is an important element in the overall valve market, particularly in the developed world. For example, the North Sea, which traditionally provided a large market for new valves, is now providing a market for replacement valves which are smaller, less intrusive on the pipelines and require reduced servicing. Increased automation is an important criterion for valve selection, as end-users attempt to reduce staffing levels and down-time and improve product life and efficiency. Ironically these improvements in efficiency, performance and valve life will impact on the future market for replacement valves.

Environmental issues, often driven by legislation are also important. As a result, the control of fugitive emissions and noise control have become important factors in the choice of valves and suppliers.

The traditional large markets for industrial valves have been the water and wastewater treatment, oil and gas, power generation, paper and pulp, and, chemical processing industries. All of these industries have suffered in the world recession, with the lack of investment in these industries during recent years impacting on the valve industry. The situation has been further exacerbated by the almost frantic merger and globalization activity in many of the end-user industries.
The markets in the developed world are now relatively mature and will show little growth for new products during the next few years. Growth in the developed world will be concentrated on the replacement market, which represents over one-third of the total valve market.

New sales growth is now concentrated in developing regions such as China, India and South America. The majority of investment in oil exploration and development will take place in the ‘developing’ countries in the Middle East, Africa, Central and South America, and, South and East Asia. Chemical processing will continue to move its manufacturing to the areas with large populations and growing living standards. These improved living standards will also lead to investment in infrastructure, for example the extension of piped water supplies and wastewater treatment services and power generation.

### 5.2 Regional Overview

#### 5.2.1 Western Europe

For the purpose of this report, Western Europe is defined as comprising the European Union (EU) countries plus Norway, Switzerland and Turkey, with the latter having had an association agreement with the EU since 1963.

Western Europe, which accounted for nearly 27% of the world’s Gross Capital Formation (GCF) in 2002, is largely composed of well-developed countries, with relatively stable economies. Most of the world’s countries with high gross domestic product (GDP) per head of population figures are in Western Europe (15 out of the top 20), and most countries depend quite heavily on exports to produce that GDP. By contrast, the countries of Central and Eastern Europe (including the countries in the Former Soviet Union (FSU) and Yugoslavia) are much poorer in GDP terms, with their total combined GDP being less than that of Italy.

The Western European region has developed into a fairly well integrated market place, despite the present division into a euro area and the non-euro area, with a high level of trade within the region.

Weak performance throughout the euro area in 2002 (GDP grew by only 0.9%), continued into 2003 and although there was a pick-up in the second half, growth was only 0.5% for the whole year. The sharp pick-up in global trade has boosted exports, despite the stronger euro and there has been an improvement in investment levels. The International Monetary Fund (IMF) forecasts that GDP growth in the euro area at 1.7% in 2004, rising to 2.3% in 2005, while outside the euro area, the UK is expected to show a growth of between 3.0% and 3.5% in 2004, easing back to below 3.0% in 2005.
The enlargement of the EU on 1 May 2004, with membership extended to eight Central and Eastern European countries together with Malta and Cyprus, should ultimately make the region a stronger force in the market, although it will take some years for the new entrants to reach the standards of industrial development shown by most of the present members. 2007 should see Bulgaria and Romania becoming members and ultimately Turkey should become a full member.

Another major driving force in Europe is the increasing impact of the EU directives upon national legislation, in subjects as diverse as water treatment and pressure system design. These impact on the equipment needed to achieve the requirements of the Directives.

| Valve Type               | 2003  | 2004  | 2005  | 2006  | 2007  | 2009  |
|--------------------------|-------|-------|-------|-------|-------|-------|
| Gate, Globe, Check       | 1723  | 1772  | 1831  | 1893  | 1956  | 2075  |
| Ball, Plug               | 943   | 970   | 1003  | 1039  | 1071  | 1139  |
| Butterfly                | 510   | 525   | 543   | 561   | 581   | 619   |
| Diaphragm                | 128   | 131   | 138   | 142   | 149   | 162   |
| Pressure Reducing Valves | 366   | 377   | 389   | 402   | 417   | 441   |
| Automatic Control        | 1014  | 1045  | 1082  | 1120  | 1160  | 1253  |
| Others                   | 618   | 634   | 654   | 676   | 697   | 739   |
| Parts                    | 1346  | 1386  | 1436  | 1488  | 1541  | 1636  |
| **Total**                | **6648** | **6840** | **7076** | **7320** | **7572** | **8064** |

5.2.1.1 Germany

After three years of stagnation, during which domestic demand declined by about 2%, the German economy fell into a shallow recession in the first two quarters of 2003 with the economy contracting by 0.2% and 0.1%, respectively. Exports, traditionally an important source of growth, declined during the first half of the year. However, in the second half of 2003, led by rising exports, growing domestic demand and increased investment activity, the economy recovered leading to only a 0.1% fall in GDP for the whole year. A gradual recovery should take place during the next two years, with growth forecast at between 1% and 1.5% in 2004 and around 2% in 2005.

A number of factors continue to hold back a stronger recovery. Unemployment remains high and is expected to continue to rise until early 2005, and this will hold back private consumption. The government's efforts to control the budget deficit will reduce the impact of public spending, and the lack of investment during the last three years will hold back potential growth. Also many companies need to consolidate their balance sheets before embarking on capacity enlarging investment.
Germany has the biggest chemical industry in Europe, but its capital spending declined in every year from 1999 to 2002 (the latest year with available data) with 2004 presenting no clear signs of an upturn for the industry.

Germany has the largest crude oil refinery capacity in Western Europe – now marginally higher than Italy. Its 17 refineries have seen capacity continue to creep upwards from 2.2 billion barrels per day in 1998 to 2.3 billion barrels per day in 2003.

Germany is the EU’s second largest consumer of natural gas after the UK, meeting most of its demand through imports. The country is a major destination point and transit centre for Europe’s gas pipelines and has 6 major pipelines on land, three from the North Sea, and several more in the construction and planning stages.

The German government has announced its intention of shutting all of the country’s 19 nuclear power stations, which could see most of the plants closed by 2020. RWE, Germany’s largest power generator, forecasts that 40 GW of replacement capacity will be needed in the German power generation market by 2020, however, much of this will not come online until after 2010.

The E.ON Group plans to invest €13.8 billion throughout Europe in 2004–2006, with the focus on maintaining the group’s power and gas networks as well as implementing environmental protection measures at power generation facilities.

Although Germany’s electricity market is very competitive, 80% of electricity generation is controlled by four companies – RWE (32%), E.ON (24%), Vattenfall Europe (14%) and EnBW (10%).

| Table 5.2 Industrial Valve Market in Germany (US$ million) |
|-----------------------------------------------------------|
| **Valve Type**                                             | **2003** | **2004** | **2005** | **2006** | **2007** | **2009** |
| Gate, Globe, Check                                        | 604      | 617      | 635      | 653      | 671      | 706      |
| Ball, Plug                                                | 276      | 282      | 290      | 298      | 306      | 321      |
| Butterfly                                                 | 144      | 147      | 151      | 155      | 159      | 168      |
| Diaphragm                                                 | 34       | 35       | 36       | 37       | 38       | 41       |
| Pressure Reducing Valves                                  | 122      | 125      | 128      | 132      | 136      | 142      |
| Automatic Control                                         | 353      | 362      | 373      | 384      | 395      | 423      |
| Others                                                    | 147      | 149      | 153      | 158      | 163      | 170      |
| Parts                                                     | 239      | 244      | 252      | 259      | 266      | 280      |
| **Total**                                                 | **1919** | **1961** | **2018** | **2076** | **2134** | **2251** |
5.2.1.2 United Kingdom

The UK economy has outperformed the euro area economy during the past two to three years, with weakness in exports and investment more than offset by strong household consumption and general government spending. Growth in 2003 was 2.3% and the economy is expected to remain relatively robust in 2004, with GDP growing at between 3.0% and 3.5%, easing to below 3.0% in 2005.

Oil production in the North Sea has been declining every year since its peak in 1999. It was down 8.9% in 2003, compared with 2002, at 22.45 million barrels per day. As the existing oil fields mature, there is an increasing focus on developing smaller fields that previously were not considered commercially viable, helped by the high price of oil. Major oil companies have been selling some of their mature fields in the North Sea to smaller, independent oil companies. In 2000 a joint government/offshore oil and gas industry initiative – PILOT – was launched. This has a strategy of sustaining capital investment at £3 billion per year and oil and gas production at 3 million barrels of oil equivalent per day beyond 2010, the latter now seen as ‘becoming more challenging’, with, it is reported, exploration at an all time low.

There are now only nine major oil refineries in the UK with a capacity of around 1.785 million barrels per day, making the industry the fourth largest in Western Europe.

UK natural gas production has also been declining since its peak in 2000. As production declines, the UK has been turning to foreign natural gas supplies to meet the increasing demand, via liquefied natural gas (LNG) and pipelines.

In October 2003, Royal Dutch/Shell, Exxon Mobil and Norway’s Statoil signed an agreement, which will see Norwegian natural gas brought to the UK through a 1200 km (750 mile) pipeline (Britpipe) from the Ormen Lange field, to the St Fergus gas terminal in Aberdeenshire. LNG terminals are planned for the Isle of Grain and Milford Haven.

The UK chemicals sector has shrunk considerably by virtue of a change away from bulk production, which has shifted overseas, towards the provision of speciality chemicals. 2002 saw a 17% fall in capital investment in the industry, but pharmaceutical and biotechnology are both very strong.

The water industry has suffered from a bout of change of ownership. However, Thames Water (now owned by RWE) has announced plans to replace more than 1000 miles of London’s ageing water mains network during the 2005–2010 period. Thames Water has also announced plans
for London's first-ever desalination plant. Subject to planning permission, the £200m project is due to come on stream in 2007/2008.

Since the privatization of the UK's electricity industry began in 1990, the industry has seen a considerable amount of restructuring, as companies have tried to become more profitable in a very competitive market.

Nuclear power accounts for about 23% of the power generation market, however, this will decrease as the ageing Magnox reactors, owned by British Nuclear Fuels, are shut down and decommissioned – the last one by 2010.

Food and beverage production features strongly as a component of the UK's GDP, with dairy and brewing sectors being particularly strong.

Table 5.3 Industrial Valve Market in United Kingdom (US$ million)

| Valve Type                      | 2003 | 2004 | 2005 | 2006 | 2007 | 2009 |
|---------------------------------|------|------|------|------|------|------|
| Gate, Globe, Check              | 201  | 208  | 215  | 223  | 231  | 245  |
| Ball, Plug                      | 104  | 108  | 112  | 116  | 120  | 128  |
| Butterfly                       | 65   | 68   | 70   | 73   | 76   | 81   |
| Diaphragm                       | 27   | 28   | 30   | 31   | 32   | 34   |
| Pressure Reducing Valves        | 65   | 68   | 70   | 73   | 76   | 80   |
| Automatic Control               | 183  | 189  | 196  | 203  | 211  | 228  |
| Others                          | 113  | 116  | 120  | 124  | 128  | 136  |
| Parts                           | 227  | 234  | 243  | 252  | 260  | 276  |
| **Total**                       | **985** | **1019** | **1056** | **1095** | **1134** | **1208** |

5.2.1.3 France

Geographically the largest country in Western Europe, France has a much smaller engineering industry and a smaller GDP than Germany. Paradoxically, in recent years, it has fared better than its neighbour in economic terms. Industrial performance had been quite good up to 2001, but there was a slowdown in real GDP growth in 2002 as most euro areas weakened, resulting in only 1.2% growth for the year. The slowdown in growth continued into the first half of 2003, with the war in Iraq, strikes, and pension reforms being major contributing factors. Although growth returned in the second half of 2003, GDP growth for the year was only 0.5%. Growth is now picking up, helped by an acceleration of exports and rising investment, with growth for 2004 forecast at around 2%, rising to around 2.5% in 2005.

Although the French chemical industry is larger in turnover terms than that of the UK, its investment has lagged behind, with €17.5 billion invested during the five-year period 1998–2002, compared with €21.1 billion in the UK. As in most other European countries, investment has
been declining since 2000. Bulk chemicals are not the power that they once were, but the pharmaceutical sector has grown rapidly.

France has got Western Europe’s third largest oil refining capacity at 1.97 million barrels per day. The French company Total is Western Europe’s largest refiner, with around 2.3 million barrels per day capacity, of which about 45% is in France.

France is a major importer of both oil and natural gas, and has a number of natural gas pipelines into the country, as well as LNG import terminals.

France is the world’s largest nuclear power generator on a per capita basis, with around 79% of its electricity coming from nuclear power. The country has 59 nuclear power reactors, the second largest number in the world after the USA. Despite public opposition, the government still favours nuclear power and may commission new plants in the future to replace its ageing stock.

France has a powerful agriculture industry, and hence a strong food and beverage sector, with a world-leading position in wine making and spirits production.

France’s water industry is dominated by two companies – Ondeo (ex-Suez Lyonnaise des Eaux) and Veolia Environment (ex-CGE/Vivendi), who have also become two of the largest water companies in the world.

| Valve Type                  | 2003 | 2004 | 2005 | 2006 | 2007 | 2009 |
|-----------------------------|------|------|------|------|------|------|
| Gate, Globe, Check          | 224  | 231  | 240  | 248  | 257  | 274  |
| Ball, Plug                  | 147  | 152  | 158  | 163  | 169  | 181  |
| Butterfly                   | 89   | 92   | 96   | 99   | 103  | 110  |
| Diaphragm                   | 16   | 17   | 17   | 18   | 19   | 20   |
| Pressure Reducing Valves    | 41   | 42   | 44   | 45   | 47   | 50   |
| Automatic Control           | 111  | 115  | 120  | 124  | 129  | 140  |
| Others                      | 68   | 70   | 73   | 76   | 78   | 84   |
| Parts                       | 186  | 192  | 200  | 207  | 215  | 228  |
| Total                       | 882  | 911  | 948  | 980  | 1017 | 1087 |

5.2.1.4 Italy

Italy has consistently been the poorest performer of the eleven countries in the euro area. There are considerable structural problems in the economy to be overcome, including the economic divergence between the north and south of the country. GDP growth, which was 1.7% in 2001 and 0.4% in 2002, remained flat at 0.4% in 2003. However, stronger growth is expected from mid-2004 and into 2005 as world
demand accelerates and uncertainties, hopefully, due to domestic corporate governance problems, recede. The Organisation for Economic Co-operation and Development (OECD) forecasts put GDP growth in 2004 at 0.9% rising to 1.9% in 2005.

The manufacturing industries in Italy have had a record of doing rather well, although 2002 and 2003 saw a fall in investment in machinery and equipment. This fall is expected to continue in 2004, but there will be a strong recovery in 2005.

With Italy’s crude oil refining capacity remaining static for the last few years, the country was overtaken by Germany in 2003 as the largest refining capacity in Western Europe. The country has 17 major refineries, five operated by the state-controlled Eni, along the Mediterranean coast and on Mediterranean islands.

Imports account for 80% of Italy’s natural gas, with most coming through pipelines from Algeria and Norway. LNG imports are expected to grow substantially with new terminals proposed for Brindisi, Rosignano, Port of Livorno (offshore) and in the North Adriatic.

While Italy’s chemical industry is smaller than France in terms of sales, its investment has been on a par with France during the 2000–2002 period.

Italy experienced two major power failures during 2003, due it is believed to under-investment in the power industry, resulting in less than sufficient reserve generation capacity. While there is a need to increase capacity, bureaucracy is an inhibiting factor.

| Valve Type                  | 2003 | 2004 | 2005 | 2006 | 2007 | 2009 |
|-----------------------------|------|------|------|------|------|------|
| Gate, Globe, Check          | 177  | 180  | 185  | 190  | 196  | 207  |
| Ball, Plug                  | 110  | 112  | 115  | 119  | 122  | 129  |
| Butterfly                   | 48   | 49   | 50   | 52   | 53   | 56   |
| Diaphragm                   | 12   | 12   | 13   | 13   | 14   | 15   |
| Pressure Reducing Valves    | 32   | 33   | 34   | 35   | 36   | 38   |
| Automatic Control           | 70   | 71   | 73   | 76   | 79   | 84   |
| Others                      | 60   | 61   | 62   | 63   | 65   | 69   |
| Parts                       | 156  | 158  | 162  | 167  | 172  | 181  |
| **Total**                   | **665** | **676** | **694** | **715** | **737** | **779** |

**5.2.1.5 Spain**

Spain has the fifth largest GDP in Western Europe, and has certainly fared better than Germany, France and Italy in the euro area during the past few years. Gross fixed capital formation, which grew by 3.0% in 2003, is expected to grow strongly by 4.0% in 2004 and 5.0% in 2005, as
a result of improved business prospects. This growth in investment combined with export growth will lead Spain to outperform the euro area as a whole throughout the period to 2005.

Investment in the Spanish chemical industry grew by 35% in both 2001 and 2002. Repsol YPF continues to invest in its petrochemical operations and a new 120,000 tonnes per year ethylene cracker is due to start operations in 2005.

Spain is Europe's largest importer of LNG and the country continues to increase its LNG terminal capacity.

There are large agricultural, food and beverage sectors, with wine making increasingly important. The engineering sectors are small, and water treatment is fragmented. To meet Spain's increasing demand for electricity, which is forecast to grow by 3% to 3.5% per annum during the present decade, power companies are investing heavily in new capacity, with Iberdrola, Endesa, ESB International, Hidrocantábrico, Union Fenosa, Repsol YPF and Gas Natural all making major investments.

Table 5.6 Industrial Valve Market in Spain (US$ million)

| Valve Type                    | 2003 | 2004 | 2005 | 2006 | 2007 | 2009 |
|-------------------------------|------|------|------|------|------|------|
| Gate, Globe, Check            | 96   | 100  | 105  | 110  | 114  | 123  |
| Ball, Plug                    | 54   | 56   | 59   | 62   | 64   | 69   |
| Butterfly                     | 27   | 28   | 29   | 30   | 32   | 35   |
| Diaphragm                     | 5    | 5    | 5    | 6    | 6    | 7    |
| Pressure Reducing Valves      | 17   | 17   | 18   | 19   | 20   | 22   |
| Automatic Control             | 46   | 48   | 50   | 53   | 55   | 61   |
| Others                        | 37   | 39   | 40   | 41   | 42   | 44   |
| Parts                         | 100  | 104  | 109  | 113  | 120  | 129  |
| **Total**                     | **382** | **397** | **415** | **434** | **453** | **490** |

5.2.1.6 Benelux Countries

Although the Netherlands has a stronger economy, in terms of GDP, than Belgium, it is the latter that has shown stronger, albeit small, growth during recent years and is forecast to continue to do so, with growth in Belgium slightly above the euro area average and Netherlands below. The Netherlands has a strong manufacturing industry, especially in chemicals, engineering and food. Investment in the chemical industry has held up well during the 2000-2002 difficult period. Although Luxembourg has the highest GDP per head of any country in Europe, it is of little significance to the valve market.

Dutch oil production from the North Sea is of little consequence now, while gas production, including on-shore fields, picked up in 2001 after
falling steadily from the peak of 1996. However, production declined again in both 2002 and 2003.

Although Belgium’s chemical industry, in terms of turnover, is in fact bigger than that of the Netherlands, its capital expenditure has been lower each year since 1997, and fell sharply by 17% in 2002.

Table 5.7 Industrial Valve Market in Benelux Countries (US$ million)

| Valve Type                  | 2003 | 2004 | 2005 | 2006 | 2007 | 2009 |
|-----------------------------|------|------|------|------|------|------|
| Gate, Globe, Check          | 106  | 109  | 112  | 115  | 119  | 125  |
| Ball, Plug                  | 76   | 78   | 80   | 83   | 85   | 90   |
| Butterfly                   | 48   | 49   | 51   | 52   | 54   | 57   |
| Diaphragm                   | 14   | 14   | 15   | 15   | 16   | 18   |
| Pressure Reducing Valves    | 33   | 34   | 35   | 36   | 37   | 39   |
| Automatic Control           | 81   | 83   | 86   | 89   | 92   | 98   |
| Others                      | 49   | 50   | 51   | 53   | 54   | 57   |
| Parts                       | 135  | 139  | 143  | 148  | 152  | 161  |
| **Total**                   | **542** | **556** | **573** | **591** | **609** | **645** |

5.2.1.7 Nordic Countries

The five Nordic countries comprise four countries of high levels of development, both industrially and socially, Denmark, Finland, Norway and Sweden, plus the very much smaller Iceland (which only contributes about 1% to the region’s total GDP).

Geographically these countries are on the northern fringe of Western Europe, but are not all that well integrated into it – Norway and Iceland are not members of the EU, while Denmark and Sweden are not in the euro area. Only Finland – because the EU provides welcome alternatives to its erstwhile dependence on Russia – seems fully enthusiastic about membership.

Finland has shown the strongest economic growth during the last four years, while expected growth in 2004 varies from 1.8% in Denmark, 2.5% in Norway and Sweden, up to 2.9% in Finland.

Table 5.8 Annual GDP Growth in Nordic Countries (%)

| Country | 2000 | 2001 | 2002 | 2003 |
|---------|------|------|------|------|
| Finland | 5.1  | 1.2  | 2.3  | 1.9  |
| Sweden  | 4.4  | 1.1  | 2.1  | 1.6  |
| Denmark | 2.9  | 1.4  | 1.0  | 0.2  |
| Norway  | 1.9  | 1.7  | 1.0  | 0.2  |

The Nordic countries, notably Finland and Sweden, have a strong paper industry, with the whole region accounting for around 30% of the Western European paper and board capacity.
The region is also strong in food and beverage production and each country has a small chemicals industry, with the combined outputs from all countries similar to the output of the Dutch chemicals industry. The region has a modest number of oil refineries, comparable to the UK, albeit with smaller capacities.

The Norwegian valve market is heavily dependent on the oil and gas industry in the North Sea. The country’s proved oil and gas reserves at the end of 2003 were more than twice that of the UK. Oil production peaked in 2001 at more than 3.4 million barrels per day and has now declined to 3.26 million barrels per day in 2003. However, natural gas production continues to rise, with a 12% increase in 2003.

Norway’s petrochemical manufacturer, the Borealis Group, has announced plans to expand its Noretyl ethylene cracker, a 50:50 joint venture with Hydro Polymers, and to debottleneck its own polypropylene plant at Rønningen. The two projects are scheduled to be completed by the autumn of 2005.

Denmark has a relatively small involvement in the North Sea industry, producing 368,000 barrels of oil per day in 2003 and 7.9 billion m$^3$ of natural gas.

Table 5.9 Industrial Valve Market in Nordic Countries (US$ million)

| Valve Type                        | 2003 | 2004 | 2005 | 2006 | 2007 | 2009 |
|-----------------------------------|------|------|------|------|------|------|
| Gate, Globe, Check                | 115  | 118  | 121  | 125  | 129  | 136  |
| Ball, Plug                        | 65   | 66   | 68   | 71   | 73   | 77   |
| Butterfly                         | 34   | 35   | 36   | 37   | 38   | 40   |
| Diaphragm                         | 8    | 8    | 9    | 9    | 10   | 11   |
| Pressure Reducing Valves          | 20   | 20   | 21   | 21   | 22   | 23   |
| Automatic Control                 | 85   | 87   | 89   | 92   | 94   | 99   |
| Parts                             | 454  | 464  | 478  | 493  | 508  | 538  |

5.2.1.8 Rest of Western Europe

The remaining countries of Western Europe are a very disparate group and include Austria, Cyprus, Greece, Ireland, Malta, Portugal, Switzerland and Turkey. These countries, collectively, account for around 11.3% of West Europe’s GDP, with Switzerland, Austria and Turkey totalling 63% of the group’s GDP.

The two Alpine countries of Austria and Switzerland are alike in many ways, but differ markedly in their views on European union. Austria is a member of the EU, but Switzerland is a steadfast non-joiner.
Austria is a strong and well-established member of the euro area, and is affected by the performance of Germany, its main trading partner. GDP growth in 2003 was 0.7% (better than Germany). Exports are expected to rebound as the international upswing gains momentum, resulting in GDP growth in 2004 of 1.5%, increasing to 2.4% in 2005.

The Swiss economy has been hit hard by the global downturn and the sharp appreciation of the franc, resulting in a 0.5% decline in GDP in 2003. Exports are a key factor in driving the Swiss economy and the present upturn in international trade should see GDP growth in 2004 of 1.8%, increasing to 2.3% in 2005. Investment, which was down in the past three years, is also expected to pick up in 2004 and 2005.

The engineering industries are strong in the two countries and Switzerland has a significant presence in chemicals, particularly pharmaceuticals.

Turkey forms a link between two continents – Europe and Asia. The country is firmly set on joining the EU, but the problems of a divided Cyprus are impeding progress.

Since the mid 1980s, Turkey’s economy has moved strongly away from the state principles on which the Republic was founded, allowing Turkey’s dynamic private sector to become the engine of economic development. The country’s economic turnaround continues to rely on market forces, export-led development, integration with the world economy, and privatization.

Average annual growth rates during the past ten years, with the exception of 1999 and 2001, have been the highest of any OECD country.

The decline in 1999 was due to the effects of Russian devaluation and the Asian markets crisis, the economy stalling in the run-up to elections, and the earthquakes in August. The government introduced a number of structural reforms in 1999, paving the way for a US$4 billion three-year stand-by agreement with the IMF, which came into effect on 1 January 2000. However, in the second half of 2000, delays in the implementation of the reforms damaged the credibility of the IMF programme leading to a financial crisis in late November 2000 and again in February 2001, forcing a sharp devaluation of its currency. Inflation and unemployment soared and, combined with the effects of 9/11, GDP fell sharply in 2001 by 7.5%.

The economy has now recovered and Turkey saw robust growth of 5.8% in 2003 and this should continue above 5% in 2004 and 2005, driven by exports and improved consumer and business confidence.

Turkey has an oil refining capacity from its seven refineries of just under half the size of that of the UK. Four of these refineries are operated by
the partly state owned company Tupras, which is currently planning a fifth refinery near Yarimca, to be completed by 2007.

There is a good deal of pipeline activity in Turkey, with the 1097 mile Baku-Tblisi-Ceyhan (BTC) oil pipeline from Azerbaijan to Turkey now under construction and due for completion in 2005. A number of options are under consideration for transporting oil from the Eastern European oil fields to Turkey and Greece.

Table 5.10 Industrial Valve Market in Rest of Western Europe (US$ million)

| Valve Type                     | 2003 | 2004 | 2005 | 2006 | 2007 | 2009 |
|--------------------------------|------|------|------|------|------|------|
| Gate, Globe, Check             | 200  | 209  | 218  | 228  | 239  | 259  |
| Ball, Plug                     | 111  | 116  | 121  | 127  | 132  | 144  |
| Butterfly                      | 55   | 57   | 60   | 63   | 66   | 72   |
| Diaphragm                      | 12   | 12   | 13   | 13   | 14   | 16   |
| Pressure Reducing Valves       | 36   | 38   | 39   | 41   | 43   | 47   |
| Automatic Control              | 105  | 110  | 115  | 120  | 126  | 140  |
| Others                         | 82   | 86   | 90   | 94   | 98   | 105  |
| Parts                          | 218  | 228  | 238  | 250  | 262  | 283  |
| **Total**                      | **819** | **856** | **894** | **936** | **980** | **1066** |

5.2.2 Central and Eastern Europe

This region includes three groups of countries:

- Commonwealth of Independent States (CIS). Following the break-up of the USSR in December 1991, the CIS was formed. At the same time the Russian Supreme Soviet changed the name of the Russian Soviet Federation Socialist Republic to the Russian Federation. The CIS now comprises twelve countries: Azerbaijan Republic, Republic of Armenia, Republic of Belarus, Georgia, Republic of Kazakhstan, Kyrgyz Republic, Republic of Moldova, Russian Federation, Republic of Tajikistan, Republic of Turkmenistan, Republic of Uzbekistan and Ukraine.

- EU Accession countries. On 1 May 2004, eight Eastern European countries joined the European Union: Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovak Republic and Slovenia.

- The rest, comprising the republics deriving from the former Yugoslavia, together with Albania, Bulgaria and Romania.

The GCF for the whole region in 2002 amounted to 3.2% of the world total and was about one eighth of the size of Western Europe (including Turkey). The CIS states accounted for 46% of the region’s GCF in 2002, with the EU Accession countries accounting for a further 42%.
5.2.2.1 Russia

The Russian Federation dominates the CIS, accounting for 74% of the GCF in 2002. In 2003, Russia’s real GDP grew by 7.3%, the country’s fifth consecutive year of economic expansion since the 1998 crisis. Russia’s economic growth has been fuelled largely by its energy sector – the country is the world’s largest exporter of natural gas and the second largest oil exporter. GDP growth is expected to slow to between 5.5% and 6.0% in 2004, with growth in 2005 expected to be between 5.0% and 5.5%. There is some uncertainty, however, among investors about the relationship between the state and big business.

The oil and gas sector is expected to remain the leading sector both in size and market and potential growth, not simply because of continuing high oil prices but also because of new sources of financing, advancing Western investment projects and evolving pipeline projects. However, with Yukos facing bankruptcy, there is considerable uncertainty in the industry.

In 2003, Tyumen Oil Company (TNK) and BP merged, and this company, TNK-BP, along with Yukos, LUKoil, Surgutneftegaz Tyumen Oil and Sibneft, dominate the oil industry. Together, they account for 70% of the country’s oil production.

Russia’s installed power generation capacity (215 GW in 2001) is the fourth largest in the world. The sector is dominated by RAO UES, which was created in 1992 as a joint-stock corporation and with the federal government as its major shareholder.

Russia’s power sector includes more than 440 thermal and hydroelectric power plants plus 30 nuclear power plants, while a further three nuclear power plants are under construction.

Electricity consumption declined rapidly following the collapse of the Soviet Union and only started to recover in 1999. Existing capacity is likely to be able to meet any further growth in demand to 2010. However, there is likely to be upgrading and repair of a number of existing ageing facilities.
Table 5.11 Industrial Valve Market in Russia (US$ million)

| Valve Type                  | 2003 | 2004 | 2005 | 2006 | 2007 | 2009 |
|-----------------------------|------|------|------|------|------|------|
| Gate, Globe, Check          | 153  | 162  | 171  | 179  | 189  | 209  |
| Ball, Plug                  | 79   | 84   | 88   | 93   | 98   | 108  |
| Butterfly                   | 26   | 27   | 28   | 30   | 31   | 34   |
| Diaphragm                   | 3    | 3    | 3    | 4    | 4    | 5    |
| Pressure Reducing Valves    | 23   | 24   | 25   | 26   | 28   | 31   |
| Automatic Control           | 45   | 48   | 51   | 54   | 57   | 64   |
| Others                      | 78   | 82   | 86   | 91   | 96   | 106  |
| Parts                       | 163  | 173  | 182  | 192  | 204  | 224  |
| **Total**                   | **570** | **603** | **634** | **669** | **707** | **781** |

5.2.2.2 Rest of Central and Eastern Europe

The countries of Eastern Europe, excluding Russia, recovered from the trauma of the break-up of the Soviet bloc in the mid 1990s.

In recent years, the three Baltic states – Estonia, Latvia and Lithuania – have shown the strongest growth, with real GDP growing by 6.4% in 2002 and 7.4% in 2003. However, these countries only accounted for 8% of the eight EU accession countries’ total GCF in 2002. The largest of the EU accession countries is Poland, followed by the Czech Republic and Hungary. After low growth of 1.4% in 2002, Poland had an export-led recovery in 2003, with a GDP growth of 3.7%. The IMF forecast stronger growth in 2004 at 4.7%, slowing to 4.0% in 2005.

Growth in the Czech Republic has been more steady, with 2.0% recorded in 2002 and 2.9% in 2003. Continued growth of 3.0% in 2004 and 3.4% in 2005 is forecast.

In Hungary, the economy slowed in 2003, despite strong consumption growth, to 2.9%. An increase to 3.2% in 2004 and 3.4% in 2005 is forecast.

Foreign direct investment will play an important role in the development of the accession states. According to the European Bank for Reconstruction and Development, foreign direct investment dipped to US$8 billion in 2003 from more than US$20 billion in 2002. Investment, however, is expected to recover to US$15 billion in 2004 and then maintain that level for some time.

In general, the accession states will see investments in various sectors to improve safety and environmental performance to meet EU requirements.

While the Czech Republic, Slovak Republic and Slovenia have seen an increase in investment in their chemical industries during the 2000–2002
period, investment in Hungary has been fairly static. Poland, meanwhile, has seen a significant decline.

Apart from Russia, the only other significant oil producer in the region is Kazakhstan, albeit producing less than an eighth of Russia’s output – even smaller producers are Azerbaijan, Romania, Turkmenistan and Uzbekistan. Kazakhstan has the Caspian Sea region’s largest recoverable crude oil reserves. Production has been steadily increasing since 1994 to around 1 million barrels per day in 2003, with the government expecting to increase this to 2.4 million barrels per day by 2010.

Eastern Europe as a whole is restructuring and liberalizing its electricity markets to meet EU requirements. There is a great need to modernize existing plants and make them more efficient. There is likely to be a move from coal to natural gas-fired generating plants to improve pollution conditions and, in some cases, a dismantling of nuclear power plants that the EU considers unsafe.

Table 5.12 Industrial Valve Market in Rest of Central and Eastern Europe (US$ million)

| Valve Type                      | 2003 | 2004 | 2005 | 2006 | 2007 | 2009 |
|---------------------------------|------|------|------|------|------|------|
| Gate, Globe, Check              | 114  | 120  | 125  | 131  | 140  | 151  |
| Ball, Plug                      | 59   | 62   | 65   | 68   | 71   | 80   |
| Butterfly                       | 20   | 21   | 22   | 23   | 24   | 26   |
| Diaphragm                       | 2    | 2    | 2    | 3    | 3    | 3    |
| Pressure Reducing Valves        | 17   | 18   | 19   | 20   | 21   | 23   |
| Automatic Control               | 33   | 35   | 37   | 39   | 41   | 46   |
| Others                          | 58   | 61   | 64   | 67   | 70   | 77   |
| Parts                           | 120  | 126  | 132  | 139  | 146  | 161  |
| **Total**                       | **423** | **445** | **466** | **490** | **516** | **567** |

5.2.3 Middle East

(Note: Because of its political ties with Europe, Turkey is counted as part of Western Europe. Egypt is also counted as part of Africa).

In the Middle East, real GDP growth strengthened in 2003, reflecting higher oil production and – in the second half of the year – the reduction in uncertainties following the Iraq war. This growth of 5.4% is expected by the IMF to ease back to 4.1% in 2004. However, the unsettled security situation, particularly in Iraq and Saudi Arabia, and the escalating oil price makes the future in the whole region uncertain.

The major valve application in the Middle East is in the oil and petrochemical industries, the region produces nearly 30% of the world’s oil, with an increasing requirement for water treatment such as desalination plants. Most of the valve sales to the region are made
through large plant contractors and oil companies. The production of natural gas is increasing to meet demands for feedstock in downstream activities in the refining sector and a number of plans for long distance natural gas export lines are under investigation, as well as new oil pipelines.

With the expected population increase and the growing economies of the region, a rapid growth in demand for electricity is also expected.

Saudi Arabia, the region's most important country, holds one-quarter of the world's proven oil reserves and has the world's fourth largest gas reserves. These sectors will continue to dominate the country's economy, and, through the Supreme Petroleum Council (SPC), the government is trying to accelerate private sector and foreign involvement. The country has ambitious plans to expand petrochemical production using natural gas as a feedstock.

Saudi Basic Industries Corp (Sabic) has recently announced a number of expansion developments totalling US$6.4 billion:

- A new petrochemical plant in Yanbu for 3.8 million tonnes per year of ethylene, ethylene glycol, polyethylene and polypropylene products;
- Expansion at Eastern Petrochemical to add 2.9 million tonnes per year of ethylene, polyethylene and ethylene glycol by 2008;
- An additional 1.7 million tonnes per year of methanol at Saudi Methanol (AR-RAZI) scheduled for production in the latter half of 2007. This will make AR-RAZI (a 50:50 joint venture with Mitsubishi), the largest single methanol-producing complex in the world;
- An additional 1 million tonnes per year of flat steel products at the Saudi Iron & Steel (HADEED), with production scheduled for 2006;
- The world's first a-sabline linear alpha olefins plant to be constructed at Jubail Industrial City by Linde.

Electricity demand is growing by more than 4.5% per annum in Saudi Arabia. At the end of 2003, the Saudi Electricity Company put out three 2 GW power projects and in early 2004 the Saudi state-owned oil company, Saudi Aramco, signed an agreement with the UK-based International Power to build more than 1 GW of natural gas fired cogeneration capacity, comprising four plants in the eastern part of the country.

Iran, the second largest oil producer in the region, announced the discovery of its largest oil find in 30 years in September 1999, with this requiring significant investment in the coming years. Iran's National Petrochemical (NPC) has embarked on a major 5-year expansion programme to develop the country's petrochemical sector.
Iran has the world’s second largest proven natural gas reserves, after Russia. The government, along with private investors, are currently working to build LNG facilities in Iran to supply both the domestic market and export market.

With the demand for electricity growing rapidly, Iran is building significant new thermal and hydroelectric capacity, with the target of adding 30 GW of capacity within 10 years.

The post-war unrest has delayed the expected massive rebuilding of infrastructure in Iraq.

The Dolphin gas project, which was launched in the spring of 1999, is one of the largest energy-related programmes undertaken anywhere in the world. As well as the construction of a new gas pipeline linking Qatar with United Arab Emirates (UAE) and Oman, the project is expected to see the construction of gas and liquid processing facilities with other downstream activities relating to the development of new and existing industrial plants in the UAE, Qatar and elsewhere in the region.

Table 5.13 Industrial Valve Market in Middle East (US$ million)

| Valve Type                  | 2003 | 2004 | 2005 | 2006 | 2007 | 2009 |
|-----------------------------|------|------|------|------|------|------|
| Gate, Globe, Check          | 159  | 165  | 173  | 182  | 192  | 211  |
| Ball, Plug                  | 76   | 79   | 83   | 87   | 92   | 101  |
| Butterfly                   | 28   | 29   | 31   | 32   | 35   | 39   |
| Diaphragm                   | 8    | 8    | 8    | 9    | 9    | 9    |
| Pressure Reducing Valves    | 27   | 28   | 30   | 31   | 33   | 36   |
| Automatic Control           | 49   | 51   | 54   | 57   | 60   | 67   |
| Others                      | 54   | 56   | 59   | 62   | 65   | 71   |
| Parts                       | 116  | 122  | 127  | 136  | 141  | 156  |
| **Total**                   | **517** | **538** | **565** | **596** | **627** | **690** |

5.2.4 Africa

The African continent produces more than 10% of the world’s oil, thus providing good opportunities for valve suppliers. Production of oil is fairly evenly split between North Africa and the sub-Sahara region.

Nigeria is the largest oil producer in Africa (25% of the region’s output), with other sub-Saharan producers including Angola, Gabon and Republic of Congo. In North Africa, Algeria is the largest producer (21% of the region’s output), followed by Libya (17%) and Egypt (10%).

Africa only accounts for a little more than 5% of the world’s production of natural gas, with Algeria, Egypt, Nigeria and Libya being the main producers. While oil production in Egypt has been in steady decline since 1995, natural gas production continues to expand – production has more
than doubled between 1999 and 2003. Further expansion is planned, with much of the increased volume being exported as LNG.

In North Africa, there are strong chemical industries in Algeria, Egypt, Libya, Morocco and Tunisia. Fluor started work on a contract to build a new benzene facility at Alexandria, Egypt in February 2004 for Egyptian Linear Alkyl Benzene (E-LAB). The project is part of a 20-year 'petrochemical master plan' for Egypt.

In the West African region, Nigeria is the main producer and user of chemicals, while in the south, South Africa is the prime market and producer. South Africa is home to Sasol, one of the world's top 20 chemical companies.

For much of Africa, connecting populations to electric power supplies remains a primary goal. However, with poor economies in many countries in the region, attracting investment has been difficult. There is a move among some countries to privatise their electric utilities to attract investment in the power system infrastructure.

South Africa is the largest African electric power generator, with more than 40% of the region's total installed generating capacity in 2001. With enough spare capacity to satisfy domestic demand until at least 2007, South Africa has become a major exporter of electric power to neighbouring countries. The state-owned Eskom generates nearly all of the country's electric power, with most generated by coal-fired power plants. As part of its privatization plans, a 30% share of Eskom is scheduled to be offered to investors by 2006. Egypt has the second largest installed electricity capacity in Africa and plans to add substantial capacity through privately-owned power plants financed under Build, Own, Operate and Transfer (BOOT) financing schemes.

In Nigeria, the government has begun the process of restructuring its state-owned electric power company, the National Electric Power Authority (NEPA), by splitting the utility into 18 separate companies, which are scheduled to be privatized. This is due for completion by 2005.
Table 5.14 Industrial Valve Market in Africa (US$ million)

| Valve Type                        | 2003 | 2004 | 2005 | 2006 | 2007 | 2009 |
|-----------------------------------|------|------|------|------|------|------|
| Gate, Globe, Check                | 86   | 89   | 94   | 98   | 102  | 111  |
| Ball, Plug                        | 43   | 45   | 47   | 49   | 51   | 56   |
| Butterfly                         | 22   | 23   | 24   | 25   | 26   | 29   |
| Diaphragm                         | 6    | 6    | 6    | 7    | 7    | 7    |
| Pressure Reducing Valves          | 22   | 24   | 25   | 26   | 27   | 29   |
| Automatic Control                 | 32   | 33   | 35   | 37   | 39   | 43   |
| Others                            | 54   | 56   | 59   | 62   | 65   | 70   |
| Parts                             | 79   | 82   | 86   | 91   | 95   | 103  |
| **Total**                         | **344** | **358** | **376** | **395** | **412** | **448** |

5.2.5 Asia and Far East

The region accounted for 29.4% of the world’s GCF in 2002, although just four countries – Japan, China, South Korea and India – accounted for 90% of the total.

5.2.5.1 Japan

Japan has the second largest economy in the world and after two depressed years in 2001 and 2002, the economy resumed modest growth in 2003 with a 2.7% increase in GDP, helped by strong exports growth. However, as part of prime-minister Junichiro Koizumi’s economic reforms, spending on public works projects, which had been funded as part of previous attempts to stimulate the economy, has been scaled back significantly, with GCF declining by 10% in 2002.

The pick-up in world trade and steady increase in domestic demand, buoyed by some improvement in the labour market, are expected to help sustain GDP growth near 3% through 2005. However, the outlook is clouded by entrenched deflation and by persistent weaknesses in corporate, financial and public sector balance sheets. Other risks include the impact of a sustained appreciation of the yen and the possibility that rising public debt could trigger sharply higher real interest rates.

Japan has the world’s second largest chemical industry, albeit less than half the size of the USA’s. However, investment in the industry was sharply down in 2002 by nearly 18%. The situation is thought to have improved in 2003, when production of many chemicals perked up.

Although Japan contains almost no oil reserves of its own, it is the world’s third largest oil consumer, after the USA and China. Consequently it has a large refining industry, although with 33 refineries it is suffering from overcapacity. Japan’s refining industry has gone through a good deal of consolidation since 1999 and is now dominated by Nippon Mitsubishi Oil.
Electrical generating capacity amounted to 262 GW in 2001. About 75% of the country’s electricity is produced by ten private-sector companies. Investment by these companies in generating capacity has steadily declined from ¥1016 billion in 1997 to ¥526 billion (US$4.2 billion) in 2002 reflecting the almost static demand for electricity during that period.

Japan’s electricity demand is expected to rise in future years, with the Federation of Electric Power Companies of Japan, which comprises the ten major electricity companies, forecasting that 35 GW of new power generation capacity will be needed in the next ten years.

About one-third of electricity in Japan comes from nuclear power, with 54 nuclear power plants in operation and a further two under construction. In spite of the recent problems – there was a scandal in 2002, when it was disclosed that Tokyo Electric Power had falsified inspection documents for 13 of its nuclear reactors – Japan plans to build a further 13 nuclear power plants, with a combined capacity of 13 GW, by 2010.

Table 5.15 Industrial Valve Market in Japan (US$ million)

| Valve Type                  | 2003  | 2004  | 2005  | 2006  | 2007  | 2009  |
|-----------------------------|-------|-------|-------|-------|-------|-------|
| Gate, Globe, Check          | 409   | 418   | 422   | 429   | 439   | 456   |
| Ball, Plug                  | 272   | 278   | 281   | 286   | 293   | 305   |
| Butterfly                   | 120   | 122   | 123   | 125   | 128   | 133   |
| Diaphragm                   | 32    | 33    | 34    | 35    | 36    | 38    |
| Pressure Reducing Valves    | 78    | 80    | 81    | 82    | 84    | 87    |
| Automatic Control           | 243   | 250   | 254   | 262   | 270   | 284   |
| Others                      | 145   | 148   | 150   | 152   | 155   | 160   |
| Parts                       | 315   | 321   | 323   | 327   | 336   | 348   |
| **Total**                   | **1614** | **1650** | **1668** | **1698** | **1741** | **1811** |

5.2.5.2 China

Based on a share of world GDP in 2002, China is already the sixth largest economy in the world. By 2010 it is forecast that it will have overtaken France and the UK, and, by 2015, also Germany, by which time it will have become the third largest economy in the world.

China’s accession to the World Trade Organisation (WTO), on 11 December 2001, heralded a new era. It symbolized China’s ongoing integration into the world economy, a transition from central planning to market-based regulatory principles and significant opportunities for exporters. China’s WTO membership is changing the way business is conducted in the country, although the transition is gradual and not without problems.
China's economy grew faster than expected in 2003, with GDP rising at 9.1% in real terms according to official figures. The outbreak of the Severe Acute Respiratory Syndrome (SARS) virus had less than expected negative economic effects, particularly on service industries.

While strong fixed investment – China's GCF in 2002 was third highest in the world – has helped to underpin real GDP growth, there are growing concerns about over-investment in several sectors, where output is booming and input prices have increased sharply. To mitigate the risks of overheating and the build-up of sectoral imbalances, additional tightening of policies is needed in the period ahead to slow GDP growth to a more sustainable rate. The IMF is forecasting GDP growth at 8.5% in 2004 and 8.0% in 2005.

Industry continues to dominate the Chinese economy, contributing about 45% to total GDP. Although demand for consumer goods remains relatively weak, government-backed spending on basic infrastructure, technical upgrades to leading enterprises, and real estate development has led to substantial growth in the output of steel – China now produces some 22% of the world's total output.

Foreign direct investment was expected to reach US$55 billion in 2003, becoming the world's top investment destination for overseas investors for the second consecutive year.

Despite moves toward privatization, much of China's economy remains controlled by large State Owned Enterprises (SOEs), many of which are inefficient and unprofitable. Restructuring of the SOE sector, including the privatization of some enterprises, is a major priority of the government, as is the restructuring of the banking sector.

One sector that has seen privatization is the oil and gas industry, with Sinopec, CNPC and CNOOC all successfully having initial public offerings (IPOs) of stock between 2000 and 2002.

China was the world's second largest consumer of petroleum products in 2003 and the fifth largest oil producer. With oil production located in the North East of the country, the government is planning the infrastructure to transport oil and gas, to consumers in the west and south of the country. Downstream infrastructure development is focused primarily on upgrading existing refineries (nearly 100 in number), rather than building new ones, due to overcapacity.

Although not a large natural gas producer or consumer, China has embarked on a major expansion of its gas infrastructure, with consumption expected to more than double by 2010.
China has established itself as the fourth largest chemicals producer in the world. Within this sector, China is now the fastest growing petrochemical producer as downstream manufacturing industries have moved from other countries, including those in Asia, into China due to its low labour costs. Eight new ethylene are planned to come on stream during 2004–2006.

China is expected to attract 29% of world petrochemical investments during the period 2002 to 2012, and currently has around 15,000 plants, both state-owned and private.

China’s pharmaceutical industry is growing fast, with production increasing by 17% per annum during the 9th Five-Year Plan (from 1996 to 2000). There are in excess of 5,100 pharmaceutical companies, including more than 1,700 foreign companies and joint ventures as well as around 1,100 state owned companies. Under the 10th Five-Year Plan (2000 to 2005), pharmaceutical production is expected to increase at the rate of 12% per annum.

China is the world’s largest food producer, and food production is China’s largest industry. However, less than 10% of the food passes through a food processing plant, so this industry has huge potential for expansion. It is reported that the growth rate for the food processing industry is around 13% per annum.

Many of China’s 4,000 paper and board mills are small and operate inefficient equipment compared with foreign competitors. As a result, many will be forced to close, while the remainder will have to invest to update their facilities.

As reported in section 6.2, China’s water problems are a major threat to its economic growth and the Chinese government is trying to encourage foreign enterprises to participate in the construction and operation of municipal water resources projects. To increase its water supply capacity, it is reported that between 600 and 800 new water treatment plants will be required by 2010.

The Chinese electric power industry, which is only in the early stages of being restructured, is now the world’s second largest after the USA, with an installed capacity in 2000 of 322 GW. The government has been closing down small inefficient thermal power plants and building bigger new ones. In the first half of 2003, the Chinese government approved 30 major new electric power projects, with around 22 GW capacity, to keep pace with increased demand. The largest project under construction is the Three Gorges Dam, which, when fully completed in 2009, will include 26 separate 700 MW hydroelectric generators.
At the end of January 2004, China had eight nuclear power plants in operation, with a further three under construction. It has been reported that the government will invite international tenders before the end of 2004 for four new nuclear power reactors.

China is the third-largest construction market, after the USA and Japan, but will be one of the fastest growing at 8.2% per annum during the 2002–2007 period.

Table 5.16 Industrial Valve Market in China (US$ million)

| Valve Type                  | 2003  | 2004  | 2005  | 2006  | 2007  | 2009  |
|-----------------------------|-------|-------|-------|-------|-------|-------|
| Gate, Globe, Check          | 305   | 331   | 357   | 385   | 414   | 478   |
| Ball, Plug                  | 135   | 146   | 158   | 170   | 183   | 211   |
| Butterfly                   | 56    | 61    | 66    | 71    | 76    | 88    |
| Diaphragm                   | 17    | 18    | 20    | 22    | 24    | 28    |
| Pressure Reducing Valves    | 49    | 53    | 57    | 61    | 65    | 74    |
| Automatic Control           | 91    | 99    | 107   | 116   | 125   | 146   |
| Others                      | 175   | 190   | 205   | 221   | 238   | 275   |
| Parts                       | 192   | 209   | 225   | 245   | 264   | 305   |
| **Total**                   | **1020** | **1107** | **1195** | **1291** | **1389** | **1605** |

5.2.5.3 South Korea

Despite a global economic slowdown, South Korea's economy grew by 6.9% in 2002. However, the economy slipped into recession in the first half of 2003, due to a tightening of consumer credit, which reduced domestic demand. A resumption of growth in the second half led to a GDP growth for the full year of 3.1%. This growth, fuelled by buoyant exports driven in large part by China, is expected to lift growth in GDP to between 5 and 6% in 2004 and 2005.

In the wake of the Asian financial crisis of 1997–98, South Korea began an economic reform programme that included addressing the problem of the power that the chaebols (large, multi-industry conglomerates) had over the financial sector. The government has introduced regulations to prevent chaebols from arbitrarily channelling money into other subsidiaries. Pressure has also been applied to get the chaebols to spin off their non-core businesses and to rationalize their corporate structures. Under privatization plans eleven state-owned companies were earmarked for disposal. Eight have so far been sold including Korea Tobacco & Ginseng, Korea Telecom and steel-maker Posco. However, plans to privatise Korea Electric Power (KEPCO) have met with fierce opposition (including strikes) from labour unions and have been much delayed.

With no oil or gas production, activities in this sector are limited to refining. Despite the consolidation of its refining sector, it has yet to fully recover from the effects of the Asian financial crisis and the shock of the
5 International Valve Market

Since South Korea has to import its natural gas, it is currently investigating the possibility of a natural gas pipeline from Russia.

South Korea’s chemical industry rates as the world’s seventh largest, just behind Italy.

Most of South Korea’s electrical generating capacity is still controlled by KEPCO, but a few independent power producers exist. The government estimates that its electricity demand will rise at an average annual rate of around 4% per annum through 2015.

There are 19 nuclear power plants in operation, supplying almost 16 GW, with another 960 MW under construction. There are also proposals to build a further eight reactors totalling 9.2 GW.

### Table 5.17 Industrial Valve Market in South Korea (US$ million)

| Valve Type                   | 2003 | 2004 | 2005 | 2006 | 2007 | 2009 |
|------------------------------|------|------|------|------|------|------|
| Gate, Globe, Check           | 125  | 132  | 140  | 148  | 157  | 175  |
| Ball, Plug                   | 67   | 71   | 75   | 80   | 85   | 95   |
| Butterfly                    | 22   | 23   | 24   | 26   | 28   | 31   |
| Diaphragm                    | 6    | 6    | 6    | 7    | 7    | 8    |
| Pressure Reducing Valves     | 29   | 31   | 32   | 34   | 36   | 40   |
| Automatic Control            | 46   | 49   | 53   | 57   | 62   | 71   |
| Others                       | 60   | 64   | 67   | 71   | 75   | 84   |
| Parts                        | 121  | 128  | 137  | 144  | 152  | 169  |
| **Total**                    | **476** | **504** | **534** | **567** | **602** | **673** |

5.2.5.4 India

The Confederation of Indian Industry (CII) forecasts that GDP growth in the year ending 31 March 2004 will have been 8.4%. This growth has been helped by investment in infrastructure, the corporate restructuring undertaken in recent years, the impact of the global outsourcing of customer support services on exports, the effect of good monsoon rains on agricultural production, and, the global recovery. The CII forecasts that growth for 2004–2005 will be in the range of 6.6% to 7.0%. However, there is some uncertainty about the future following the recent shock election victory of the Congress Party.

India’s oil production has remained fairly static during recent years at just under 800 000 barrels per day. The country has 17 refineries and increasingly pipelines between refineries and major urban centres are replacing rail as the main mode of transportation. India is also investing heavily in the infrastructure required to support increased use of natural gas.
The Indian chemical industry occupies an important position in the country's economy and has been growing at about twice the rate of growth in GDP.

Continued shortages of electricity continue to plague the country – many industrial users of electricity have invested in small generators for on-site production of electricity. Most of India's power plants are coal-fired, with hydroelectric being the second largest source. The government has plans to increase the use of hydroelectric, nuclear power and natural gas to provide the capacity to cope with an anticipated growth in demand of 3.5% to 4% per annum.

In 2003, the government launched an initiative to add 50 MW of hydroelectric power by 2012 and several large-scale projects are now under construction.

The country has 14 nuclear power plants in operation, with a further eight reactors currently under construction and there are reported plans to build another 24 with a capacity of more than 13 GW. Most power plant capacity is publicly-owned. Although the government has tried to attract private and foreign investment in new independent power producers, most of the proposed projects have not proceeded because of an inadequate legal and commercial framework and delays in obtaining regulatory approvals.

Water supply services are woefully inadequate but again the problem remains one of funding.

| Valve Type              | 2003 | 2004 | 2005 | 2006 | 2007 | 2009 |
|-------------------------|------|------|------|------|------|------|
| Gate, Globe, Check      | 106  | 113  | 120  | 128  | 136  | 155  |
| Ball, Plug              | 56   | 60   | 63   | 68   | 73   | 82   |
| Butterfly               | 19   | 20   | 21   | 23   | 25   | 28   |
| Diaphragm               | 5    | 5    | 5    | 6    | 6    | 7    |
| Pressure Reducing Valves| 43   | 46   | 48   | 51   | 55   | 62   |
| Automatic Control       | 43   | 46   | 49   | 53   | 57   | 65   |
| Others                  | 76   | 81   | 87   | 93   | 98   | 111  |
| Parts                   | 99   | 106  | 113  | 120  | 128  | 146  |
| **Total**               | **447** | **477** | **506** | **542** | **578** | **656** |

5.2.5.5 Other Asia

This region covers all of the Far East and Asia, excluding Japan, China (including Hong Kong and Macao), India and South Korea. The region’s GCF represented only 10% of the whole of the Far East and Asia’s investment in 2002, with six countries accounting for about 81% of this investment.
Taiwan’s economy is heavily oriented towards the manufacture of electronics products, such as personal computers. Weak demand for these products caused a recession in 2001, with GDP falling by 2.2%. A recovery in export markets, and the accession of Taiwan to the WTO, resulted in a recovery in 2002 with GDP growth of 3.5%. Although a growth of 3.7% was expected in 2003, the impact of SARS reduced this to 3.2%.

Once a largely agrarian economy, Thailand is transforming itself into a manufacturing economy, now 30–35% of GDP, with industries as diverse as automotive, electronics and textiles. After a slowdown in growth in 2001 to 1.9%, real GDP growth rebounded strongly in 2002 to reach 5.3% and increased further in 2003 to reach 6.7%. The momentum is expected to continue in 2004.

The Thai government has recently announced plans to invest US$1.4 billion to construct four new power plants to meet expected rising electricity demand. The proposed new facilities, each with a capacity of 700 MW, will use natural gas as their main fuel. Construction of the first plant will start in 2005.

Indonesia maintained positive GDP growth (3.4%) through the world economic slowdown in 2001. Growth continued in 2002, at 3.7%, and in 2003, at 4.1%, largely driven by private consumption. However, there needs to be progress on banking, legal and judicial reforms to help enhance the investment climate and put the economy on a higher growth path. Oil production has declined steadily since 1996, as its oil fields age and the liberalization of the country’s downstream oil and gas sector only making very slow progress.

Growth in electricity consumption in the region will be at a lower rate than its neighbours in China, India and South Korea.

Water shortage and pollution continue to be problems in the region and investment is expected to address these.
Table 5.20 Industrial Valve Market in Rest of Asia (US$ million)

| Valve Type                  | 2003 | 2004 | 2005 | 2006 | 2007 | 2009 |
|-----------------------------|------|------|------|------|------|------|
| Gate, Globe, Check          | 121  | 128  | 135  | 143  | 151  | 168  |
| Ball, Plug                  | 65   | 69   | 73   | 77   | 82   | 91   |
| Butterfly                   | 36   | 38   | 40   | 43   | 45   | 51   |
| Diaphragm                   | 7    | 7    | 7    | 8    | 8    | 9    |
| Pressure Reducing Valves    | 28   | 30   | 31   | 33   | 35   | 39   |
| Automatic Control           | 37   | 40   | 43   | 46   | 46   | 52   |
| Others                      | 58   | 60   | 63   | 66   | 75   | 82   |
| Parts                       | 107  | 113  | 121  | 127  | 134  | 150  |
| **Total**                   | **459** | **485** | **513** | **543** | **576** | **642** |

5.2.6 Australasia

The region is defined as including Australia, New Zealand, Papua New Guinea and neighbouring archipelagos. The region is obviously economically dominated by Australia, which accounts for more than 86% of the region’s GDP.

Australia’s economy continues to expand, marking its twelfth consecutive year of growth in 2003, with a GDP increase of 3.0%. There is every indication that this trend will continue in 2004 and 2005.

Australia has an active oil and gas industry, sophisticated water management systems and a considerable industrial base in mining and materials processing. However, oil production, after peaking at 812 000 barrels per day in 2000 is on the decline and the country’s refineries have been suffering from declining gross margins. In April 2003 Exxon Mobil announced plans to close its Adelaide refinery and further closures can be expected.

Natural gas production, however, is on the increase, with a number of gas pipeline projects under way or being planned.

Most of Australia’s state-owned electric utilities have been privatized and recent years have seen considerable investment, with 3.3 GW of generating capacity being added between 2000 and 2002. The government’s Renewable Energy Act, passed in 2000, requires power producers to increase the renewable share of their electricity mix by 2% by 2010.

Most of New Zealand’s electrical generating capacity is hydroelectric, but there has been hardly any increase in the country’s capacity during the past few years, although demand has been rising. With concerns about the problems caused by dry years, other fuels are being considered, but concerns about future gas supplies have delayed decisions on new projects.
### Table 5.21 Industrial Valve Market in Australasia (US$ million)

| Valve Type                  | 2003 | 2004 | 2005 | 2006 | 2007 | 2009 |
|-----------------------------|------|------|------|------|------|------|
| Gate, Globe, Check          | 72   | 74   | 77   | 79   | 82   | 88   |
| Bell, Plug                  | 30   | 31   | 32   | 33   | 34   | 37   |
| Butterfly                   | 16   | 16   | 17   | 18   | 19   | 21   |
| Diaphragm                   | 5    | 5    | 5    | 6    | 6    | 7    |
| Pressure Reducing Valves    | 12   | 12   | 13   | 13   | 14   | 16   |
| Automatic Control           | 26   | 27   | 28   | 29   | 30   | 33   |
| Others                      | 37   | 38   | 39   | 41   | 42   | 45   |
| Parts                       | 46   | 48   | 49   | 50   | 51   | 53   |
| **Total**                   | 244  | 251  | 260  | 269  | 278  | 300  |

#### 5.2.7 North America

**5.2.7.1 USA**

The USA was heading for, if not already in, recession before the 9/11 terrorist attacks on New York and Washington DC. The economic fall was quite rapid, coming after a prolonged period of high production. GDP growth, which in 1999 had been 4.2%, fell slightly in 2000 to 3.8%, but then plummeted to 0.3% in 2001. After a slight recovery in the early part of 2002, GDP growth slowed markedly from about mid-2002, owing both to rising geopolitical uncertainties in the run-up to the war in Iraq and to the continued after-effects of the bursting of the equity price bubble. GDP growth turned out at 2.2%.

Following the end of the war in Iraq, the economy began to regain momentum, aided by a sharp rise in government expenditure, resulting in GDP growth in 2003 of 3.1%.

The expansion is now firmly established across most sectors of the economy, helped by continued stimulus from fiscal and monetary policies – the US Federal Reserve has maintained its interest rate target at an extremely low level (1.0%), while the US budget continues to run large deficits. Against this background the IMF projects a GDP growth in 2004 of 4.6%, easing back to 3.9% in 2005.

Capital spending in the US chemical industry fell every year from a peak of US$33.8 billion in 1998 to US$25.7 billion in 2002. It is thought that 2003 showed a slight recovery and this will continue into 2004. The American Chemistry Council (ACC) has predicted that valve shipments to the US chemical industry would increase by 1.8% in 2003 and 2.8% in 2004.

US oil production declined by 1.6% in 2003, while natural gas production was up by 0.7%. Sharp increases in oil and gas prices fuelled a 23.6% increase in exploration and production capital spending in 2003,
according to the *Oil & Gas Journal (OGJ)*. *OGJ* forecasts that the increase in oil and gas exploration and production capital spending in 2004 will be around 5%. *OGJ* also forecasts capital spending on refining to increase by 11.1% in 2004.

During the past decade, interstate natural gas pipeline capacity has increased substantially, and much more will be needed in coming years as demand for natural gas continues to grow.

LNG imports are forecast to grow by a factor of six by 2015, with the result that existing facilities are being refurbished and several new facilities are planned.

As reported in section 6.7, new investment in the US power generation industry has been delayed or cancelled, following a capacity overbuild. Investment in new plant is expected to remain depressed during the next year or two, although there will be opportunities for upgrade and maintenance work.

Although the USA has 104 nuclear power plants, no further plants are expected to be built. More than 15 reactors have now been granted licence renewals that extend their operating lives from 40 to 60 years, with operators of most of the others expected to apply for similar extensions.

The US domestic water and wastewater industry is reported to be in need of major capital improvements and should provide good opportunities for valve manufacturers.

| Valve Type               | 2003 | 2004 | 2005 | 2006 | 2007 | 2009 |
|--------------------------|------|------|------|------|------|------|
| Gate, Globe, Check       | 619  | 624  | 638  | 652  | 670  | 692  |
| Ball, Plug               | 648  | 665  | 686  | 708  | 731  | 774  |
| Butterfly                | 272  | 277  | 285  | 293  | 300  | 316  |
| Diaphragm                | 66   | 68   | 70   | 73   | 76   | 81   |
| Pressure Reducing Valves | 193  | 198  | 204  | 210  | 217  | 229  |
| Automatic Control        | 903  | 935  | 968  | 1002 | 1039 | 1118 |
| Others                   | 212  | 218  | 224  | 230  | 237  | 248  |
| Parts                    | 1010 | 1040 | 1071 | 1102 | 1137 | 1199 |
| **Total**                | 3923 | 4025 | 4146 | 4270 | 4407 | 4657 |

### 5.2.7.2 Canada

Strong domestic demand resulted in the Canadian economy growing by 3.3% in 2002, up from 1.9% in 2001. However, GDP growth fell back again in 2003 to 1.7%. This was due to a combination of factors – the weak US economy, on which Canada is very dependent; a strong
appreciation of the Canadian dollar affecting exports, which comprise 40% of GDP; and, the SARS outbreak in Toronto. However, export volumes have rebounded and with the expected world trade recovery, the IMF forecasts growth in 2004 of 2.6%, increasing to 3.1% in 2005.

Canada's chemical industry, although only about a twentieth of the size of the US industry, is important to the country's manufacturing industries. The period 2000 to 2002 saw a sharp fall in capital expenditure in the sector, but with chemical sales increasing by 6% in 2003, capital expenditure was also up by 12% and further expenditure is forecast to increase by 10% in 2004.

Canada's proven oil reserves are a little more than one-half of the reserves in the USA, with production in 2003 increased by around 6%. Natural gas production, however, fell by around 4%. OGJ forecasts that capital spending on Canadian exploration and production for oil and gas will be down in 2004 by 2%, but spending on refining (13.8%), crude and products pipelines (49.6%) and natural gas pipelines (12.3%) will be up.

Canada has a strong paper and pulp industry, accounting for 6% of world production in 2002.

More than one-half of Canada's electricity is generated by hydropower, but trends are for an increase in thermal power generation, mainly natural gas-fired.

| Valve Type                  | 2003 | 2004 | 2005 | 2006 | 2007 | 2009 |
|-----------------------------|------|------|------|------|------|------|
| Gate, Globe, Check          | 52   | 53   | 54   | 55   | 56   | 58   |
| Ball, Plug                  | 53   | 54   | 55   | 57   | 59   | 62   |
| Butterfly                   | 23   | 23   | 24   | 24   | 25   | 26   |
| Diaphragm                   | 4    | 4    | 4    | 5    | 5    | 6    |
| Pressure Reducing Valves    | 18   | 18   | 19   | 19   | 20   | 21   |
| Automatic Control           | 69   | 71   | 73   | 76   | 79   | 85   |
| Others                      | 22   | 22   | 23   | 23   | 23   | 24   |
| Parts                       | 78   | 80   | 82   | 84   | 86   | 90   |
| **Total**                   | **319** | **325** | **334** | **343** | **353** | **372** |

5.2.8 Central and South America

Central and South America, including the Caribbean, accounted for 4.9% of world GCF in 2002. The region is dominated in economic terms by two countries, Mexico and Brazil, which accounted for 40% and 28%, respectively, of the region's GCF.
5.2.8.1 Mexico

Mexico is the largest trading nation in Latin America and the tenth largest in the world. GDP growth has been strong since 1996 and foreign direct investment has surged into the country attracted by Mexico’s low costs of production and membership of the North American Trade Agreement (NAFTA). The country also has a low cost, easily trainable workforce. Since the enactment of NAFTA in January 1994, Mexico’s imports from the US have grown considerably, totalling US$98 billion in 2002. The US share of Mexico’s trade has likewise increased with NAFTA, accounting for nearly 78% of Mexico’s total trade in 2002. Mexico is now the second most important US trading partner after Canada.

Mexico is vigorously pursuing free trade agreements with other countries in order to reap the benefits of trade and to reduce its dependence on the US market. Mexico has a free-trade agreement with the EU similar in coverage to NAFTA, and also benefits from agreements with the European Free Trade Association (EFTA). Negotiations to liberalize trade are ongoing with Brazil, Argentina, Panama and Japan.

The Mexican economy, after facing a recession and negative real growth of –0.2% in 2001, showed positive growth of 0.7% in 2002. Given Mexico’s strong integration with the US, Mexico’s recovery is highly dependent upon US economic performance. Growth projections for Mexico from the Mexican Ministry of Finance and Public Credit estimated 2.3% growth for 2003, citing sound fiscal and monetary policies, higher oil prices, and, further integration with the USA as positive factors, but the IMF downgraded this to 1.3% in its April 2004 economic prospects report. Recovery gathered pace in the second half of 2003, in line with a pick-up in US growth and the easing of monetary conditions. Long-term growth, however, is dependent on structural reforms.

The limited progress with reforms in critical areas – including the energy sector, labour market, and, tax system – has dampened private investment and there are increasing concerns about Mexico’s medium-term competitiveness.

Mexico is the region’s largest oil producer (35% of the total), with the state-owned Petróleos Mexicanos (PEMEX) the major player. Capital expenditure by the company has increased steadily since 2001, and planned expenditure for 2004 is US$12.0 billion, a 12% increase on 2003.

To help improve Mexico’s US$6 billion trade deficit in chemicals, the government has proposed the Phoenix Project, which consists of an ethane-based ethylene-polyolefin complex in the Coatzacoalcos area and a naphtha cracker for olefins, aromatics and derivatives in Altamira. Some
20 companies are reported to be discussing the projects with PEMEX. PEMEX is already building a 300 000 metric tonne per year polyethylene plant at Coatzacoalcos, which is expected to come on stream in late 2005.

CFE and Luz y Fuerza Centro (LFC) are Mexico's two state-owned electricity companies, with CFE generating about 90% of the country's electricity and LFC about 2%. Attempts to increase private sector generation have to date met with resistance from the Mexican Congress.

The Mexican Energy Secretariat has estimated that an additional 13 GW of new capacity will be needed between 1999 and 2005 to meet demand.

Although Mexico has two nuclear power plants, there are no plans to build new plants. The country has around 10 GW of installed hydroelectricity capacity and plans to expand its use of the technology. In March 2003, a contract was awarded for the construction of the 750 MW El Cajón hydropower project to be built in the northwest state of Nayarit at Tepic, with completion scheduled for 2008.

Table 5.24 Industrial Valve Market in Mexico (US$ million)

| Valve Type                  | 2003 | 2004 | 2005 | 2006 | 2007 | 2009 |
|----------------------------|------|------|------|------|------|------|
| Gate, Globe, Check         | 87   | 90   | 93   | 97   | 101  | 109  |
| Ball, Plug                 | 39   | 40   | 42   | 44   | 46   | 49   |
| Butterfly                  | 21   | 22   | 23   | 24   | 25   | 26   |
| Diaphragm                  | 5    | 5    | 5    | 6    | 6    | 7    |
| Pressure Reducing Valves   | 18   | 19   | 19   | 20   | 21   | 22   |
| Automatic Control          | 31   | 32   | 34   | 35   | 37   | 40   |
| Others                     | 52   | 54   | 55   | 57   | 59   | 64   |
| Parts                      | 61   | 63   | 65   | 67   | 69   | 75   |
| **Total**                  | **314** | **325** | **336** | **350** | **364** | **392** |

5.2.8.2 Brazil

Brazil is the largest of the Latin American countries in terms of population and geographic size. GDP grew by 1.5% in 2002, a similar level to that achieved in 2001. However, the election of President da Silva in January 2003 resulted in a weakening of the currency, as the financial markets feared the impact of the new government's socialist agenda. To regain confidence, tight monetary and fiscal policies were introduced, resulting in a fall in GDP of 0.2%. These strong macroeconomic policies and progress with structural reforms have contributed to improved confidence and signs of recovery, including a resumption of output growth in the fourth quarter of 2003. The economy is expected to grow by 3.0 to 3.5% in 2004.
Although only the third largest oil producer in the region, Brazil is the fastest growing, with output more than doubling in the last ten years to in excess of 1.6 million barrels per day.

The bulk of oil and gas production is still in the hands of the state-owned Petrobrás, although there has been considerable investment in the sector since the company lost its monopoly in upstream activity in 1997. Shell became the first private company to produce oil in 2003.

In May 2004, Petrobrás announced a strategic plan for the period 2004–2010, one of the main highlights of which is to increase oil production in Brazil to around 2.3 million barrels per day by 2010. Total investment during the period is planned at US$53.6 billion of which US$32.1 billion is for exploration and production and US$11.2 billion is for refining, transport and communication, US$6.7 billion for gas and energy and US$1.1 billion for petrochemicals.

The petrochemical market strengthened in 2003, with Braskem, Brazil’s largest private chemical company, increasing its sales in 2003 by 27% to R$11.3 billion (US$3.6 billion). The company invested R$176 million in 2003 and this is scheduled to increase to R$400 million (US$130 million) in 2004.

The chemical industry plays a leading role in the development of Brazil’s manufacturing industry. The chemical industry ranks second in Brazil’s industrial sector with 12.5% of the GDP of the manufacturing industry, behind the food and beverage industry with 14.9% of the total.

Brazil started deregulating its electricity market in 1995. The distribution sector is now about 60% to 80% privatized, although generation is still mainly publicly owned, with Electrobrás alone controlling more than 45% of generation capacity. The new Labour Party government, which came to power in early 2003, has given up the plans of privatizing the state-owned generators and intends to increase the role of Electrobrás as the major promoter of new large investments. Installed capacity was 71 GW at the end of 2000, with 85% of it hydroelectric.

In 2001, Brazil had a severe electricity shortage, caused by low rainfall for hydroelectric generation and the general lack of investment in generation and transmission capacity. The Brazilian government has launched the Thermoelectric Priority Program, which consists of a series of measures to increase and stimulate investment in thermal power plants – mainly combined cycle gas turbine plants. Several of these projects are co-financed by Petrobras and foreign investors.

There are also plans to expand hydroelectric capacity. The Brazilian government has announced plans to revive 17 hydroelectric projects in 2004, with a combined capacity of 4.15 GW.
Brazil is expected to invest heavily in its water and wastewater treatment infrastructure, with government sources estimating expenditure of at least US$20 billion during the next 10 to 15 years.

Table 5.25 Industrial Valve Market in Brazil (US$ million)

| Valve Type                        | 2003 | 2004 | 2005 | 2006 | 2007 | 2009 |
|-----------------------------------|------|------|------|------|------|------|
| Gate, Globe, Check                | 61   | 63   | 65   | 68   | 71   | 75   |
| Ball, Plug                        | 28   | 29   | 30   | 31   | 33   | 36   |
| Butterfly                         | 26   | 27   | 28   | 30   | 32   | 34   |
| Diaphragm                         | 7    | 7    | 8    | 8    | 8    | 9    |
| Pressure Reducing Valves          | 14   | 15   | 15   | 16   | 16   | 18   |
| Automatic Control                 | 23   | 24   | 25   | 26   | 27   | 30   |
| Others                            | 34   | 35   | 36   | 37   | 38   | 42   |
| Parts                             | 35   | 36   | 37   | 39   | 41   | 44   |
| **Total**                         | **228** | **236** | **244** | **255** | **265** | **288** |

5.2.8.3 Rest of Central & South America

The third largest country in Latin America, Argentina, saw a recovery from the economic problems in the early 2000s, with a growth in real GDP in 2003 estimated to have been around 8.7%, as consumption and construction investment strengthened. The economy is forecast to expand by a further 5.5% in 2004.

Helped by cheap feedstock and energy costs, the Argentinian chemical industry recovered in 2003, with a strong growth in output. Repsol YPF has announced plans to invest €1128 million in its chemical activities in Argentina and Spain during the 2003–2007 period.

Following the freeze in electricity tariffs by the Argentinian government in January 2002, there has been very little investment in electricity infrastructure.

Venezuela has seen a recent recovery in its economy, starting in the fourth quarter of 2003 and continuing into the first quarter of 2004. The economy is emerging from its worst recession ever – seven consecutive quarters in which it shrank about 20% – due to the continuing political crisis surrounding President Hugo Chavez and the disastrous oil production strike of December 2002 – February 2003. The state-owned energy company, PDVSA, has recently announced plans to increase its production of crude oil capacity from 3.6 million barrels per day to more than 5 million barrels per day by 2009. The company plans to invest some US$27 billion of its own funds and US$10 billion from third parties.

It is reported that PDVSA plans to build a 1 million tonne ethane cracker in Jose, in a US$2.4 billion joint venture with Exxon Mobil.
Venezuela’s untapped natural gas reserves are estimated as the eighth largest in the world and the government is promoting greater use of natural gas domestically as a clean and cost efficient energy source.

Venezuela’s private sector remains largely on the sidelines, with little domestic investment and a steady loss of jobs and productive capacity.

In Colombia, the improved security situation and government measures have boosted confidence. Real GDP growth in 2003 was 3.6% and continued growth of 4.0% is forecast for 2004 and 2005.

The Chilean economy has similarly performed well with GDP growth in 2003 of 3.3% and boosted by higher copper prices and increased investment in infrastructure, GDP growth of 4.6% in 2004 and 5.5% in 2005 is forecast.

Table 5.26 Industrial Valve Market in Rest of Central & South America (US$ million)

| Valve Type                  | 2003 | 2004 | 2005 | 2006 | 2007 | 2009 |
|-----------------------------|------|------|------|------|------|------|
| Gate, Globe, Check          | 68   | 70   | 72   | 74   | 77   | 84   |
| Ball, Plug                  | 30   | 32   | 33   | 34   | 35   | 37   |
| Butterfly                   | 16   | 17   | 18   | 19   | 20   | 21   |
| Diaphragm                   | 3    | 3    | 3    | 4    | 4    | 4    |
| Pressure Reducing Valves    | 14   | 14   | 14   | 15   | 15   | 17   |
| Automatic Control           | 19   | 20   | 21   | 22   | 23   | 25   |
| Others                      | 36   | 37   | 38   | 40   | 42   | 45   |
| Parts                       | 57   | 59   | 61   | 63   | 66   | 72   |
| **Total**                   | **243** | **252** | **260** | **271** | **282** | **305** |