

## Strong growth in power generation

*Capex, maintenance and consumables expenditure forecasts for oil and gas production, refining, petrochemical sectors*

*Oct '07*



Our overall global forecast for growth for consumables suggests a CAGR of between 4.2-4.5% to 2014. Market growth for consumable products in power generation will see global growth rates of 8.3% CAGR to 2014. In contrast, ADL forecasts that the market for consumable products in E&P, Chemicals and Refining industry will experience weak growth of 0.5 – 2.7% CAGR over the period 2007 to 2014. The CAPEX forecast for energy based industries shows an aggregate growth trend of 4.1% CAGR with most of the growth driven by new investments in power generation. Maintenance spend in selected energy-based industries shows overall growth of 3.7% CAGR to 2014, principally driven by E&P and power generation.

This market research note presents Arthur D. Little's recent forecasts for global expenditure in four key process industries for capital expenditure, maintenance and spending on consumable products. The research was carried out in September-October 2007 and reflects exchange rates and built-in expectations of energy prices around this time<sup>1</sup>.

The model was developed to estimate likely maintenance activity and the associated market demand for the types of consumable products that are generally used during construction and maintenance in process industries. These class of products typically include items such as: catalysts, gaskets, "o" rings and other static seals and compression fittings, tubings, and filters that are typically replaced as part of maintenance. In addition it could also extend to consumption of signal cables and instrumentation.

The forecasts are based on CAPEX and maintenance estimates for these products and cover the following four industries:

- exploration and production in the upstream oil and gas industry (we exclude activities involving liquefied natural gas and gas to liquids plant)
- refining
- chemical
- power generation

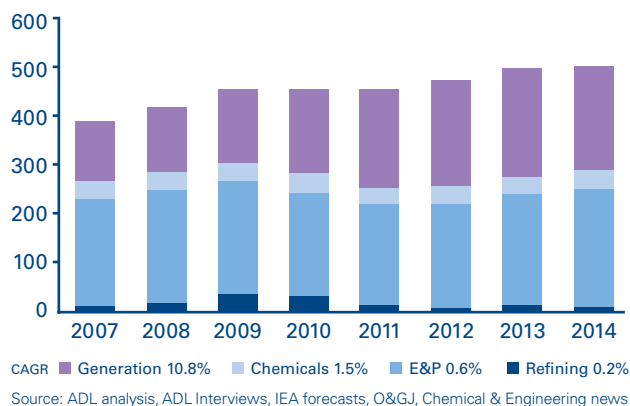
Our forecasts are based on interviews with industry experts and combinations of data from the International Energy Agency, and other publically available sources. Model assumptions and results were validated through a series of interviews with market participants.

### Global CAPEX and maintenance spend

#### CAPEX

Our forecast of CAPEX spend in selected energy-based industries shows an overall growth trend of 4.1% CAGR over the period 2007 to 2014 and could reach in excess of \$500 billion.

Figure 1: Forecast CAPEX spend to 2014 in \$bn



<sup>1</sup> If you require an updated version of the report or would like additional information and further breakdown by industry & region please contact the authors

The sectors in our review each have different drivers for capital expenditure:

- In refining the driver is the demand for oil products in relation to current refining capacity. We see strong growth to 2010 stabilising thereafter.
- In upstream exploration and production the current demand for oil and high oil prices are making more complex developments economic. We believe the current high levels of annual investments will reach a level of around \$250m p.a. by 2014.
- In chemicals we see cyclical demand driven by global economic trends. We believe we are towards the growth end of the cycle and forecast steady investment with a CAGR of 1.5% to 2014.
- In power generation growth is driven by demand for electricity from localised economic growth and industrialisation, as well as retirements of aging plant in developed countries. Strong investments are required worldwide to meet energy needs and we forecast increasing CAPEX investment, with up to 10.8% CAGR over the period.

### Maintenance

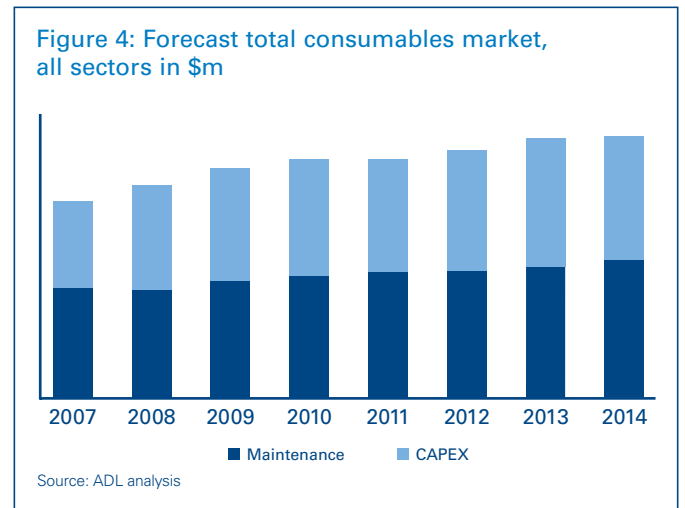
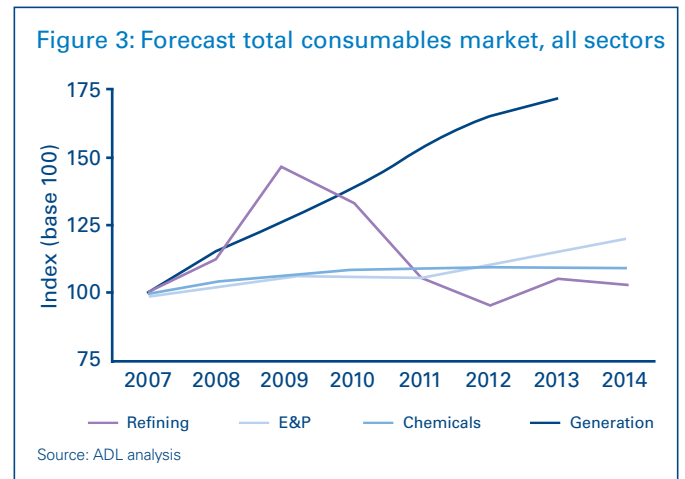
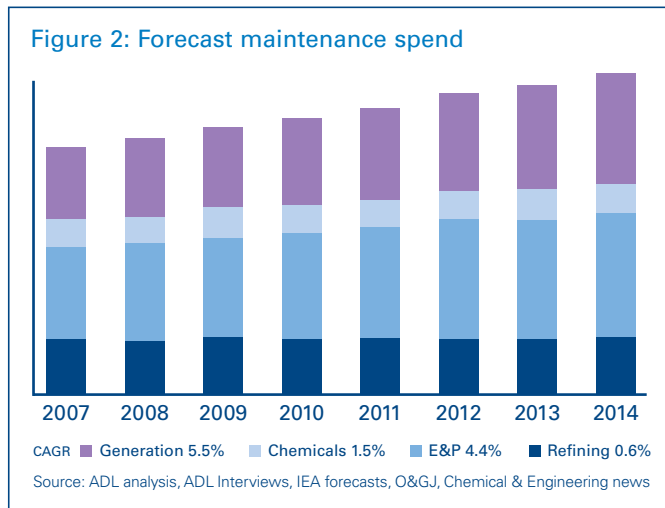
For each sector we estimated maintenance costs relative to current capital base with different maintenance benchmarks per sector depending on the scale of the maintenance work required on the types of facilities involved and the length of time required between planned maintenance work.

Some plants require full shutdowns for maintenance periodically and in this case we have allocated the expenditure for maintenance over the period to develop an annual figure.

E&P and power generation facilities generally have shorter time periods between major maintenance works than the other sectors, and with strong capital expenditure we forecast growth in maintenance spend at 4.4% CAGR for E&P and 5.5% for power generation. We foresee lower growth rates for maintenance expenditure for refining (0.6%) and chemicals sectors (1.5%), in part due to longer periods between turnarounds.

### Forecast spend on consumables

Based on capital expenditure and maintenance spend on plant in upstream oil and gas, oil refining, chemicals and power generation, we have estimated the market for consumables, based on the relationship between total spend and consumables spend in the various segments for CAPEX and maintenance projects. The figures below present our forecast growth for different markets and an overall breakdown of activities between CAPEX investment and maintenance activities. Our overall global forecast for growth for consumables suggests a CAGR of between 4.2-4.5% to 2014.



- The global upward trend in capital expenditure in the energy sector is the main driver for the consumables market, with strong growth in the power generation sector (8.3% CAGR to 2014).
- E&P will experience some fluctuations driven by the CAPEX investments but as large projects are completed and subsequently require regular maintenance we forecast steady growth (2.7% CAGR).
- The chemicals sector shows 1.5% CAGR steady growth, with stable contributions from both new plant and maintenance spend.
- Refining has 0.55% CAGR over the period, with fluctuation in consumables for this sector due to high investment in plant early in the period which drops off after 2010, while maintenance spend grows marginally.

### Qualifications and Disclaimers

The statements and opinions set out in this report are based on economic, market, regulatory, technical and other conditions prevailing at the date of this report. These conditions may change significantly over a period of time.

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