East and South East Asia are increasingly important in the world aluminium market, accounting for over 30 per cent of primary metal consumption. But there are major disparities in consumption levels across the region, with per person consumption in South East Asia being mostly well below that in the more developed northern countries. This difference will reduce over time as incomes rise and economies move from their industrial phases of development to a more consumer oriented phase, with consumption eventually moving closer to that currently prevailing in the developed regional economies.

Slower Asian economic growth since mid-1997 will be reflected in some easing in rates of aluminium consumption increase as metals intensive infrastructure development slows temporarily — and this will affect decisions about future investment in new or expanded smelters in the region. Despite the recent set backs, it seems likely that economic growth in East and South East Asia will continue to outstrip that in the developed economies of North America and western Europe — thus contributing to a longer term rise in the importance of the region as a consumer and producer of aluminium.
Introduction

With rapidly growing economies over the past two decades, the East and South East Asian region has become an increasingly important consumer of aluminium. While the major regional economies of Japan, South Korea, Chinese Taipei and China account for the majority of the consumption, the smaller economies of South East Asia are also expanding rapidly as users of aluminium. The most important economies in this latter group are Indonesia, Malaysia, the Philippines, Singapore and Thailand.

The rate and extent of economic development will have a large bearing on future trends in the market for aluminium in the region. An assessment of the prospects for economic growth in both the short and medium term will provide a base for the projections of aluminium consumption contained in the latter part of this paper.

Since the region is also a significant source of primary aluminium for the global market, supply prospects in East and South East Asia will be important to the overall picture. Developments and constraints to future increases in aluminium capacity in China — the region’s major producer — will be the principal determinant of future supply growth in the region.

Aluminium consumption trends in Asia

With strong economic growth and rising consumer incomes, Asia has become an increasingly important consumer of aluminium. East and South East Asia’s share of world aluminium consumption has increased from 18 per cent in 1985 to an estimated 31 per

![Figure 1: Share of world aluminium consumption](image-url)
This greater share of world aluminium consumption translates into an increase of 3.7 million tonnes over the period.

Most of the growth has come in the developing and newly industrialised countries of the region. Aluminium consumption and rates of growth in consumption in individual East and South East Asian countries and China are shown in table 1. Although Japanese consumption of aluminium rose some 800,000 tonnes between 1985 and 1997 (table 1), Japan is now a less important player in the market, accounting for 38 per cent of East and South East Asian consumption in 1997, down from 60 per cent in 1985.

Growth rates have been particularly high in South East Asia where aluminium consumption increased at a compound average growth rate of 14 per cent a year between 1985 and 1997. It needs to be remembered though, that these increases are from a very low base.

Consumption in China has grown rapidly since 1990 — at an average of 15 per cent a year. The China market is now almost as large as Japan’s. While aluminium consumption in Chinese Taipei and South Korea was virtually the same in 1985, higher average rates of economic growth since then have contributed to consumption in South Korea now being almost double that of Chinese Taipei. The major growth spurt for South Korea was in the 1985–90 period, when consumption rose by 20 per cent a year on average. Growth in

<table>
<thead>
<tr>
<th></th>
<th>Consumption</th>
<th>Compound annual growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>1695 kt</td>
<td>2414 kt</td>
</tr>
<tr>
<td>Chinese Taipei</td>
<td>148 kt</td>
<td>198 kt</td>
</tr>
<tr>
<td>South Korea</td>
<td>147 kt</td>
<td>369 kt</td>
</tr>
<tr>
<td>Total East Asia</td>
<td>1990 kt</td>
<td>2981 kt</td>
</tr>
<tr>
<td>China/HK</td>
<td>657 kt</td>
<td>890 kt</td>
</tr>
<tr>
<td>Indonesia</td>
<td>41 kt</td>
<td>88 kt</td>
</tr>
<tr>
<td>Malaysia</td>
<td>22 kt</td>
<td>59 kt</td>
</tr>
<tr>
<td>Thailand</td>
<td>45 kt</td>
<td>128 kt</td>
</tr>
<tr>
<td>Singapore</td>
<td>7 kt</td>
<td>23 kt</td>
</tr>
<tr>
<td>Philippines</td>
<td>5 kt</td>
<td>14 kt</td>
</tr>
<tr>
<td>Total SE Asia</td>
<td>120 kt</td>
<td>312 kt</td>
</tr>
</tbody>
</table>

Source: World Bureau of Metal Statistics; ABARE.
consumption of aluminium in Chinese Taipei has been consistently strong, but not spectacular, for over a decade now.

Despite the strong growth in aluminium consumption, China and most countries in South East Asia are characterised by low per person use (table 2). This reflects a variety of factors, including the overall level of economic development, characterised by low per person incomes and limited penetration of aluminium into main end use markets, such as transport and packaging. As incomes increase with further economic development, per person consumption of aluminium will increase in these countries. This means that there is considerable scope for substantial longer term rises in aluminium consumption in South East Asia and China.

The situation is different in the more developed countries of South Korea, Chinese Taipei and Singapore, where per person consumption has risen rapidly as their economies have moved to a more advanced stage of economic development. Consumption per person in these countries is still some way short of that reached in Japan, where there appears to have been a leveling off during the 1990s.

### Future consumption prospects

Consumption of aluminium in East and South East Asia is expected to be significantly affected by the current economic problems in several of the region’s countries. Despite this, the medium to longer term outlook for aluminium demand in the region remains positive.

### Short term outlook

The financial and economic upheavals experienced by a number of Asian countries since mid-1997 have contributed to uncertainty about future rates of growth in aluminium consumption in the region, as well as for the world as a whole. Rapidly depreciating currencies and weaknesses in domestic financial systems have adversely affected economic activity.
Aluminium consumption in the East and South East Asian region is estimated to have increased by just over 1.5 per cent in 1997. This rate of growth is well down on the average rates of growth experienced in recent years (see table 1).

With the exception of South Korea, Indonesia and Thailand, the economies of East and South East Asia are expected to grow in 1998, albeit at a much slower rate than in previous years. Despite the still positive economic growth in a number of countries, consumption of aluminium appears likely to decline in 1998. Consumption in East Asia is forecast to decline by around 5 per cent in 1998, while consumption in South East Asia is forecast to fall by over 16 per cent. The important construction sector appears likely to bear the brunt of the short term slowing in economic growth. The exception to the above downturn is likely to be China, where economic growth is assumed to remain at a still healthy 7.5 per cent in 1998.

Given that much of the aluminium consumed in the region is imported it is likely that the economic downturn, particularly in the worst affected countries of Indonesia, South Korea and Thailand, will adversely affect trade in the metal. The effect on trade will depend in large measure on whether the aluminium is for final consumption in the importing country, whether it is for processing and re-export, and (in the case of the latter) the difficulties that manufacturers may experience in financing inventories of (now more expensive) imported raw material in a climate of higher domestic interest rates. Where the value added in processing is high, imports of aluminium may not be greatly affected because they will comprise only a small proportion of the final product cost.

**East Asia**

Japan experienced a mixed year in 1997 in terms of aluminium consumption. In the first half of the year consumption growth was strong, with year on year consumption growing by 6 per cent to June, as consumers brought forward their purchases to beat a consumption tax increase in April. However, over the second half of the year consumption fell sharply, reflecting weak demand in the construction and automotive sectors. For the year as a whole, Japanese consumption is estimated to have increased by around 1 per cent.

In the construction sector, consumption was affected by weak residential demand and a slowdown in government spending on infrastructure. In the transport sector, use was strong in the first half of the year, but then faltered in the second half. Production of commercial and noncommercial vehicles was up 10 per cent, year on year, to August. However, production then declined as the domestic economy slowed and as exports to Asian
countries fell because of contracting demand and a decline in competitiveness stemming from a relatively high valued yen.

Japanese consumption of primary aluminium may even contract in 1998. Such an assessment reflects expectations that the economy will remain weak this year; that exports of aluminium containing manufactures (such as motor vehicles) to other parts of Asia are likely to be down; and that competition from manufacturers in those countries experiencing the greatest exchange rate devaluations will be intense in both domestic and export markets.

Aluminium consumption in South Korea, which declined in 1997, is expected to be significantly affected by the current economic malaise in that country. Consumption of aluminium containing products in South Korea has also been affected in recent times by reduced orders from one of the most important end use sectors, the defence forces. With economic growth assumed to the zero in 1998, use of aluminium in manufacturing and construction is expected to decline.

South Korean imports of aluminium have fallen since late last year, reflecting the economic upheavals and deteriorating economic prospects. Substantially higher costs of imported metal following an estimated 70 per cent decline in the value of the Korean won in the six months to March 1998, and problems in obtaining trade finance have had a major adverse effect on the trade.

On a more positive note, the fact that South Korea exports a significant amount of aluminium containing products means that the worst of the downturn in imports may be relatively short lived. The weaker exchange rate and associated improvement in international competitiveness is expected to result in increased exports of aluminium-containing products to western countries in the next one or two years.

In Chinese Taipei, the construction sector is a major user of aluminium, but construction activity in the country has been relatively weak over the past couple of years. Offsetting this weakness, aluminium consumption has increased in other end use markets, particularly in the production of exportable manufactures. As a result aluminium consumption in Chinese Taipei is estimated to have increased in 1997. Because of its growing use in the manufacturing and packaging sector — and with exports to China being particularly strong — aluminium use in Chinese Taipei is likely to be the least affected by the economic upheavals in the region.
South East Asia

The main driver behind the growth in aluminium consumption in the South East Asian countries has been the construction sector. Other sectors of importance include packaging and, to a lesser extent, manufactured goods. During the region’s rapid industrial development over the past ten to fifteen years, construction activity has grown dramatically. For example, in Malaysia expenditure on construction activity grew by an average 12 per cent a year in real terms over the period 1988–96; similar growth rates were recorded in Thailand.

However, the recent upheavals in financial and currency markets in South East Asia is expected to have a major adverse effect on the construction sector in the short term and, as a result, on aluminium consumption. With expectations of lower economic growth, falling property values, higher interest rates, and depreciated currencies, a number of important infrastructure and construction projects in South East Asia have been cancelled or postponed.

As aluminium consumption in South East Asia is not currently concentrated in export intensive industries, there also does not appear to be immediate potential for aluminium use in export industries to increase significantly as exporters take advantage of improved competitiveness flowing from currency depreciations.

China

China has so far avoided any significant adverse effects from the economic and financial upheavals hitting other economies in the region. However, the slowdown in these economies and the rapid depreciation of a number of their currencies means that there will be reduced demand for manufactures (including those from China) in the worst affected countries, and that China’s exports will be relatively less competitive in other markets.

There are also a number of other factors that could dampen demand for aluminium in China in the short term. These include the restructuring of state owned enterprises; excess capacity in some main consuming industries, such as construction, the automotive industry and electrical appliances; and the fragility of China’s financial system (Lennon 1998).

Longer term outlook

Despite the economic problems currently affecting the countries of East and South East Asia, it is likely that economic growth will pick up over the next few years. Economic growth in the region (excluding China, which is likely to be higher, and Japan, lower) is
assumed to recover to around 5 per cent a year early in the next decade. This is well short of the average of almost 8 per cent achieved in the ten years to 1996.

Economic recovery is expected to be slowest in those countries currently experiencing the greatest economic downturn — Indonesia, South Korea and Thailand. China’s economy is assumed to grow at around 7–8 per cent a year over the next five years, and the Japanese economy at 2–3 per cent a year on average.

If these assumptions on economic growth are largely borne out, the longer term prognosis for regional consumption of aluminium is quite positive. However, in considering how aluminium consumption in the region may grow over the longer term, it is useful to reflect on past patterns of economic growth and metal consumption.

Countries notionally pass through several phases during the economic development process, moving from a pre-industrial economy, where agriculture plays a major role; to an industrialising economy, where basic manufacturing and development of domestic infrastructure takes place, involving rapidly growing metals consumption; to an industrialised phase, where metals consumption levels off; and finally to a services expansion phase, where metals consumption may actually decline (Radetzki 1990). Using this framework as a base, it would appear that many of the countries of East and South East Asia are clearly in the ‘industrialising’ phase of economic development. The leveling off of per person aluminium consumption in Japan during the 1990s (table 2) is indicative of that country having reached industrial maturity. Low rates of economic growth in Japan will also have affected consumption during the period.

The high degree of responsiveness of aluminium consumption to income growth is particularly evident in the case of the less developed economies. The South East Asian group of countries provide a good example of the high correlation between income growth and consumption (figure 2). In the graph, consumption per person is plotted against real gross domestic product per person (expressed in US dollars) for the region as a whole over the period from 1980 to 1997.

In view of the above observations, it is possible to shed some light on the potential for future growth in aluminium consumption by using estimates of the responsiveness of consumption in each country to changes in income. The indicators of responsiveness which were estimated from data covering the period 1980–96, are shown in table 3.
These estimates were combined with ABARE assumptions of economic growth rates used in its most recent set of commodity forecasts (ABARE 1998). The resulting projections of future income growth related trends in aluminium consumption are shown in table 4. In absolute terms, the greatest potential for growth is in the East Asian economies, while in relative terms it is South East Asia where the most potential lies. Total South East Asian consumption is projected to rise at a rate approaching 7 per cent a year between 1997 and 2003, and East Asian consumption (excluding China) by about 3.5 per cent a year.

Such rates of growth are impressive, but they are less than what would have been projected a year ago — when economic prospects for the region were a lot better. In fact, the projected income related growth in consumption reported in table 4 is about 300 000 tonnes lower for East Asia and over 250 000 tonnes down for South East Asia.

Although the above figures provide some indication of possible future growth in consumption of aluminium, they should not be viewed in isolation. Other factors, particularly aluminium prices and prices of substitutes, and technological change affecting the uses of the metal and the viability of new substitute materials will also be important. The very substantial devaluation of the currencies of some countries in the past year means that price will be especially important to consump-
tion because of the loss of purchasing power that this implies for consumers in those countries. Offsetting this effect to some extent will be the greater competitiveness and likely expansion of aluminium containing exports from these countries.

As the lesser developed economies of the region recover over the next few years, there is likely to be strong investment in building and construction and infrastructure development (such as electric power transmission facilities). The emerging markets of South East Asia are also likely to offer considerable scope for increased aluminium consumption in the packaging sectors as incomes rise.

**China**

In China, the majority of aluminium consumed has been in infrastructure development, rather than consumer durables. Evidence of this can be seen in figure 3 which displays consumption in China, by end use, in 1994, with the construction and electrical sectors being the largest consumers of aluminium.

Although there are no reliable estimates of the relationship between income growth and aluminium consumption in China, there seems little doubt that consumption in China will continue to grow rapidly.

### Table 4: Projected aluminium consumption due to economic growth

<table>
<thead>
<tr>
<th></th>
<th>1997</th>
<th>2003</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>kt</td>
<td>kt</td>
<td>%</td>
</tr>
<tr>
<td>Japan</td>
<td>2 500</td>
<td>2 836</td>
<td>13.4</td>
</tr>
<tr>
<td>South Korea</td>
<td>690</td>
<td>991</td>
<td>43.6</td>
</tr>
<tr>
<td>Chinese Taipei</td>
<td>360</td>
<td>527</td>
<td>46.4</td>
</tr>
<tr>
<td>East Asia</td>
<td>3 550</td>
<td>4 354</td>
<td>22.6</td>
</tr>
<tr>
<td>Indonesia</td>
<td>152</td>
<td>222</td>
<td>46.1</td>
</tr>
<tr>
<td>Malaysia</td>
<td>135</td>
<td>223</td>
<td>65.2</td>
</tr>
<tr>
<td>Philippines</td>
<td>30</td>
<td>48</td>
<td>60.0</td>
</tr>
<tr>
<td>Singapore</td>
<td>40</td>
<td>75</td>
<td>87.5</td>
</tr>
<tr>
<td>Thailand</td>
<td>210</td>
<td>269</td>
<td>28.1</td>
</tr>
<tr>
<td>South East Asia</td>
<td>567</td>
<td>837</td>
<td>47.6</td>
</tr>
</tbody>
</table>

**Figure 3: Chinese aluminium consumption, by end use, 1994**
Given the stage of development of China’s economy, construction is expected to remain a major consumption growth area over the next five years, with additional growth projected for the transport and packaging sectors. In the current Chinese plan for the period 1996–2000, the government has designated the construction, electronic and automobile sectors as ‘pillar’ industries for development (Lennon 1996).

Aluminium consumption growth is expected to at least match economic growth forecasts for the economy as a whole, and will very likely exceed it. So far in the 1990s, consumption of aluminium in China has grown at around 15 per cent a year, and the Chinese economy by around 11 per cent a year. Assuming the economy expands at around 7.5 per cent a year, and that aluminium use at least keeps pace with economic growth, consumption of aluminium in China (including Hong Kong) could be around 3.6 million tonnes by 2003.

**Aluminium supply**

Although East and South East Asian is expanding rapidly as a market for aluminium, only a relatively small amount of the metal is produced in the region. East and South East Asia’s share of world primary aluminium production capacity has increased from 1.2 million tonnes (around 6 per cent of the world total) in 1990 to 2.3 million tonnes (around 9 per cent of global capacity) in 1997 (King 1997). This stems solely from the rapid growth in production capacity in China.

Currently, there is only one smelter located in South East Asia, the Inalum-Asahan 230 000 tonne capacity facility at Kuala Tanjung in Indonesia.

In China, where output is estimated to have been around 1.8 million tonnes in 1997, producers are committed to significantly expand smelting capacity over the next few years. Expansions in China are projected to total over 500 000 tonnes by 2000 (Bird 1998). Bird has also identified additional increases in Chinese capacity, estimated to total around 700 000 tonnes, which are understood to be under consideration or at early stages of planning. These projects, should they proceed, could be in production by 2003.

An important constraint to smelter establishment or expansion in most East and South East Asian countries is the availability of sufficient low cost electric power. There are plans to substantially expand generating capacity over the next 5–10 years in most countries of the region. However, the recent economic upheavals are likely to result in some of those plans
being temporarily delayed, especially where projects are not at an advanced stage of planning or construction and where finance is yet to be obtained.

Conclusions

The current economic and financial crises affecting a number of East and South East Asian countries is forecast to result in lower consumption in the worst affected countries over the short term. However, as these countries resolve their economic difficulties and industrial activity picks up, aluminium consumption is expected to grow relatively strongly.

The developing countries of South East Asia, and China, with low per person consumption of aluminium, are projected to experience the strongest growth in aluminium consumption over the medium term. The region is therefore expected to account for an increasing share of the world market over the next decade.

References


