

wood supply in Khamouan will thus be seriously deficit in relation to the current capacity of the wood processing industry. In fact, diminished wood supply has already led to a contraction in the industry and number of people employed in it.

In Boulikhamsay 8 sawmills and timber processing mills were operating in the province around year 2000 with a combined processing capacity of around 100,000 m<sup>3</sup> per year. In addition, a large integrated wood-processing plant has been constructed at Lak Xao. The production capacity of this plant is assumed to be around 250,000 – 300,000 m<sup>3</sup> per year

Today there is only one production forest area in Boulykhamaysay Province with a potential yield that is far less than the current installed production capacity of the processing industry.

An initiative to improve sustainability in the forestry sector is the SUFORD project currently being implemented in Khammouane, Savannakhet, Salavan and Champassak. provinces. The project will work in 3 districts in Khammouane. Two of these, Mahaxai and Xe Bangfai, are located in also the NT2 impact zone. The 2 production forest areas form part of the project area. Project components include capacity building and sustainable forest management with demonstrations of management practices in the field including active participation of villagers. The field implementation will cover 528,000 ha of natural forest whereof 110,000 are in Khammouane Province. The implementation period started in 2003 and will continue up till 2007.

Another potentially important factor that will influence the forestry sector in the future is the development of tree plantations with fast growing species suitable for industrial use. The BGA Company is presently developing a total area of 154,000 ha in Boulikhamsay Province. One third will be planted to mainly *Eucalyptus camadulensis*. The plantation area is divided in several sub-plots situated between the Mekong and the mountain range from Pakkading in the north to the mouth of the Hinboun River in the south.

Finally, according recent initiatives from biggest rubber company, Thai Rubber Latex Corporation, Boulikhamsay is one of the 2 provinces that are considered for establishment of sizable rubber plantations. The company has already made some surveys of potential sites. If the investment goes ahead the company will establish around 14,000 ha (100,000 rai) of plantations in the country.

## 7 INDUSTRY

### 7.1 Regional Perspective

The most industrialised countries in the region are Vietnam and Thailand. However, in these countries most of the industrial activities take place outside the Mekong Basin. Cambodia and Lao PDR have only a modest industrial sector. In Thailand's part of the Basin, the main industry is food processing. Nakhorn Ratchasima is the main industrial centre of the Northeast.

In Lao PDR and Cambodia, industrial development is at an early stage, but the sector is rapidly expanding as especially the textile industry is growing fast. In both countries industrial development is concentrated in the capitals.

Industrial development will increase the need for water resources. The quality and quantity of industrial water demand varies significantly by country, industry and particular uses, ranging from high water quality for the beverage industry to brackish water or treated municipal effluent for cooling purposes.

## 7.2 Lao Perspective

Lao PDR presently has a small industrial base mainly concentrated to the Vientiane area and the major towns in the south of the country. Today Vientiane Municipality and Vientiane Province account for 63% of manufacturing output while Kammouan accounts for 15%, Savannakhet for 9% and Champasak for 6%. Only 2.5 percent of the total manufacturing production takes place in the northern region. Table 20 gives the number of different types of industrial enterprise by province.

*Table 20: Number of industries and handicraft entities (Selected provinces 1998-1999)*

Province	1998		1999	
	Middle	Large	Middle	Large
<b>Vientiane Municipality</b>	134	60	157	62
<b>Vientiane Province</b>	46	1	65	2
<b>Savannakhet</b>	41	10	57	10
<b>Champasak</b>	53	6	47	12
<b>Bolikhamxay</b>	22	3	34	5
<b>Kammouan</b>	8	18	25	19
<b>Xayabury</b>	33	-	37	-
<b>Saravan</b>	19	-	16	1
<b>Sekong</b>	15	-	96	-

Source: Statistical Yearbook 2001, NSC, Large = number of employees >100 persons; middle = number of employees between 10 and 99 persons

The industry sector's contribution to the economy in terms of percentage of GDP was 23.4 in 2001. Of this contribution, manufacturing dominated with the textile industry, accounting for 17.7 percent. The average annual industrial growth rate for the last decade was around 10 percent while the manufacturing part grew slightly faster with an average of 12 percent.

Lao PDR's strategy for industrialisation prioritises a number of sub-sectors including energy, agriculture and forest based industries, manufacturing, tourism, mining and production of construction materials. The Government will also focus on promoting the following industries:

- Labour-intensive industries that create income for people
- Natural-resource based industries
- Agro industries, and
- Import-substituting industries and production.

While larger-scale industries like textile production have higher employment potential, considerable emphasis will be placed on promoting and creating small and medium-scale enterprises. These enterprises will include village-based handicraft production and food processing, based on agricultural produce to raise

producers' incomes. Production for export will be encouraged along with production of selected consumer goods in order to reduce imports.

One important strategy is to create industrial zones in Vientiane Municipality, Savannakhet, Champasak and Oudomxay provinces. Savannakhet will be established as a special economic zone. This initiative also links up with the East-West Corridor Project and the building of a bridge over the Mekong.

### 7.3 Local Perspective

In terms of industrial production, Savannakhet is second only to Vientiane on the national scale. The factories and enterprises are concentrated in Savannakhet town and adjacent areas and comprise the production of electrical appliances, tobacco processing, canning of fruit based products and textiles. The establishment of a special economic zone is likely to attract more enterprises to the province.

Possible future developments include an oil refinery and terminal that will have the capacity to cover 50 percent of the country's consumption. It is not known at this stage how likely it is that the refinery will be constructed. If it becomes a reality it will probably not be built before 2010.

Wood processing (sawmills, etc) is the dominant industrial activity in Khammouane with a total of seven registered enterprises in 2001. The existing sawmills represent a considerable overcapacity. The present output of the plywood factory at Mahaxai is probably much lower than its actual capacity. New establishments are not expected within wood processing. In this sector consolidation is required, and focus is likely to be on value added processing from those enterprises that will be allowed to continue to operate. It is likely that sawmills not able to meet new requirements will be shut down.

A new cement factory is planned to be constructed in Mahaxai District. The construction work is planned to commence in November 2004 and a two year construction period is expected. 300 workers are expected to be employed on a permanent basis by the factory.

In Bolikhamxai the construction material industry dominates. In 2001 there were seven enterprises providing gravel and sand for different types of construction and building activities. Wood processing and production of mirrors also takes place. A notable enterprise is the extraction of chemical compounds from wood (Mai Ketsana) for use in the production of incense sticks and cosmetics.

The assumed industrial development in these provinces is included in the calculation of power demand for "Power System Development Plan for Lao PDR" (Meritec/Lahmeyer International, 2004). The point loads are shown in Table 21.

*Table 21: Estimated power demand Central 2,1 grid (Meritec/Lahmeyer International, 2004)*

Point Loads Items	Power Requirement	Commencement
Cement factory	20 MW	2005
Quarry	5 MW	2008
Gypsum & lead mine	5 MW	2006
Copper/gold mine	40 MW	2005
NT2 construction	4-8 MW	2006-2010
Irrigation schemes	10 MW	2003-2020

## 8 MINING

### 8.1 Regional Perspective

All the countries in the region have identified rich mineral resources, and more may be found, as many areas have not yet been surveyed. At present the economic exploitation of the resources is not very high.

In Cambodia, mineral investigations began in the 1950s when significant deposits of sapphires, rubies, alluvial gold, alluvial cassiterite, silica, bauxite, manganese and coal were found. The only significant exploitation carried out has been gemstone mining in the Battambang province. At these mines the gems are exploited by artisanal methods and more or less outside governmental control.

In the Dak Lak province of the Vietnam Central Highlands large reserves of kaolin and bauxite have been found. The bauxite reserve is estimated to be 5 billion tons. The prospect for exploitation seems remote due to the weak infrastructure, lack of water and lack of electricity for smelting.

Northeast Thailand is rich in salt and potash. Several large mining companies are now considering exploitation of a major potash deposit.

### 8.2 Lao Perspective

Lao PDR has significant mineral resources that are not yet exploited. The mining sector might develop to become an important element of the national economy in the future. Commercial mining of tin, gypsum, coal, salt, gemstones and construction materials has so far been carried out on a small scale.

The mining sector contributed 0.48% of the country's GDP in 2002, and is dominated by the production of gypsum and tin. Other mineral commodities produced in Laos include barite, coal, construction materials, gemstones, gold, limestone, and zinc. Undiscovered mineral resources of iron ore, potash, and rock salt are believed to be substantial. None of Laos' mineral resources, however, are considered of world significance.

At the Kaiso deposit in the Vang Vieng area, zinc ore is being mined and exported to Thailand for smelting and refining. The measured resources at the