

Rapid Trade and Environment Assessment (RTEA)

Background Research Paper

**Environmental Impacts of Trade Liberalization in the
Hydropower, Mining and Constuction Materials Sectors
of the Lao PDR**

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To inform the *Rapid Trade and Environment Assessment* for Lao PDR, seven background papers covering nine key economic sectors were commissioned by the RTEA Expert Advisory Panel, a body consisting of key government and private sector stakeholders established to provide overall guidance to the assessment process. These papers provided vital background information and illuminated key sector-specific policy recommendations for the main assessment and are seen as a valuable contribution to the growing body of in-country research focusing on the complex dynamics between trade and the environment in Lao PDR.

This research exercise was coordinated by the Science, Technology and Environment Agency and IUCN – The World Conservation Union in Lao PDR.

Papers edited by Sabrina Shaw (IISD) and Tom Callander (IUCN)

RTEA background research papers can be obtained at www.iisd.org

Environmental Impacts of Trade Liberalization in the Hydropower, Mining and Construction Materials Sectors, Lao PDR

by Tom Callander*

Introduction

Trade, foreign investment and, in turn, increased growth have the potential to radically alter a country's economy, people and environment. Done without concern for all three of these elements, growth can be perverse and often destructive. When carefully considered, planned and implemented, this same growth has the potential to benefit society and the power to ensure environmental conservation. Whether this change is positive or negative is ultimately the responsibility of key decision makers within government, business and society at large.

The Government of Lao PDR (GoL) is committed to promoting trade-related growth through economic liberalization and providing greater access to foreign investors. This is an important aspect of meeting Lao PDR's overall goal of sustainable development, economic growth, poverty reduction and environmental conservation, as outlined in the government's *National Growth and Poverty Eradication Strategy* (2004a) and as a result, the country is moving quickly to integrate its burgeoning market in the global economy. In 1992, Lao PDR joined the Greater Mekong Subregion (GMS) – an Asian Development Bank led initiative - with its five neighbouring countries – Cambodia, China, Myanmar, Thailand and Vietnam. In 1997, the GoL joined the Association of Southeast Asian Nations (ASEAN), and as a result became party to the ASEAN Free Trade Area (AFTA) and the ASEAN-China Free Trade Area (ACFTA). In recent years, trade ties have also been strengthened through bilateral trade agreements such as the resumption of Normal Trade Relations with the United States, signed in 2004, and the Cua Lo Agreement expanding trade between Lao PDR and Vietnam in 2005. Currently, the GoL is looking beyond the region, concentrating efforts on accession to the World Trade Organization by 2010.

Increasing trade relations have played an important role in the dramatic rise of foreign direct investment (FDI) in Lao PDR. The GMS, through its programme of infrastructure development and promotion of the freer flow of goods and services has emerged as a significant regional forum for cooperation across a variety of themes including trade, investment, energy and the environment.

In terms of ASEAN, one of the most important impacts of Lao PDR's membership was the signal given to investors that the country's transition to a market economy would be more certain and rapid (Menon 1998), with a commitment to reform and simplify national investment procedures in line with ASEAN requirements. With membership in AFTA, Lao PDR has also adopted the ASEAN Agreement on the Promotion and Protection of Investment 1994 through its Individual Action Plan, and is working with its neighbours on improving the investment climate through the ASEAN Investment Area, to which it will be fully committed in 2010 (GoL 2000).

Due in part to the improved national investment policy climate, investment has been booming in the industrial sectors of mining, hydropower and construction materials. With actual investment more than doubling between 2004 and 2006 (see Figures 1.1 & 1.2), this trend is expected to continue well into the next decade (World Bank 2007). The new investment law (GoL 2004a) promotes, first, activities for export such as electricity generated from hydropower and minerals from mining (Article 16.1), and many of the areas where these activities take place are in priority low economic infrastructure zones (Article 17). In addition, security of investments is particularly important for large-scale investors in politically and environmentally sensitive areas such hydropower, mining and construction materials (Menon 1998),

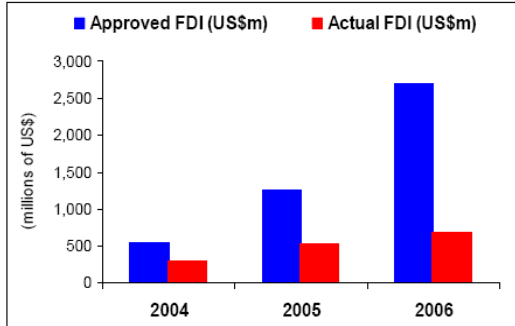
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and the impact of increased investor confidence resulting from integration through ASEAN should not be underestimated.

Foreign Direct Investment into Lao PDR

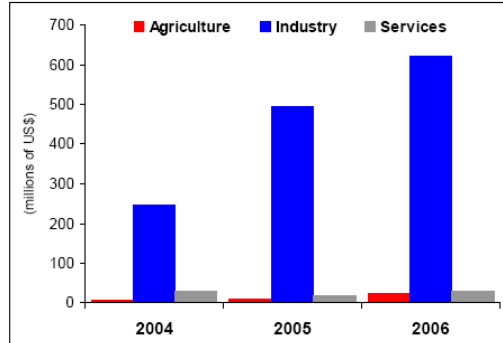
(Source: World Bank 2006)

Figure 1.1 FDI in Lao PDR



Source: Lao authorities (CPI) and WB staff estimates and projections (2006)

Figure 1.2 Actual FDI per Sector in Lao PDR



Source: WB staffs estimates and projections (2006)

This record growth in FDI may also be the result of external factors such as the increasing demand for energy in Lao PDR's neighbour countries, and their desire to ensure future energy security, high gold prices and strong demand for metals and minerals globally. While this may be the case, regional and international trade agreements now and in the future will become key to securing these resources, and investment security will remain important to ensuring large-scale investments.

The development and growth that this investment spawns is set to have a significant impact on Lao PDR. Understanding the linkages between trade and the environment, and ultimately, integrating environmental considerations into the trading system will be vital factors if sustainable development is to be achieved. Key decision-makers in the Government have an opportunity now to better understand these linkages, and by doing so, help steer Lao PDR's development by identifying unique sustainable growth opportunities and avoiding adverse environmental impacts before they arise. The present situation, one in which investors are lining up to enter the country, should be viewed with the understanding that Lao PDR is comparatively small in the regional trade context, and decisions about how the country's resources are committed will shape Lao PDR's trading position now and well into the future.

The purpose of this paper is to identify key environmental concerns in three priority sectors - hydropower, mining and construction materials - and to examine both positive and negative environmental impacts of trade liberalization. It is not intended to be a comprehensive analysis, but rather a 'discussion starter' that will help guide both environment and trade decision-makers as well as future work to strengthen the sound economic, social and environmental development of Lao PDR.

Section 1:

Overview of the hydropower, mining and construction materials sectors

1.1 Hydropower

Assumption: Increased trade ties will strengthen the flow of foreign investment in the hydropower sector and in turn provide Lao PDR with substantial exports in renewable energy.

Hydropower is a key sector for Lao PDR. The country is estimated to hold around 80 percent of the total hydropower potential in the lower Mekong basin and high investment and development priority has been placed on harnessing this resource.

This sector is not a new one. Energy from water has been produced in Lao PDR for decades and the first large-scale dam and hydro facility, Nam Ngum 1, was completed in the 1970s. However, it was not until recently that long-term plans for the substantial development of the sector began to be implemented. There are presently more than 40 hydropower projects in Lao PDR (CPI & UNDP 2006) with further feasibility studies underway.

Fact box: Hydropower

- In 2004, exports of electricity of over US\$100 million accounted for 18 percent of Lao exports.
- All past exports have gone to Thailand but new agreements and the development of the GMS grid will see electricity exports to Vietnam, China and other GMS countries.
- Upon completion of the Nam Theun 2 Dam in 2010, exports are expected to increase to US\$354 million, with total government revenue from electricity exports of approximately US\$100 million per annum.
- The total capacity of the country is estimated at 23,000 mega watts – 81 percent of all hydropower potential in the Mekong basin south of China.

(source: CPI & UNDP 2006)

Growth in foreign direct investment in this sector is being spurred by increasing demand for energy globally, and the active energy security policies of countries like China, Thailand and Vietnam, all of which are concerned with how they will continue to power the growth of their economies in the future. Hydropower is also seen by many as a clean energy source in a world which is currently grappling with the realities of climate change, and demand for this type of energy production is expected to keep rising.

1.2 Mining

Assumption: Liberalization commitments undertaken regionally and internationally will ensure a steady flow of foreign direct investment into the Lao PDR mining sector and substantial increases in exports of metals and minerals.

Fact box: Mining

- In 2004, total exports of minerals reached US\$64.7 million, accounting for 11 percent of Lao exports.
- Lang Xang Minerals, the subsidiary of Australian company Oxiana commenced gold and copper mining operations in 2003, and is by far the largest single investor (US\$375 million) and source of mineral exports.
- At the beginning of 2006, there were 121 mining concessions; 35 foreign investors held 50 of these concessions, with the majority Chinese (24), Vietnamese (11) and Thai (6).
- Only 30 percent of the country has been surveyed, but results indicate strong deposits of gold, copper, zinc, gypsum, coal and lignite.

(source: CPI & UNDP 2006; World Bank 2006)

Mining is singled out in the GoL's *National Growth and Poverty Eradication Strategy* (NGPES) (2004a) as a priority sector for investment, due to its potential for stimulating economic growth and increasing government revenue – which in turn can help to reduce poverty. The sector consists of five key groups: 1) metal minerals; 2) industrial minerals; 3) construction materials and dimension stones; 4) gems; and 5) fossil fuels (UNIDO & MoIH 2003). Until the late 1990s, only small mines and artesian mining operations could be found, and the industry represented just 0.56 percent of the national GDP. However, recent successes of the Sepon gold and copper mine developed by the Australian-owned company Lang Xang Minerals (Oxiana Limited) have led to a flurry of foreign interest in the country's mineral assets. Private investment in the sector has grown by almost 34 percent over the last five years; in 2006, the sector was expected to represent nearly 10 percent of the national GDP (World Bank 2006).

Demand for metals and minerals is being fuelled by strong construction sectors in countries such as China and India. Metal prices are at their highest levels for some time. Despite constraints of high transport costs, skills shortages and persisting ambiguities in the mining law and regulations, the *National Human Development Report* (NHDR) (CPI & UNDP 2006) notes that foreign investors are 'lining up' for the opportunity to operate in Lao PDR. With increased regional and international

cooperation through agreements such as AFTA and ACFTA, coupled with growing world-wide demand, investment in the mining sector in Lao PDR will continue to grow rapidly.

1.3 Construction Materials

Assumption: Trade liberalization and the subsequent lowering of trade barriers will lead to increased foreign competition and rising imports, and domestic production will be forced to increase efficiency and find high-value niche markets. Increased foreign direct investment in infrastructure in Lao PDR will also stimulate the growth of the construction sector.

Fact box: Construction Materials Sector

- In 2001, consumption of construction materials in Lao PDR amounted to US\$56 million (US\$36 million domestic and US\$25 million imported materials).
- Domestic materials consist mainly of plastic tubes, pipes and hoses (US\$7 million), cement (US\$6 million), and iron bars (US\$5 million).
- Cement manufacturing operates at a loss (mainly due to the small scale of operations) and enjoys protection from cheaper international products in the form of quantitative import restrictions, which will not be possible under AFTA post-2008.
- Thailand and Vietnam are major exporters of construction materials to Lao PDR.

(Source: Lao PDR Industrial Development Strategy, 2003)

The Lao PDR construction materials sector, another priority growth sector cited in the NGPES (GoL 2004b) consists mainly of plastic tubes, pipes, hoses, cement, corrugated roofing and iron bars (excluding wood products produced for building purposes and micro-scale village brick production).

In terms of FDI, the cement industry has recorded significant investment in recent years and there are three cement facilities operating in Lao PDR, all either partly or wholly funded by Chinese foreign investment. In 1994, production began at Lao PDR's first cement plant, Wanrong Cement Plant 1 – a US\$13.9 million joint Lao-Chinese investment in Vang Vieng district, 160 km north of Vientiane. Construction of the second plant, Wanrong 2, with a total joint Lao-Chinese investment of US\$37 million, was completed in 2001. The country's third Chinese-funded cement plant was recently constructed in the province of Saravan. This new cement factory is 100 percent owned by Chinese investors who invested about US\$30 million to build the plant. The total cement production capacity of the country is now estimated at 473,000 tons per year (World Bank 2006), mainly for domestic consumption.

According to the Lao PDR *Medium-Term Strategy and Action Plan for Industrial Development* (UNIDO & MoI 2003), some industries, such as the cement industry, operate at substantial losses due mainly to inadequate economies of scale, but enjoy government protection in the form of quantity restrictions on imports of cement. It has been predicted that when AFTA commitments are implemented in 2008, quantitative restrictions in most of these sectors will need to be abolished and as a result, significant impact from foreign competition may be felt in the cement and roof panel sectors (CPI & UNDP 2006). These sectors will need to become more competitive. Various policy options include promoting larger sized production facilities; adopting standards, regulations and quality control for building materials to ensure eligibility on international markets; investing in research and development to find niche products; investing in infrastructure development for transit services to allow cheaper in-country transit of domestically-produced cement; and domestic industry-friendly government procurement policies (UNIDO & MoI 2003).

1.4 An outline of environmental concerns in the hydropower, mining and construction materials sectors

The hydropower, mining and construction materials sectors can all be viewed as large 'ecological footprint' sectors – that is, they all have substantial impacts on the natural environment because of their use and reliance upon natural resources. The Lao PDR National Environmental Performance Assessment (EPA) Report (STEA & UNEP 2006) provides a base for identifying key environmental concerns in these three sectors in the context of the current state of the country's natural resources, and developing indicators of increasing pressures, the basic assumption being that with increased trade

and growth in these sectors, environmental impacts will also increase. The extent of the impact will be determined by the policy and regulatory framework in which increased trade takes place, in order to accentuate the opportunities and mitigate potential negative environmental impacts.

The table shown in Annex 1 was developed using the National EPA report, and highlights the following key concerns, which will be analyzed in more detail in Section 3 of this paper:

- Impacts on the forest resources of Lao PDR include the flooding of large forested areas for hydropower dams, clearing for mining operations and clearing of forests for access and essential infrastructure improvements to support the development of these industries.
- Impacts on water resources, in particular the hydropower effects on natural flows and the potential of mining operations to pollute clean water systems with hazardous waste (e.g., cyanide), wastewater or sediment.
- Impacts on biodiversity including fisheries resources, which can be impacted severely by hydropower and mining operations through the destruction of habitats and pollution of water supplies.
- The effects of climate change which will be an increasing concern in the future. All three sectors have the ability to minimize their impact. Hydropower and the construction material sectors are seen to possibly contribute towards stabilizing the issue in the years to come.

1.5 An outline of the policy and regulatory framework relevant for the hydropower, mining and construction materials sectors

The above concerns can be mitigated and even avoided through the development and successful implementation of constructive policy and regulations. It is therefore important that trade decision-makers are aware of which frameworks exist, how effective they are in addressing key environmental concerns, and more importantly, how they will fare in an open and growing economy, presumably with a much greater potential for environmental impact.

The NGPES (GoL 2004b) is the GoL's umbrella policy document which identifies all future growth and poverty eradication programmes that will be developed and implemented (2004b). The Strategy articulates the following key points in relation to this paper:

- The underlying goal of sustainable growth, coupled with continuous social progress and equity;
- Priority investment and growth sectors including hydropower, mining and construction materials; and
- The vital importance of environmental conservation in achieving long-term sustainable economic growth and poverty eradication.

Through the NGPES, the GoL has recognized that “solutions for environmental conservation have to be founded in the broader context of national development, wherein each sector integrates environmental principles in its policies, programmes and projects” (2004b). However, at this point in time, the GoL is still in the process of crafting a broad environmental policy and assigning a specific institution tasked with ensuring this integration. Currently, there exists an array of complex and fragmented institutional relationships and interrelating policies and regulations. A brief outline is provided in Annex 2, and certain policies and regulations will be discussed in more detail in Sections 2 and 3.

Section 2:

Trade-related environmental impacts and national experiences in improving environmental sustainability in the sectors

As noted in the introduction of this paper, trade and investment can have positive and negative impacts on the natural environment, and in many cases these effects can occur simultaneously. The relationship is complex and the ‘final’ result for any given country will depend on myriad factors, including the

characteristics of the national economy, policy and regulatory frameworks, the strength of institutions and perhaps most importantly the commitment of key decision-makers (Cosbey 2004).

FDI in Lao PDR has been increasing rapidly in recent years, led by growth in priority sectors such as mining, hydropower and construction materials. These sectors, although vital for national economic development, can lead to serious and irreversible environmental problems if developed poorly. At the same time, the GoL is seen to be committed to the integration of environmental principles in its policies and regulations to ensure sustainable development; however, capacity for implementation is still lacking.

2.1 Analysis of the impacts of trade in the hydropower, mining and construction materials sectors on the natural environment

The *Trade and Environment Handbook* (IISD & UNEP 2000) outlines four categories of physical and economic impacts on the environment and development resulting from trade flows and trade liberalization:

1. **Scale effects** - Trade leading to expanded levels of economic activity can have positive impacts in terms of the wealth it creates – increasing the ability to acquire new and more environmentally-friendly technology or increasing environmental concern; and negative impacts in terms of increased scale of production without appropriate control, increased use of natural resources and in turn increased impacts such as the unsustainable use of resources and increased pollution.
2. **Structural effects** - Trade can lead to changes in the composition of an economy, causing it to produce more of the goods it makes well or has in abundance and fewer of the goods it does not. An economy may change so that fewer polluting sectors dominate, labour-intensive industries may provide employment and wealth (see Scale Effect as discussed previously) and the demand for green goods may result in the composition of certain sectors being geared solely towards these markets. On the other hand, if the goods a country produces are more resource-intensive and polluting, and contribute less to development objectives, trade, if guided poorly can have significant adverse impacts on the environment and thereafter on the foundation for sustained economic growth and poverty alleviation.
3. **Product effects** (also known as technology effects) - Traded products themselves can have an effect on the environment. Positive effects may include investment in newer, more efficient and cleaner technology; or the rapid adoption of goods that have less environmental impacts than those being used. Conversely, the product effect can be negative such as sourcing foreign investment that utilizes cheaper but more polluting technology, and facilitates the transfer of poor management practices to the country.
4. **Direct effects** - Direct effects are those environmental impacts caused by the very fact that trade is occurring, for example pollution caused by the transportation of goods.

The above categories, combined with key environmental concerns sourced from the GoL's EPA report (STEPA & UNEP 2006) and listed in Annex 1, provide a useful platform for the analysis of potential impacts of increased liberalization of trade and investment. Using these two frameworks, this Section seeks to analyze some of the more pressing issues and present some examples of where the GoL and the private sector are or could be capturing the environmental potential of foreign direct investment and increased trade.¹

2.1.1 Forests and biodiversity (including fish resources) – the scale effect in the hydropower sector

Lao PDR's forest and biodiversity resources are the centrepiece of the country's development. STEPA & UNEP's EPA (2006) reports that the quantity and quality of natural resources in Lao PDR are on the decline, and that since the 1960s, it is estimated that forest cover has been reduced from around 70 percent to 40 percent of the country's total land surface. Directly correlated to this loss of habitat is the loss of species. The IUCN Red List in 2005 recorded 48 species as vulnerable, 21 as endangered and

¹ While 'direct effects' including impacts associated with transportation do span across these three sectors it was decided that they were of low priority and that this analysis should concentrate on the three remaining categories – scale, structural and product.

12 critically endangered (IUCN 2007). In an attempt to try stabilize this downward trend, the GoL has established a comprehensive network of National Protected Areas (NPAs). Poor management of these NPAs, however, coupled with intensifying pressures on their natural resources, continue to threaten the integrity of ecosystems and the stability of the livelihoods throughout the country (IUCN 2007).

As outlined in Annex 1, the hydropower, mining and construction materials sectors can all have significant impacts on forests and biodiversity, and any increase in scale in these sectors will most likely lead to the increased scale of this impact. New investment in the hydropower sector will significantly increase as plans for the construction of over 40 hydroelectric power facilities by 2020 continue. The environmental impacts of this sector have been well documented in Lao PDR and include the logging of entire valleys, the flooding of areas of high biodiversity and changes to water flows and the impact this can have on resources downstream, such as fish resources and water quality.

A critical point to note is that there are different levels of investor responsibility in this sector. The NHDR (CPI & UNDP 2006) notes that dam projects funded by the World Bank or the Asian Development Bank tend to have more stringent standards for resettlement and mitigation of environmental impacts (see World Commission on Dams at <<http://www.dams.org>>), while those funded by individual countries or private companies, which make up the majority of projects in the sector, are generally lacking the same standards.

The Nam Thuen 2 hydropower project (NT2) is the first attempt in Lao PDR to build mechanisms into the hydropower development process that take into account environment and social considerations. NT2, a World Bank-supported project, will use the Xe Ban Fai, Nam Phit and Nam Katang rivers, and flood 450 square kilometres of the biologically diverse Nakai-Nam Theun NPA. It is estimated that in addition to the almost 13,000 people who will be displaced by the development, a further 790,000 people could be affected by changes in flows and water quality (CPI & UNDP 2006). Clearly, the environmental and social costs of this project are high, but the GoL has made the decision in this case, that the economic potential and high government revenues of USUS\$30 million per annum for the first 10 years and USUS\$110 million per annum between 2020-2034 (World Bank 2007) make it vital that this development goes ahead. At the same time, commitment has been made by the GoL and developers to mitigate and offset these negative impacts.²

One important policy to arise from this project has been the GoL's *National Policy: Environmental and Social Sustainability of the Hydropower Sector in Lao PDR* (2005). The aim of this policy is to help ensure that the principles of social and ecological sustainability are integrated into all large hydropower developments. Another is the establishment of the first Watershed Management Protection Authority in Lao PDR. Yet even this multi-million-dollar project, with years of stakeholder engagement and strong commitments to mitigate serious environmental social issues, is seen by many as falling short of meeting some of its key promises. A February 2007 report prepared by the International Environmental and Social Panel of Experts reveals that not all Government, Nam Theun 2 Power Company personnel and contractors share the same conservation goals for NPAs, nor do they share an understanding of the importance of watershed protection (Mcdowell, Scudder & Talbot 2007). This difference in opinions has led to issues such as delays in resettlement activities, uncertainty surrounding allocated village forests reserves, and environmental degradation caused by poor construction practices. In addition, it has been reported that livelihood restoration programs have yet to effectively begin and face significant time and budget constraints (IR 2007).

The above example highlights two important points for consideration in the event of a substantial increase of hydropower development in Lao PDR in the coming years:

- Further efforts will have to be made to ensure that dams are supported by bilateral or private investment, and have undergone rigorous cost-benefit and environmental and social impact assessments. If approved, dam projects must have appropriate environmental and social safeguards in place. In addition, appropriate documents and strategies need to be disclosed to the public.

² Numerous assessments and reports detailing lessons learned have been produced by NGOs and others. Many can be found on the website of the International Rivers Network (www.irn.org).

- Once environmental and social commitments have been made, capacity and commitment at all levels must be continuously monitored in order to ensure implementation.

2.1.2 Water pollution and land contamination (water pollution and hazardous waste) – the structural and product (or technology) effects

New investment from abroad can bring new skills, knowledge, methods and technologies, which in turn can have positive influences on developing countries, for example foreign investment may bring with it “state-of-the-art” pollution control management systems. FDI, if not managed appropriately, can also have a negative impact on the country, whereby foreign companies move to countries with less stringent environmental standards and in turn exploit the industry, for example by utilizing cheap, outdated polluting technologies and practices.

Lao PDR has abundant and high quality water resources that have been highlighted as key to the country’s development. However, as investment in water dependant sectors grows, so too will competing interests and pressures on these resources. A key risk to water quality in the mining sector is the use and management of cyanide, the disposal of slag and the tertiary treatment of water. The NHDR (CPI & UNDP 2006) reported that in 2005, a mining company mishandled and spilled cyanide, which contaminated a water stream, killing fish and affecting the health of some villagers, and that Oxiana, operator of the Sepon gold and copper mine, reported an increase in level 2 and 3 incidents³ in 2005 (Oxiana 2006). While these incidents are a concern, it is encouraging that the second example was reported in the public domain, a practice common now in developed countries but less so in developing economies. With the mining sector set to grow rapidly over the next few years, it is of the utmost importance that the best technology and management practices be encouraged and/or regulated to minimize these incidents from the outset.

“Corporate Social Responsibility is the continuing commitment by business to contribute to economic development while improving the quality of life of the workforce and their families as well as of the community and society at large”
(Source: WBCSD 1998)

Oxiana Limited views itself as a leader in the mining sector. It has portrayed a commitment to Corporate Social Responsibility (CSR). The company believes that to achieve its corporate growth targets, it needs to operate according to the principles of sustainable development; its guiding principle is to develop mineral deposits in a manner that is financially sound, while being environmentally and socially responsible. To ensure it lives up to this principle, the company runs programs designed to maximize benefits and minimize impacts, including the \$500,000 Sepon Community Trust Fund to share the benefits of its operations with the community, and environmental monitoring and rehabilitation seeking to go beyond compliance at its site. In addition, Oxiana openly reports on its performance (using the Global Reporting Initiative framework - see <http://www.globalreporting.org>) not only in the traditional financial sense, but also on its economic contribution to the province and country in which it is operating, its environmental impact and management performance, and its commitment to its stakeholders, including employees and communities.

It should be noted that there many critics of CSR who believe that a great deal of CSR to date has been little more than ‘green-wash’ – a term used to describe companies that publicize their commitment to the environment, but make minimal effort to address these issues. It is therefore important that care be taken to seek out clear assessments on the true performance of CSR companies. Nevertheless, companies that publicly commit to environmental and social best practices are more likely to address concerns in these areas. Analysis of CSR performance and appropriate incentives to attract committed companies may have the potential to provide investment decision makers with an additional tool in ensuring investment in Lao PDR that meets the countries overall socio-economic development goals.

In addition to encouraging companies to raise the bar in environment and social performance, clear investment laws, procedures and coordination mechanisms specifically related to Environmental Impact

³ Oxiana’s sustainability report has an environmental incidents category system, level 2, a localized impact confined within the exploration lease boundary with minimal damage to the environment and level 3, a moderate impact that may extend beyond the exploration lease boundary.

Assessment (EIA) are required to ensure best practice. Over recent years, the integration of EIA requirements across the GoL has been improved through laws such as the *Regulation on Environmental Assessment 2000* (see Annex 3), and has contributed to the capacity building of government institutions to carry out their responsibilities. EIAs are now being completed for most major projects and STEA is working on ways to incorporate these processes into sector policies through Strategic Environment Assessments. There remains however, a missing link in the EIA chain between the approval of an EIA regarding whether it meets the requirements, and the final decision-making process of the project. The mechanism for coordinating a response to such assessments is insufficient, and necessary action needs to be taken to ensure that EIA recommendations are considered, acted upon (either through mitigation measures or disallowing the project altogether) and incorporated into the final decision-making process.

Issues also arise regarding the law on the *Promotion of Foreign Investment 2004*, which although it incorporates many provisions regarding the environment (see Annex 4), there is no specific reference to EIAs. In addition, while STEA has been assigned responsibility for final approval of an EIA (confirmation that an EIA meets the requirements) (see Annex 3), it is not clear if a specific mandate on EIAs has been given to the Committee for Promotion and Management of Investment, which has been assigned overall responsibility for final decisions regarding foreign investment (GoL 2004a). One possible factor stifling progress in this area may be the belief by some that international standards will deter investment, where others would argue that enforcing high standards would mean that only socially and environmentally responsible investment would be attracted to the country and would then contribute to the alleviation of poverty and meet sustainable development priorities (CPI & UNDP 2006). The case study above demonstrates the type of company that can be attracted, even with stringent standards. In fact, companies and industry associations are often interested in playing leading roles in the development of such standards (Johnson 2006).

The latter understanding has been emerging in Lao PDR government policy in recent years. In February 2007, the Committee for Planning and Investment announced an official 'slow down' in mining concession/investment approvals to enable the GoL to build capacity for assessing the credentials of foreign applicants (Pansivongsay 2007). More recently, the Lao PDR Prime Minister announced a moratorium on large land concessions until a more comprehensive strategy could be developed (*Vientiane Times* 2007). In addition, a Ministry of Energy and Mines was established in 2005, which has brought attention to current gaps in the governance of mining investment and development, and is currently drafting a national mining policy with some of the following key recommendations for the development of the mining sector:

- Revisiting investment procedures and EIA processes, including ensuring mechanisms for coordinating a response to EIA recommendations and taking action - either modification or cancellation - as required.
- Increasing efforts to ensure mining laws and laws relating to the environment are applied to all investors, domestic and foreign, in line with international norms (World Bank 2006).
- Strengthening the penalty system to regulate illegal mining activities.
- Building capacity to manage the social and environmental impacts of mining operations, for example STEA has just commenced a project titled Independent Environmental Monitoring and Assessment of Technologies in the Mining Sector in Lao PDR (DISM & STEA 2007).

2.1.3 Climate change: the product (technology) effect

The final environmental impact to be discussed in this paper is climate change. Midway through 2007, the International Panel on Climate Change, prepared a 4th Assessment report summary (IPCC 2007) that highlighted the level of consensus that increased man-made greenhouse gases does in fact contribute to climate change, and warned of its disastrous consequences. Climate change has the potential to severely impact Lao PDR, environmentally, economy and socially. A climate impact study conducted in the southern province of Attapeu revealed that climate change has the potential to bring about floods with greater severity and increased frequency, which in turn has the potential to impact on local communities, including loss of paddy fields, rice stocks, livestock and equipment, as well as disease and housing damage (MWBP 2006). Climate change is an increasingly important regional and

global issue with which the Lao PDR must engage. In recognition of this, the GoL has signed the UN *Framework Convention on Climate Change* and ratified the *Kyoto Protocol*.

Lao PDR has been addressing the issue of climate change through the development of hydropower energy. FDI is contributing to the development of renewable energy technology in the country by helping to facilitate trade liberalization in the energy sector and assist Lao PDRs position as a net exporter of this 'clean' energy in the region. While hydropower has the potential to contribute positively to mitigating climate change, in actual fact it can have the opposite effect if large tracts of forest are cleared for the building of dams, thereby removing carbon sinks. In addition, there are associated carbon emissions from the development of hydropower infrastructure, such as roads and buildings. There is also debate as to whether rotting organic matter in large dam reservoirs will contribute to greenhouse gas emissions (see Annex 1 for further discussion on the impacts of hydropower on the environment).

Lao PDR has the potential to develop and supply regional trading partners with energy-efficient construction materials. The construction materials sector has an impact on climate change in terms of the energy consumed in the production process, and in terms of the energy efficiency of the product itself. Despite encouraging the adoption of international management standards, such as ISO 9000/14000 for certain facilities to ensure better energy efficiency, there is little evidence that FDI is facilitating the wide-scale transfer of technology that allows the production of energy-efficient construction materials (DISM & STEA 2007). Lao PDR could however follow China's lead in the adoption of energy-efficient technologies. The Chinese government considers the adoption of energy-efficient technologies in buildings to be a promising path to ease the expanding energy crisis, with the nation spending up to 45 percent of its total energy on manufacturing and transporting building materials, constructing homes and offices, and heating and cooling structures (Li 2007). The country's latest five-year plan (2006–10) calls for energy savings of 50 percent for new buildings nationwide and up to 65 percent for buildings in four large municipalities (Beijing, Shanghai, Tianjin & Chongqing). In early 2006, the Government issued a design standard for energy conservation to encourage contractors to use energy-efficient materials and adopt energy-saving technologies for heating, cooling, ventilating, and lighting public buildings (Li 2007). With support, Lao PDR could move further into the energy efficient industry.

The Lao PDR *Medium-term Strategy and Action Plan for Industrial Development* (UNIDO & MoIH 2003) outlines the overall need to improve competitiveness of the sector in the wake of regional competition resulting from post-2008 AFTA implementation. It recommends exploring niche opportunities through research and development, using donor direct investment and adopting norms and standards for specific building materials. As explained above, demand for energy-efficient materials in China is on the rise. If trade liberalization pushes Lao PDR to improve the competitiveness of the construction materials industry, one example of an emerging niche is the demand for green building materials from an energy-conscious China. By encouraging the eco-efficiency of its resources and helping others to do the same, Lao PDR has the potential to expand its economy, and at the same time conserve its natural resource base.

Section 3:

Conclusions and strategic policy recommendations for the hydropower, mining and construction materials sectors

3.1 Conclusions

To ensure that environmental concerns are best addressed and that opportunities for environmental conservation are realized in the hydropower, mining and construction materials sectors, the following key conclusions can be drawn from this paper:

- The GoL is making a concerted effort to review its FDI policies and practices to ensure that the country benefits economically, socially and environmentally from this investment. However, it also reveals that it is difficult for policy-makers to keep pace with the scale of investment and economic growth in Lao PDR.
- The scale and growth of FDI in Lao PDR should also be viewed within the international context of the increasing demand for resources. Global demand for energy, minerals and construction materials is high, and Lao PDR, being well-endowed with these resources, is in a strong position to accept only the most economic, environmentally and socially beneficial investments for the country.
- A sufficient policy and investment framework needs to be put in place to guide the recent and significant inflows of FDI, which are concentrated in mining and hydropower.
- There has been significant analysis of the development potential for Lao PDR in certain key sectors, such as electricity, mining and construction materials. These sectors are highlighted as models for providing “long-term security and prosperity” for Lao PDR. From a sustainable development perspective, however, the type of large infrastructure development that characterizes these dynamic sectors also brings with it potentially significant environmental concerns. Concerns include:
 - ▶ Depletion of forest resources through the flooding of large forested areas for hydropower dams, clearing for mining operations (including limestone excavation), as well as clearing forest areas for the development of access points and infrastructure to support these industries.
 - ▶ Hydropower operations alter the natural hydrology of an area, particularly by inhibiting natural flows downstream of the dam.
 - ▶ Mining operations have the potential to pollute water systems with hazardous waste (e.g., cyanide), waste-water or sediment.
 - ▶ Mining and hydropower operations can destroy aquatic habitats and pollute water supplies, impacting severely on fish stock preservation and the fishing industry.

3.2 Strategic policy recommendations

Regional approaches to common environmental issues in the hydropower, mining and construction material sectors are vitally important, specifically with respect to the management of Mekong River resources. This paper makes four key recommendations for the hydropower, mining and construction materials sectors to ensure environmental concerns are best addressed, and that opportunities for growth-led environmental conservation are realized:

- **Improve environmental governance at the same pace as current trends of FDI in Lao PDR.**

Improving environmental governance includes developing the commitment of the Government and the private sector to address environmental concerns; strengthen institutional capacity, especially at the provincial and district levels to implement government policies; and ensure better coordination/collaboration between all levels of Lao society.

It is clear that the current governance structures are under pressure from the increase in investment and growth over recent years. Substantial time and resources need to be allocated to strengthening governance to assist in sustainable development, not only in the government but across Lao PDR society.

The critical importance of integrating policy and strategy commitments has been recognised at the highest levels; this recognition needs to continue to be translated into real action on the ground. Of utmost importance is the government’s commitment to ensuring that policies and regulations – and as early as possible, international best practices – are respected by foreign investors, including through improved EIA/SIA. While much effort has been made to integrate these requirements across government and build institutional capacity, there is insufficient clarity and direction on the mechanisms for coordinating a response to the recommendations of such assessments and on the need to ensure that foreign investors are accountable for adhering to appropriate standards.

Government commitment is essential in ensuring that only foreign investors that implement best practices are attracted to Lao PDR. This could include:

- ▶ improving environmental governance in the EIA/SIA and investment process;
- ▶ undertaking further research and analysis on the link between the investment and EIA processes, including an analysis of gaps and current weaknesses;
- ▶ strengthening the process of responding and taking necessary action on EIA recommendations, and clarifying the roles and responsibilities and capacity of relevant government agencies in key policies and laws. One possibility would be to amend the *Law on the Promotion of Foreign Investment* 2004 to better reflect the roles and responsibilities of the CPMI and investor obligations concerning EIA/SIAs; and
- ▶ Further developing leadership within key government agencies in order to increase the awareness of the importance of EIA's/SIAs at all levels.

■ **Build closer regional cooperation on investment to ensure environmental concerns across the region are addressed.**

Continuing to strengthen regional agreements concerning the environmental requirements of foreign direct investment, both from outside and within Asia, is important to ensure sustainable development in the region. To this end, it is recommended that:

- ▶ Lao PDR continue to engage in regional processes through the GMS and ASEAN mechanisms, such as the ASEAN Investment Area Council, the ASEAN Coordinating Committee on Investment, the GMS business forum and various environmental institutional structures, such as the ASEAN Ministerial Meeting on the Environment or the GMS Regional Working Group on the Environment. One possibility may be to establish a regional trade and environmental research and policy network under ASEAN or the GMS consisting of representatives from each member country to further information exchange, collaborative research and strategic policy advice on the issues concerning trade and the environment.
- ▶ The GoL seek further regional cooperation on issues related to trade and the environment through bilateral relationships and continue to incorporate these aspects into bilateral trade agreements.

■ **Facilitate a domestic business environment that attracts responsible business and international best practice.**

Improving implementation of policies and enforcement of regulations creates an environment of certainty which is conducive to attracting investment. While the government plays a lead role in the enforcement of these decisions, the private sector is responsible for adhering to them, and in many instances can raise – or even go beyond - national standards. Attracting those companies that have a proven track record of good practice elsewhere during the initial investment stages can ease the burden on government agencies that are tasked with ensuring the implementation of environment-related policies and regulations. In this light, it is recommended that the government:

- ▶ encourage and, in time, require that companies adopt international best practice codes of conduct and guidelines;
- ▶ provide investment incentives to private companies that are committed to implementing new approaches to managing environmental issues, such as Corporate Social Responsibility that go beyond national standards; and
- ▶ encourage and facilitate more input from the private sector on the development of laws and policy by increasing engagement with associations, such as the Lao Chamber of Commerce and Industry and the Lao Business Forum.

■ **Realize growth-led environmental conservation: green market opportunities.**

Recognizing the environmental opportunities that will result from trade liberalization is vital for the sustainable development of industry in Lao PDR. Identifying these opportunities should be a priority

for government decision-makers, trade negotiators and industry representatives. Green market opportunities should be integrated into current development policies, such as research and development in the construction material sector and niche market creation.

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Annex 1: The state of Lao PDR's natural resources, environmental concerns and pressures caused by the industrial sector

Environmental concerns	State (source: Lao EPA report 2006 and Lao SOE report 2001)	Pressure		
		Hydropower Sector	Mining Sector	Construction Materials Sector
Forest Resources	Currently, forest cover stands at 40 percent, down from 70 percent in the 1940s. While this forest cover remains the highest in the region, the rate of deforestation is rapid and the country currently contains large areas of low-density forest.	Flooding of forested areas.	Clearing of forested areas for mining operations.	Sourcing of timber and clearing for sourcing materials such as limestone; inputs for cement.
Water Resources	Abundant and high-quality water resources coming under increasing pressure from competing interests.	Changes to natural environmental flow; decreased downstream water quality; changes to fisheries resources for food, biodiversity and livelihoods.	Use of water in mining operations; acid mine drainage from mining operations and waste tailings results in pollution of water resources; impact on water sheds; biodiversity.	Use of water in cutting materials and construction production processes.
Fisheries Resources	Fisheries resources are still relatively sound, but captured fisheries have stagnated in recent years.	Hydropower dams change habitats and block migration of certain fish species; changes in flows impact on downstream fisheries.	Water pollution impacts on downstream fisheries; potential reduction of stream flow as water is diverted into mining operations with potential impact to aquatic life.	
Biodiversity	High biodiversity exists and protected areas have been set up, but the loss of biodiversity is increasing.	Flooding of key biodiversity areas; access roads opening up PAs; change in hydrological flow regimes impacts species diversity and richness.	Clearing of biodiversity areas for mining operations; access roads opening up PAs.	Sourcing input materials for construction.

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Land	Large areas of the country's cropland, grassland, woodland and forests are now seriously degraded.	Deforestation, erosion of alluvial plains; landscape change.	Open-cut mining degrades land; pollutants from mining degrade land.	Use of land inputs for construction materials.
Solid Waste Management	Solid waste management is improving (in major centres), however on the whole the management of solid wastes continues to be poor.	Disposal needs of mine tailings and overburden wastes.	Solid waste from mining operations deposited of in surrounding environment.	Increase in construction materials lead to increase waste (off-cuts etc).
Hazardous Waste Management	Hazardous wastes is increasing and limited management facilities exist (only in Vientiane and four secondary towns). In other areas, hazardous waste is deposited of with non-hazardous waste.		Hazardous waste generated by mining operations (e.g., arsenic used in gold mining).	Oil-based solvents, paints and lacquers used in construction present hazards when remainders and unused portions are mixed with solid waste streams; asbestos-based insulation presents human health threat.
Climate Change	Climate change is a global issue, and the state of this problem is outlined in the most recent Intergovernmental Panel on Climate Change, in which the level of concern has been raised significantly.	Deforestation; carbon-free energy production.	Carbon intensive industry – mining operations, transport etc.	Ability to produce energy-efficient construction materials that reduce carbon if energy is sourced from fossil fuels.

Annex 2: Key Institutions, policies and regulations in relation to the environment governing the hydropower, mining and construction material sectors in Lao PDR

	Key National Institutions	Key National Policies and Regulations
Overarching	Ministry of Foreign Affairs	National Growth and Poverty Eradication Strategy 2004
Environment, Natural Resources	Science Technology and Environment Agency Ministry of Agriculture and Forestry Land Management Authority National Environment Committee Environment Protection Fund	National Environmental Strategy 2010-2020 National Biodiversity Strategy and Action Plan to 2020 Forestry Strategy 2020 Power Sector Environment Policy Water Sector Strategy and Action Plan 1999-2004 Environment Protection Law 1999 Regulation on Environment Assessment 2000 Forestry Law 1996 Prime Minister's Decree 164 (1993) establishing national protected areas
Trade, Commerce and Investment	Ministry of Industry and Commerce National Committee for Planning and Investment	Law on the Promotion of Foreign Investment in Lao PDR 2004 Enterprise Law 2005
Hydropower	Ministry of Energy and Mines Lao National Committee on Energy	National Policy – Environmental and Social Sustainability of the Hydropower Sector in Lao PDR (No.561/CPI)
Mining	Ministry of Energy and Mines Director General of Mines (DGM)	Mining policy under development (inputs to this policy supplied by World Bank report 2006) Mining Law 1997 (article 31 of the mining law – EIA) Draft Implementing Rules and Regulations of the Lao PDR Mining Law 1997 (in preparation)
Construction Materials	Ministry of Industry and Commerce	Lao PDR: Medium-Term Strategy and Action Plan for Industrial Development (2003)

Annex 3: Responsibilities for carrying out the Environmental Assessment Law (2000)

Organisation or Entity	Responsibility
Project owners or their consultants	<ul style="list-style-type: none"> - prepares project descriptions (Article 7) - prepares IEE (Article 9) with EMP (Articles 9 and 14) or for ToR for scoping of an EIA (Article 11) - implements the EPMS (Article 14) - monitor and evaluates the project environment (Article 15)
DPRM (Office for Foreign or Domestic Investment Management)	Delegates rights and duties with respect to the mandate and tasks according to paragraph 5, Article 3 of this Regulation including project environment screening and IEE review and approval to the Environmental Management and Monitoring Unit (EMMU) of the concerned ministry. The EMMU retains responsibility for ensuring that the EA process is completed in accordance with this Regulation.
DPRM (Ministries responsible for development projects)	<ul style="list-style-type: none"> - preparing project descriptions for its own project (Article 7) - screens project descriptions for all projects in its sector area of responsibility (Article 8) - prepares or retains a consultant to prepare an IEE for its own projects (Article 9) - reviews and recommends approval of IEE of projects in its sector area of responsibility (Article 10) - prepares and reviews ToR for EIA for its own projects and reviews ToR for other projects in its sector area of responsibility (Article 11) - prepares or retains a consultant to prepare an EIA with an EMP, for its own projects (Article 12) - reviews and approves EMPs for all projects in its sector area of responsibility (Article 10) - monitors and evaluates the project environment for its own projects (Article 15) - Monitors and evaluates the project environment for all projects in its sector area of responsibility (Article 15)
Science, Technology and Environment Agency	<ul style="list-style-type: none"> - finally approves IEE reports (Article 10) - finally approves ToR for EIA (Article 11) - reviews and approves EIA reports and EMPs (Article 13) - coordinates with line agencies for monitoring and evaluation (Article 15) - issues environmental compliance certificates for projects that have satisfactorily completed the EA process (Articles 8, 10 and 13)

Annex 4: Environmental considerations contained within the Law on the Promotion of Foreign Investment (2004)

Article 3 of the Investment law states that foreign investors may invest in all business sectors in the Lao PDR, except in business activities which are detrimental to national security or cause a negative impact on the environment in the present or long term, or are detrimental to health or national traditions.

Article 13(7) obliges foreign investors to protect the environment.

Article 16 (3) of the law promotes those activities that protect the country's environment and biodiversity.