23. PROJECT-WIDE SOCIO-ECONOMIC IMPACTS AND MITIGATION MEASURES

23.1 Introduction

This chapter summarises the findings of Appendix 26, Social Impact Assessment (SIA). The SIA details the studies undertaken for this EIS and dating back more than a decade, predicts the socio-economic effects of the PNG LNG project on its host communities, and makes recommendations by which to mitigate potential social impacts. The recommendations support both the commitments by Esso and matters within the purview of government and other parties for them to consider.

23.2 Assessment Approach

The SIA has predicted impacts via a matrix of valence (positive or negative), nature of impact (direct, indirect or cumulative), duration, extent, and likelihood. This chapter provides a discursive summary of these results for the with–PNG LNG Project case and for the without–PNG LNG Project case.

Methods of prediction included:

- Quantitative and mathematical models.
- The analogue existing oil and gas developments in the same and adjacent environs.
- Professional judgement.

23.3 Social Cultural Context Considerations

The multi-ethnic population of the project area is endemically factionalised. The decade-long exposure of communities to development projects in Kutubu, Gobe, Hides, Kare, Porgera and Moran has created a culture of expectation around benefit streams, and project constituencies jealously guard their resources and aggressively compete with others to maximise gain. Negotiations with non-landowner stakeholders are always precariously balanced as agreements are perceived as no more than pauses in an ongoing process of bargaining.

Moreover, as Arce and Long (2000), like many others, have shown of the developing world generally, the arrival of the new does not necessarily entail the disintegration of the old. Introduced models of due process, institutional arrangements and agreements are always subject to adaptation to reflect local political and economic realities. In this hybrid, western ideological values—of, for example, gender equity or financial transparency—can count for little. At the same time, however, the old ways present a coherent entity, with which outsiders can treat, and a resilience to cope with change.

In Melanesia, the cultural values predicated on secrecy, on the appropriation of politico-jural decision-making by men, and of respect for leadership by inheritance or ‘big-man’ status, all come to bear on introduced arrangements. And in so doing, they can appear to outsiders to subvert the ‘development’ agendas of the developed world. Cultural blueprints come to underwrite commercial bricks and mortar.

In this cultural mix are fundamental differences in patterns of negotiation, understandings and concepts of contract, accident, liability and compensation. The western ideas of ‘contract’ and other business conventions have to interface with discontinuous customary notions of 'agreement'. This calls for continued adaptation and education on the part of all participants. Moreover, financial accountability can also be problematic for local landowner companies and associations. Papua New Guineans have some respect for these grass-roots entities, despite understanding that the proceeds are not always harnessed into projects and services for the entitled recipient communities. Certainly the evidence of the SIA is that accountability of such funds is virtually non-existent.

Notwithstanding, the project area is experiencing an unprecedented acceleration of adjustment by the people to a more western-influenced organisational culture, in which traditional forms of identity have a diminishing influence. There is a widespread perception that 'individualism and self-interest' have flourished at the cost of traditional descent unit solidarity. In part, this is a product of clans and sub-clans no longer functioning in ways that gave rise to their generation, including ritual, warfare and marriage. However, the trend seems likely to be to a more nucleated form of social organisation based on family kinship.

The PNG LNG Project is a large industrial enterprise in a host community that still depends largely on a subsistence economy. The 1998 Gas Project SEIS (PDM, 1998) indicated the changes resulting from the petroleum projects were not so much ideological in nature – fundamental transformations in beliefs and practices – as idiomatic**,** doing the same things for the same reasons but in different ways. In broad terms, therefore, the PNG LNG Project is expected to accelerate the types of change that the resource development has already brought about.

One conclusion of the SIA is that, with or without the PNG LNG Project, there will be little wholesale change in the service infrastructure and capacity of the provincial governments in the next five years. The chains of inefficiency and corruption have to be broken, and the processes of funding and project management radically changed to make the best of those opportunities that this project presents. Certainly, the project landowners have made it clear that a continuation of current modes of benefits and service delivery is undesirable.

23.4 Major Social Challenges

While the SIA details the many social challenges associated with the project, two principal processes merit comment.

23.4.1 The Benefits Sharing Agreement

The Benefits Sharing Agreement is a State responsibility and will set out the basis for government and landowner parties to share royalties, development levies, equity dividends and other PNG LNG Project benefits. The Benefits Sharing Agreement has the potential to directly impact the economic livelihoods of project landowners.

Details of how the government intends to achieve democratic and transparent selection of project landowner representatives to participate in the Benefits Sharing Agreement process, what principle will be used to determine how many representatives participate from each project region, the computation of benefits to be considered, and which vehicle(s) will be used to ensure equitable distribution of benefits to the correct project area landowners, have all still to be decided. The process needs to abide by the following principles:

- Transparency – community consent to and knowledge of all constituent benefits sharing agreement processes.

- Equity – that no project stakeholder constituency, ethnic, gender or generational, is disadvantaged or disempowered by the Benefits Sharing Agreement process.
- Manageable – that representation has a number that can reasonably be assembled at one time or in manageable groups to facilitate negotiation.
- Mandated – that representation reflects, and be publicly seen to reflect, the mandate of the affected and impacted project landowners.

However, while the Benefits Sharing Agreement is the cornerstone for social development in the project area over the next 30 years, adherence to these principles is likely to be encumbered by the inter-ethnic baggage of both pre-and post-colonial relations in the region.

The Benefits Sharing Agreement is discussed further in Section 23.11.1, Project Landowner Identification and the Benefits Sharing Agreement.

23.4.2 Involuntary Resettlement

As detailed in the SIA and discussed further in Section 23.9, Agriculture, Fisheries, Forestry and Subsistence, there will be the need for both (a) physical relocation of some landowners, mainly in the Huli region, because of the construction of the Hides Gas Conditioning Plant, and pipeline ROW, and perhaps also the Komo airstrip; and (b) livelihood restoration as a consequence of the economic displacement in the LNG Facilities site area and perhaps also, albeit temporarily, in the Omati River. Whilst the scale of these resettlement processes is, by comparison with neighbouring projects such as Porgera Gold Mine, relatively small, the constituencies are well educated and capable of harnessing international attention to their claimed plight or dissatisfactions. The EIS roadshow (see Section 9.7.3, Landowners and Local Communities) feedback indicates that it is unlikely the affected constituencies will be happy with a one-off compensation and relocation agreement. The cultural practices and understandings of agreements and compensation militate against any easy solution and, most likely, these processes will need to be revisited and monitored on a regular basis.

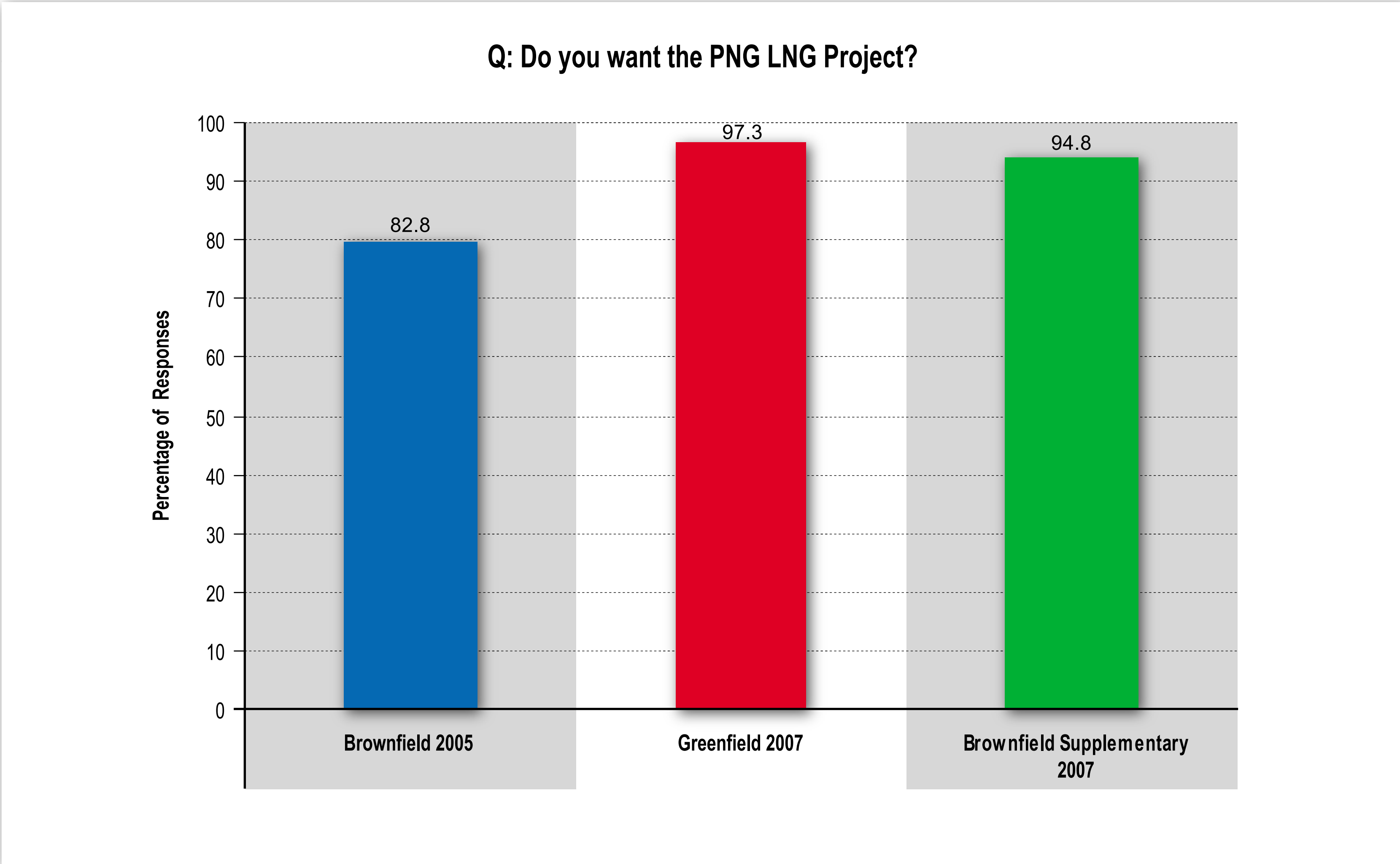
However, these implementation issues should not be allowed to improperly overshadow past experience and current community support for the project. Development projects have crossed similar hurdles before.

23.5 Host Community Support for the Project

Perhaps the single most important finding of the SIA is the support for, and consent to, the PNG LNG Project. Across all the upstream project area, the evidence of the past 18 years has indicated that the impacts of oil and gas production infrastructure on land and people’s use of land have not led the affected people to reconsider their long-standing support for the presence and expansion of the industry:

- The host constituency supports the project.
- The same constituency believes it will improve their life.

The household questionnaire and supplementary surveys are provided as annexures to the SIA, and the results (Figure 23.1) show there is overwhelming support amongst the project area landowners for the project. Whilst the brownfield 2005 SIA for the PNG Gas Project (Enesar, 2005) found project acceptance was at 83%, for the PNG LNG Project support is even higher at 96.5%.



PNG LNG	Job No: 1284 File Name: 1284_09_F23.01_HB	Esso Highlands Limited PNG LNG Project	SIA household survey Q. G4 - project support

Figure No: 23.1

The majority of greenfield respondents to the SIA household and village survey on whether the project would improve their lives (Figure 23.2) clearly have optimistic outlooks. This response may be compared with that of PNG Gas Project respondents, half of whom were ‘unsure’ that the project would bring lifestyle improvements.

23.6 Future Economic Benefits

23.6.1 Beneficiaries

Benefits of the PNG LNG Project will be shared among national government, provincial governments, local-level governments and affected project landowners.

The project will increase the number of landowner beneficiaries over the present petroleum projects by incorporating:

- A new petroleum development licence for parts of the present PRL11 along the route of the pipeline between Hides and PDL2, PDL5 and PDL6. The new petroleum development licence will encompass the Komo catchment area.
- New petroleum development licences for PRL12 and PRL2.
- Land along the pipeline route from Kopi (PL2) to the Omati River Landfall.
- Landowners in the buffer zone around the LNG Facilities site.

The licences required for the project are shown in Figure 8.3.

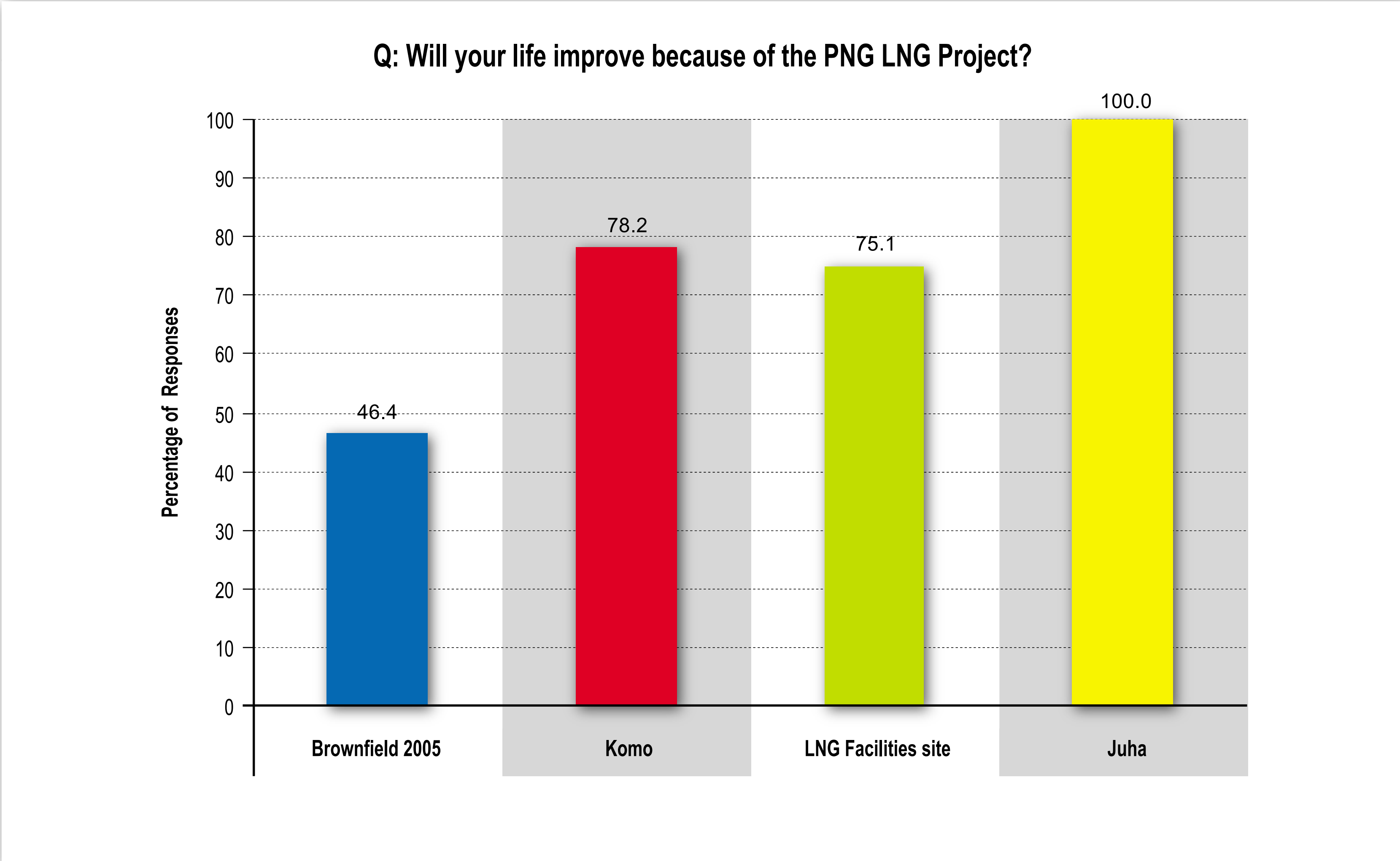
23.6.2 Benefit Streams

As part of the various formal agreements entered into by the stakeholders in resource projects, mechanisms are included to direct some of the financial benefits to the host provinces, local-level governments and landowning communities.

Notwithstanding the discussion in Section 23.4.1, The Benefits Sharing Agreement, a Benefits Sharing Agreement will set out the basis for these parties to share royalties, development levies, equity dividends and other project benefits. It will be negotiated between the state (Minister for Department of Petroleum and Energy, and possibly other relevant government departments), project area landowners, affected local-level governments, and affected provincial governments.

Benefit streams included within the Benefits Sharing Agreement are:

- Royalties: a tax on the value of production paid to the landowners, provincial and local level governments, calculated at a percentage of product sale value.
- Special support grants and development levies: grants paid to provincial and local level governments hosting resource projects. Funds are expected to cover the costs of small infrastructure projects such as water supplies and village feeder roads.
- Equity dividends: payments made to landowners and local level governments as a result of their beneficial interest in the project.



Job No: 1284	Esso Highlands Limited	SIA household survey Q. G7 - positive project impact	Figure No: 23.2
File Name: 1284_09_F23.02_HB	PNG LNG Project		

Additional project benefits may include:

- Local business development: proponent provision of business and employment opportunities. Local interests are represented by landowner companies, who are awarded construction and service contracts.
- Tax Credit Scheme projects: project proponent funds infrastructure projects approved by provincial government, Department of National Planning and Rural Development, Department of Petroleum and Energy and Internal Revenue Commission, which are offset against proponent tax payments. The amount that can be expended in any one year on tax credit projects is 0.75% of assessable income (from 1997 to 2000, this was increased to 2%). Occasional special tax credit provisions have allowed expenditure of an additional 1.25% for specific projects, e.g., road construction and highway emergency repairs.
- Discretionary spending: proponent-funded, usually small-scale programs supporting impacted communities in areas such as education and health.

23.6.3 Without–PNG LNG Project Case

Table 23.1 shows that oil production at Kutubu, Moran and Gobe have resulted in the payment of some K1.3 billion in benefits to provincial and local-level governments and landowners over a period of 16 years. These include cash and in-kind benefits and payments to community investment and future generations trusts. During this period, the value of contracts to landowner companies (see Section 15.5.2, Representative Community Organisations) has been approximately K695 million.

Table 23.1 Benefits summary to local stakeholders at December 2006

Benefit Description	**Total Benefit (Million Kina)**
Provincial Government	
Special support grants	166.8
Infrastructure grants	11.3
Royalties	166
Equity dividends	77
Memorandum of agreement grants	42.6
Development levies (PDL5 only)	65
Subtotal	*528.7*
Local-level Government	
Royalties (PDL5 only)	8.7
Equity dividends (PDL5 only)	0.18
Subtotal	*8.9*
Landowners (Cash)	
Royalties	115.4
Land compensation	7.4
Land rentals	2.9
Equity dividends	99.4
Subtotal	*225.1*

Table 23.1 Benefits summary to local stakeholders at December 2006 (cont'd)

Benefit Description	**Total Benefit (Million Kina)**
Landowners (Non-cash)	
Landowner company loan guarantees	20
Seed capital grants	5.5
Tax credit funded infrastructure	404
Memorandum of agreement grants	55.1
Royalty future generations and infrastructure trusts	49.7
Equity dividends future generations and community investment trusts	26.4
Subtotal	*560.7*
Total	**1,323.4**

The existing oil and gas production operations also provide certain discretionary benefits to project area communities:

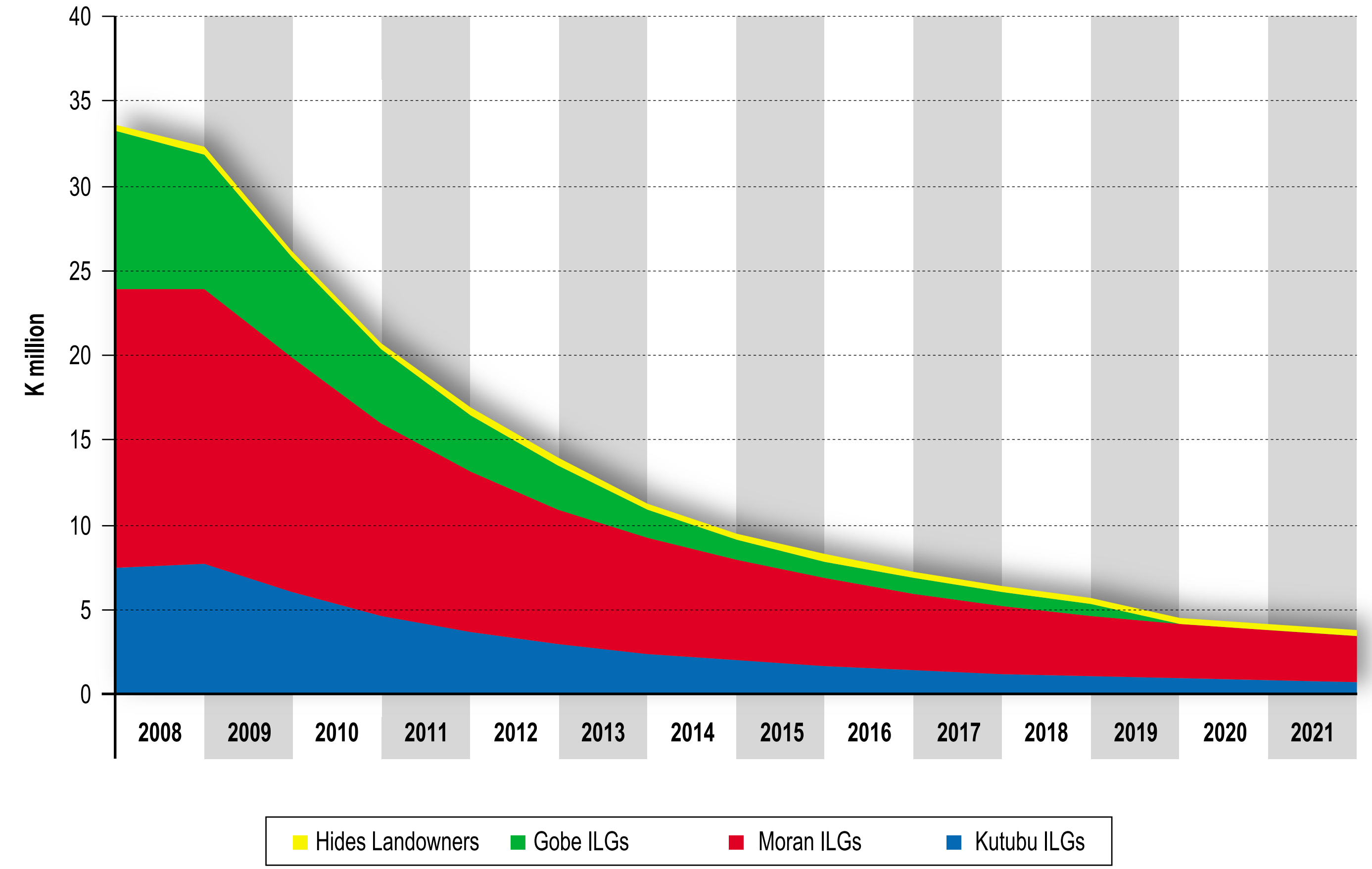
- The Donations Program expends approximately K200,000 annually to support local government service institutions through the strategic donation of relatively small items, for example, medicines and school materials and equipment.
- The Community Assistance Program requires local community committees to prioritise needs and submit projects in which the oil and gas field operator matches in materials, fixtures and fittings the value of the 'sweat equity' contribution of labour, materials, land and similar by communities. Annual expenditure under the Community Assistance Program is currently running at approximately K300,000 per annum.
- The Community Health Program, with the assistance of the Community Development Initiative, provides preventative healthcare, vaccination and treatment (see Section 15.5.3, Non-government Organisations and Section 15.6, Health).

The payments set out in Table 23.1 above and the discretionary spending described above, have accelerated the pace of social transformation and provided a level of exposure to, training for, and adoption of, institutional frameworks for development-oriented activity.

The SIA states that without the project benefit streams already enjoyed, including the flow-on (indirect) benefits of existing projects, much less would have been achieved in respect to general community development and well-being in the same time frame. From this vantage point, the national and local PNG constituencies continue to welcome and encourage exploration, continue to enjoy the benefits of present income streams, and continue to support the efforts of developers to assist community stakeholders.

In Papua New Guinea, oil production is expected to gradually decline to the point where the fields become uneconomic. The P50 (proven and probable reserves) production profile scenario currently foreshadows these closures as follows: South East Mananda, 2011; Gobe Main field, 2015; and South East Gobe, 2020. This will leave just the PDL2, PDL5 and PDL6 fields to produce thereafter.

Figure 23.3 shows the future flow of royalties to the existing landowner beneficiaries from the current portfolio of oil developments.



ILG = Incorporated Land Group

PNG LNG	Job No: 1284	Esso Highlands Limited	Future projected gross oil project royalties to existing landowners	Figure No: 23.3
	File Name: 1284_09_F23.03_HB	PNG LNG Project		

Figure 23.4 shows the future flow of royalties and development levies to provincial and local-level governments. They will also receive equity dividends.

Decreasing oil production and the associated increase in operating costs will reduce the petroleum tax receipts of the national government. Future tax has been projected at its historical percentage of wellhead value (22.4%) to total approximately K4,241 million for the period between 2008 and 2022.

In summary, if there is no PNG LNG Project, then the existing oil and gas production will:

- Continue to provide both government and landowner stakeholders with a substantial flow of income (Figure 23.5) with projected total national government revenue at more than K5,600 million, and projected landowners' cash and non-cash benefits total just over K2,950 million for the period 2008 to 2022.
- Continue to provide significant, although declining, tax credits for infrastructure construction and maintenance.
- Provide a certain level of landowner disposable income, and an accumulation of assets for the beneficiaries of future generations and community investment/infrastructure trusts.
- Generate funds that could be applied to improve government capacity to undertake social service delivery and development at the national, provincial and local levels.
- Enable education, employment and experience across all sectors of business management, planning, contracts and operation.

However, as fields decline these benefits will decline with declining petroleum income to project landowners, national and provincial governments. Continued project dependency and a lack of other business will translate into a decline in project area services, road construction and maintenance and disposable income. With no PNG LNG Project, future benefits will diminish to what can be supported by the prudent management of present wealth.

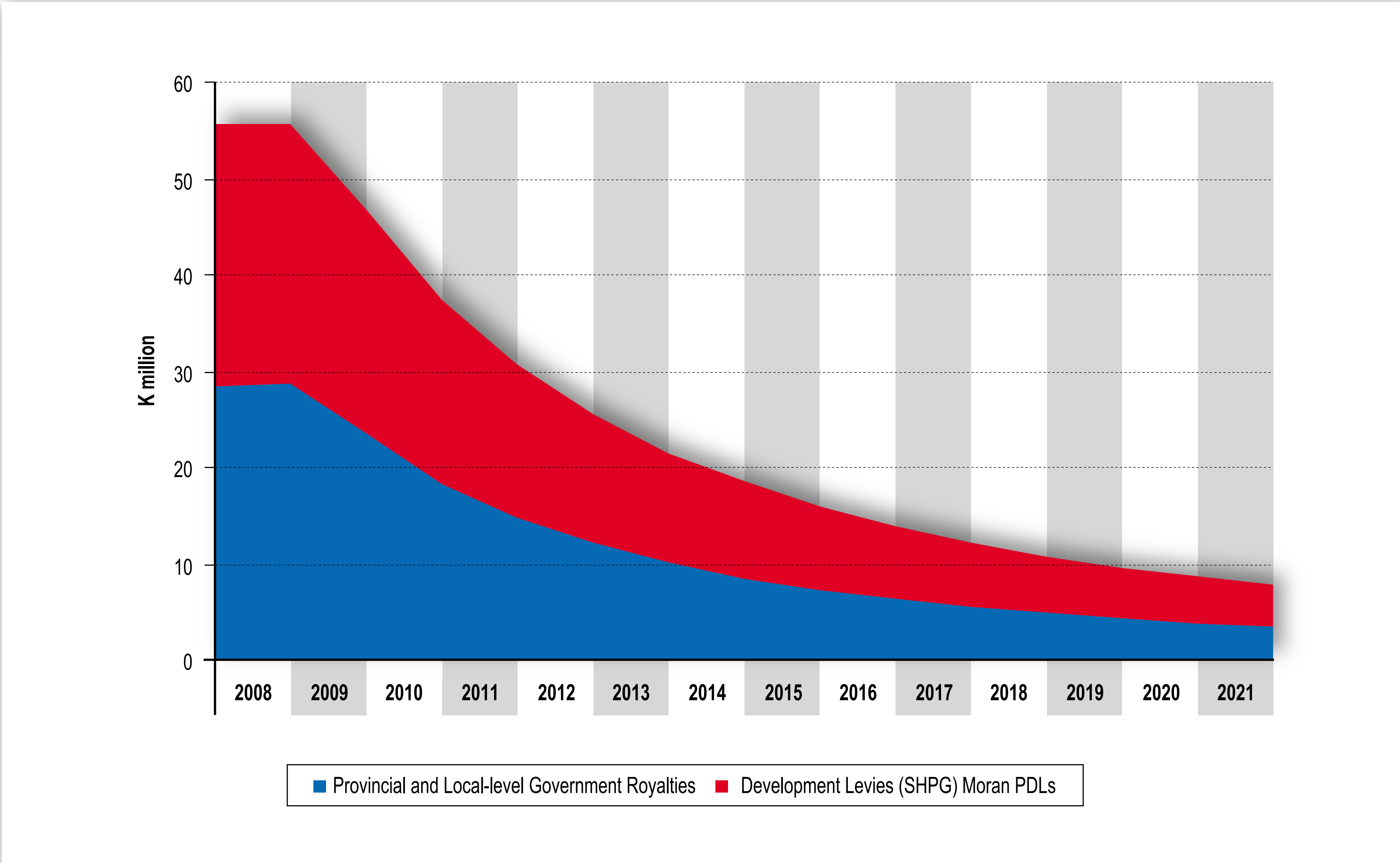
23.6.4 With–PNG LNG Project Case

For the combination of tax, royalty, development levies and equity, the overall benefit of the PNG LNG Project over the previous effort to commercialise gas (PNG Gas Project) is expected to be not less than a multiple of five.

The assumptions and estimates detailed in this section are a summary of the findings of Appendix 26, Social Impact Assessment (SIA) that are based on the assumptions originally made by ACIL Tasman (2008). They have been made in advance of formal negotiations on the Benefits Sharing Agreement and, in themselves, should not be taken to reflect the final outcome of these negotiations.

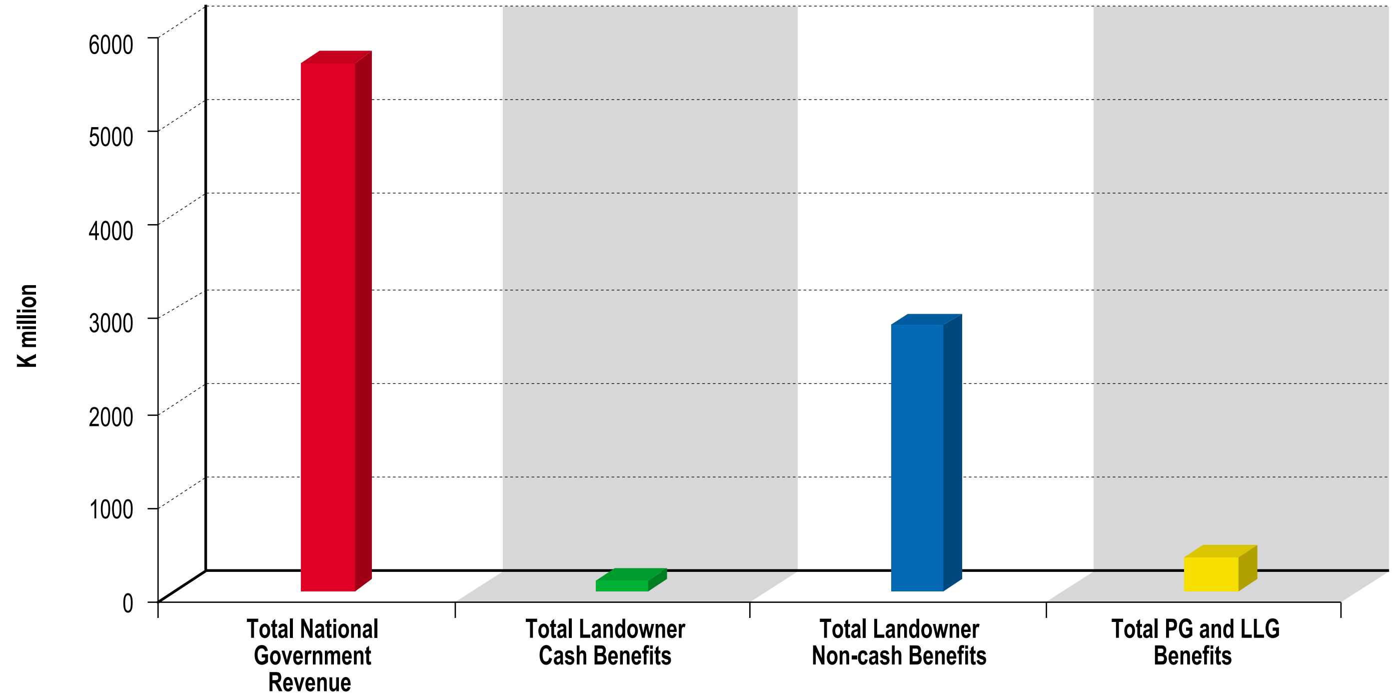
23.6.4.1 Direct Benefits

Table 23.2 summarises the types of benefit streams associated with existing petroleum and gas projects, and which will likely flow from the PNG LNG Project. The ultimate allocation of these revenues will be decided by the benefits sharing agreement that is still to be negotiated between national, provincial and local-level governments and project landowners.



PDL = Petroleum Development Licence
SHPG = Southern Highlands Provincial Government

PNG LNG	Job No: 1284	Esso Highlands Limited	Future projected gross provincial and local-level government oil benefits	Figure No: 23.4
	File Name: 1284_09_F23.04_HB	PNG LNG Project		



PG = Provincial Government
LLG = Local-level Government

PNG LNG	Job No: 1284 File Name: 1284_09_F23.05_HB	Esso Highlands Limited PNG LNG Project	Projected comparative stakeholder benefits from oil projects 2008 to 2022

Figure No: 23.5

Table 23.2 PNG stakeholder benefit streams

Recipient	Source/Benefit Type
National Government	Company taxation
	Salary/wages tax
	Stamp duty/import duties
	Equity dividends
	Business withholding tax
Landowner Cash Receipts	Royalties
	Land compensation
	National wages
	Land rentals
	Equity dividends
	Landowner company dividends Business development seed capital grants
	Scholarships/donations
Landowner Non-cash	Landowner company contracts
	Community infrastructure projects
	Employment and training
Provincial/Local-level Governments	Development levies
	Infrastructure grants
	Royalties
	Equity dividends

The estimate of future benefit streams assumes that benefit sharing will be similar to that of PDL5 and PDL6, where royalties are split 60% to landowners, 30% to provincial governments (Southern Highlands, Western, Gulf and Central) and 10% to local-level governments. The projections also assume that landowner royalties and equity dividend income would be split 40% to cash and 30% each to future generations and community infrastructure trusts respectively. This sharing between cash and trusts is consistent with s. 176 of the *Oil and Gas (Amendment) Act 2001* (No. 21 of 2001). Under these assumptions, the economic benefits (see Section 7.2, Economic Benefits to Papua New Guinea) would be as follows:

- The project is forecast to deliver direct capital investment of some K36 billion in real terms over a 30-year project life. It is projected that this will more than double the gross domestic product of Papua New Guinea to an average of K18.2 billion annually. Average recurrent annual expenditure could be K680 million (ACIL Tasman, 2008). The real significance of the project, however, is its potential to influence the economy indirectly, through flow-on to other industry sectors, investment in physical assets, social assets and enhancing the productivity of economic factors, that is, the multiplier effects.

- The national government will be the major financial beneficiary of the PNG LNG Project. Its principal income streams will be corporate tax, withholding tax, import and stamp duties and salary tax. Total projected national government taxation revenue is K67 billion over a 30-year project life. For relativity, national government tax revenue will rise from less than K200 million during the construction phase to upwards of K2 billion per annum throughout production.

- Royalty payments to provincial governments (30%), local-level governments (10%) and landowners (60%) over a 30-year project life are projected to total K5.3 billion. The landowner share of more than K3.2 billion would effectively be split 40% cash (K1.3 billion) and 30% each (K0.9 billion) to community infrastructure and future generations trusts respectively over the 30-year project life.

Figure 23.6 shows the revenues to provincial government from the existing petroleum production with LNG revenues superimposed.

Under the assumptions described above, the PNG LNG Project is expected to provide the following revenue streams to the project impact area over a 30-year project life:

- Of the provincial governments' benefits total of K7.3 billion, K0.5 billion will be contributed by tax credit expenditure, K1.6 billion by royalties and the largest portion, K5.3 billion, by development levies.
- The future net dividend income projected to be generated from the equity shareholding of the 19% held by national and local level governments and project area landowners could total in the order of K37 billion.
- Development levies are estimated at more than K5.3 billion, a considerable input to the budgets of the Southern Highlands, Gulf, Western and Central provincial and local-level governments, at a rate of approximately K150 to K225 million a year.
- Any estimation of the possible quantum of the gross value of construction contracts that are likely to be awarded to local landowner companies is difficult. Given that the overall capital cost of the PNG LNG Project will be in excess of K35 billion, it would be reasonable to assume that landowner company contracts would be a significant sum.

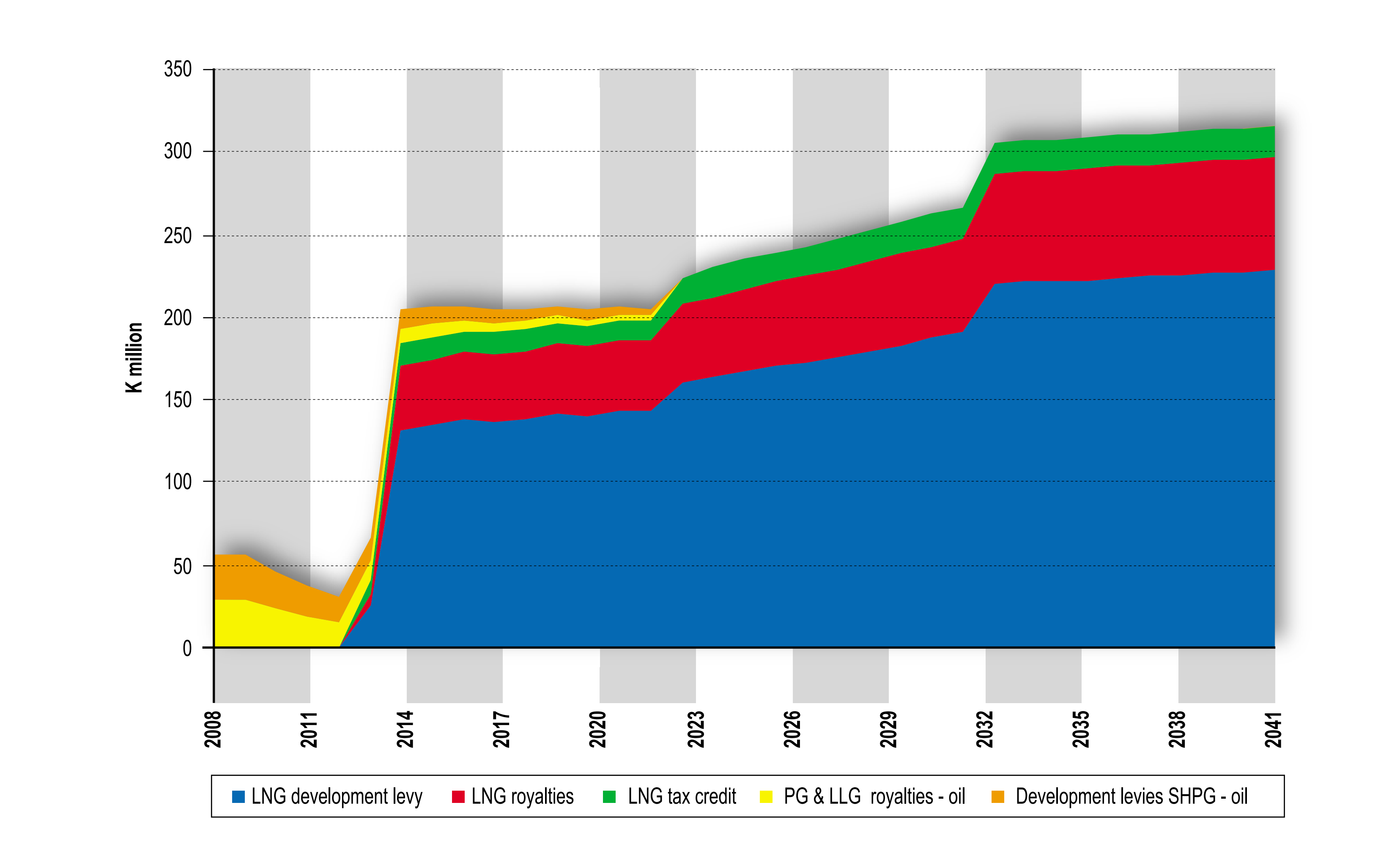
23.6.4.2 Indirect Benefits

The quantum of direct financial and economic benefits of the PNG LNG Project, particularly to the national government, will have significant impacts elsewhere in Papua New Guinea (flow-on effects).

An estimate of the kina value of these multiplier, or flow-on, effects is difficult to undertake given the many assumptions. Principal impacts can be identified as follows:

- **Expenditure of wages** – In the immediate local project impact area and elsewhere in Papua New Guinea, benefits would be expected to flow through the economy from expenditure of wages of PNG LNG Project staff on purchases of food, consumables, vehicles and other assets. It is estimated that during the construction phase, post-tax wages paid to national and expatriate contractor staff will be a combined K2.3 billion per annum.

  Assuming that national employees spent 50% of their disposable income and expatriates 10%, the indirect impact during the construction phase could be expected to be about K250 million per annum. During the operations phase, with lower employee numbers and a greater proportion of national staff, the post-tax earnings of expatriate and national employees has been estimated to be K11 million and K86 million respectively. This represents a significant input into the local economy.



PG = Provincial Government
LLG = Local-level Government
SHPG = Southern Highlands Provincial Government

PNG LNG	Job No: 1284 File Name: 1284_09_F23.06_HB	Esso Highlands Limited PNG LNG Project	Provincial governments' benefits: oil vs LNG

Figure No: 23.6

- **Benefits to business** – Benefits would be expected to extend to suppliers based elsewhere in Papua New Guinea providing goods and services to both the PNG LNG Project and the government, providing employment and dividends.
- **Provincial governments' activities** – The income projected to accrue to provincial governments, as equity dividends and through other direct benefit streams, over the 30-year life of the project would be expected to result in additional discretionary development income per province every year.
- **Improved infrastructure** – Government revenue from the PNG LNG Project would be expected to be applied to develop or upgrade health and education facilities, roads, bridges and communications infrastructure. This would enhance access to remote areas, improve livelihoods and provide opportunities for employment and trading of cash crops.
- **Improved social services** – Income that accrues to landowner equity and royalty future generations and community infrastructure trust funds would be expected to have a positive impact on social services in the project impacted areas.

23.6.4.3 Other Benefits

Employment and training would be expected to be substantial:

- Up to 7,500 persons during the three-to-four-year construction phase, 20% of whom are expected to be full-time nationals; and about 850 persons during operations, the majority (up to 80%) being Papua New Guinea nationals.[1]

Such employment and training will provide the skills and experiences to equip people for employment elsewhere in Papua New Guinea and overseas.

The project will develop a National Content Plan, in order to promote early business opportunities. The main components of the National Content Plan are:

- Workforce development. To create local jobs and train people in construction, trades, technical and professional skills that will be needed during the construction and operation phases of the project.
- Supplier development. To purchase local goods and services, transfer knowledge and skills and increase local suppliers' capability to help them meet global standards and qualify for contracts with the PNG LNG Project and other projects.
- Strategic community investments. To help improve the living standards by supporting infrastructure growth as well as health and education projects, particularly in local communities that will be impacted by the PNG LNG Project.

The following are also envisaged as vehicles to manage the varied and complex social and economic challenges that the project presents:

- Consultation and disclosure plan. Stakeholder, community and public engagement, including grievance mechanism (see also Chapter 9, Stakeholder Engagement).

[1] For a more recent employment estimate, see Section 1.2.6, Project Staffing. The employment numbers used in the SIA are based on the information available at the time the report was written.

- Community health plan. Identification of public and community health priorities for health infrastructure and resources (see Section 23.7, Health).
- Resettlement action plan. Economic displacement and landowner relocation and compensation, including livelihood restoration programs (see Section 23.9, Agriculture, Fisheries, Forestry and Subsistence).

Overall, the SIA contains a total of 51 recommendations relating to social-economic issues (see Appendix 26, Social Impact Assessment).

23.6.5 Opportunities and Risks

The PNG LNG Project's life of three decades presents the opportunity to raise the standard of living of project area communities in a way that only a development of this scale could contemplate.

The project has the further potential to provide impetus for petroleum exploration, infrastructure and income to people and governments, all combining to potentially create the following opportunities for economic and social development:

- Increased and sustained flows of cash and development funds available to local project impact area landowners and their representative local-level governments.
- Development funds, with which to deliver engineering and social infrastructure and services, available to all levels of government.
- Income to landowner future generations and community infrastructure trusts, which could provide a long-term income after project closure or supplement government services.
- Tax revenues to government from increased community wealth and expenditure.
- Discretionary and voluntary spending by the project operator on social programs.
- The advantage that established petroleum processing and export infrastructure gives to the commercialisation of new oil and gas discoveries and the incentive that this gives to further exploration (an important source of income in rural areas of Papua New Guinea).

There are also associated potential negative impacts of increased benefits, which may result from the project:

- At the national level, there may be pressure on exchange rates and diversion of capital and labour away from primary production.
- Lack of revenue management and fiscal diligence by stakeholders may result in lost opportunities to maximise the possible social development benefits of the project.
- Dependence on project income and benefit streams of a project that has a finite life.
- Greater wealth may impact the health and well-being of project impact area communities:
  - Diet may be affected as the result of increased reliance on trade-store goods.
  - Use and levels of prostitution may increase.
  - Greater male absenteeism may occur.
  - Youths may feel that their income flows negate the need to continue their education.
  - Alcohol and drug use may increase.

- Levels of gambling and social disharmony may increase as opportunists move through the benefit-rich villages in search of employment, loans and gifts.

Capitalising on the opportunities presented by the PNG LNG Project faces the following challenges:

- The persistent view among project impact area landowners that project-benefit income is for personal and immediate enjoyment, rather than public/community services and infrastructure or investment for the future.
- The project-dependency of the majority of educational, employment and business benefit. Unless benefits can be deployed into future income-producing ventures, the opportunities provided by the project will, in the long-term, be unsustainable.

23.7 Health

23.7.1 Context and Development Needs

Sections 15.6, Health, and 17.6, Health respectively describe existing upstream and LNG Facilities area community health infrastructure and people's health status.

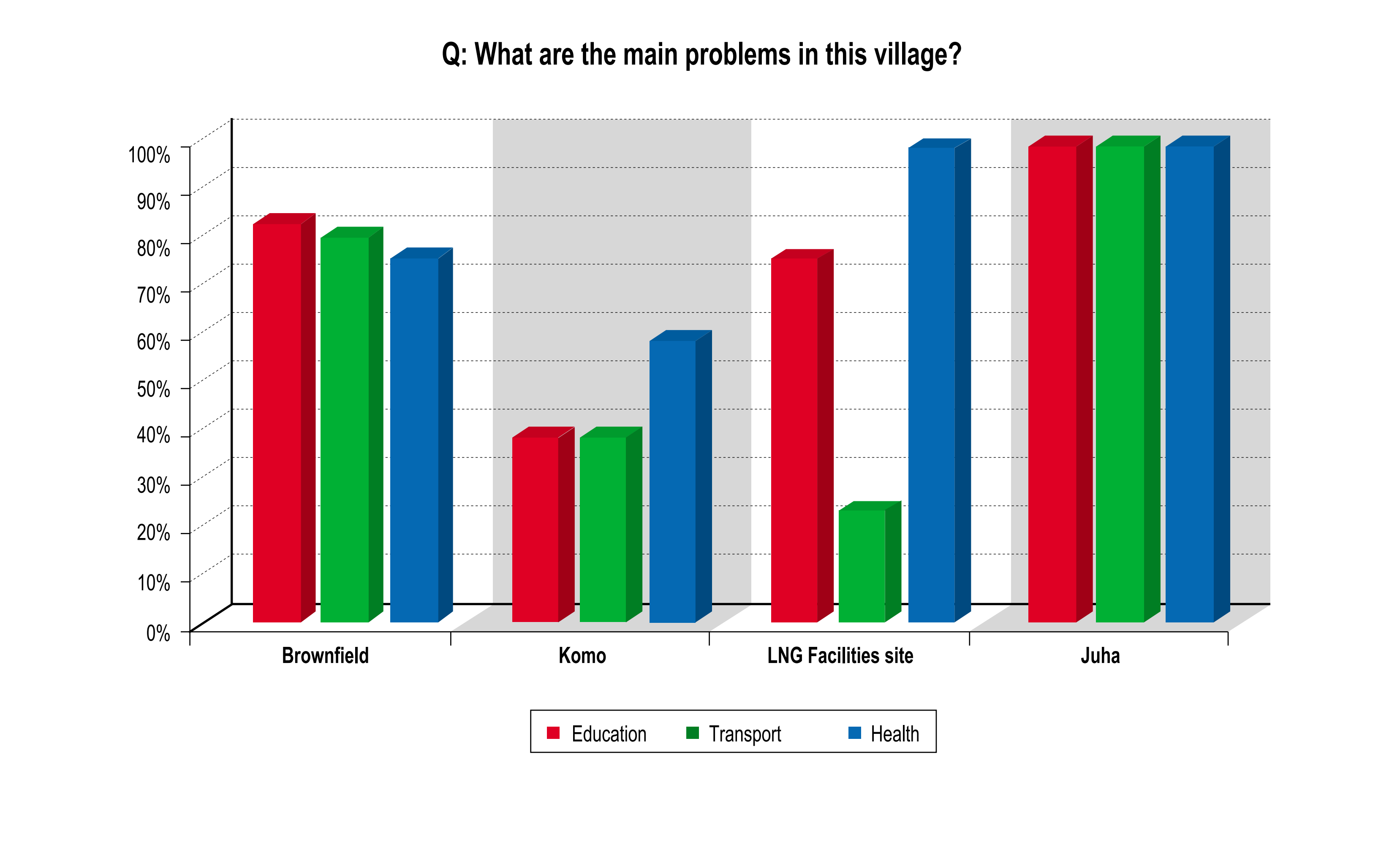
The SIA household surveys showed that health consistently ranked (with education and transport) in the top three concerns raised by project landowners (Figure 23.7).

To date, the existing oil and gas producers have variously:

- Facilitated major health establishments and improvements at Kikori, Tari, Margarima, Ialibu and Pimaga.
- Assisted provincial and local government health operatives.
- Installed rainwater tanks in a number of villages and pumps at Kaipu and Sisibia.
- Initiated mosquito control programs and clinics: mosquito nets and net treatments, ventilated pit latrines, technical and training support for clinical and community health outreach functions.
- Conducted health surveys and drawn up area health plans.
- Conducted numerous outreach clinics and health education presentations.
- Looked after health emergencies, including evacuation for specialist medical treatment.

These measures need to be viewed in the context of the difficult terrain and the funding, training and staffing difficulties faced by government medical services. The Southern Highlands and Gulf provincial governments have come to rely on the oil and gas industry for logistical, technical, material and training support for their own health surveys and services.

The SIA notes that, despite these measures being taken, the health status of the project impact area communities remains substandard.



PNG LNG	Job No: 1284 File Name: 1284_09_F23.07_HB	Esso Highlands Limited PNG LNG Project	SIA village survey Q. I - perceived development needs

Figure No: 23.7

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23.7.2 Negative Aspects of the Existing Situation

The increased mobility, which is an indirect effect of development generally, tends, in the absence of prevention, to spread communicable diseases. In some cases, traditional customs and beliefs, in particular, gender roles and attitudes to condoms and birth control continue to work against health education.

23.7.3 Without–PNG LNG Project Case

No PNG LNG Project and no real changes to infrastructure funding regimes make it likely that the current situation of inadequate staffing, high staff turnover and inadequate supply of medicines, will continue.

In the short term, the current level of services is likely to continue. However, declining oil revenues may eventually reduce service levels in the region.

23.7.4 With–PNG LNG Project Case

The PNG LNG Project is predicted to create the funding preconditions for a major upgrade in government health services, provided that:

- The project benefits regime directs government expenditure towards health.
- A project health unit is established to operate health programs and coordinate with other health service providers.
- There is better access to and within the project impact area for the transport of medical supplies and staff.
- Tax Credit Scheme and discretionary expenditure by the oil and gas industry continues to support public health.
- Real change occurs in staffing levels, medical supplies, and the current poor system of reporting.

On the other hand, the increased mobility and migration, coupled to greater disposable incomes, are among the pre-conditions for communicable diseases and drug-and alcohol-related medical and social problems, especially close to the project facilities.

In relation to HIV/AIDS, the proximity of large construction workforces to Port Moresby and the populous part of Southern Highlands Province poses a high risk of increased infection.

The following risks of the transmission of tuberculosis and other infectious diseases, particularly in the LNG Facilities site environs, are also present:

- Inappropriate design of project accommodation leading to overcrowding and subsequent transmission of infectious respiratory diseases from workers' home environments to the local community.
- Spread of ectoparasites (lice, mites and fleas).
- Increased vehicular traffic along project roadways affecting air quality.
- Temporary crowding of construction sites by job seekers (with their extended family members) and service workers, particularly given the proximity of the LNG Facilities site to Port Moresby.

- The scale of the project requires expatriate workers who may be employed from countries from which they may introduce new strains of tuberculosis.

Recommendations in the SIA specifically relate to water and sanitation improvements, immunisation, HIV/AIDS education and testing, training of health workers, and management of health funds to combat high health worker turnovers and to improve community health facilities.

23.8 Education

23.8.1 Context and Development Needs

Sections 15.7, Education, and 17.7, Education, describe the existing education infrastructure, funding and levels of education attained in upstream and LNG Facilities site project impact area communities respectively.

Baseline primary school education data collected since 1990 in the brownfield project area from Hides to Omati suggests the retention rate (i.e., percentage of children entering school who complete primary education) averaged about 50%, dropping to below 50% in the transition from Grade 6 to 7.

The following circumstances are common throughout the brownfield project impact area:

- Schools close during times of local warfare, as project landowners are fearful of travelling or sending their children to school in enemy areas.
- School buildings are often burnt down in war reprisals.
- Tax-credit funded infrastructures such as school buildings are not staffed and are left to dilapidate or become subject to vandalism.
- School supplies rarely keep pace with demand, and transporting supplies to outlying areas can be problematic.
- Teachers can be absent for long periods and especially when they have to collect their pay from Mendi. If they are not local, they can feel threatened, either physically or as an object of sorcery, and leave the community.
- Children, who receive project benefits, often lose the incentive to continue schooling.

These recurrent problems coexist with a genuine concern of parents to ensure the best education for their children.

However, educational infrastructure has advanced, despite these issues, largely under the initiatives of the existing oil and gas producers, as follows:

- Erecting and upgrading school buildings under the Tax Credit Scheme.
- Supervision and funding of the College of Distance Education program now outsourced to the Community Development Initiative, and support for enrolment in the Flexible Open Distance Education Program.
- Sponsorship (both national and overseas) and vocational training.
- Establishment of The Oil Search Academy to train employees and build capacity.

- Continued financial support to Community Development Initiative, which manages educational programs in brownfields project impact areas.

The Tax Credit Scheme has allowed the existing oil and gas producers to make substantial contributions to education infrastructure in the upstream project area and elsewhere. However, only nationally trained staff can be used to supply teachers; and the Tax Credit Scheme does not allow operators to pay salaries.

Annually, Oil Search Limited provides funds to support tertiary training within their project impact area. Preference is given to those people wishing to attend trade courses, or undertake training in health or education, so these skills can be transferred into the project impact area. In 2007, a total of 489 education sponsorship applications were received (20% from females), of which 123 were approved (19% female).

The Community Development Initiative facilitates an education program run from three satellite centres in Moro, Samberigi and Kikori. The program incorporates village skills training (carpentry, domestic and mechanical skills), the Flexible Open Distance Education scheme, the Certificate in Tertiary & Community Studies course, and support to local schools. At the end of December 2007, 786 students attended the Flexible Open Distance Education scheme which is funded by Oil Search Limited.

The Community Assistance Program, also funded by Oil Search Limited, aids school buildings, educational supplies, water tank projects, and other infrastructure. In the Hides area especially, the Community Assistance Program has encouraged Huli to cluster their houses around services and other amenities.

23.8.2 Negative Aspects of the Existing Situation

Despite the progress, the education system faces difficulties of accessibility, shortages of teachers and supplies and pupil and staff retention.

Certainly, building schools alone (for example under the Tax Credit Scheme) is not enough to bring education to where it is needed.

In some cases, landowner demands incorporated in formal agreements with government and the resources industry have overridden provincial priorities based on population and need. (As is the case with roads and health services, schools are sought-after symbols of modernity and hence community pride.)

Gender inequity in school enrolments and further education remains a major issue. The causes of this imbalance could reflect parental support for male students and the traditional expectation of females to marry and look after children and gardens.

23.8.3 Without–PNG LNG Project Case

The without-project case will not bring changes to infrastructure funding, and so the current situation of high staff turnover, inadequate resources and uneven levels of educational service delivery would continue. As oil revenue declines, the capacity of both the provincial government and Community Development Initiative to sustain even the present level of services will also decline (unless the latter, being directly tied to oil production, could win donor support from other sources).

23.8.4 With–PNG LNG Project Case

The PNG LNG Project presents an opportunity to use the lessons learned from almost two decades of petroleum production, in order to improve public education in the project area. However, the following circumstances need to eventuate:

- The project benefits regime directs expenditure specifically towards education. This is a matter for government.
- A non-government organisation, such as Community Development Initiative (which is the most active in the project area), continues to operate and expand.
- The Tax Credit Scheme and discretionary expenditure by the oil and gas industry continue to support education and training.

23.9 Agriculture, Fisheries, Forestry and Subsistence

Given that both the oil and gas resources are finite and non-renewable, the benefit incomes that project impact area communities receive from their legislated rights to royalties, equity dividends and other sources, will eventually cease. At that time, the only resource that communities can draw upon to derive a cash income to meet family and other expenses is their land, i.e., some form of cash-cropping.

SIA baseline findings from community surveys indicated that one-third to one-half of respondents considered environmental issues to be as important as concerns about delivery of services and development. In this regard, the project's impact on the environment is an issue within the community consciousness. Project landowners perceive their flora and fauna to be in decline; the system is to their way of thinking entropic. Indeed, many of the project landowners hold to the theory that the extraction of oil and gas somehow 'robs the ground of the fertile grease' needed to grow crops. In the brownfield catchments, concerns were expressed about damage, pollution to land, air and waterways, spills and leaks, sandbank build-up (restricted to the Kikori River delta), noise, acid rain and introduction of new pests.

23.9.1 Context and Development Needs

Sections 15.8 and 17.8, Agriculture, Fishing and Hunting, and Agriculture, Fishing and Subsistence describe the existing agriculture, fishing, forestry and subsistence issues in the upstream and LNG Facilities site project area communities, respectively.

The commercialisation of agriculture on a large scale is often promoted as one saviour for the rural population in a post-project era. However, sago and coffee are probably the only crops capable of supporting a sustained agricultural business in the upstream project area.

The transition to a cash economy continues under the impetus of oil and gas industry revenues, but traditional subsistence patterns underpin the livelihoods of the vast majority of the project impact area landowners. In part, this reflects necessity: urban development has been non-existent or pedestrian, trade stores are subject to the vicissitudes of their owners' business acumen, and there are, in any event, too few wage earners in most communities to return a profit to the traders. The SIA notes a symbiotic relationship between the subsistence and exchange economies, so that bride wealth and traditional compensation continue to rely on the customary exchange values of pigs and, in some areas, shells. In many respects, the daily life of people has changed little over the past 50 years.

At present, there is no established agricultural crop in the upstream project impact area that provides a continuing source of cash income for the general population.

Table 23.3 shows cash crop cultivation in the upstream project area. The average for coffee farming is 34.89%, with a high incidence figure of 58.7**%** for Hides respondents. This may reflect the coffee promotional activities of Oil Search Limited and their Community Based Health Care programs.

Table 23.3 Percentage of respondents growing cash crops (catchment-wide averages)

Cash Crop	1998 SIA		2001 SIA			2005 SIA			
	Kutubu	Kikori	Kutubu	Kikori	Gobe	Kutubu	Kikori	Gobe	Hides
Coffee	3.6	0.6	13.0	3.2	26.4	5.8	1.5	16.4	58.7
Food crops	22.9	68.3	26.8	51.2	67.3	55.5	50.0	53.5	71.9
Vanilla	-	-	16.3	10.1	0.9	26.7	22.7	58.8	1.4

Note: units represent the percentage of respondents growing a particular crop.

At the same time, Table 23.3 may be suggesting an inverse relationship between an increase in cash income from project benefit streams and a decrease in cash cropping. The paradox is that, at the very time when landowners have some cash flow for start-up businesses, they choose not to invest in the commercial activity, with which they are most familiar, namely agriculture.

Table 23.4 shows the increase in livestock wealth across the project impact area. This may be a consequence of increased cash income, but it also shows the importance to local economies of exchange and household consumption, rather than income-producing agricultural assets. Certainly, Tables 23.3 and 23.4 both suggest caution against an over-optimistic enthusiasm for agricultural assistance programs. Similar sentiments apply to the potential for commercial fishing, the history of which has been of consistent failure. In the forestry sector, industrial logging takes place in the Gulf and Western provinces, while villagers use small portable sawmills to provide sawn timber for local use.

Table 23.4 Average livestock per households surveyed

Livestock per Household	1998 PNG Gas Project SIA		2001 Petroleum Project SIA (Kutubu to Kikori)			2005 PNG Gas Project SIA (Hides to Omati)			2008 PNG LNG Project SIA	
	Kutubu	Kikori	Kutubu	Kikori	Gobe	Kutubu	Kikori	Gobe	LNG Facilities Site	Juha
Pigs	2.7	0.7	3.9	1.9	4.3	3.6	1.8	4.5	2.8	4.6
Chicken	4.5	3.5	3.4	2.3	5.2	12.3	5.3	11.6	6.6	4.4
Cattle	No data	No data	0.0	1.2	4.3	0.0	1.8	9.0	0.4	0.0

23.9.2 Negative Aspects of the Existing Situation

Three aspects of the agriculture, fisheries, forestry and subsistence sector merit comment:

- The 1998 PNG Gas Project social and economic impact study (PDM, 1998) noted the need for major improvements in support services: feed and seed supply, training inputs, transport, marketing, banking and developer–government coordination.

- The road network beyond the immediate environs of the oil and gas infrastructure continues to decline. For example, the iron bridge to Koroba is in disrepair, and the road has been eroded to the point of being almost impassable at various locations.
- The limited availability of banking facilities across the project area is a further impediment to development.

23.9.3 Without–PNG LNG Project Case

Any agrarian development in the project impact area seems closely tied to an improved road network and its radial effects on banking, telecommunications, power, travel and income streams. The nearly completed government road to the east of the project area (linking Mendi to Kikori via Kagua, Erave and Samberigi) could help rural development in the road's catchment, but it will need to be maintained.

23.9.4 With–PNG LNG Project Case

The PNG LNG Project will provide opportunities to increase food and timber production by:

- Stimulating local demand.
- Improving market access.

The present petroleum industry provides a large local market for agricultural and livestock produce, fish and crustaceans. This market has not been effectively exploited in the past. However, the project's workforce and potentially high local wages could provide an opportunity for increased sales of local agricultural produce and fish, provided that the produce is surplus to subsistence requirements, and farmed specifically for this purpose.

Rough-sawn and dressed timber could potentially supply the project for houses and facilities, as well as Community Assistance Program and Tax Credit Scheme projects. In the regional context, this logging will be small-scale and selective and in no way comparable to the industrial-scale forestry practised in the Lower Kikori River catchment.

The potential for the PNG LNG Project to enable forestry access by others for non-project-related purposes is low (see Section 24.3.1, Forestry).

On the other hand, an increased reliance on the cash economy will tend to cause traditional agricultural skills to be lost. Whether this risk can be offset by developing diversified agricultural and animal husbandry skills depends on local participation to a degree that previous rural development programs in PNG have not achieved.

The project will be located in an area that overlaps considerably, but not entirely, with the area impacted for nearly twenty years by the existing petroleum developments. Many of the proposed pipelines, roads, access tracks and processing facilities for the project will occupy or be built close to the same land footprint used by these existing projects. Added to this will be the greenfield increments at Juha (after 10 years), of pipelines from Kopi to Omati, and of the LNG Facilities at Caution Bay.

Thus the great majority of project area landowners already know how a petroleum project affects their land, resources and livelihood. Even in the remote greenfield area of Juha, the inhabitants have experienced intermittent seismic exploration and drilling since 1982.

Some landowners, mainly in the Huli catchment of Hides, will have their use and access to traditional land restricted for the duration of the project. Of these, very few will require involuntary resettlement, while others will lose access to a small portion of their land.

Prior to construction, a resettlement action plan will detail the areas to be accessed, current use, predicted impacts, numbers of houses likely to be directly and indirectly affected and compensation packages.

The majority of landowners likely to require resettlement are in the environs of the proposed Hides Gas Conditioning Plant, around the Komo airstrip, and along the section of ROW between Idauwi and Homa. Current estimates are that there may be some 30 to 50 structures involved.

The affected project landowners are protected by the provisions of the *Oil and Gas Act,* which ensures adequate and fair compensation for land that is accessed or acquired. These provisions are overseen by the PNG Government agencies of the Department of Petroleum and Energy and Department of Lands and Physical Planning. Project Community Affairs staff usually oversee the process of compensation, which can include:

- Agreed compensation rates for assets.
- Occupation/deprivation fee (rental) per hectare.
- Initial compensation per hectare.
- Surface damage per hectare.
- Any water and/or episodic water damage, gravel royalties, man-made structures and land improvements.

Table 23.5 indicates the individuals or groups likely to be eligible for compensation by the PNG LNG Project.

Table 23.5 Entitlement matrix

Compensation Type	Oil and Gas Act Reference	Eligible Claimants
Deprivation of use of land	S. 118 (2) (a)	Landowners and land users with rightful, recognised claims to land.
Damage to land surface	S. 118 (2) (b) (e) (i)	Owners of dwellings, fences, houses, and other man-made structures.
Damage to any trees, animals or fish	S. 118 (2) (b) (ii)	Persons recognised as owners of animals, planters of trees or, in the case of riverine fish, villages holding traditional fishing rights in the stretch of river where fish kills occur.
Damage to improvements	S. 118 (3)	Recognised owners of improvements, whether landowners or not.
Severance or reduced access to land	S. 118 (2) (c)	Persons recognised as landowners or land users of the land to which access is reduced.

Table 23.5 Entitlement matrix (cont'd)

Compensation Type	Oil and Gas Act Reference	Eligible Claimants
ROW or easements	S. 118 (2) (d)	Persons recognised as landowners along the ROW or easement.
Any other damage (e.g., water)	S. 118 (2) (e)	In the case of water damage, villagers who habitually use the tainted water source.

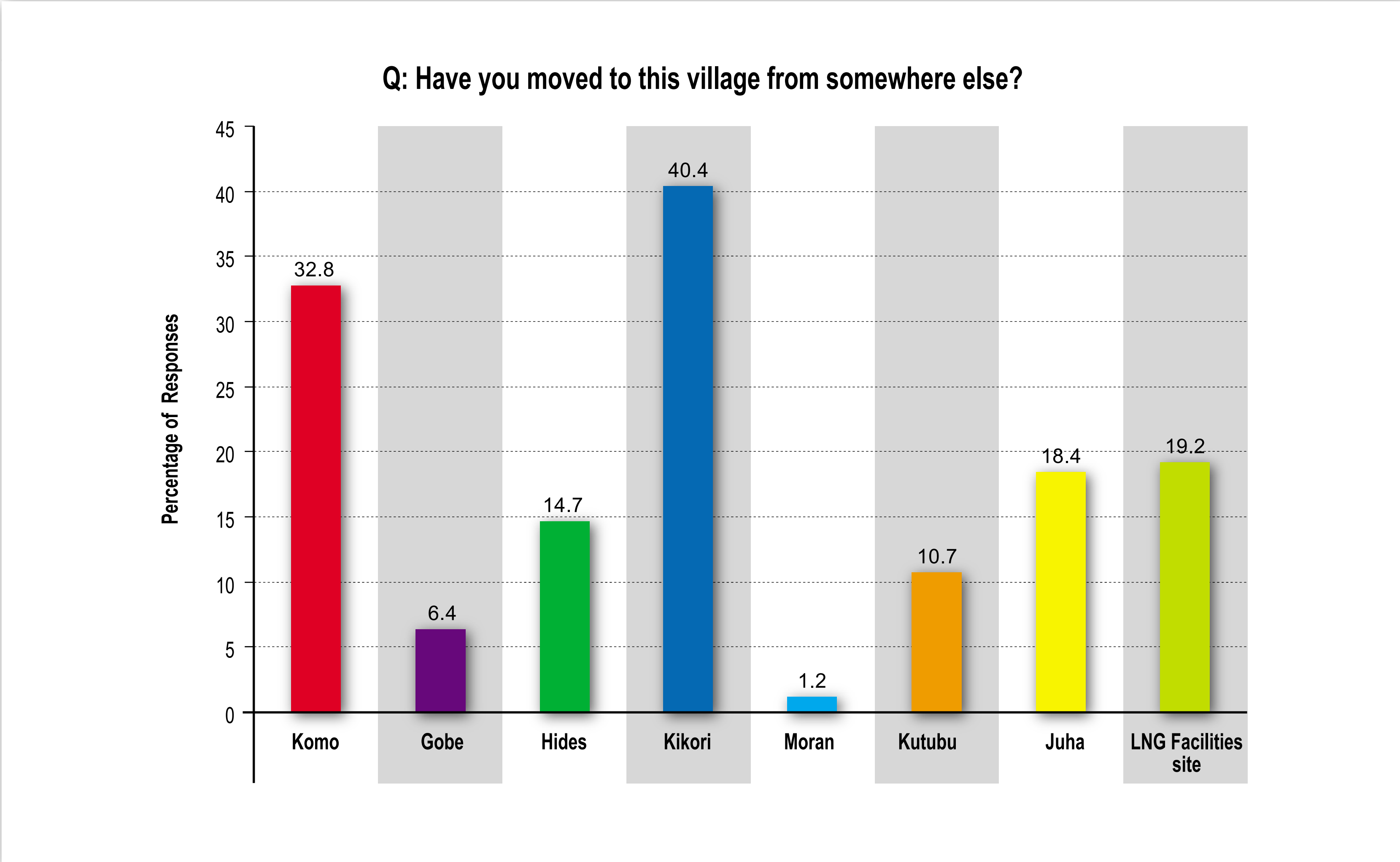
The conclusion of the SIA—that landowners in the Juha to Kutubu catchments will not be adversely affected or suffer intolerable and long-term disadvantage—is based on the fact that almost 20 years of petroleum have not caused people to reject, or reconsider the merits of further development. Certainly dissatisfaction over process and unmet expectations remain important issues for local people, but they do not involve the deprivation of use of land and resources. The ethnic group most impacted by resettlement, the Huli, live in scattered, multiple households. They have generally been satisfied to receive compensation and rents, in part for the intrinsic short-term benefits of cash income, in part because subsistence activities are well able to continue regardless, and in part in the knowledge that, in the post-project era, the land will revert back to customary title and use.

More problematic than the loss of land will be the basis for compensation. Figure 23.8 shows how, in some catchments, a high proportion of project landowners, particularly in Kikori, have moved to their present locations from elsewhere. The Huli catchments averaged a 20% response to the SIA household survey on migration ('Have you moved to this village from somewhere else?'). In effect, this suggests that any resettlement plan in the Huli areas is likely to engender multiple cross-claims for land compensation. This arises because the land tenure system in Huli is complex, and made more so by distinctions between incumbent inhabitants with usufructuary rights and absentee landholders from landowning clans.

It is evident from Figure 23.9 that, in the Komo catchment, there is also a noticeable concern about the impacts of migration back into the area.

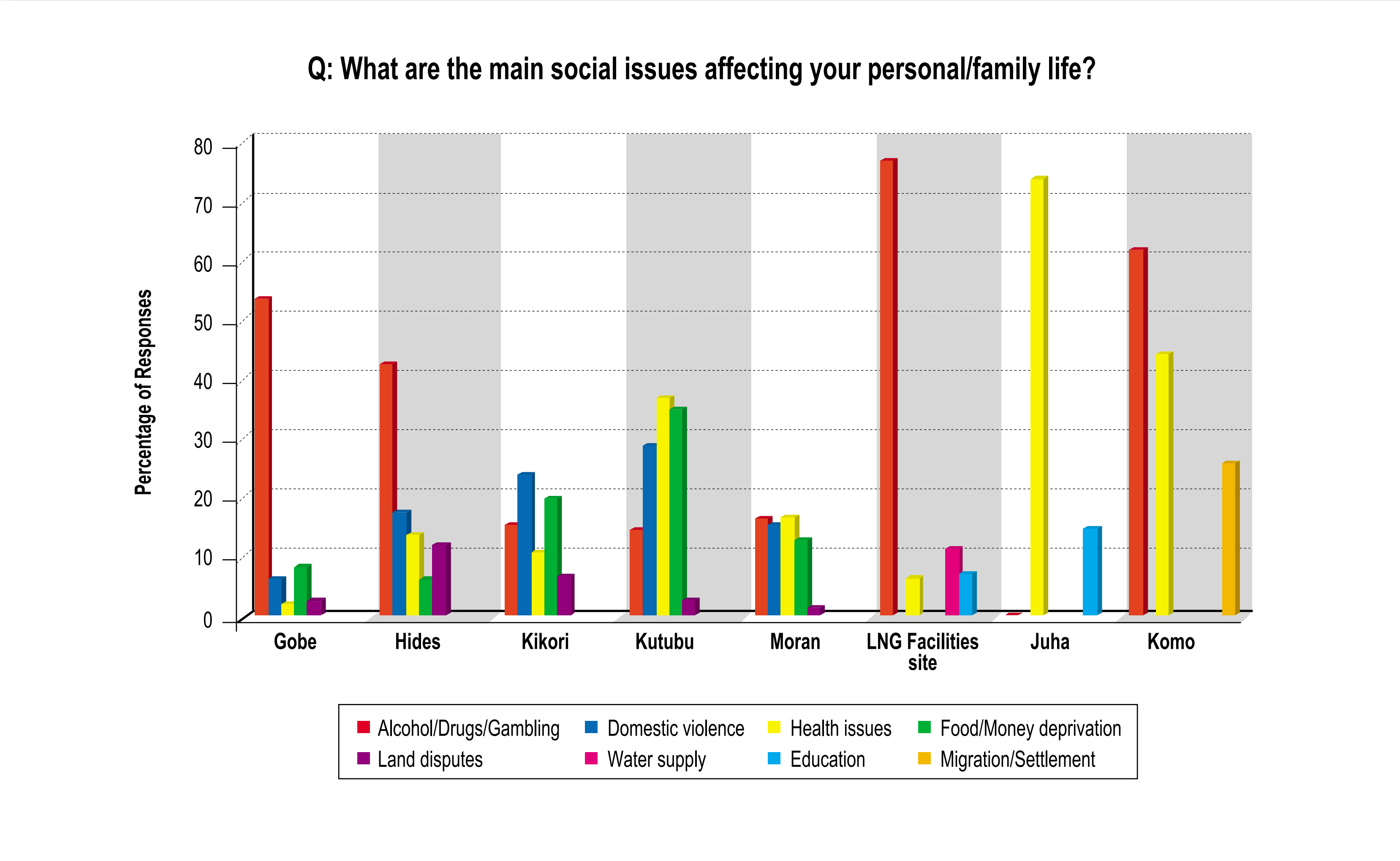
At the LNG Facilities site and surrounding areas, there will be a material impact on the use of and access to resources. Section 17.8, Agriculture, Fishing and Subsistence, has reported the high subsistence and cash value of the reefs and mangroves of Caution Bay between Boera and Papa to villagers and the intensive use by local people of these resources. The Materials Offloading Facility and LNG Jetty will prevent pedestrian and boat travel along the shore and the marine exclusion zones will be an inconvenience to fishing access to reefs. These impacts will be subject to monetary compensation and the community benefits program; however, an arrangement over possible maintenance of access to, and passage between, the mangrove and reefs around the LNG Facilities site will be a subject for negotiation between the operator and the project-affected landowners (see Chapter 21.4, Coral Reef, Seagrass and Mangrove Habitats).

The on-land portion of the LNG Facilities site is located on Crown land and no compensation is required legally. However, social management plans will be developed to address the needs of local project constituencies that are, in part, fashioned as an indirect recognition of the symbolic importance of 'customary land title' in these areas.



PNG LNG	Job No: 1284 File Name: 1284_09_F23.08_HB	Esso Highlands Limited PNG LNG Project	SIA household survey Q. A1 - positive response levels to in-migration

Figure No: 23.8



Job No: 1284	Esso Highlands Limited	SIA hosehold survey Q. I5 - social issues affecting personal/family life	Figure No: 23.9
File Name: 1284_09_F23.09_HB	PNG LNG Project		

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23.10 Transport and Communications

23.10.1 Context and Development Needs

The transport and communications network in the upstream and LNG Facilities site areas are described in Sections 15.9 and 17.9 respectively. Section 17.9 also includes a summary of a road survey conducted at the LNG Facilities site to determine road surface and safety conditions.

In the upstream project area, the oil and gas industry has improved transport infrastructure locally around the production facilities, helped increase landowner mobility and assisted local landowners with their small business ventures by improvements in roads and bridges. Trade store activity has increased and the Tax Credit Scheme enables local landowner company contractors to build and maintain roads.

In the LNG Facilities site area, users cited road condition and reckless driving as the major safety concerns. However, 75% of those questioned did not report an accident in the last six months. Moreover, apart from the narrow road at Baruni, the reported accidents were thought to have been caused by stray animals and criminal behaviour, rather than the state of the road or traffic conditions. The road between the LNG Facilities site and Port Moresby is paved.

Communications development is highly localised and limited to those sites associated with local landowner companies and landowner associations.

Whilst the factors are difficult to quantify, the increased mobility of local landowners, their interaction with other ethnic groups, and more inter-ethnic marriage have all increased cross-cultural links and communications in the general region.

23.10.2 Negative Impacts

Routine surveys of landowner attitudes and opinions have consistently reported the social disadvantages of better access and communications:

- Increased influx of raskols and squatters.
- Failure of governments to maintain roads.
- Roads impassable during conflict in the absence of a police presence to ensure safe passage.
- Prostitution.
- Drug and disease-related problems.

There has been in-migration around public markets, and the establishment of squatter settlements at Moro (cleared in May 2008) and Kikori. The consequences have been manifest in minor levels of crime and dissatisfaction but not, at this time, in serious social disruption or anarchy.

Landowners consistently raise two other issues:

- Claims of an increase in siltation of waterways in the Kikori River delta have been a bone of contention between the petroleum industry and some Lower Kikori River delta villagers for many years. It is said that the crude oil export pipeline has disrupted the sediment regime, making waterways sometimes unnavigable and affecting fishing and fish stocks.[2]
- Concern about litter on roadsides.

23.10.3 Without–PNG LNG Project Case

While there are disagreements over where roads should go, there is ubiquitous general support for more and better-maintained roads across the existing oil and gas development areas. The SIA predicts that the fall in provincial government revenue with the decline of petroleum production will affect road maintenance to the point where a number of roads will become unserviceable. Similarly, the number of serviceable vehicles will also decline, as payments to landowners and landowner companies fall and vehicles can no longer be repaired or replaced.

These, in turn, affect access for private individuals and the delivery of communications and services.

23.10.4 With–PNG LNG Project Case

In broad terms, the PNG LNG Project will add scale and longevity to the life and benefits of the existing oil and gas production industry. Roads, in themselves, are a source of business and employment and have a diverse multiplier effect through the numerous activities and services, which they enable to take place. While there has been no development of ancillary transport industry to date, e.g., maintenance and repair garages, the project offers the opportunity for these to develop. Communications infrastructure is also expected to continue to improve and expand as an indirect result of the project: better road access is expected to make the delivery of communications easier and more widespread, and mobile phone infrastructure, for example, is expected to result from project-required infrastructure (such as repeater towers).

23.10.4.1 Upstream Roads

The main community benefit will be better maintenance of existing public roads, notably to Moro from Mendi and (by a long and indirect route) from Tari.

The SIA notes that the Juha people have for some years been receiving petroleum-related rents and royalties. As far as these potentially vulnerable populations or constituencies are concerned, the road links or road upgrades in the area of Hides, Juha and Tari represent a continuation of what has been happening already as a natural (and much sought after) consequence of past developments. Access to the project road to Juha, however, will be controlled.

The logistics strategy is to spread project construction freight between Port Moresby and Lae (see Chapter 5, Project Logistics). The initial Port Moresby freight will travel the southern logistics route by barge, road or air to construction laydown areas. In contrast, the Lae freight entails use

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[2] To put these claims in context, the Kutubu Crude Oil Export Pipeline has an internal diameter of 500 mm and a concrete weight coat. It runs along the bed of the Kikori River out through the delta. The river has a daily 10% exceedence high flow of more than 4,000 m^3/s, carries an estimated annual sediment load of 2.8 Mt/a and washes down numerous dead trees (NSR, 1990). Deltas are by their nature dynamic landforms and major changes, both erosion and accretion, have been observed within the generally prograding morphology of the Fly and Kikori river deltas (Taylor, 1973; Bird, 1997).

of a northern logistics route along the Highlands Highway continuing westward along the ring-road to Hides.

Upgrades of the Highlands Highway will be necessary: upgrading bridges, widening the road pavement in places, and possibly increasing the curve radius of the more acute bends (see Section 5.2.3.3, Upstream Roadways: Construction and Upgrading).

PNG LNG Project construction freight traffic will average 2 trucks per day, with a peak of up to 7 trucks, which is an increase of nearly 10% over the existing truck traffic of 66 per day.

The project will develop a traffic management plan that will detail signage upgrades, driver training, project-specific speed limits and vehicle speed controllers, and set driving time limits.

Setting the small increase in truck traffic against road upgrades and safety measures suggests that there should be a net benefit to other road users.

23.10.4.2 LNG Facilities Construction Traffic

The main works required to support the construction logistics program includes the upgrade of Lea Lea road between Port Moresby and the LNG Facilities site. The Materials Offloading Facility at the LNG Facilities site will also be developed to receive oversized and/or heavy freight via barge from Port Moresby (see Section 4.2.1.5, Public Road Upgrade from Port Moresby to the LNG Facilities Site and see Figure 17.5).

The first six months of construction will receive seaborne equipment and supplies through the Curtin Brothers offloading facility on Motokea Island and from there via the Lea Lea road (see Figure 17.5). Seaborne traffic will then move to the newly constructed LNG Facilities Materials Offloading Facility in Caution Bay. The existing Lea Lea road will carry locally sourced equipment and materials and bring construction workers to the construction camp at the LNG Facilities site (although a ferry to bring workers from Port Moresby is also being considered).

Construction-stage traffic is expected to peak at about 500 vehicles per day, of which some 70% would be heavy vehicles carrying contractors' earthmoving equipment, materials and prefabricated modules for the construction camp and fuel and supplies. This will increase the current traffic through Baruni by threefold (from 500 to 1,500 vehicle journeys per day) and by eight-fold through the Konebada turn-off (from 140 to 1,140 vehicle journeys per day).

The increased volume of traffic and number of heavy vehicles along the Lea Lea road raises the implications of road capacity, road safety and wear and tear for other road users and people living and working along the existing road (see Section 17.9, Transportation and Communications). In general terms, the upgrade and re-routing of the existing road is intended specifically to accommodate these issues so that, once the peak of construction traffic has passed, the net effect in the long term should be of an inherently safer road with spare traffic capacity. However, the section of the existing road through Baruni – already narrow – cannot be easily widened, nor can the village be bypassed without the complications of acquiring customary land. Design measures to mitigate potential amenity impacts along this section of the route will be investigated during FEED and detailed design. Nonetheless, the passage of some 350 truck journeys to and from the LNG Facilities site may have noise impact for the period of construction, and mitigation and management measures will be detailed in the traffic management plan as part of the project environmental management plan (see discussions of noise impacts in Section 20.9, Noise).

23.10.4.3 LNG Facilities Operations Traffic

The operations workforce will be living in the permanent operations camp and the Materials Offloading Facility will continue to handle large, inbound sea freight. Project-related traffic between the LNG Facilities site and Port Moresby is expected to average from 25 to 30 round trips per day (an increase of around 10%), mainly comprising:

- Workers who commute via bus to plant each day (office and management staff, warehouse staff, camp staff, security, etc.).
- Rotators being bussed from airport to site and back each month.
- Some traffic for special purpose trips.
- Deliveries to site.

23.10.4.4 LNG Facilities: Other Effects

The upgraded Lea Lea road will be open to the public, as is the existing road, and so there will be no restrictions to public access. The consequences are expected to be as follows:

- Roadside trade stores and stalls with temporary and permanent housing will set up along the roadway.
- Casual visits to the area will increase.
- Sex workers and drug, alcohol and gambling dealers are likely to move in.
- There will be an influx of people hoping to obtain employment or maximise their business dealings by residing with kin or *wantoks*.
- Local petty crime and altercations between visitors and resident villagers will increase.

The intrinsic safety of the road will be improved over what now exists, and the increased project freight traffic volumes are not great. On the other hand, non-project traffic will increase and stalls and hawkers will crowd the pavement, and so day-to-day patrolling to enforce safe setbacks may be needed.

23.11 Community Issues

23.11.1 Project Landowner Identification and the Benefit Sharing Agreement

The benefits sharing agreement, managed by the Department of Petroleum and Energy, represents the devolution of project benefits to provincial and local-level governments and to the grass roots owners of project land under customary title. It is a matter for these three constituencies to negotiate, which requires a majority of landowners to accept the underlying model for their representation at the benefits sharing agreement forum. Moreover, the satisfactory conclusion of the agreement has significant implications for the project as a whole. First, it matters to the project execution schedule. Second, it defines what the project will do for the people and on whose land it will be located, and hence goes to the legitimacy of the project as a creator and equitable distributor of wealth.

The SIA expresses the view, based on the numerous social mapping and landowner identification studies carried out for PNG's oil and gas industry, that landowner identification at the level of the individual is best left to an empowered body of project area landowners.

However, land ownership disputes at some of the existing licence areas demonstrate that landowners are wary of accepting adjudications by the Department of Petroleum and Energy on who is and who is not a 'project area landowner'.

The following issues will need to be addressed:

- Early identification of and advice to communities on what the entity receiving the benefit will be: incorporated land groups, clans, individuals, and/or agencies. Most landowners in the brownfield catchments wish to have the benefits distributed on a per capita basis. Landowners in the Juha and the LNG Facilities site greenfield catchments want benefits distributed to clans.
- Identification of an external decision-making process to arbitrate disputes between claimants.
- Principles are required by which to accommodate divergent land tenure systems at the interface of two or more ethnic groups. For example, the Febi do not recognise the Huli genealogical footprint by which Huli clans, who trace an ancestral provenance to Febi in PRL2, wish to be recognised as 'project area landowners'.
- For the benefits sharing agreement, Department of Petroleum and Energy will have to address what limits, if any, there are on Huli claiming project landowner status in multiple licence areas. The social mapping and landowner identification reports for PDL1 (Goldman, 2008a), PRL11 (Goldman, 2008b) and PRL12 (Goldman, 2008c) describe how Huli have traditionally maintained multi-local residences in their father's, mother's and mother's brothers' land. Therefore, the benefits sharing agreement will face Huli claims from more than one petroleum development licence, irrespective of their residential status at the time of such claims (Figure 23.10). This could swell the claimant constituency in any petroleum development licence to more than 30% over the actual number of resident land-users and dilute individual shares in the process. Some 20,000 to 30,000 benefit claims are to be expected on this basis in the Hides, Komo and Angore areas alone.

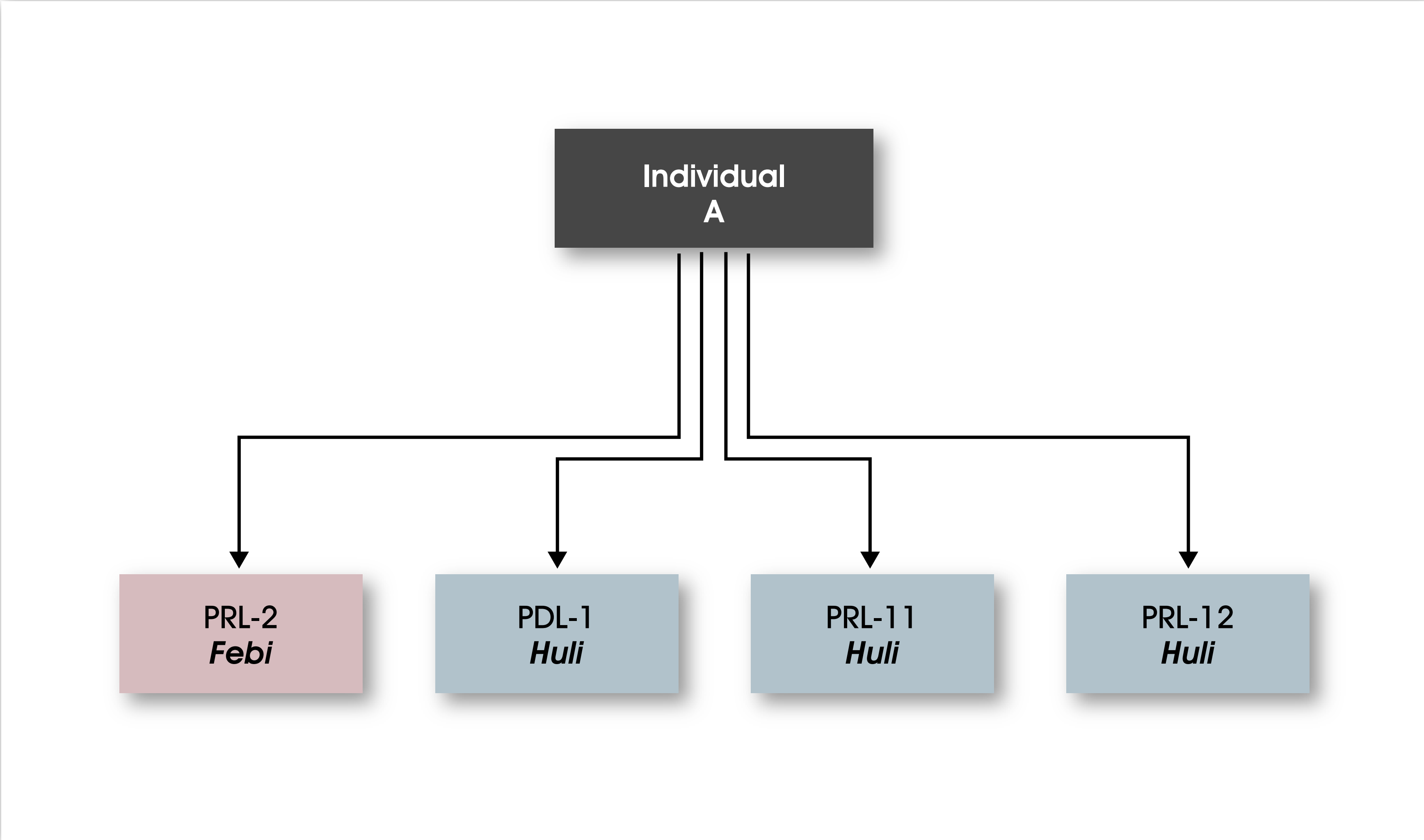
These issues also apply to the LNG Facilities site. Weiner (2008) noted that:

> In a broader sense, Motu and Koitabu people outside the 5 km Project Zone can be expected to vigorously pursue their interests within the Zone based on what they know about past history and migrations. As I discussed in the report, we are aware of the migrations stories of the ancestors of the present-day inhabitants of the so-called Project Zone between Lea Lea and Porebada—these stories also apply to Motu and Koitabu people outside the Project Zone…one conclusion is that different groups will use different principles to assert proprietary rights to land within the Project Zone: some will cite ancestral migrations as giving them a connection to sites …others will cite an established multi-generational history of land use which has now been interpreted as establishing a proprietary control…still others will cite historical land transfers (such as that by Boera to Gunina Clan of Porebada; or of Lea Lea Village to Papa Village Koitabu) as establishing such rights. No one principle will account for all asserted rights to land.

These issues represent significant challenges to negotiated agreements on benefits sharing.

23.11.2 Local Business Development and Participation

Section 129 of the *Oil and Gas (Amendment) Act 2001* (No. 21 of 2001) requires the operator of a petroleum licence to use and purchase locally made goods and services; encourage and assist



PRL = Petroleum Retention Licence
PDL = Petroleum Development Licence

PNG LNG	Job No: 1284	Esso Highlands Limited	Multiple residence and licence benefit claims	Figure No: 23.10
	File Name: 1284_09_F23.10_HB	PNG LNG Project		

PNG citizens who provide goods and services; and make maximum use of PNG contractors and subcontractors, who can provide goods and services to a standard comparable to those provided by other companies.

Planning for local business development will be needed if landowner companies are to take up project opportunities from the start of project construction. In other words, the first tangible cash benefits will accrue years before the start of other production or profit-related benefits, such as royalties and equity dividends. These issues are recognised in Esso's national content plan.

The PNG LNG Project construction will be a significant business opportunity for landowner companies in the project area. It is important that project proponents and these local entities are encouraged to maximise landowner companies' involvement. It is conservatively estimated, on the basis of 1% of a total construction cost of US$10 billion, that local construction contracts could total as much as K300 million during this three- to four-year stage. This represents a considerable local business opportunity.

A number of possibilities could be considered to ensure effective involvement of landowner companies:

a) A single joint venture or consortium (as with the Mananda and Moran model).
b) A number of regional joint ventures or consortia.
c) Contracting individual landowner companies.
d) A combination of (a), (b) and (c).

Ethnicity will constrain cross-cultural arrangements as the population imbalances and traditional enmities from across the project area are unlikely to dissipate in the short term. Equally, the present 'have-nots' will attempt in earnest to ensure they have similar size contracts in security and construction to the present 'haves'.

23.11.3 Government Capacity and Alignment

The SIA notes that landowners consider that government commitments made to them through past projects have not been fulfilled, nor have they been consistently engaged by government agencies. In recognition of this viewpoint, the Department of Petroleum and Energy has, during the time of the SIA, advertised for some 12 field positions to increase their capacity.

The SIA found that agencies such as the Register of Titles and the departments of Environment and Conservation and Petroleum and Energy must necessarily rely on project proponents and operators for transport, security and accommodation while performing in-field duties. These parties will equally be sensitive to ensuring their impartiality is not compromised.

Landowners also want a change in the way that government revenues are distributed in their area. The SIA suggested that:

> ….unless there is immediate change in the practices which govern the relationship between the National Government and the provinces, in planning for and disbursing oil revenue entitlements, most of the future oil and gas revenues may be mismanaged or misappropriated… the Gas Partners will face disruption to their operations from disaffected landowner groups seeking to pressure the company into leveraging the government into meeting its Development Agreement commitments'.

According to the SIA, unwillingness to accept the need for such change on the part of any stakeholder constituency - particularly within government – could present a real risk to project progress. How national government agencies deal with provincial government interests and agendas may also hold the key to successful project development.

Most significantly, as indicated above in Section 23.11.1, Project Landowner Identification and the Benefit Sharing Agreement, the benefits sharing agreement negotiations process will likely prove to be complex, as they will be encumbered by ethnic jealousies and longstanding enmities.

23.11.4 Project Developer and Community Interface

The PNG LNG Project and the existing petroleum production operations have much of their respective footprints in common but have separate community affairs departments. The option exists to maintain this situation through their respective operations, or to merge the functions.

Predisposing the latter are the advantages of a common approach to what are largely the same people. As well, there may be some benefit from an agency of review and arbitration at one remove from day-to-day community affairs operations.

23.11.5 Women's Issues

Much has been written about the place of women both generally in Papua New Guinea cultures and specifically within the politico-legal domain.

As in many traditional cultures, the sexual division of labour and gender ideologies often mean women's roles are anchored to 'domestic' contexts, with men monopolising the politico-legal realms of social action. Education is seen to be less important for women as they are expected to marry and bear children. The distribution of wealth, whether in pigs or money, is directed and controlled largely by males. Women receive financial benefits mostly through male hands, and receive proportionately less than males. From culture to commerce, there has been continuity in the behaviour of males.

The SIA reports that in pre-contact times, there was no ideological challenge by women to this social order. However, there has been a change in women's attitudes in the post-colonial era, with many women finding unacceptable the regime of male financial control.

For a number of years, existing oil and gas producers employed women in community affairs roles to assist the initiation of women's groups. These were essentially church-based but received training in health, hygiene, family planning, leadership, meetings procedures and sewing.

The Kutubu Women's Association is one such successful women's group, and has been operating a business venture in Kutubu selling fast food, dry goods and small artefacts. It acts as a centre for other satellite women's associations.

While efforts have been made to address women's issues, the gender imbalance in education and benefits remains. The SIA found that there is:

- Reluctance by men to support programs empowering women.
- Reluctance to distribute revenue to women with incorporated land group passbooks controlled by males.
- An attitude by men that women's issues are organisationally separate from male politics.

Although a number of women have been elected to the Koroba Town Council, and local landowner companies are, albeit slowly, realising the importance of having women directors, women are still conspicuously absent as signatories to formal development agreements. It has been the past practice of operators and government in the project area to accept the gender status quo of the cultural groups by dealing exclusively with males, despite gender equity principles being enshrined in the PNG Constitution, and in charters and operating principles of operators.

The failure of local level government means that women have lost their most accessible avenue to a greater say in community decisions, even in the matters of social infrastructure for which, at the family level, they are by universal agreement responsible. This situation will be unlikely to change in the short term without a concerted effort by all parties, including male-dominated landowners representatives, who will naturally take exception to outside interference in their affairs.

23.11.6 Vulnerable Populations

Both the Onabasulu (population 900) and Febi (population 350) represent 'vulnerable' groups in the precise sense of inhabiting border areas with the populous Huli (population 130,000 speakers). The Huli are seen to be territorially aggressive and to use their long genealogies and genealogical knowledge to press claims for ever larger areas of land and ancestral priority on these tracts. Their numerical advantage represents a real threat to neighbouring ethnic minorities. The trajectory already witnessed in northern Fasu villages, such as Sisibia, is for the gradual assimilation of Huli language and culture. In one sense, this process is perhaps inevitable and the PNG LNG Project will merely accelerate these transformations through greater exchange, inter-marriage, and cooperation. The Febi, like the Onabasulu before them, have by their own initiative catalysed such changes by inter-marriage with Huli, enrolling in nearby Huli schools and in some cases moving to live in the Huli mainstream.

23.11.7 Consumerism

Successive surveys have revealed a consistent pattern of expenditure of cash benefits and wages on consumables like clothing, footwear, vehicles, electrical goods and leisure. This is partly the result of a lack of repair and maintenance services and partly a reflection of the traditional (and necessary) practice of discarding and replacing artefacts (such as tools and even houses), rather than repairing them.

There is no culture of cash savings and investment. The issue, noted in the SIA, is not so much that landowners are spending on wasteful or conspicuous consumption, but more the opportunity cost of such consumerism on their ability and willingness to direct the same monies to services or investment.

With this type of consumerism come also concerns about waste disposal. Most traditional rubbish was biodegradable; however, the waste of modern consumerism is different and requires different methods of disposal. The waste situation in Porebada is a portent of the problems that will be encountered and it is exacerbated by the tidal flooding that swamps village grounds with rubbish.

The net cash income for an adult project landowner from the PNG LNG Gas Project is estimated to be in the order of K3,000 to K4,000[3] per annum over the life of the project. An income of perhaps some K77 per week for each project landowner will not dramatically affect expenditure; there will merely be a continuation of the patterns already entrenched. The SIA predicts there is unlikely to be any immediate quantum change in levels of household assets, type of household construction, or wholesale changes in diet.

[3] This figure is based on assumptions that may not reflect what eventuates in the various agreement scenarios discussed.

The SIA takes the view that women, in particular, are most likely to invest part of their income provided the benefits sharing agreement ensures they receive an equitable share of these cash benefits. Males are more likely to expend income on bride-wealth, travel, consumption of trade store items, alcohol, tobacco, loans and gifts, compensation payments and gambling.

There will be a sizeable cashed-up constituency of male landowners keen to spend their money in the urban hubs like Lae and Port Moresby that will likely result in increasing short-term male absenteeism, and potentially attract unsociable elements (crime and prostitution), close to the development centres.

Being close to Port Moresby, the villagers of the LNG Facilities site area understandably fear that the mixed attractions of the city will come to them. Figure 23.9 shows high concern about drugs and alcohol, and anxiety about law and order in the future.

23.11.8 Migration, Law and Order

The people of the project impact area have a fear, first expressed at the time of the 1998 PNG Gas Project, of an influx of migrants, with attendant social and ecological disruption. The landowners in Kikori and LNG Facilities site area are particularly concerned about this issue. The SIA predicts a level of in-migration, which will put pressure on already overstretched services and infrastructure.

The SIA reports the perception that unwelcome and unscrupulous people are attracted to resource development areas by the possibility of employment and the possibility of illicitly stealing the newfound wealth of project area people. Not only does this elevate levels of social disruption, but also the ‘outsider’ provenance of raskols makes it difficult to enforce ‘pay back’ principles, due to problems of identification and distance. The perception is that resource projects, through wealth creation, attract undesirables who reside without permission of accredited landholders. The 2005 household survey repeated these findings and concerns; however, it was difficult to match these perceptions to statistical evidence.

The SIA reported migration in the Kikori area northwards to Kopi–Kikori from many of the southerly riverine settlements, leaving many villages with small skeletal populations. These changes may not be entirely due to petroleum project impacts, and may have occurred in any event with development in this region. However, many of the migrants have moved to take advantage of petroleum benefits.

There is no information on social deviance for the project area. However, one simple indicator – violent conflicts between squatters and landholders – has yet to manifest itself. Taking up residence on someone else’s land has drawbacks: reprisals, failure to sustain agriculture, and lack of a supporting network are all serious risks for would-be squatters. After nearly two decades of production, the PNG petroleum industry has yet to experience in-migration and law and order problems on a sufficient scale to create significant social disruption.

Peace Foundation Melanesia (a PNG NGO) produced a report[4] on law and order issues in the Southern Highlands Province. Their stakeholder interview groups identified five main issues: illegal guns, tribal fighting, domestic violence, marijuana use and hold ups.

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[4] See Appendix 26, Social Impact Assessment.

The SIA reported firearms in the project area, of which it estimated that 90% were homemade rifles. Notwithstanding this, the use of such weapons is not an everyday occurrence, and they serve more as a deterrent than a threat to peace.

Alcohol and drugs are identified as major catalysts for social disruption, thought to be caused largely by disaffected unemployed youth with no interest in subsistence agriculture and leisure time in which to indulge in anti-social behaviour.

There will likely be two distinct phases of migration:

- The initial phase will see resettlement closer to major public roads reflecting start-up businesses, and the need of local landowners to avail themselves of local public motor vehicle traffic.
- As infrastructure becomes established in the medium term, landowners will move closer to the townships of Kopi, Kikori, Moro and Nogoli/Komo. They may inter-marry to legitimise their presence or take advantage of kinship and descent ties to maintain both a subsistence and cash economy existence.

23.11.9 Post-project Sustainability

The PNG LNG Project will maintain the truism that one project (in this case the original developments at Hides and Kutubu) makes subsequent projects more likely (which, to date, include Gobe, Southeast Gobe, Agogo/Moran and Mananda). The nominal life of the PNG LNG Project is 30 years, but other gas fields are yet to be developed and indeed probably yet to be discovered in the under-explored north-western sector of the Papua New Guinea Fold Belt. In any event, the day when petroleum production ceases is expected to be many decades into the future.

Meanwhile the communities in areas of existing petroleum production operations have been in transition for nearly two decades. The pace of resource development has led many to accommodate and adapt to new systems of representation and regimes of income, investment and expenditure far removed from those of the pre-resource era. However, PNG society has the tendency to capture and re-form modernising influences into the pre-existing cultural idiom and so in many important respects, less has changed than might appear.

Because so much of the progress is project-dependent, there is concern that in a post-project era, there will be stagnation and possibly regression because of wasted opportunities to capitalise on the advances made to date. This anxiety was expressed by more than 90% of respondents in a previous 2001 SIA industry survey (cited in Appendix 26, Social Impact Assessment) about post-project issues.

The SIA notes that it is easy to pronounce that employment is the ‘magic bullet’ that would solve many social issues and that the proponent should be encouraging non-project dependent industries capable of sustaining themselves in a post-project phase. However, while the local economy remains based on subsistence farming and fishing, and much of the area is remote with low-density dispersed settlement in the brownfield areas, in the medium-term these objectives face various obstacles:

- The development of a manufacturing-based industry in the brownfields project area capable of servicing the local economies or exporting remains unrealistic in the medium-term.

- Cash-crop agricultural projects will, in the short-term, provide a limited base for business training, but will prove logistically problematic should roads fall into disrepair. Despite years of effort, cash cropping is still localised and small-scale. There is no established agricultural crop in the project area that provides a continuing source of cash income for the population.
- Petroleum-based employment will continue, even in the declining phases of production, and may even increase if satellite fields are developed. However, the majority of the cash contracts are project-linked and in a post-project era, will be likely to dry up.

Importantly, the accumulation of capital is a precondition for turning feasible developments into reality under local ownership. In order for this to happen there needs to be:

- Proper administration of the Future Generations Trust[5].
- Prudent investment so as to provide the financial basis, by which to take advantage of new business opportunities.

23.11.10 Concluding Remarks on Community Issues

The consequences when traditional cultural values meet modern commercial interests, organisations and idioms frequently appear to work contrary to western expectations. For example, the misappropriation of revenues, the male domination of decision-making and the use of profits for personal gain do not align well with the aspirations of outsiders for the social development of the country.

However, such consequences are not necessarily fixed nor are these underpinning practices universally supported within Papua New Guinean society. Women, in particular, want much more to be made of the opportunities that resource projects bring—a view shared by many overseas companies operating in Papua New Guinea and their financiers.

[5] The Future Generations' Trust is a fund to which contributions are made by the resource industry for the benefit of the nation. Payments are made to provincial governments, mining lease landowners and associated landowners on both a direct cash and non-cash benefits basis.